

## ZAMBIA

# Can Financial Incentives Improve the Last-Mile Delivery of Textbooks?

MAY 2020

This study examined how financial incentives to district offices and schools impacted the distribution and availability of textbooks at schools.



Photo courtesy of USAID's Zambia's STEP-Up program



Ninety-one percent of primary schools in Zambia lack textbooks.



Financial incentives may help improve the last-mile delivery of textbooks.

**The Results in Education for All Children (REACH) Trust Fund** supports and disseminates research on the impact of results-based financing on learning outcomes. The EVIDENCE series highlights REACH grants around the world to provide empirical evidence and operational lessons helpful in the design and implementation of successful performance-based programs.

Zambia has invested heavily on education with an allocation of about 20 percent of the government budget, but this investment has not translated into better student learning outcomes in primary education. Among the main reasons for this is the severe shortage of learning materials, particularly textbooks in both English and local languages. A public expenditure review of the Zambian education system has shown that 91 percent of schools lack textbooks and on average five to six pupils share less than one textbook, including textbooks in local languages.<sup>1</sup>

To address this shortage, the REACH Trust Fund provided a grant to investigate the factors related to the availability of textbooks in schools and to evaluate a set of financial incentive mechanisms for improving the last-mile delivery of textbooks. The questions that the research set out to answer were:

- What is the current status of textbook distribution in Zambia and what are the factors that influence their availability?
- Do financial incentives have any impact on textbook distribution and



Photo courtesy of GPE/Carine Durand

*availability? What kind of financing scheme might be effective in improving the last-mile delivery of textbooks?*

- *Does providing information to schools about textbook availability increase the numbers that are available in schools?*

A study was conducted in 2018–2019 with the objective of answering these questions. It focused on textbooks procured for use in Zambian literacy

and English courses for students in grade two in 2016 and grade four in 2018. The study surveyed 243 schools in 27 districts in Zambia that had not received grade four Zambian language literacy course books until July 2019 as a result of the severe resource constraints that they were experiencing. The study used the difference-in-difference estimation methodology to identify the causal links among the factors contributing to availability and delivery of textbooks to schools.



**The textbook distribution practices and timelines vary from year to year, making it difficult for the regional authorities and schools in Zambia to predict how many textbooks they will receive and when.**

## CONTEXT

Since the curriculum was revised in 2014, textbooks have been distributed to schools in several different stages. Publishers deliver the books to the central warehouse of the Ministry of General Education (MoGE) in Lusaka, then the ministry organizes for the books to be delivered first to the Provincial Education Offices (PEOs), then to the District Education Board Secretariats (DEBS), and finally to the schools. The responsibility for the last-mile delivery of textbooks to schools, including providing information on textbook availability, rests with the regional authorities (PEOs and DEBS).

However, the distribution practices and timelines vary from year to year, depending on when the procurement and distribution budget for the MoGE is set by the Ministry of Finance (MoF). This makes it difficult for each PEO, DEBS, and school to predict how many textbooks they will receive

each year and when they will receive them. Therefore, PEOs that have the resources to do so collect their textbooks from the MoGE early and distribute them promptly to their DEBS, whereas resource-constrained PEOs postpone collecting their textbooks from Lusaka until they have secured their distribution budget. Even for the last-mile delivery of textbooks from DEBS to schools, although the official responsibility of textbook delivery is held by the DEBS, the actual practice in most districts has been for the DEBS to ask the schools to collect their books, either from the DEBS offices or from zone-center schools to which DEBS sometimes deliver the books. The DEBS are also responsible for informing schools about what textbooks are available, but how each DEBS does this varies in practice from making an announcement during unrelated workshops or meetings to sending out group phone messages to head teachers.



