Public and Private Funding of Basic Education in Zambia

Implications of Budgetary Allocations for Service Delivery

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Foreword

Education is at the center of many poverty reduction strategies. Yet too often, education services fail to improve outcomes for a variety of reasons. Budgetary allocations often favor the better-off, limiting poor people's access to services or preventing improvements in quality. In many poor countries improvements in educational outcomes call for institutional—not merely managerial—reforms. Such reforms include bottom-up measures to give users a stronger voice and more power over providers. They also include top-down measures to ensure better monitoring of providers and introduce effective incentives for improving staff performance. Both types of reform depend on a body of systematic information on performance, incentives, and other aspects of frontline service delivery. This information is indispensable for catalyzing and guiding the institutional reforms needed to improve education and educational outcomes—yet little of these essential data are currently available.

To help fill this gap, the Development Research Group of the World Bank is carrying out, in collaboration with local institutions and Bank operations, a multicountry study of education service delivery in Laos, Pakistan, Papua New Guinea, Uganda, as well as Zambia, the subject of this paper. The purpose of the research is to understand the relationship between funding and educational outcomes by tracking funding and resources and relating them at different levels of the delivery system to outcomes in different institutional and organizational contexts.

The education research program pilots the Quantitative Service Delivery Survey (QSDS), in which the school is the primary unit of observation. Beyond its use in analyzing provision of services, the QSDS fits well into the larger goal of impact evaluation. When combined with household surveys, it allows exploration of interactions between frontline providers and users of services. By adding surveys of local politicians and officials, it can also shed light on the political economy of service delivery and on interactions between providers and policymakers.

The Education Service Delivery Study (ESD) in Zambia carefully examines the structure of funding and service delivery to better understand the relationship between educational inputs and outcomes. It specifically takes into account linkages that may arise among different players involved in the delivery of education (for instance, the province education office, the district education office, schools, parent teachers associations, and pupils) and seeks to examine the ways through which these players respond to changes in the institutional setting and funding structure. The ESD addresses these important issues through the careful measurement of school inputs both at the school and the household level, as well as educational outcomes, through tests administered to the same pupils at two different times (in collaboration with the Examination Council of Zambia).

The Government of the Republic of Zambia (GRZ) has long recognized the importance of education. Nevertheless, a sharp decline from the mid-1980s onward in copper prices has led to a commensurate decline in GNI per capita, from $590 in 1975 to $300 in 2000, and this has presented several obstacles for

the education sector. The government, along with a consortium of donors, has been working closely to improve educational outcomes. The Education Service Delivery Study addresses important issues regarding the link between this effort and educational outcomes.

This report provides a detailed evaluation of public expenditure. It includes both a public expenditure tracking and a funding-equity exercise. The tracking exercise provides information on the extent to which educational expenditures earmarked under the central budget actually reach schools, and the funding-equity exercise examines whether such funding can be regarded as progressive—to what extent, if any, do poorer schools receive a greater share of public funding than their richer counterparts, and if so, how does this funding impact inequality in educational expenditure? The evaluation provides a complete picture of funding to primary and basic schools based on allocated and discretionary budgetary components, and household contributions to education expenses.

This report makes three contributions to the understanding of education funding in the Zambian context. First, it shows that funding characteristics are closely linked to the type of disbursement. Funds allocated according to a clear, predefined rule reach schools with little evidence of diversion. A significant proportion of funds allocated at the discretion of district and provincial educational offices, however, are retained at higher levels of the hierarchy.

Second, rule-based allocations have led to greater per-pupil funding for poorer and more rural schools.

These allocations, however, are the only progressive disbursements in the survey. The disbursement of discretionary allocations is neutral with respect to wealth, and per-pupil staff allocations are higher in urban and richer schools. Once all sources of public funding are factored into the analysis, public school funding in Zambia is regressive, with almost 30 percent higher allocations to richer schools.

Third, private expenditures at the level of the household have a critical impact on equity in educational funding. In fact, the inequality in public expenditure is dominated by the large share of private expenditures in overall educational spending. Moreover, these expenditures adjust to school funding, decreasing when funding rises. The magnitude of these adjustments appear to be the same across rich and poor households, suggesting that higher public funding may be useful in decreasing inequality across, but not within, communities.

The findings are highly relevant for educational reforms being undertaken in many developing countries to improve educational outcomes. My hope is that by offering a new perspective from the front lines of education, this paper will make a useful contribution to the reform agenda for improving education services for poor people in Zambia and elsewhere.

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Abstract

This report presents findings from a survey of 182 primary (grades 1-7) and basic (grades 1-9) schools carried out in Zambia in 2002. It describes and analyzes resource flows to these schools from three sources: rule-based funding from the center, discretionary funding from district and provincial education offices, and household spending on education.

Rule-based funds reached schools exactly as earmarked. The rule-based component of funding was highly progressive, as the same amount was disbursed to all schools irrespective of enrollment. Since small schools tend to have poorer student bodies, the rule-based allocation per pupil translated to more funding for poorer students.

Discretionary funds, controlled by the province and district education offices, reached only 25 percent of schools. The discretionary funds were wealth neutral. Even shares were distributed to schools with poor and nonpoor students.

Household educational expenditures show that nonfee expenditures by the family are seven times the corresponding expenditure on fees, making them the main source of inequalities in private expenditure. Once private expenditure is factored into the analysis, the nonprogressive nature of the public education funding system worsens: the share of educational expenditures for the poorest 50 percent of the population declines from 40 to 34 percent. Furthermore, when examining substitution between private expenditures and public funding, there is strong evidence that households decrease expenditures when public funding increases.

Although public funding could address inequalities in educational spending with progressive allocation across villages and schools, the desired impact of such redistributions may be less than imagined due to the crowding-out of private expenditures. The report suggests that increases in funding may not be the optimal way to improve educational attainment. It might be more beneficial to concentrate instead on providing inputs that households cannot supply on their own, such as high-quality teachers.

Acknowledgments

Abbreviations and Acronyms

BESSIP	Basic Education Sub-Sector Investment Program
DEO	District Education Office (Officer)
ESD	Education Service Delivery
ESDS	Education Service Delivery Survey
GDP	Gross Domestic Product
GNI	Gross National Investment
GRZ	Government of the Republic of Zambia
HIPC	Debt Initiative for Heavily Indebted Poor Countries (World Bank)
IRT	Item Response Theory
LCMS	Living Conditions Monitoring Survey
NGO	Nongovernmental organization
PAGE	Program for the Advancement of Girls' Education
PEO	Province Education Office (Officer)
PTA	Parent Teachers Association
QSDS	Quantitative Service Delivery Survey

Executive Summary

The link between education and development provides a strong case for allocating public expenditures to the education sector. However, allocating more central budgetary resources to the education sector will not necessarily deliver better outcomes. Budgetary resources may not reach the intended beneficiaries, and even if they do, these resources may not lead to the desired outcomes. This report examines the structure of funding and service delivery in Zambia using a recently completed Educational Service Delivery Survey (ESDS).

The Government of the Republic of Zambia (GRZ) has long recognized the importance of education. Nevertheless, a sharp decline from the mid-1980s onward in copper prices has led to a commensurate decline in GNI per capita from $590 in 1975 to $300 in 2000, and this has presented several obstacles for the education sector. The government and a consortium of donors have been working together to improve educational outcomes in Zambia. The survey and study ask two questions: What is the current record of the education sector in delivering services to the intended recipients? Have the changes undertaken by the Ministry of Education had the desired consequences in terms of educational outcomes?

The report focuses on a detailed evaluation of public expenditure—through both a tracking and a funding-equity exercise—to gauge the extent to which educational expenditures earmarked under the central budget actually reach schools, as well as the extent to which such funding can be regarded as progressive. Of the four issues that concern us during this exercise, the first three relate to the public funding of education and the last examines private educational funding and its relationship to public expenditure. These issues are as follows:

- What percentage of resources is spent at each level of the administrative hierarchy?
- To what extent is variation in funding across districts and schools explained by funding formulas that relate budgetary allocation to district and school characteristics such as enrollment or the number of schools?
- To the extent that there is variation in funding across districts and schools, what is the relationship between this variation and characteristics of districts and schools? (For instance, do richer districts and schools systematically receive more funds?)
- How important is private funding in the provision of education and how does this component of funding relate to equity in the overall funding of education?

In Zambia public funding for education flows to schools through a three-tiered administrative hierarchy involving the province offices, the district offices, and schools. Moreover, funds do not necessarily flow in a top-down manner; at each tier of the hierarchy, funds may come directly from the government or

from international and national donors. In our analysis, we classify these funds into four categories:

- *Rule-based allocations to schools.* A fixed-grant of $600 or $650 is allocated to each school, depending on the type of school. The grant is *not* a per-pupil allocation and it is independent of the enrollment in the school.
- *Discretionary allocations to schools.* Such funds are allocated at the discretion of districts and provinces and are over and above the rule-based allocation.
- *Rule-based allocations to teachers.* Teachers are paid directly via deposit slips through a centralized payroll in Zambia. This money does not pass through the province or district offices.
- *Discretionary allocations to teachers.* In addition to salaries and monthly allowances, teachers are entitled to one-time benefits, such as leave benefits, transfer benefits (paid when a teacher switches schools), and funeral benefits. The payment of such benefits is left

to the discretion of the provincial and district-level administration.

It is also necessary to distinguish between provinces with and without district education boards. Although districts receive money directly from the GRZ, both for rule-based and discretionary allocations, all money for discretionary allocations is first transferred to the concerned province, and from there moves onward to the district. For this reason, provinces with district education boards are referred to as *decentralized provinces* and those without district education boards are referred to as *centralized provinces*. In the study sample there are two of each: Lusaka and Copperbelt provinces are decentralized and Northern and Eastern province are centralized. Figure 1 shows how funds are allocated across both types of provinces.

