IPA INNOVATIONS FOR POVERTY ACTION

IGC International Growth Centre

Reducing school staffing imbalances and wasteful government spending in Zambia

In brief

- This project addresses two closely related concerns:
    - Staffing imbalances: Pupil-teacher ratios vary from less than 20 to above 100 across public primary schools in Zambia.
    - Payroll mismatch: Teachers frequently do not work at the schools that they are recorded at in government payroll.
- Payroll mismatch does not only have implications for the distribution of teachers across schools but also leads to incorrect payment of hardship allowances which are tied to the location of schools.
- The researchers combine administrative data from the Education Management Information System and the Government Payroll System to firstly simulate the effects of a simple local teacher re-allocation programme on inequality in access to teachers, and secondly quantify the extent of payroll mismatch and its financial implications.
- It is found that teacher re-allocation within districts following a simple assignment rule could reduce inequality in access to teachers substantially.
- The results also show that 61% of teachers do not work at the schools they are recorded at in payroll, implying a monthly loss equivalent to 1,330 basic teacher salaries due to incorrectly paid hardship allowances.

This project was funded by IGC Zambia

Ideas for growth
www.theigc.org

DIRECTED BY
LSE UNIVERSITY OF OXFORD

FUNDED BY
UKaid
from the British people

Overview

Differences in pupil-teacher ratios (PTRs) between public primary schools are large in Zambia. As shown in previous research, 10% of public primary school pupils attend schools with PTRs below 30 pupils per teacher while 16% of pupils – approximately 475,000 children – go to schools with PTRs above 80. The majority of the variation in PTRs is within districts, thus relatively local. As a result, targeted local teacher transfers have the potential to contribute significantly to equalising access to teachers across schools.

"This brief finds that teacher re-allocation within districts following a simple assignment rule could reduce inequality in access to teachers substantially."

This brief finds that teacher re-allocation within districts following a simple assignment rule could reduce inequality in access to teachers substantially. Additionally, a teacher re-allocation programme would offer an opportunity to address payroll mismatch and reduce wasteful government spending due to incorrectly paid hardship allowances significantly.

Reducing school staffing imbalances through local teacher re-allocation

Since inequality in pupil-teacher ratios between public primary schools is concentrated within districts, we propose a teacher re-allocation programme that reassigns teachers to schools within the same district. Compared to a re-allocation programme that also allows for transfers of teachers across districts, such a programme has the advantage that transfer distances are limited. Moreover, implementation is facilitated because only one local government body, the District Education Office (DEOs), is directly involved (as compared to several DEOs and Provincial Education Offices).

Figure 1: Distribution of pupil-teacher ratios across public primary schools – actual and counterfactual
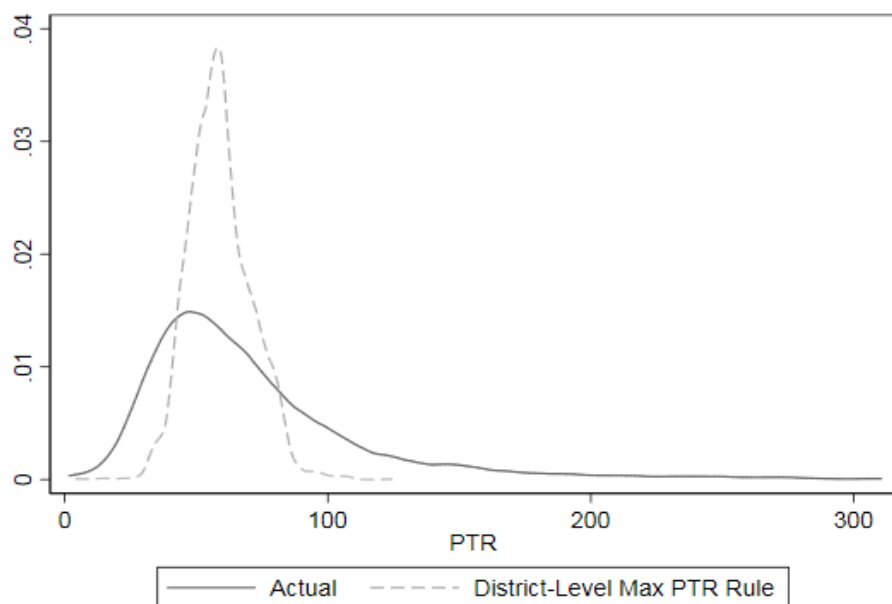
Concretely, we propose to determine the number of teacher positions at each public primary school within a given district based on a rule of the following type: The PTR shall not exceed the threshold x at any school. Using data from the Education Management Information System (EMIS) 2017, we determine the smallest threshold x that can be achieved in each district given the total stock of teachers in the district and the enrollment at each school. The threshold varies between 35 in Kabwe district and 125 in Ngabwe district.