Photo courtesy of the World Bank

## WHY WAS THIS INTERVENTION CHOSEN?

There are multiple factors that make textbooks scarce in developing countries. These include: (a) poor planning, management, and monitoring of textbook production and distribution; (b) a lack of data on the availability and use of textbooks; (c) an inadequate storage and distribution system.<sup>2</sup>

This study focused on the distribution aspect of textbook supply, in particular, the last-mile delivery of textbooks from regional education offices to schools in Zambia. Specifically, it evaluated the outcomes achieved by using result-based financing (RBF) to try to ensure that textbooks were delivered in a more efficient and timely way. Incentives used in RBF can take a variety of forms including pay for performance (P4P), pay for activities, bonuses,

performance-based fee schedules, or grants.<sup>3</sup> Among these financial incentive schemes, P4P has been studied the most, but the findings regarding its effectiveness have been mixed. A recent review of the effect of P4P in the health sectors of 14 OECD countries concluded that its impact is unclear and attributed some positive program effects to improved monitoring and data recording rather than to the P4P scheme itself.<sup>4</sup> Several studies have examined the effects of team-based performance pay. One study found that the implementation of team-based performance payments for lower-level public sector workers in the UK had a positive impact on the productivity of small teams but a negative impact on the productivity of large teams.<sup>5/6</sup>

This study evaluated a financial incentive scheme that combined “partial pay for activities” and “pay for performance” to improve the system for distributing textbooks in Zambia. The incentives, which consisted of pre-determined bonuses, were given to incentivize agents who were already a part of the last-mile delivery of textbooks—the DEBS offices and schools. The incentive schemes were designed to preclude the possibility of any cream-skimming in the DEBS offices by giving them larger bonuses if they served hard-to-reach clients (schools in remote locations). The study also evaluated whether giving incentives to schools or to DEBS was more effective in getting textbooks to schools faster and more efficiently.

Prior to this intervention, no clear procedure existed for informing schools about the availability of textbooks. It was left to the discretion of the staff of the DEBS who sometimes made phone calls to schools or made announcements in unrelated meetings with head teachers or even just posted a notice on their information board. As a result, many schools had no idea if the textbooks were available or not, meaning that the books were often left uncollected and undistributed in the DEBS warehouse or in the zone-center schools. Therefore, in addition to the financial incentives, a new information and communication strategy managed by the MoGE was implemented in all intervention districts.



## HOW DID THE INTERVENTION WORK?

The study evaluated two different incentive schemes to measure their impact on last-mile delivery of textbooks to schools. Scheme 1 provided payments to schools, while Scheme 2 provided payments to the DEBS. Each of the two schemes was implemented in nine randomly selected districts, while another nine districts were selected to be

### Scheme 1

Provided payments to remote schools for collecting textbooks from DEBS Office

### Scheme 2

Provided payments to DEBS for delivering textbooks to schools



Photo courtesy of GPE/Kelley Lynch

the control group. All 27 districts received an upfront grant of 7,800 ZMW (US\$557) to fund the distribution of textbooks.

In Scheme 1, each remote school was awarded an incentive payment of 700 ZMW (US\$50) whenever staff from the school collected its allocation of textbooks from the DEBS office within four weeks after receiving an official notice that they were available. Alternatively, each remote school was awarded an incentive payment of 400 ZMW (US\$28) if the school staff collected the textbooks between four and eight weeks after receiving the official notice.

In Scheme 2, each DEBS was awarded an incentive payment of 325 ZMW (US\$23) for every remote school and 180 ZMW (US\$13) for every non-remote school if the DEBS delivered textbooks to the assigned schools within one month after receiving the textbooks from the MoGE.

During the endline survey, data was collected on textbook availability and distribution for both pre- and post-treatment periods. Pre-treatment distribution was in 2016 (grade two textbooks) and post-treatment was in 2019 (grade four textbooks). The primary survey respondents were the teachers in charge of textbooks, and their answers were cross-checked against relevant MoGE and DEBS data as well as against any textbook records or inventory kept in the schools.

Two different constructs were measured—one for the availability of textbooks and one for the textbook delivery mechanism. The outcome variables for textbook availability were measured by: (a) an indicator of whether a school had received textbooks from DEBS; (b) the textbook-pupil ratio in the school; and (c) an indicator whether schools received the textbooks within one month from when the books were made available by the DEBS. The textbook delivery mechanism captures how the textbooks reach the schools—whether the schools have to collect the books from the DEBS offices or from zone-center schools or whether the DEBS deliver the books to the schools.

The study also examined the role of the new information and communications strategy on textbook availability. The MoGE managed the communication to the PEOs and DEBS directly and followed-up with the DEBS to confirm if the information on the availability of textbooks had reached schools. The DEBS used multiple channels to inform all schools in the 27 intervention districts about the availability of their textbooks, including phone calls to individual schools, group WhatsApp messages to head teachers in each district, and an official message to schools from the DEBS.