EXPENDITURE TRACKING

The tracking exercise follows all nonsalary funding flows through the administrative hierarchy (recall that

Figure 1. Funding Flows across Centralized and Decentralized Provinces
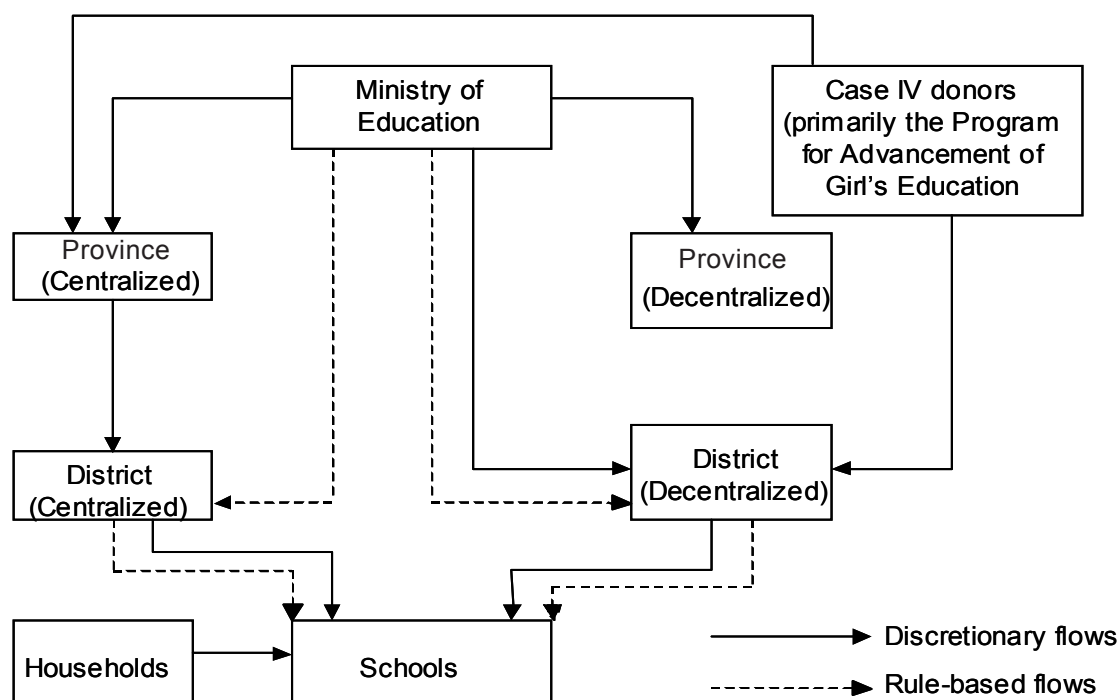
Note: Decentralized provinces are Lusaka and Copperbelt. Centralized provinces are Northern and Eastern.

payroll goes from the center directly to teachers). The expenditure flows can be characterized as follows:

- On average, K 28,000 per pupil enters the educational system for the four provinces surveyed. This amount hides a significant degree of variation among provinces with, for instance, Eastern Province (K 44,300) receiving more than double the per-pupil funding received by Copperbelt (K 19,000).
- Of this amount, discretionary funds at the level of the province and district account for 70 percent of all funding and rule-based funds accounts for the remaining 30 percent. Thus rule-based funds allocated through the fixed-school grant of $600 ($650) account for less than one-third of all the funding received.[1]
- Between one-sixth and one-third of total funding in the system eventually reaches the schools. Again, there are significant differences between provinces, with 34 percent of provincial-level funds reaching schools in Copperbelt, and only 14 percent reaching schools in Lusaka.
- Although decentralization has shifted spending from the provincial to the district level, it has not resulted in greater disbursements to schools. The differences between centralized and decentralized provinces *up to* the level of the district are as follows: centralized provinces spend more than decentralized provinces at the provincial level. Thus, in Eastern (38 percent) and Northern (18 percent) province a far higher percentage of funding is spent at the provincial level compared to Copperbelt (9 percent) and Lusaka (5 percent). However, extra funding that reaches the districts in decentralized provinces results in higher spending only at the district level and is not associated with greater funding to schools.

LEAKAGE

Following the methodology used in Uganda (Ablo and Reinikka 2000), the definition of leakage in the Zambian educational system is the ratio of what schools *actually receive* to what they were *supposed to receive*. The equivalent of per-pupil funding in Uganda is the fixed-school grant in Zambia. Thus leakage for rule-based allocations is defined as follows:

$$Leakage = \frac{amount\ received\ by\ school}{\$600\ (\$650\ for\ basic\ schools)}$$

This report, however, goes beyond an estimate of leakage based on allocated funds to provide a complete picture of the funding of educational institutions. It examines all sources of funding for the school. For example, in the case of discretionary components the rule-based methodology fails (since there is no rule about the amounts that schools are supposed to receive, it is not possible to determine what constitutes leakage in the system). After tracking the amounts that schools receive, it's possible to examine the *equity* implications of such allocations. The section on leakage establishes the following:

- **Rule-based allocations to schools in the Zambian educational system seem to work efficiently.** There is little evidence to suggest that funds earmarked for disbursements do not reach intended beneficiaries. Specifically, more than 90 percent of all schools (95 percent in all provinces except Lusaka) had received the rule-based allocation at the time of the survey, and delays in disbursement rather than leakage of funds was a more likely explanation in the case of schools that had not received the grant (this grant was disbursed two months prior to the survey).
- **Rule-based allocations to teachers—salaries and clearly defined allowances—are disbursed efficiently.** There is some evidence of delays in the updating of the payroll system, as well as significant arrears in the case of allowances that are not clearly specified. In the case of salaries, 95 percent of teachers had no outstanding amounts. For allowances where there is a clear specification based on location (hardship allowance in rural locations) or status (teacher trainee allowance), less than 15 percent of payments were overdue by six months or more. However, in the case of overtime allowances (which must be filed every term), and allowances that resulted from a change in the status of the teacher (such as added tasks with commensurate allowances), 50 percent of payments were overdue. For all allowances there is considerable evidence that

lags in updating the payroll regularly result in delays of one to three months in payment.

- **For discretionary allocations to schools, the positive results obtained earlier no longer hold: less than 25 percent of schools receive *any* funding from discretionary sources.** The crucial importance of rule-based funding at the level of the school is also highlighted by the change in the relative share by source as we move down the administrative hierarchy. At the level of the province, the share of rule-based allocations in total funding ranges from 8 to 40 percent, with a median of 12 percent. Moving down to the districts, this share increases to between 19 and 63 percent, with a median of 44 percent. Finally, at the level of the school this share ranges from 2 to 100 percent, with a median of 99 percent. More than 75 percent of all schools received cash resources only from rule-based sources in the current year.
- **For discretionary allocations to teachers there are substantial amounts overdue for one-time benefits and payments.** In some provinces the overdue payments amount to three times the monthly salary of the teacher.
- **Discretionary funding disbursed to schools tend to be one of two types.** Small sums are disbursed under the UNICEF-administered Program for the Advancement of Girls' Education (PAGE) or larger sums are received from district offices. The high variation in the amounts received is significant. Conditional on a school receiving such funding, it could account for as much as 60 times what it would get under the fixed-allocation grant.

This suggests two potential explanations for the patterns of discretionary funding and school expenditure:

- Schools are provided discretionary funds for large expenditures on a rotating basis. For instance, if a school were rehabilitated every 10 years only 10 percent of schools in any given year would receive money for capital expenditures. In addition, the amounts of such expenditures received would be large compared to amounts received for recurrent spending. According to this hypothesis, the pattern of funding and expenditure observed is a reflection of the lumpy nature of big investments.
- Since rule-based funding is clearly defined and transparent, it is extremely difficult for any political economy considerations (such as capture of funds by elites) to impact school allotments. Discretionary funding is not associated with any such rule. So the pattern of funding observed is a reflection of the difference between rules and discretion. The few schools that receive large amounts are special schools that have greater bargaining power within the administrative structure.

The section on equity turns to exactly this concern and relies on the following observation: if the first explanation is correct it is unlikely that the flow of discretionary funds to schools will be correlated with wealth. If schools are provided with capital expenditure funds on a rotating basis, it seems natural to assume that the sample of schools receiving such funding will be a mix of schools in rich and poor areas.[2] Consequently, systematic differences in funding by wealth levels would lead to an explanation based on the difference between rules and discretion, rather than one based on a distinction between one-time and recurrent expenditures.

EQUITY

The examination of funding equity in the education system follows rule-based and discretionary allocations separately, and focuses on the relationship between the type of funding and following related variables:

- *Urbanization.* Do urban schools and urbanized districts receive more than their rural counterparts?
- *Wealth.* Do richer schools and districts receive more than their poorer counterparts?
- *Distance to administrative offices.* Do schools that are closer to administrative offices receive more than those farther away?

The main findings are summarized below.

- *Equity of rule-based funds.* Rule-based funds are *progressive*, with greater per-pupil amounts

allocated to less urban and poorer schools and districts. This result is entirely due to the inverse relationship between school size and wealth and urbanization. Thus, schools in rural areas tend to be smaller and poorer whereas schools in urban areas tend to be larger and richer. Since rule-based funds are allocated per school rather than per student, poorer and more rural schools receive greater funding per pupil. The same logic applies at the district level, where those with smaller average enrollments will receive higher funding.[3] Thus, poorer schools receive four times the rule-based allocation of richer schools and rural schools receive three times the allocation of urban schools.

- *Equity of discretionary funds.* There is no evidence that discretionary funds are distributed in a progressive manner, with poorer schools receiving more than their richer counterparts. If anything, discretionary funding within rural areas has a higher probability of being disbursed to wealthier schools, while allocations in urban areas are wealth neutral.
- *Equity of staff compensation.* The data show that the per-pupil compensation of staff is higher in richer and more urban schools, and this arises primarily from higher class sizes and the extensive use of teacher-trainees in rural areas.
- *Overall equity in funding.* Since discretionary disbursements can be very large, once these are accounted for the progressive nature of the rule-based allocations disappears. At best, funding that flows from the district to the school is wealth neutral (with no significant differences in received amounts across rich and poor schools), and at worse it is regressive for rural and progressive for urban schools. Once staff compensation is factored into the analysis, the results show that the *only* progressive component of the education system is the rule-based allocation. Once per-pupil teacher funding is added in, the entire education funding system becomes regressive with poorer schools (K 14,531 per pupil) receiving less than richer schools (K 19,826 per pupil).

PRIVATE SPENDING

This then opens up the question of household inputs into education. If there are huge funding differentials between schools (for instance, the rule-based component implied that per-pupil funding could vary from K 1,889 to over K 8,000 depending on school size), do households adjust contributions to account for the level of school receipts from the public funding system? If yes, how does this household spending impact on funding equity in the education system? The report presents some preliminary results relating to both household contributions to school funding, as well as household private expenditure on education that complements the construction of the public expenditure system presented here.

The issue of household contributions to school funding is at an important juncture in Zambia. Anecdotal evidence from a number of studies during the 1990s suggested that schools had started charging higher Parent Teachers Association (PTA) fees, and a concurrent decline in net enrollment during the same time period led to an correlation between lower enrollment and high PTA fees. Consequently, in April 2002 (three months prior to the fielding of the ESDS) PTA fees were abolished for primary and basic schools and the government reiterated its commitment to free basic education.