Figure 1 shows how the distribution of pupil-teacher ratios across public primary schools in Zambia under the proposed rule compares to the actual distribution. Variation in PTRs is substantially lower under the proposed rule. The difference between the PTR of the school at the 90th and the school at the 10th percentile of the distribution is reduced from 91.3 to 30.8. Moreover, the share of schools with extremely high PTRs is significantly lower. While currently more than 22% of public primary schools have PTRs above 90, less than 1% of schools would have such high PTRs under the proposed rule.

The maximum PTR rule described above determines a maximum permissible PTR threshold x for each district. By design, some schools have more teachers than necessary to meet this threshold and other others do not have enough, but in total there are sufficient teachers for the threshold to be met at all schools. Therefore, the implementation of the proposed rule does not require the recruitment of additional teachers, but only the re-allocation of existing teachers from schools with an excess of teachers to schools with a lack of teachers.

We assume that teachers prefer transfers to nearby schools to transfers to more distant schools and use a matching algorithm to determine how many teachers have to be transferred between schools. The algorithm respects teacher preferences for short-distance transfers as much as possible while ensuring that teachers are equally distributed across schools after transfers. We find that the full implementation of suggested transfers would require 16% of teachers to move to another school. 50% of transfers would be across distances of 16km or less, and 75% across distances of 40km or less. Hence, the share of teachers that would have to be reallocated across more than 40km in order to achieve a substantial reduction in PTR inequality would only amount to 4%.

Reducing payroll mismatch and wasteful government spending

An additional benefit of the proposed re-allocation of teachers within districts is the opportunity to reduce payroll mismatch and associated wasteful government spending significantly. Payroll mismatch arises when teachers do not work at the schools that they are recorded at in government payroll. Using administrative data (EMIS and government payroll), we show

that this is a common problem: 61% of teachers do not work at the schools they are recorded at in payroll. Since the payment of hardship allowances is tied to school location (urban/rural/remote), however, this implies that many teachers are not paid their allowances correctly.

Table 1 shows the share of teachers entitled to a hardship allowance based on their actual working location (as reported in EMIS) and the share of teachers that is in fact paid a hardship allowance (as reported on payroll). We find that 11.7% of teachers are overpaid and 4.6% are underpaid due to payroll mismatch. This implies that on net, total monthly government expenses for hardship allowances are 11.1% higher than they would be in the absence of payroll mismatch – corresponding to a monthly loss of ZMW 4.86 million which is equivalent to 1,330 basic teacher salaries.

Table 1: Eligibility for and payment of hardship allowances

	Entitled (EMIS)		
	None	**Rural Hardship**	**Remote Hardship**
None	43,0%	1,9%	0,2%
Rural Hardship	6,3%	32,4%	2,5%
Remote Hardship	1,3%	4,1%	8,2%

Paid (Payroll) labels the row group.

Legend: Overpaid, Underpaid, Accurate pay

Since the implementation of a within-district teacher re-allocation programme does not only require transfers of teachers but also corresponding adjustments in payroll, it offers an opportunity to eliminate payroll mismatch within districts at the same time. And as payroll mismatch is concentrated within districts – 91% of teachers work in the district they are recorded in on payroll – overall payroll mismatch could be substantially reduced this way.

Policy recommendations

With the above benefits to teacher re-allocation looming large, a word of caution is necessary. Teacher re-allocation involves many factors that are not discussed in this report. For example, re-distributing teachers between schools could have a temporary negative effect on learning outcomes as teacher re-allocation may cause a disruption to learning in affected schools. Additionally, the assignment of additional teachers to schools that are not only lacking teachers, but also other basic learning and teaching inputs may not be sufficient to improve learning in those schools. Finally, some schools may be so unattractive (e.g. because they are remote or lacking basic infrastructure) that it is not possible to find enough qualified teachers willing to work at these schools.

To understand these issues, we propose to conduct a pilot study in a selected district that allows for a comprehensive analysis of teacher re-allocation.

This would involve:

- creating a master list of all schools and teachers in the district;
- mapping all schools (including teacher housing);
- determining the need for teachers at each school;
- eliciting the preferences of all teachers over schools;
- elaborating a transfer scheme that adheres to teacher preferences as much as possible;
- adjusting establishment registers and payroll (vacancies) accordingly; and
- re-allocating teachers accordingly.

The experience from this district could then serve as a guideline for the development and implementation of similar programmes in other districts.