## WHAT WERE THE RESULTS?

### Overall Changes in Textbook Distribution and Availability in Study Districts

The majority of schools reported collecting books from DEBS offices at their own expense—69 percent for grade two books and 74 percent for grade four books. This contrasts with the responses from the DEBS who claimed that only about 44 percent and 55 percent of schools collected grade two and grade four books from the DEBS. The DEBS delivered the books to only 14 to 15 percent of the schools. Figure 1 describes the last-mile delivery of grades two and four textbooks from DEBS to schools.

After implementation of the new communication strategy, 94 percent of schools reported receiving information about the availability

of grade four textbooks. This is an improvement from 69 percent of schools that reported that they had received some type of communication from their DEBS about the availability of textbooks for grade two (Figure 2).

While almost of all schools (97 percent) reported receiving their grade four textbooks, only 49 percent of schools reported having received their grade two textbooks in 2016, which included books from both the new and old curricula because they were delivered after the 2014 curriculum revision. Only 28 percent of schools received the grade two books that were based on the new curriculum (Figure 3). This low number was partly due to the fact that many DEBS had not yet received any books based on the new curriculum (63 percent). However, even after taking this into

account, fewer than half of the schools (44 percent) reported receiving any textbooks. In terms of the textbook to student ratio, four or five students had to share one grade two textbook in one of the Zambian local languages (when combining the numbers of both new and old curriculum textbooks), while in grade four, every student had their own textbook in one of the Zambian local languages.

The distribution time was shortened dramatically for the grade four textbooks. Ninety percent of the schools in both the treatment and control groups received textbooks within two months. Only 27 percent of schools reported receiving the grade two textbooks within a month after they were delivered to the DEBS offices from the MoGE's central warehouse.

Figure 1: The Ways Schools Receive New Textbooks

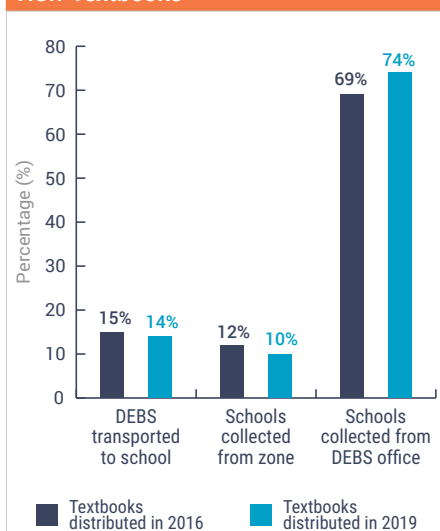


Figure 2: Information and Communication

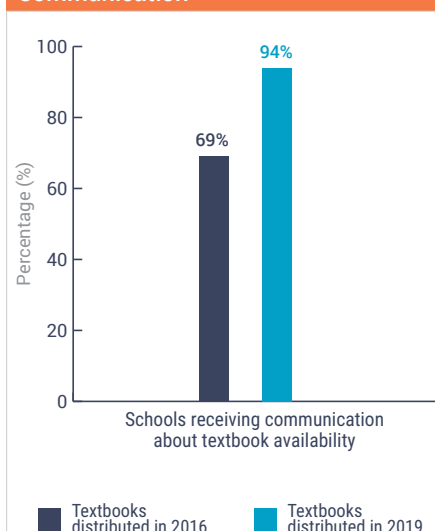
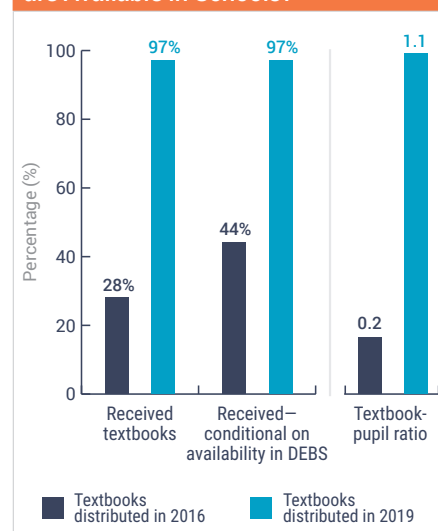


Figure 3: How Many Textbooks are Available in Schools?