With this background in mind, the key findings regarding household contributions to school funding follow:

- The announcement seemed to have had the desired effect. PTA fees decreased to less than 30 percent of 2000 values, although this decline is concentrated primarily in the urban areas of Lusaka and Copperbelt. The gradient between PTA fees and school wealth has also declined sharply during the same period.
- For all provinces, but especially for Eastern and Northern provinces, public funds are the most important source of financial flows to the school, comprising 96 percent of the total funding of the schools in Eastern province (the most reliant on public funds) and 82 percent in Lusaka province (the least reliant).
- Since the contribution of households to school funding is small, the addition of private funds should not alter the results regarding equity in school funding obtained in the previous section, and this is indeed the case. Thus, the difference in

private contributions between schools with poorer and richer households is only K 1,300 per pupil compared to K 3,100 for public funding.

- Examining only private contributions to school funds can be misleading if most inequality in private expenditure is at the level of the household, i.e., through private, household-level nonfee spending (purchase of textbooks). The final section examines this aspect of educational funding.

- Nonfee expenditures are seven times the corresponding expenditure on school fees. Thus, nonfee expenditures are the main source of inequalities in private expenditure. When such private spending is included in the total funding picture, the nonprogressive nature of the public funding system worsens: the share of educational expenditures for the poorer 50 percent of the population declines from 40 to 34 percent once private expenditures are factored into the analysis.

- There is strong evidence that households decrease spending when public funding increases. This suggests that, although public funding could address inequalities in educational spending by progressive allocation across villages and schools, the desired impact of such redistributions may be less than imagined due to the crowding-out of private expenditures.

DISCUSSION AND CONCLUSIONS

This report makes three contributions to the understanding of education funding in the Zambian context. First, it shows that funding characteristics are closely linked to the type of funding and the way it is disbursed. In the case of rule-based funding, the disbursement system seems to works efficiently and there is no evidence that such funds are diverted from their stated purpose. The majority of discretionary funds, however, are spent at the district and provincial levels, and less than 20 percent is allocated to schools.

Second, analyzing funding equity using the wealth of pupils in the school shows that the specific rule used in the case of rule-based allocations has led to greater per-pupil funding for poorer and more rural schools. However, these allocations are the *only* progressive disbursements. Per-pupil staff allocations are higher in urban and richer schools.

For discretionary allocations there is evidence of higher disbursements to richer schools within rural areas, and wealth-neutral allocations within urban areas. Once all sources of public funding are factored into the analysis, public school funding in Zambia is regressive, with almost 30 percent higher allocations to richer schools.

Third, the report shows how private expenditure at the level of the household impacts equity in education funding. It argues that nonfee expenditures incurred by households, rather than contributions to school funds through PTA and other fees, are the major source of inequalities in the current environment. Moreover, it find evidence that households decrease private contributions when public funds to the schools increase.

If the government wishes to allocate higher funding to poorer schools, these findings suggest that a greater percentage of all funding allocation should be rule-based. It was initially thought that the process of decentralization would partially fulfill this need, since more money would flow directly to the districts, making accountability and therefore disbursements higher. Unfortunately decentralization seems to have only shifted spending from the province to the district, and, in terms of funding equity, it is precisely at the district level that richer schools are receiving higher discretionary funds than their poorer counterparts.

Even if rule-based funding were to increase, three subsidiary implications need to be carefully evaluated. First, the current rule-based allocation implies that schools fare better in terms of per-pupil funding if they decrease enrollments. A more common funding rule (used, for instance, in Uganda) is based on transfers that increase the number of enrolled children (such as $1 per enrolled child). There is unfortunately no guarantee such a scheme would work as well as the current, unambiguous rule. One suggestion would be to continue with the current rule (which also has the desired equity implications), but to monitor enrollment carefully through regular data collection under the school census.

Second, an increase in public funds to schools crowds out private spending. Although the results presented here are preliminary, there is evidence that this crowding-out can be fairly large. Thus,

public funds may be far more effective at addressing inequalities *across* rather than *within* villages. This would suggest targeting at the level of schools, with greater funding to poorer regions.

Third, the crowding-out of private expenditures by public funding implies that rule-based funds may not have the desired impact on learning achievement. Since for every dollar of school funding, private funding decreases, the true increase in total funds available for education is much less than the additional dollar. This would suggest that increases in funding may not be the optimal way to improve educational attainment. It might be more beneficial to concentrate instead on providing inputs that households cannot supply on their own, such as high-quality teachers.[4]

NOTES

1. In Kwacha terms, schools receive either K 2.6 million or K 3.0 million. We use the dollar equivalents at the exchange rate of $1=K4,400.

2. Unless of course, rich schools systematically depreciate their infrastructure faster than poor schools, but this does seem unlikely a priori.

3. Consider two districts each with 100 schools but average enrollments of 50 (district A) and 100 (district B). Since the rule-based allocation is a fixed per-school grant, both districts receive exactly the same allocation. However, since district A has a smaller number of students than district B, the average per-pupil grant will be much higher in district A compared to district B.

4. This argument will be developed fully in another report on the relationship between schooling inputs and learning achievement.

1

Introduction

The importance of education for development provides a strong case for allocating public expenditures to the education sector. But simply allocating more central budgetary resources to the education sector may not deliver better outcomes. Budgetary resources may not reach the intended beneficiaries, and even if they do, these resources may not lead to the desired outcomes. This report examines the structure of funding and service delivery in Zambia using a recently completed Educational Service Delivery Survey (ESDS).

The Government of the Republic of Zambia (GRZ) has long recognized the importance of education. It set up universities immediately following independence and has focused more recently on attaining equity and quality in primary education. Nevertheless, a sharp decline in copper prices since the mid-1980s (the main export) and a commensurate decline in GNP per capita (from $590 in 1975 to $300 in 2000) has presented several obstacles for the education sector.

To overcome these obstacles, the government and a consortium of donors have been working together to improve educational outcomes in the country. Some of these changes are directly related to overall financing of education and others aim to improve the delivery of education by changing the administrative and institutional structure of education delivery.

The Education Service Delivery Study (ESD) is designed to examine the structure of funding and implications for service delivery, and the relationship between public expenditure and educational outcomes. Specifically, it tries to answer two questions: (1) What is the current record of the education sector in delivering services to the intended recipients? (2) Have the changes undertaken by the Ministry of Education had the desired consequences in terms of educational outcomes?

The study specifically takes into account linkages that may arise among the different players involved in the delivery of education (for instance, the district education office, Parent Teachers Associations, the provincial education office, schools, and pupils) and examines the way these players respond to changes in the institutional setting and funding structure.[5] The ESD addresses these issues through the careful measurement of school inputs (the subject of this report), and educational outcomes through tests administered to the same pupils at two different times in collaboration with the Examination Council of Zambia (another report).

This report focuses on public and private expenditure at the school level. It provides a detailed evaluation of public expenditure through a tracking and a funding-equity exercise, which gauges the extent to which educational expenditures earmarked under the central budget actually reaches schools, as well as the extent to which such funding can be regarded as progressive. A related body of work in Uganda (Ablo and Reinikka 2000; Reinikka and Svensson 2002) shows that the traditional view of the government as a benevolent agent is highly simplistic—public funding may not matter simply because it does not reach grassroot levels of the administrative structure.

Of the four questions that repeatedly concern us during this exercise, the first three relate to the public funding of education and the last examines private educational funding and its relationship to public expenditure.

- What percentage of resources is spent at each level of the administrative hierarchy?
- To what extent is variation in funding across districts and schools explained by funding formulas that relate budgetary allocation to district and school characteristics, such as enrollment or the number of schools?
- To the extent that there is variation in funding across districts and schools, what is the relationship between this variation and characteristics of districts and schools? (For instance, do richer districts and schools systematically receive more funds?)
- How important is private funding in the provision of education and how does this component of funding relate to equity in the overall funding of education?

The findings from this report provide the basis for the second component of the ESD study (another report), which relates the availability of funding to improvements in learning outcomes in Zambian schools. The main concern in addressing this set of issues arises from the observation that lower school funding does not *in itself* imply worse outcomes. Problems of inappropriate use may be worse at the level of the school *or* higher levels of the administration may be better able to use available resources. The second component of the study on enrollment and learning outcomes will make some welfare statements regarding the findings of the current report.

This report is structured as follows. Section 2 provides a brief history of education in Zambia during the 1990s. Section 3 describes the methodology, and section 4 describes the school sample. Funding flows are examined in section 5, and section 6 discusses leakage. Section 7 addresses the equity aspects of education funding and examines the association between funding and school and district characteristics. Section 8 presents preliminary results from the related household survey on private expenditures. Section 9 concludes.

NOTES

5. Todd and Wolpin (2003) illustrate this kind of linkage. An intriguing aspect of the link between public expenditure and education is that it is extremely hard to demonstrate any effect of increased funding to schools on learning by pupils (see for instance, Hanushek 1986). Todd and Wolpin argue that a potential reason for this (weak) relationship is that households change their behavior with the level of public funding; when public expenditure is high, households spend less and vice versa, keeping the overall level of schooling inputs for the child constant.

2

Zambian Education during the 1990s

A decline in copper prices has been accompanied by a commensurate decrease in income and government resources. Since 1998 domestic financing fell from 2.3 percent of GDP to only 2.1 percent in 1999, and although the share of primary education has increased from 54 to 57 percent over the same time period, net funding for primary education has declined (World Bank 2001; Siamatowe 2002). Equally important, actual overall expenditure has declined during the past six years, from US$ 97 million in 1996 to US$ 74 million in 2000 (Siamatowe 2002). As a result, average real per capita government education expenditure in 1996–98 was only 73 percent of its 1990–92 level, declining further to an average of 60 percent of this level by 1999–2000.[6] This decline in funding seems to have had a number of undesirable impacts.

First, primary school enrollment is currently low, and there is strong evidence that it has fallen in the last decade. Table 1 shows that net enrollment

Table 1. Enrollment Rates, 1992–2001

(percent)

Enrollment rates	1992	1996	2001
Net (Gross) enrollment rate (Primary)			
Female	66	57	60
	(92)	(77)	(78)
Male	65	54	60
	(107)	(86)	(90)
Net (Gross) enrollment rate (Secondary)			
Female	6	12	16
	(9)	(16)	(24)
Male	8	11	16
	(16)	(23)	(29)
School participation rate (Primary)			
Female	77	68	67
Male	77	66	67
School participation rate (Secondary)			
Female	46	45	48
Male	65	61	66

Data sources: Analysis based on Demographic and Health Surveys (1992, 1996, and 2000). The net enrollment rate and gross enrollment rates follow standard definitions. The school participation rate (primary) is defined as the percentage of children between 7 and 13 years of age enrolled in school at the time of the survey. The secondary participation rate uses the age group 14 to 18 instead.

stood at 60 percent in 2001, with limited gender disparity at the primary school level.[7] These levels are similar to Kenya, higher than Mozambique, but below levels typically attained in other Southern African countries.[8] Net primary school enrollment rates for both girls and boys over the last decade have declined by 5 percent. Although declines of a similar magnitude are found in other African countries like Botswana and Lesotho, the decline in Zambia is larger than in comparable countries, such as Mozambique or Tanzania (UNESCO Edstats 2002).

Figure 2 shows further characteristics of school enrollment in Zambia based on age-specific enrollment rates (Filmer and Pritchett 1999). The individual curves show the proportion of children enrolled in school at the time of survey, where the primary data is based on the Demographic and Health Surveys from 1992 and 1996. Net enrollments are substantially higher in urban areas, and the differences in enrollment between the poor and the rich

are also substantial.[9] Moreover, the curves clearly show delayed enrollment among all income groups in Zambia. Even among the rich (1996 survey), enrollment is less than 50 percent for children aged seven or less. Finally, in every income group across rural and urban locations there has been a decline in enrollment between 1992 and 1996, and this decline appears to be particularly severe for middle-income groups.

Other characteristics based on the Living Conditions Monitoring Survey (LCMS) data (World Bank 1998) show further problems with grade-specific enrollment rates in grade 1 and grade 7, and progression rates between grade 8 and 9. The LCMS data show rapid declines in enrollment over the years, suggesting substantial dropout. While 90 percent net enrollment at grade 1 is achieved, this figure is 34 percentage points lower by grade 7. Further, the progression rate from grade 7 to 8 appears to be only 33 percent. Data comparability

Figure 2. Characteristics of School Enrollment in Zambia
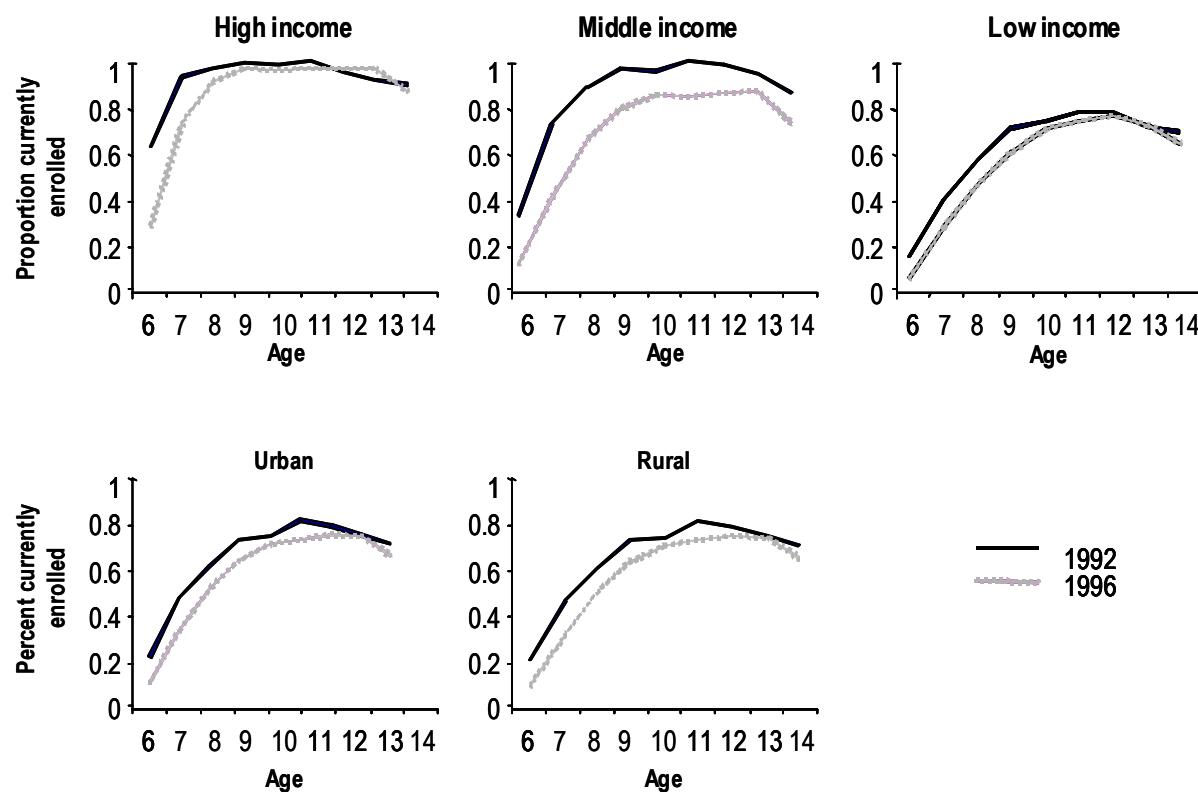
Source: Based on Filmer and Pritchett (1999).

appears difficult, but this latter figure appears to be lower than most other African countries, especially in Southern Africa.[10] This suggests that in Zambia, in addition to declining enrollments over the last decade, there seems to be a particular problem with pupil retention within the primary education system and progression after grade 7.

Since 1998, however, the government in collaboration with a consortium of donors has worked actively to reverse steadily declining outcomes in the education sector. Specifically, the government's Basic Education Sub-Sector Investment Program (BESSIP) was the subject of a Joint Appraisal in September 1998, and donors made new financing commitments in support of BESSIP beginning in 1999. This collaboration has resulted in changes both in the funding of education and the administrative structure of education delivery (decentralizing decisions and funding to the district level through district education boards is one such example), teacher deployment, and the ability of schools to levy fees and contributions. This report examines whether further changes can be made to the institutional structure of education delivery to improve outcomes in the education sector.

NOTES

6. World Bank data based on Government of Zambia Financial Statements.

7. Depending on the sources used, net enrollment varies from 68 to 72 percent, so that 72 percent represents an upper bound.

8. See, for example, online educational databases such as World Development Indicators (World Bank) and Edstats (UNESCO)).

9. These two statistics are not unrelated, since rural poverty is still substantially higher than urban poverty (83 versus 56 percent) despite some recent increases in urban poverty (World Bank 2001).

10. For instance, this is lower than Mozambique for 1990 (39 percent), but higher than Tanzania in 1998 (14 percent).

3

Tracking Methodology

The tracking exercise was designed to collect information on the effectiveness of funding programs in reaching their intended beneficiaries, and the relationship between increased funding at the central level and educational outcomes in schools. The survey was carried out at various levels of the administrative structure, including the province office (immediately below the Ministry of Education), the district office, schools, and households. The tracking exercise follows the flow of funds and educational resources from the Ministry of Education to the province education office and then onward to the district education office and the schools. While in theory such an exercise may seem relatively straightforward, the complexity of funding flows and the multiplicity of sources at each level of the administration for educational funding and materials makes this exercise challenging.

In the Zambian education sector, funding to schools has three separate components. The first is a per-school grant of $600 (for primary) and $650 (for basic) schools.[11] The second is the money disbursed by districts (and in some cases provinces), presumably using some notion of need at the level of the school. The third is remuneration of staff through salaries and benefits. What does this funding structure imply for the tracking of public expenditures?

In the Uganda study (Ablo and Reinikka 2000), the government used a clearly defined rule to allocate funds to schools. Schools were allocated $1 for each enrolled child. In this context, leakage in public funding was defined as the ratio of what a school actually received to what the school was supposed to receive. The per-school grant in Zambia corresponds exactly to the per-pupil grant in Uganda. Analogous to the Uganda study, leakage in rule-based allocations in Zambia can be defined as follows:

$$Leakage = \frac{amount\ received\ by\ school}{\$600\ (\$650\ for\ basic\ schools)}$$

Unlike the Uganda study, however, this report goes beyond an estimate of leakage in allocated funds. It uses an innovative approach to provide a complete picture of the funding for educational institutions by examining *all* sources of funding for the school. In the case of the fixed grant and the salary component, the Uganda methodology is used to determine leakage in the system. But in the case of *discretionary components*, this methodology fails since there is no rule about the amounts that schools are supposed to receive. Therefore, it is not possible to benchmark the amounts that schools *actually* receive or determine what constitutes leakage in the system.

This problem is addressed by classifying funding flows into the rule-based component (the $600 fixed grant), the discretionary component (infrastructure and other grants), and the payroll component, and focusing on three related issues:

- The pure tracking exercise first asks how much money per pupil is available at each level of the delivery chain (see section 5). This addresses the issue of the percentage of spending undertaken

at different levels of the hierarchy and the amount that finally reaches the schools.

- The estimate of leakage focuses on the rule-based allocations and payroll components (see section 6).[12]
- Equity in funding examines the degree to which variation in funding across districts and schools is explained by funding rules (see section 7). To the extent that there is excess variation after accounting for differences due to funding rules, the relationship between this excess variation and district and school characteristics is analyzed.

The entire equity exercise is made possible through the careful data collection on the household assets of pupils in the school. Such data is normally not available as part of expenditure tracking surveys. This report shows that the regular collection and analysis of this information has important repercussions for policies regarding the delivery of education.

Educational funding in Zambia derives both from domestic (GRZ) funding and funding from donors. In the case of donors, funds are divided into four categories: donor funds bracketed as Case I, Case II or Case III, which are controlled by the Ministry of Education, and Case IV donors that administer funds directly.[13] While most funding is theoretically obtained from the GRZ, a clear distinction at all levels of the administration is maintained throughout the report between BESSIP funding (the program linked to the consortium of donors that form Case I–Case III) and other GRZ funding.

To better understand the flow of funds and resources, it is useful to build classifications based on the *type* of resource (fund) and the underlying administrative structure, and the level of discretion at each level of the administration to allocate and distribute such flows. Resources and funds are divided into three categories: educational materials (such as textbooks), monetary (only cash), and payroll (remuneration of staff). The four provinces of the survey are divided in two categories: provinces *with* district education boards (henceforth *decentralized provinces*—Lusaka and Copperbelt in the sample) and provinces *without* district education boards (henceforth *centralized provinces*—Northern and Eastern in the sample).[14]

Using this typology, school funding is composed of five types of funds and resources:

- *Cash flows: fixed-grant component.* The fixed-grant component (also referred to as the BESSIP grant) is the per-school allocation of either $600 or $650, and no level of the administration has discretion over the amount disbursed. No information is required for the disbursement of funds as in the per-pupil allotment in Uganda, where data is required on enrollments in the school, and which may be subject to distortions at the level of the school or district. The fixed-grant is a *rule-based* component of school funding.
- *Cash flows: infrastructure grants.* Schools also receive money for rehabilitation of classrooms or for new construction (infrastructure). This money is disbursed through the microprojects unit of the Zambian Social Investment Fund, but the district retains considerable discretion over disbursement. Such grants are part of the *discretionary* component of school funding.
- *Cash flows: other grants.* Schools may receive additional money from the GRZ or Case IV donors (mostly funding through the Program for Advancement of Girls' Education), and these resources are distributed entirely at the discretion of the district. Consequently, as with (2) above, these grants are classified as a *discretionary* component of school funding.
- *Flows of educational materials.* Schools may receive educational materials such as textbooks and chalk, again allocated at the discretion of the district, with some input from the provinces and the Ministry of Education. Although it is technically possible to track such resource flows, the procurement of educational materials had not yet been completed at the time of the survey (midway through the academic year). As a result, schools received such materials sporadically and in very small quantities. This component is excluded from the exercise.
- *Payment of staff.* Staff remuneration can be thought of as arising from rule-based and discretionary components. Specifically, the salaries and allowances of teachers are paid through the centralized payroll system. Neither provinces nor districts have discretion over the salary or

allowances that a teacher receives, so this is identified as a rule-based component of staff payment. On the other hand, payments of one-time benefits (detailed below) are left to the discretion of districts and provinces, so this is identified as a discretionary component. Since most staff remuneration is a direct flow from the center to the teachers payroll funds are omitted from the *tracking exercise*,[15] and

this component in discussed in the sections on leakage and funding equity. The structure of funding flows is summarized in table 2.