## Intervention Impacts on Textbook Distribution and Availability

The school incentive increased the probability of schools receiving textbooks by 12 percentage points (0.126) compared to the control group (Figure 4). On the other hand, the DEBS incentive DEBS incentive had no statistically significant impact on the probability of schools receiving their textbooks and actually reduced the probability of schools receiving their textbooks within a month by 0.324.

The school incentive scheme increased the probability of schools collecting the books from zone-center schools by about 36 percentage points (0.356) and increased the probability of them collecting books from DEBS offices by about 16 percentage points (0.158). The DEBS incentive scheme had no statistically significant impact on how books were either distributed or collected. (Figure 5)

The impact of the financial incentives on the textbook-pupil ratio was not statistically significant. This may have been because the MoGE distributes a pre-determined number of books to each district rather than basing the textbook allocations on the current number of students or the needs of the schools in each district.

## Role of the Communication Strategy on Textbook Availability

Disseminating information to schools about the availability of their textbooks had a positive effect on almost all outcome variables.

Providing information and increasing communication to schools increased the probability of them receiving textbooks by 33 percentage points (0.334), increased the textbook-pupil ratio by about 23 percentage points (0.226), and increased the probability of schools receiving their textbooks within a month by 20 percentage points (0.202) at 1 percent significance level (Figure 6).

While it is not possible to rigorously evaluate the effects of the communication strategy due to absence of a control group, these non-causal findings may indicate that not knowing that textbooks were available had been a vital barrier preventing schools from accessing textbooks. By removing this information barrier, schools are then motivated to collect their books from wherever they are located, either in zone-center schools or in the DEBS office.

Communicating with all schools using multiple channels cost about 2.8 ZMW (US\$0.20) per school, which is much more cost-effective than the school incentive scheme.

The school incentive scheme cost an average of 513 ZMW (US\$37) per school, provided that all remote schools collected their books within a month after they became available at the DEBS level. This is slightly higher than the amount estimated by the DEBS for transporting textbooks to all schools within their districts (506 ZMW (US\$36)). However, improving communication without providing the necessary resources to fund the delivery of textbooks to schools is not a good solution in the long term because schools could be discouraged from collecting them without a proper incentive. It could also exacerbate any inequalities between schools.

Figure 4: Impact of Financial Incentives on Textbook Availability in Schools

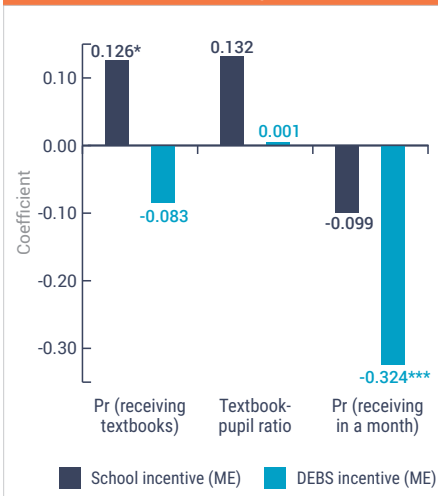
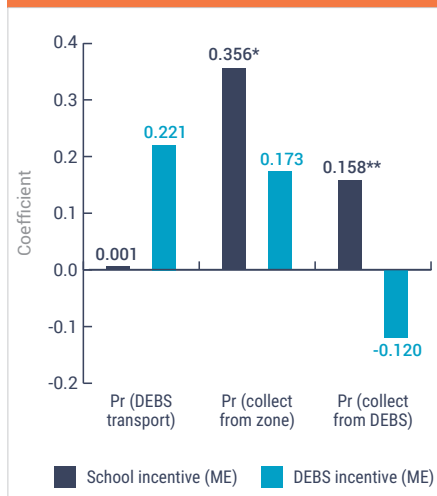
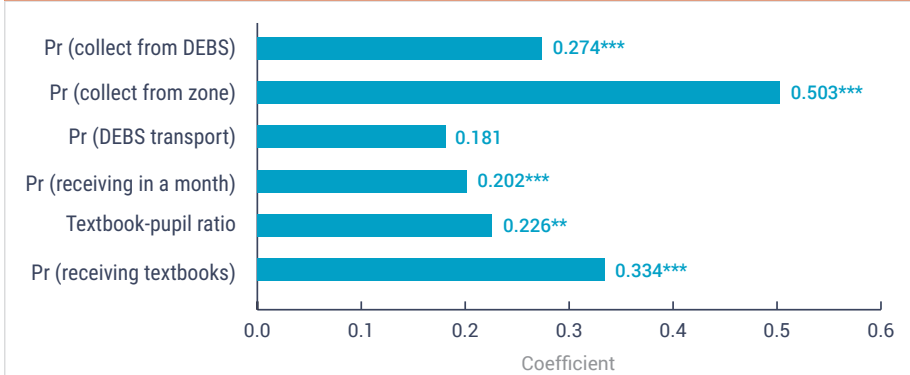