SUMMARY

Funding flows to schools in Zambia are divided into a rule-based component and a discretionary component to track and analyze the level of expenditures at each level of the administrative hierarchy.

Table 2. Structure of Resource and Funding Flows in Zambia

	Ministry of Education/ Ministry of Finance	*Does province have discretion? (centralized)[a]*	*Does province have discretion? (decentralized)*	*Does district have discretion? (centralized)*	*Does district have discretion? (centralized)*	*What can the school/teachers expect to receive?*
Flows of educational materials (discretionary)	Handles procurement and distributes to provinces/districts	YES Decides how much to pass on to district	NO Materials passed directly to districts	YES Decides how much to pass on to schools	YES Decides how much to pass on to schools	Depends on district
Payment of staff: salaries and allowances (rule-based)	Completely centralized and are made directly to teachers	NO	NO	NO	NO	Teachers receive salaries and allowances according to the salary scale
Payment of staff: One time benefits (discretionary payments)	Disburses funds to provinces and districts for such payments	YES	YES	YES	YES	Payments for one-time benefits such as leave and transfers
Cash flows from GRZ: fixed grant (rule-based funding)	An allocation of either $600 or $650 is made to every primary-basic school.	NO	NO	NO	NO	$600 or $650
Cash flows from GRZ: (discretionary funding)	Allocations are made for recurrent and capital expenditures, as well as disbursement to districts/schools	YES Decides how much to pass on to districts	NO Districts receive most money directly	YES Decides how much to pass on to schools	YES Decides how much to pass on to schools	Depends on district: Schools may expect to receive money for recurrent/ infrastructure expenditures
Cash flows from case IV donors (discretionary component)	No discretion. Most money from case IV donors is for PAGE (Program for Advancement of Girls' Education)	YES Province decides how much to pass on to districts	NO Districts receive most money directly	YES District decides how much to pass on to schools	YES District decides how much to pass on to schools	Depends on district

a. Northern and Eastern province in the ESDS.

For the rule-based and payroll components, leakage is identified as the ratio of what the school received to what the school was *supposed* to receive. The analysis of equity in funding flows examines total funding per pupil, including the two components above, as well as remuneration of staff, and studies the correlates of such funding with particular emphasis on the wealth of students' households. In order to analyze equity in funding, it is critical to establish a tracking exercise (see section 5). One far-reaching conclusion from the Uganda study was that budgetary allocations *cannot be used* as a proxy for funding at the school level.

NOTES

11. In current terminology, a "lower-and-middle basic school" offers grades 1–7 and a "full-basic school" offers grades 1–7 and continues to grades 8-9. This report refers to them as primary schools, (grades 1–7), and basic school, (grades 1–9).

12. For discretionary components, we remain agnostic about whether low/high receipts at the school level constitute good or bad service delivery. This issue is addressed in a follow-on report on outcomes and efficiency of public spending.

13. DFID, Ireland, the Netherlands, and Norway contribute to the Case I pool; IDA credit is Case II; the African Development Bank is Case III; and USAID, JICA, and Denmark follow Case IV.

14. The prevalence of both systems of administration arises because district education boards have been phased in since 2000. Decentralization was introduced to grant greater autonomy to districts and to reduce their dependence on the province for funding.

15. The money for salaries and allowances are disbursed directly to teachers so that no money passes through the administrative chain. Although it is theoretically possible to track one-time benefits, these funds are not earmarked for such disbursements and hence cannot be traced through the system.

4

School Characteristics of the Sample

This section provides a brief introduction to the sample. The schools surveyed were chosen from a list frame of primary and basic schools in four Zambian provinces: Lusaka, Copperbelt, Northern, and Eastern. A random sample stratified on the basis of urban and rural locations included 184 schools in 33 districts. As part of the re-testing exercise, 3,200 pupils formed the initial sample for the administration of tests in English, mathematics, and vernacular (Icibemba or Nyanja).[16] The choice of these four provinces was dictated primarily by the variation in educational attainments, regional incomes, and administrative structures. Specifically, Lusaka and Copperbelt are the two richest provinces in Zambia, with commensurately high enrollment rates, and Northern and

Eastern provinces are the poorest, with enrollment rates only marginally better than the worst performing Central province (table 3). Learning outcomes confirm the wide disparities in performance among the provinces studied: apart from Northwestern province, Northern and Eastern provinces reported the worst English and mathematics scores, while Lusaka reported the best (table 4).

The schools in the sample are grouped into four descriptive categories: school enrollment and staffing, school infrastructure, school performance, and characteristics of households in the school. Since significant differences are likely to emerge between urban and rural schools, the summary statistics are disaggregated by school location.

Table 5a shows significant differences between rural and urban schools in enrollment and staffing. Urban schools tend to have large enrollment (an average of 1,440 pupils per school compared to 554

Table 3. Enrollment, Urbanization, and Poverty
(percent)

Province	Net enrollment age 7–13	Poverty head count	Rural	Population share
Central	75	77	66	10
Copperbelt[a]	76	65	23	18
Eastern[a]	49	79	91	13
Luapala	61	81	86	7
Lusaka[a]	79	53	19	15
Northern[a]	60	82	84	12
North Western	66	76	86	6
Southern	73	75	80	12
Western	64	89	90	7
All Zambia	68	73	63	100

a. Provinces covered in the ESD sample.
Source: World Bank (1998).

Table 4. Mean Math and English Scores, by Province

Province	English	Math
Central	9.02	14.94
Copperbelt[a]	9.06	13.60
Eastern[a]	9.02	13.56
Luapula	9.68	13.90
Lusaka[a]	10.34	15.16
Northern[a]	8.68	13.21
North Western	7.76	13.37
Southern	9.43	14.37
Western	8.95	13.62

a. Provinces covered in the ESD sample.
Source: ESDS team calculations based on Examination Council Data.

26

Table 5a. School Enrollment and Staffing

Variable	Urban	Rural	Difference
School size	1439.5	553.4	886.56[a]
(number of pupils)	(74.23)	(38.19)	
Number of	37.5	12.8	21.98 [a]
teachers	(1.67)	(1.15)	
Female teachers as	69.0	30.9	–38.10 [a]
percent of total	(5.6)	(4.3)	
Pupil-teacher	42.25	60.96	–18.70 [a]
ratio	(2.93)	(3.76)	

a. Difference is significant at the 5 percent confidence level. Standard errors in brackets.
Source: ESD sample.

for rural schools), but the difference in size is more than compensated for by the difference in staffing. The pupil-teacher ratio in urban schools at 42 is much closer to the Zambian goal of 40 pupils per teacher than the rates in rural schools at 61.[17] Also noteworthy is the large difference in female teachers between urban and rural schools. Female make up 70 percent of the teaching workforce in urban schools, and 31 percent in rural schools. Conversations with teachers suggest that safety and the lack of teacher's housing is a major concern in rural areas. If there is a significant difference in performance by the gender of the teacher, this is an area for future policy consideration.

Table 5b shows the distribution of key infrastructure variables in urban and rural schools. All three variables reported—number of pupils per classroom, number of students per toilet, and number of teachers per staff house—suggest considerable overcrowding, although the lack of data from other countries does not allow us to establish a suitable benchmark. With an average of 6.4 teachers per staff house, it appears there is a considerable shortage of

Table 5b. Infrastructure

Variable	Urban	Rural	Difference
Number of pupils per	103.4	96.7	6.73
classroom in good condition	(7.14)	(4.76)	
Number of pupils per	198.9	113.2	85.72*
toilet in good condition	(39.9)	(15.2)	
Number of teachers per	11.39	4.34	7.04*
staff-house in good condition	(2.01)	(0.827)	

a. Difference is significant at the 5 percent confidence level. Standard errors in brackets.
Source: ESD sample.

staff housing in the system. Interestingly, for all three indicators of infrastructure, rural schools perform better than their urban counterparts, and this difference is significant for toilets per pupil and teachers per available staff house.

The next two tables provide performance indicators for, and household characteristics of, children in the school. Table 5c shows four key indicators of performance: children repeating classes, dropouts, and performance on examinations for male and female students. Two key points emerge. First, rural schools perform significantly worse than urban schools in terms of repetition and dropouts. Close to 10 percent of students in rural schools repeat a grade, whereas 5 percent of students in urban schools repeat a grade. Similarly, dropouts in the previous

Table 5c. Key Performance Indicators

Variable	Urban	Rural	Difference
Repeating the same	4.7	9.45	–4.74*
grade (percent)	(0.49)	(0.62)	
Dropouts as ratio of current	1.67	4.56	–2.88*
enrollment (percent)	(0.32)	(0.47)	
Pass-rate in 2000 Grade	44	50.5	–6.50
VII examination (males)	(6.1)	(4.8)	
Pass-rate in 2000 Grade	42.5	44.5	–2.00
VII examination (females)	(6.0)	(4.8)	

a. Difference is significant at the 5 percent confidence level. Standard error in brackets.
Source: ESD sample.

year as a percentage of current enrollment was 5 percent in rural schools and 2 percent in urban schools. The poorer performance of rural schools, however, did not extend to performance on the nationwide grade 7 examination in 2000. In fact, rural schools performed slightly better, achieving a pass rate of 51 percent (males) and 45 percent (females), compared to 44 (males) and 43 (females) percent for their urban counterparts.[18]

Table 5d presents households indicators for rural and urban schools. Two characteristics emerge from this table. First, children attending rural schools come from poorer households compared to their urban counterparts (the average difference exceeds one standard deviation in the wealth distribution). Second, although averages are very high, school attendance for single and double orphans is the same in

Table 5d. Household Indicators

Variable	Urban	Rural	Difference
Average value of wealth index of households with children in the school	0.74 (0.067)	–0.44 (.05)	1.18*
Percentage of children who are single orphans	7.6 (3.2)	7.7 (2.5)	–0.10
Percentage of children who are double orphans	4.72 (2.5)	4.79 (1.9)	–0.70

a. Difference is significant at the 5 percent confidence level. Standard error in brackets.
Source: ESD sample.

rural and urban. On average, one in every 13 pupils is a single orphan (has lost a single parent) and one out of every 25 pupils is a double orphan (has lost both parents). From this table one would expect a priori that vulnerability is a significant problem in rural schools compared to urban schools in terms of overall poverty, but not in terms of the orphan status of the child.

SUMMARY

This section provides insights regarding the equity aspects of the rule-based component of funding. Because schools in rural regions tend to have lower enrollment than their urban counterparts, and the rule-based funding is allocated on a per-school basis, as long as schools receive the allotted amounts, one would expect rural schools to receive higher per-pupil amounts. This has direct implications for equity. Since rural schools are also poorer than urban schools, in theory, rule-based funding should be highly progressive.

NOTES

16. Detailed notes on the sampling procedure can be found at http://econ.worldbank.org/programs/public_services/topic/tools.

17. This does not imply that classes are bigger in rural schools. Data from the survey suggests that teachers in rural schools teach more hours than their urban counterparts, and as a result the average class size is actually lower in rural schools.

18. This is probably due to greater ability-based selection into higher grades in rural areas. For instance, in rural areas 40 percent of students do not make it to grade 7. If these children are worse than the average enrolled child, test scores in rural areas will reflect this selection process.

5

Expenditure Tracking at Provincial, District, and School Levels

This section examines whether schools actually receive the fixed-grant component, and whether provinces and districts further support poorer districts and school through discretionary cash grants. The tracking exercise for nonsalary funding assesses the total amount of cash available at the province and district levels, and then tracks the movement of funds from provinces to districts and from districts to schools.[19] Figure 3 highlights the distinction between centralized and decentralized

Figure 3. Funding Flows across Centralized and Decentralized Provinces
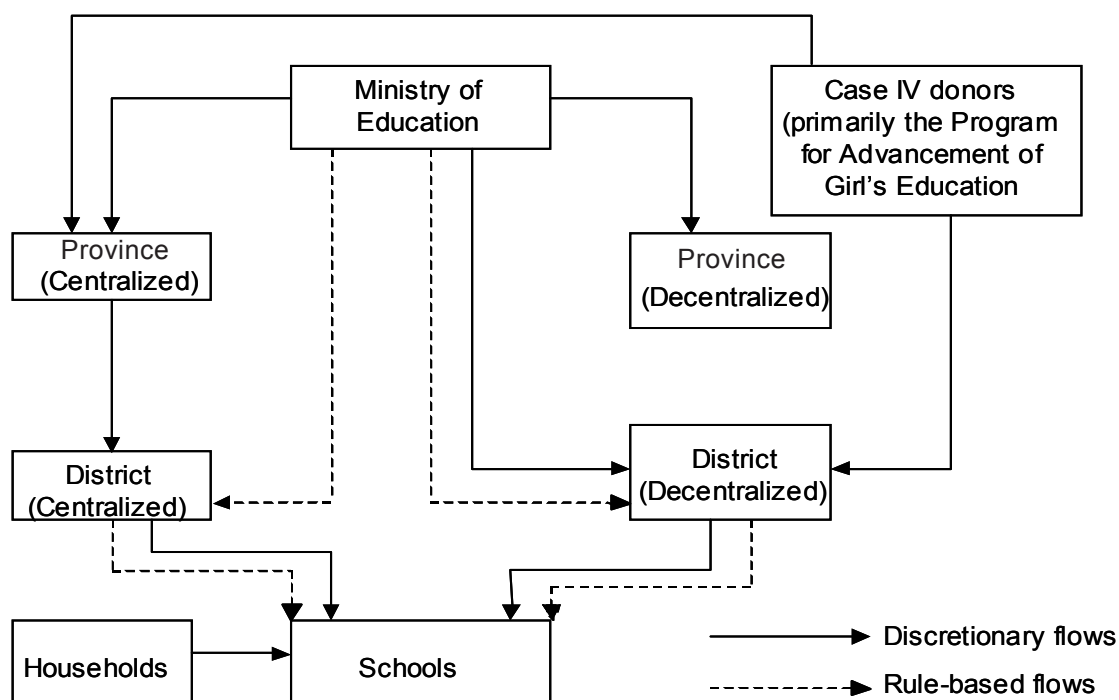
Note: Decentralized provinces are Lusaka and Copperbelt. Centralized provinces are Northern and Eastern.

provinces in terms of expenditure flows. The arrows divide funding flows into rule-based and discretionary components. One characteristic of the funding system becomes immediately clear—funding in the system does not flow in a top-down manner. Instead, fresh money enters the hierarchy at each level.

In both centralized and decentralized provinces, money given under the BESSIP program (Case I–Case III donors) enters directly at the district level. In decentralized provinces other cash flows move directly to districts. Finally, fresh money enters at the level of the school through household contributions. An accurate assessment of the resources available at each stage involves tracking monetary flows from the funding body immediately above as well as the flows that directly enter the system at each level.

Each of these funds will be reported in terms of *Kwacha per pupil*. Total funds are divided by total enrollment in the province (and similarly for districts and schools).[20] The data on enrollment is based on the 2001 schools census, using grade 1–9 pupils of all schools for which the GRZ has some funding responsibility (this includes schools aided by grants and community schools, but excludes five private schools).[21]

THE PROVINCIAL LEVEL

Cash receipts. Table 6 shows the cash received per pupil at the level of the province averaged over

Table 6. Cash Received by Province Education Offices

Province type	Province	Cash receipts (Kwacha per pupil)	Total primary enrollment
Centralized	Northern	19,779	235,012
	Eastern	29,308	192,321
Decentralized	Copperbelt[a]	4,133	286,710
	Lusaka[a]	8,034	206,318

a. Decentralized provinces with district education boards.
Source: ESD survey data and total primary enrollment date from the Zambian School Census (2001).

one year (June 2001 to June 2002). The pattern of receipts at the provincial level are clearly in line with expected receipts from the decentralization process. The centralized provinces receive sums that are orders of magnitude higher than their decentralized counterparts, with Eastern province (K 29,000 per pupil) receiving more than seven times the receipts for Copperbelt (K 4,133 per pupil).

The amounts received in the centralized provinces give a rough idea of the money passing to the provinces from the ministry. From the Ministry of Education "Financial Statistics 1986–2000" and the BESSIP Financial Statement 2000, total per-pupil recurrent expenditure for basic schools (not including salaries) is K 29,550 and total per-pupil capital expenditure is K 36,519. Since money given to the

Table 7. Funding Sources at Province Education Office Level, June 2001–June 2002
(Kwacha per pupil)

Province type	Province	GRZ funding: Case I– Case III pool (external sources)		GRZ funding (domestic sources)	Case IV funding	
		Rule-based component (BESSIP)	Discretionary components (HIPC Funds)	Discretionary components (other GRZ)	Discretionary components	Total
Centralized	Northern	7,882	4,011	5,250	2,636	19,779
		(40)	(20)	(27)	(13)	(100)
	Eastern	2,206	8,947	14,801	3,354	29,308
		(8)	(31)	(51)	(11)	(100)
Decentralized	Copperbelt[a]	475	1,764	1,300	593	4,133
		(12)	(43)	(31)	(14)	(100)
	Lusaka[a]	704	5,828	1,350	152	8,034
		(9)	(73)	(17)	(2)	(100)

Note: Percentages (in brackets) may not add up to 100 due to rounding.
a. Decentralized provinces with district education boards.
Source: ESDS.

province includes money for recurrent and capital expenditures, an upper bound is that 95 percent of total per-pupil expenditure is available at lower levels in the case of Eastern province, and 65 percent is available at lower levels in the case of Northern province.

Table 6 also shows vast differences within centralized and decentralized provinces, with almost a 50 percent difference in cash received per pupil between Eastern and Northern provinces, and a 100 percent difference in cash received between Lusaka and Copperbelt. Table 7 examines these differences further by looking at the receipts per province from the four sources of funding: BESSIP, HIPC (Debt Initiative for Heavily Indebted Poor Countries of the World Bank), and other GRZ and Case IV donors.

Two characteristics stand out. First, the funding from nondomestic sources (BESSIP and HIPC), consistently exceeds 60 percent of total funding for all provinces (except Eastern with 49 percent). Second, there is no clear pattern in terms of a single province receiving more or less than others from any single source. Some receive more funding from BESSIP sources (Northern), but less from Case IV and domestic GRZ sources, while others (Lusaka) receive very little from BESSIP, domestic GRZ, and Case IV sources, but large amounts from HIPC.

Cash disbursements. From these financial receipts provinces disburse cash to districts. In the case of decentralized provinces (which receive cash directly from the ministry), one would expect disbursements to be very low. Table 8 confirms this with data on disbursements to the districts over a six-month period from January 2002 to June 2002. In per-pupil terms, this is virtually nil for all cash in decentralized provinces and for capital expenditures in centralized

Table 8. Funding Disbursed to Districts, January 2002–June 2002
(Kwacha per pupil)

Province type	Province	Recurrent expenditures	Capital expenditures	Total
Centralized	Northern	3,381	264	3,645
	Eastern	1,390	0	1,390
Decentralized	Copperbelt[a]	0	0	0
	Lusaka[a]	397	0	397

a. Decentralized provinces with district education boards.
Source: ESDS.

Table 9. Cash Received by Districts
(weighted average by province)

Province type	Province	Cash receipts at district level (Kwacha per pupil)
Centralized	Northern	24,196
	Eastern	27,437
Decentralized	Copperbelt[a]	17,263
	Lusaka[a]	20,690

a. Decentralized provinces with district education boards.
Source: ESDS.

provinces. However, in the centralized provinces these disbursements represent a small proportion of what the province actually receives. In Northern province, disbursements to districts correspond only to one-third of the annual funding that the province received, and in Eastern province to only one-tenth.[22]

THE DISTRICT LEVEL

Cash received. Table 9 shows the cash received at the district level.[23] The data for one year, from June 2001 to June 2002, are enrollment-weighted averages across all districts in the province. On average, districts in the Eastern and Northern provinces receive much more (districts in Eastern for example receive almost 60 percent more than Copperbelt districts) than those in Lusaka and Copperbelt, but this hides substantial differences within provinces, an issue explored in section 6.

Similar to cash flows at the provincial level (table 7), there are wide differences between district receipts across provinces from the four funding sources. As table 10 shows, the higher level of funding per pupil in districts in Northern and Eastern province resulted primarily from the rule-based component of the funding system, with the average district in Eastern province receiving more than twice (219 percent) the receipts of the average district in Copperbelt.