Figure 5: Impact of Financial Incentives on Textbook Distribution Mechanism



Note Fig 4–6: Coefficients are shown as a label on the top of each bar with significance level of 1% (\*\*\*), 5% (\*\*), or 10% (\*).

Figure 6: Role of Information and Communication on Textbook Availability



The school incentive had the most significant impact in terms of increasing the probability of the schools receiving textbooks, while the incentive to District Education Board Secretariats had no significant impact.

## WHAT WERE THE LESSONS LEARNED?

Providing financial incentives to encourage schools to collect textbooks from the DEBS level was an effective result-based financing mechanism for increasing the availability of textbooks in schools in Zambia. However, providing financial incentives to DEBS does not seem to be effective in this regard. This is partly because the current textbook delivery practice in districts and communities relies heavily on the schools themselves taking the initiative to collect the books rather than on the DEBS delivering the books to the schools.

The amounts provided in the financial incentives should be carefully considered, given that the cost of collecting or distributing the textbooks is highly dependent upon the geographic accessibility of the schools. When deciding the incentive amounts, policymakers should also consider the intervention's long-term financial sustainability along

with any possible potential negative consequences such as discouraging the intrinsic motivations of schools.

Evidence from the study that information on textbook deliveries is important. In considering the scaling up of the incentives it may be worthwhile ensuring that schools are aware of textbook availability to ensure that they can act on the incentives and collect their books.

The current practice results in every school receiving almost the same number of textbooks with no account taken of their actual needs. There are several reasons for this. Although the procurement of textbooks is based on the total number of enrolled students in the procurement year, it does not predict or accommodate any likely changes in textbook demand in the subsequent year. This, along with the prolonged procurement process and poor budget execution by the central

government, distorts the supply and demand of textbooks at the regional and sub-regional levels. Furthermore, at present, the MoGE has no clear and consistent guidelines for textbook distribution. This may explain why the textbook-pupil ratio was not affected by any of the study's financial incentive schemes. The fact that textbook distribution takes place on an ad hoc basis makes the textbook-pupil ratio in schools only loosely correlated with the probability of schools receiving their textbooks.

It is recommended that the MoGE should establish a procurement plan for textbooks based on a reliable estimate of future demand and should develop clear and easy-to-follow guidelines for textbook distribution and circulate it to all relevant stakeholders in the textbook supply chain, including publishers, the MoGE central office, PEOs,

DEBS, and schools. The guidelines should require the use of current enrollment figures and should include a systematic information and communication channel to inform schools when textbooks are available, an accountability mechanism for textbook delivery, and the provision of appropriate financial incentives to ensure that textbooks can reach all schools and help students to learn.

## CONCLUSION

Providing financial incentives to schools to encourage them to collect textbooks from the DEBS level has been shown to increase the availability of textbooks in schools in Zambia. However, providing financial incentives to DEBS does not have any impact on the likelihood of a school receiving textbooks. This is partly because the current textbook delivery

practice in districts and communities relies heavily on the action of schools and less on District Education Board Secretaries. Thus, providing incentives directly to schools seems to intensify the current last-mile textbook distribution practice and has better results. In addition, providing information to schools on the availability of textbooks at DEBS offices improves the outcomes significantly with minimum cost.

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### RESULTS IN EDUCATION FOR ALL CHILDREN (REACH)

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