This variation follows entirely from the specificity of the rule-based component, which takes the form of lump-sum payments per school. In provinces where the average school size is smaller, the fixed-grant funding per student will be higher. According to the 2001 school census data, Northern and Eastern schools have, on average, about 315 pupils, while Copperbelt schools have about 877 pupils, and Lusaka schools have 1,037 pupils. The difference in

Table 10. Funding Sources at the District Level
(Kwacha per student)

| Province type | Average district in province | GRZ funding: Case I – Case III pool | | GRZ funding from domestic sources | Case IV funding | |
		Rule-based component (BESSIP)	Discretionary components (HIPC Funds)	Discretionary components (other GRZ)	Discretionary components (Case IV funding)	Total
Centralized	Northern	9,576	1,278	4,656	1,547	24,196
		(44)	(6)	(17)	(7)	(100)
	Eastern	15,019	921	7,364	1,534	27,437
		(63)	(4)	(21)	(5)	(100)
Decentralized	Copperbelt[a]	6,850	1,049	8,074	652	17,263
		(43)	(6)	(43)	(4)	(100)
	Lusaka[a]	4,057	263	9,751	731	20,690
		(19)	(1)	(45)	(3)	(100)

Note: Percentages (in brackets) may not add up to 100 due to rounding.
a. Decentralized provinces.
Source: ESD data.

average enrollment almost entirely accounts for the large variation in per-pupil funding at the district level.

Turning to discretionary funds, it is striking that Copperbelt and Lusaka receive more in per-pupil terms via discretionary sources than the centralized provinces, which depend on funding initially routed through the provincial level. Thus in Northern and Eastern province, discretionary sources account for only 20 percent of total resources, whereas this increases to 45 percent for the decentralized provinces.

Tracking results (province to district). The tracking exercise of public funds from the province to the district level takes into account the complexities of the funding arrangements discussed in the previous section.[24] It is assumed that total rule-based cash received by districts is fresh money in the system, since there is no movement of rule-based funding from the province to the district. Discretionary funding at the district level in centralized provinces (including both GRZ and Case IV sources) is routed via the province; in decentralized provinces funding is not routed via the provinces and constitutes new resources in the system. From this the net total funds passed on to the province and the district via the Ministry of Education can be calculated. Table 11 gives the results.

On average, K 28,000 per pupil enters the system for nonsalary spending from the center. Up to one-third of total cash in the system is earmarked for schools via the rule-based funding component, and the remainder is spent at the discretion of the provinces and districts. As table 11 shows, decentralization seems to have decreased the spending at the provincial level. Thus, spending at the provincial level is between K 5,000 per pupil (Northern) and K 16,800 per pupil (Eastern) in the centralized provinces (18 and 38 percent of total funds in the system, respectively) and this decreases to K 1,500 per pupil for the decentralized provinces (around 7 percent of total funds in the system). As a result the proportion of money available at the level of the district increases in the decentralized provinces from 70 percent to more than 90 percent (95 percent in the case of Lusaka) of total funds in the system.

This data seem to suggest that the system of decentralization improves the flow of funds by decreasing provincial spending, but it leaves unanswered the question of whether decentralized districts are spending more at the district level, or passing on greater amounts to the schools.

The School Level

District disbursements and school receipts. Schools are *supposed* to receive either $600 or $650 through the *rule-based* component. In addition, they may also receive cash from infrastructure and other spending grants, through GRZ spending or from Case

Table 11. Tracking of Resources, June 2001–June 2002
(*Kwacha per pupil per year*)

Province type	Province	Rule-based + discretionary (district)	Rule-based (district)		Discretionary (district)		Discretionary (province)		Rule-based + discretionary (total)
		Total funds at the district level	Funds received directly from ministry	Funds received from the province	Funds received directly from ministry	Additional funds from province to district	Total discretionary funds available at the provincial level	Spending: provincial level	Total funds in the system
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Centralized	Northern	24,196	9,576	7,812	0	6,808	19,779	5,159	29,355
		(82)	(33)	(27)	(0)	(23)	(67)	(18)	(100)
	Eastern	27,437	15,019	2,780	0	9,638	29,308	16,890	44,327
		(62)	(34)	(6)	(0)	(22)	(66)	(38)	(100)
Decentralized	Copperbelt[a]	17,263	6,850	0	8,074	2,339	4,133	1,793	19,056
		(91)	(36)	(0)	(42)	(12)	(22)	(9)	(100)
	Lusaka[a]	20,690	4,057	916	9,751	5,966	8,034	1,152	21,842
		(95)	(19)	(4)	(45)	(27)	(37)	(5)	(100)

Note: Percentages of total funds in system are bracketed. All total funds in the system refer to *nonsalary* resources.
a. Decentralized provinces.
Sources: ESD survey data. Column (1) data from table 9. Column (2) data from table 10 total rule-based funding to districts. Column (3) extrapolated to yearly spending from data on funding to districts, January 2002-June 2002. Column (4) from table 10, discretionary funds allocated directly to the district in the case of Lusaka and Copperbelt. Column (5): (5)=(1)-(2)-(3)-(4). This correction assumes that funds are reported correctly at the district level and the province underreports transfers. (The sums involved correspond closely to the sum of HIPC and PAGE resources received at the provincial level, which were earmarked to be passed on to lower level, but which may not have been recorded as cash passed on to district.) Column (6) data from table 8. Column (7): (7)=(6)-(5)-(3). Column (8): (8)=(1)+(7).

IV donors. Regardless of the original funding body, this money is eventually disbursed through the district. In isolated cases schools may also receive funds from other sources (churches, local donors, nongovernmental organizations (NGOs), or directly from the Ministry of Education). Since the data contains only one such example, public funding to the school is considered as a one-way flow from the district.

The results of the expenditure tracking at the school level are presented in two parts. First, in continuance of the previous tracking exercise the per-pupil amounts available to each school in different districts provides an estimate of the percentage of funds that reaches schools. Since the rule-based component of funding is a per-school amount, we cannot ascertain leakage through this exercise. The per-school amounts are thus postponed to the next subsection, where school funding is disaggregated in terms of rule-based versus discretionary funding, which directly tackles the issue of leakage.

To check for robustness, three options are used to calculate the amounts passed on to schools. Option 1 in table 12 is direct measurement of the cash passed on from the district to the schools in the sample, with the associated problem that the data is only for a sample of schools (those covered by the survey for a six-month recall period). Option 2 is a measure of spending patterns at the district level and is based on a one-month recall of spending in May 2002. Option 3 uses data collected at the school level, with a six-month recall period. The high correlation observed between all three measures confirms the reliability of the reported financial data. Although there is some variation in the amounts depending on the option used, option 3 always lies between options 1 and option 2. One strategy therefore is to use the amount calculated from option 1 as the upper bound

of school receipts and amount calculated from option 2 as the lower bound.

The results of this per-pupil tracking exercise are shown in table 12 (and summarized in figure 4). Columns 1, 2, and 3 show the funds available in the entire system at the province and district level (identical to table 11). Column 4 shows the total amount passed on to the schools using option 1 (district report). Column 5 shows the spending on schools using shares of spending in May (option 2), and column 6 shows the funds reported by the school (option 3).

Option 1 (the upper bound) suggests that typically between 25 and 48 percent of total funding (between K 5,000 and K 13,600 per pupil) in the system is passed on to schools; option 2 (the lower bound) suggests 11 to 33 percent (between K 2,500 and K 8,000) is passed on. Typically less than half the funding in the system reaches the school level, and in Eastern and especially Lusaka province the share seems even lower.

Gains from decentralization in terms of reduced spending at the provincial level now disappear: there is no evidence that increased funding to districts in decentralized provinces is passed on to schools. As a percentage of total funds in the system, schools in centralized provinces receive around 30 percent of total funds and this actually decreases to (approximately) 25 percent in the case of decentralized provinces. Thus, in terms of funding it appears that decentralization has merely *shifted* spending from the province to the district, with no improvement in disbursements to schools.

SUMMARY

The tracking exercise established the following characteristics of the education funding system in Zambia.

- *Discretionary funds at the level of the province and district account for 70 percent of all funding.* On average, about K 28,000 per pupil enters the educational system at the level of the province. Approximately 30 percent of this amount is earmarked for *rule-based* funds

Table 12. Tracking of Resources from the District Level to Schools, 2001–2002
(enrollment weighted by Kwacha per pupil)

Province type	Province	Rule-based + discretionary	Discretionary (province)	Rule-based + (district)	Rule-based + discretionary (schools)		
		Total funds in the system	Total discretionary funds available at the provincial level	Funds at the district education office level	Option 1: reportedly passed on to schools	Option 2: spending on schools (based on shares)	Option 3: funds reported by schools
		(1)	(2)	(3)	(4)	(5)	(6)
Centralized	Northern	29,355 (100)	19,779 (67)	24,196 (82)	13,618 (46)	7,985 (27)	9,179 (31)
	Eastern	44,327 (100)	29,308 (66)	27,437 (62)	15,528 (35)	7,408 (17)	11,925 (27)
Decentralized	Copperbelt[a]	19,056 (100)	4,133 (22)	17,263 (91)	9,216 (48)	6,215 (33)	6,384 (34)
	Lusaka[a]	21,842 (100)	8,034 (37)	20,690 (95)	5,382 (25)	2,483 (11)	3,121 (14)

Note: Percentages of total funds in brackets. Data excludes two schools in Kafue district, with substantial reported grants not reflected in district data, and most likely outliers linked to measurement problems.
a. Decentralized provinces.
Source: ESD data. Columns (1), (2) and (3): taken from table 11. Column (4) reported by district, extrapolated from a recall period January 2002-July 2002 and from data specifically related to the ESDS sample of schools explicitly asking how much cash was allocated to each school in our sample (for recurrent and capital expenditures). Column (5) reported by district, extrapolated from actual spending data for May 2002. Column (6) based on data collected at the schools level, recall period January 2002–June 2002.

Figure 4. Funding Disbursement in Centralized and Decentralized Provinces
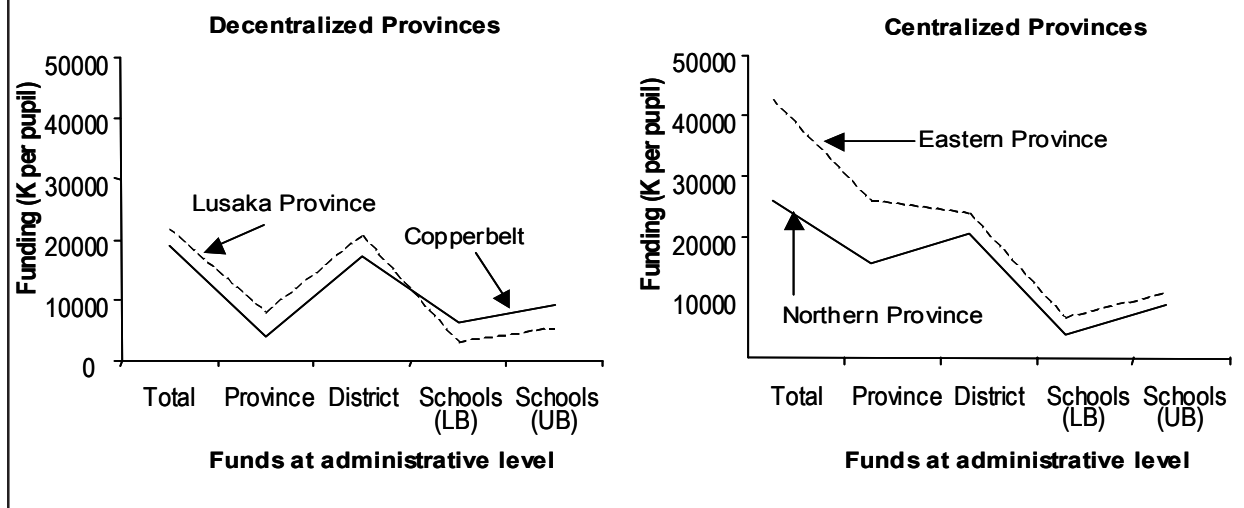
through the fixed-school grant of $600 ($650), and 70 percent is in the form of funding allocated at the discretion of provinces and districts.

- *Between one-sixth and one-third of total funding in the system eventually reaches schools.* Of this total amount, between 14 and 34 percent eventually reaches the schools as a combination of rule-based and discretionary spending, and the rest is spent at the provincial and district levels.

- *Decentralization has shifted spending from the provincial to the district level, but has not resulted in greater disbursements to schools.* There are important differences between centralized and decentralized provinces up to the level of the district. Centralized provinces spend more at the provincial level compared to those that have been decentralized. However, the extra funding that reaches the districts in decentralized provinces results in higher spending at the district level and is not associated with greater funding to schools.

These findings are summarized in figure 4, where *K per pupil* funding is plotted at each level of the administrative hierarchy. The amount that finally reaches the school is much less than the total amount available in the system and this decline is the sharpest in Eastern province. Moreover, a large fraction of the difference in funds arises from the nature of the rule-based component of funding. Hence, disbursement curves in the decentralized districts are consistently below those in the centralized district as a direct consequence of the rule-based component, in conjunction with the difference in average school enrollment between the provinces discussed previously.

Already the results of the tracking exercise provide suggestive evidence regarding the leakage of funds. In particular, the correspondence between the funding received by schools and the amount of the fixed-school grant indicate that almost *all rule-based* funds are passed on, while little of the available *discretionary* funding actually reach the schools. In the next section we explicitly address this issue for both the nonsalary funding discussed in this section, as well as payroll funds that do not pass through the administrative hierarchy.

NOTES

19. Recall that the payroll is centralized and payments are made directly to teachers from the center. Thus there is no notion of money being distributed from provinces onward. Of course, the important question of whether teachers receive their salaries remains, and is taken up in section 5.

20. An alternative measure could rely on per-child funds. This measure would have the attractive property that differential dropout rates would not affect the overall funding statistic. Ideally we would like to report both,

but there are two problems. The first is that the population census is not currently available. The second and more serious problem is that to report this statistic at the school level one would have to define a catchment area, which is often arbitrary, especially for urban schools. Without a clearly defined catchment, it is unclear that this concept would be useful at the level of the individual school.

21. The enrollment figures include all districts for which data are available. In the calculation of the financial figures per pupil, two districts were dropped because of incomplete financial data, Nakonde in Northern Province and Chongwe in Lusaka Province. Recall also that these are all nonsalary transfers.

22. One option could be that this low amount is linked to low cash receipts from January to June. According to the timing of funds, most funding reaches provinces from September to November and could thus have already been disbursed by January.

23. Aspects of the tracking exercise to keep in mind include two crucial points. First, the fixed grant is directly passed on from the Ministry of Education to the districts and thus enters the system only at the district level. Second, in decentralized provinces discretionary resources for recurrent expenditure flow directly to the districts, without passing through the provinces.

24. The nature of the data available still implies the need for some assumptions to interpret the results. For example, recall periods for funds received are a full year, but for resources passed on the only workable recall was the preceding half-year. For spending at the province or district level, a one-month recall period was used. The pilot study revealed that these recall periods provide the most accurate information.

6

Leakage of Nonsalary and Payroll Funds

For both nonsalary and payroll, funding sources are divided into rule-based and discretionary flows. Since the division for payroll is like the division for nonsalaried funding explored in some detail earlier, the same classification is used. Specifically, staff remuneration has three distinct components: salary, allowances, and one-time benefits.[25] Both salary and allowances are paid individually to each teacher through a centralized payroll system, whereas one-time benefits are paid by the district according to the availability of funds. As with nonsalaried funding, salary and allowances are classified as the *rule-based* component of the payroll system, and one-time benefits are classified as the *discretionary* component.

RULE-BASED FUNDING

The disbursement of the *rule-based* components of school funding and remuneration of staff yields a positive finding. There is little evidence of leakage, either for disbursements to schools or for payments to staff. Table 13a shows the provincial breakdown of the fixed-grant receipts by schools. In every province except Lusaka, more than 90 percent of schools

received the funds allocated, with the remaining 10 percent evenly divided among schools that either received no money or received less than the allocated sums. In both cases it is likely that there are other explanations relating to delays in disbursement and measurement error, rather than leakage in the delivery system. In the case of schools that received no cash (particularly the 28 percent in Lusaka), the actual disbursement of this cash started only in May, five months into the academic year. Since the survey was carried out in July, one possibility is that the schools that received no money were experiencing delays in disbursement (i.e., head teachers had not yet gone to the district headquarters to receive the check), rather than the money being diverted at a higher level of the administrative hierarchy.[26] For schools that reported receiving less than the allotted amount (only two schools each in Eastern and Northern provinces), the amounts reported are between $363 and $500, which may reflect errors in reporting or recording rather than actual variation in the amounts disbursed. Thus, in the case of this fixed-grant allotment it would appear that the administration is fairly efficient and unbiased in the

Table 13a. Disbursement of Fixed-Grant Allocations, by Province
(percent)

Rule-based funds	Centralized provinces		Decentralized provinces	
	Northern	*Eastern*	*Copperbelt*	*Lusaka*
Who received either $600 or $650	90.39	94.87	94.12	71.3
Who received nothing	5.77	0	5.88	28.57
Who received less than $600	3.84	5.13	0	0

Source: ESD data.

allocation of funding resources to schools. Given the small numbers of schools that had not received this funding at the time of the survey, there does not seem to be evidence of systematic leakage or diversion of funds from the schools.

A similar story emerges with the salary part of rule-based components of payroll (table 13b). Over 95 percent of those on salary were paid on time. In all provinces, the percentage of staff that are more than six months overdue is less than 3 percent.[27]

The record of disbursements for allowances is worse, and seems to depend on the kind of allowance the teacher was supposed to receive. Considerable lags in updating the centralized payroll for new allowances is reflected in delays in disbursement. Disbursements for four different types of allowances are examined: double-class allowances, hardship allowances, student-trainee allowances, and other allowances.

Double-class allowance. This allowance is an additional amount, over and above the regular salary, given to teachers who teach more than their contracts stipulate. This allowance category has significant problems in disbursement. While, on average, less than 6 percent of teachers in all four provinces are supposed to receive this allowance, more than 75 percent of those designated to receive this allowance are at least six months overdue. On average, less than 20 percent of teachers are up to date on such receipts. It's likely that the double-class allowance was originally conceived of as an overtime allowance, where extenuating circumstances, such as the sudden departure of a teacher, forced staff members to take on extra duties. As a result, it is necessary for a teacher to apply *every semester* for renewal of this allowance. Large delays in the renewal process have led to problems in the timeliness of disbursements, and in some cases teachers have stopped applying for this particular allowance.[28]

Hardship allowance. This allowance is a clearly defined additional amount given to teachers as an incentive to teach in rural areas. This is clearly reflected in the large differences between those who are supposed to receive the allowance in predominantly rural (45 percent in Northern and 59 percent in Eastern) compared to urban provinces (14 percent in Copperbelt and 16 percent in Lusaka). For all provinces (except Copperbelt, with 42 percent) more than 80 percent of the teachers are up to date on the receipts, and less than 15 percent are more than six months overdue.

Student-trainee allowance. This allowance is given to teachers, during the second year of the teacher training program, who have been deputed to a rural school. Again, problems with delays appear. On average, only 22 percent are up to date in Northern and Eastern provinces and 46 percent in Copperbelt and Lusaka provinces. But data on the *structure* of delays does not support the hypothesis that this money is being diverted for other purposes. Very few student trainees are more than six months overdue, and as with the salary for new staff, this seems to reflect delays in updating the payroll system in Lusaka.

Other allowances. Other allowances include primarily a responsibility allowance—an amount given to senior teachers who take on additional responsibilities, such as sports coordinator. On average, 70 percent are up to date on receipts, whereas 30 percent are at least six months overdue.

These systematic delays in the disbursement of allowances might suggest leakage in the payroll system if

Table 13b. Disbursement of Salaries, by Province
(percent)

Salaries	Centralized provinces		Decentralized provinces	
	Northern	Eastern	Copperbelt	Lusaka
Those who are supposed to receive	79.46	81.18	89.11	96.88
Up to date (of those who receive)	97.78	94.29	91.80	95.48
1–3 months overdue	0	5.72	4.92	2.58
> 6 months overdue	2.22	0	3.28	1.94

Note: Two types of teachers—student trainees and volunteers—are not supposed to receive a salary, but are paid an allowance either by the government or by the community.
Source: ESD data.

the money not disbursed earned interest during the delay period. This possibility *could* be investigated further, especially by the Ministry of Finance and the Accountant-General's office, it is not possible to ascertain at this point whether these delays arise from leakage or reflect the time needed to update the centralized payroll system. As discussed above, the double-class allowance, both in conversation with teachers and through the evidence presented here, seems to be completely nonfunctional. The requirement that teachers file for this allowance at the beginning of every school term combined with the long lag time in disbursement implies that applications for this allowance often go untendered.

In general the data on the rule-based components of both school and payroll disbursements suggest that leakage problems are small (table 13c). Most schools have received the allotted fixed grant and most teachers have received salaries and well-defined allowance payments (hardship and responsibility) on time. There is some indication of delays in disbursement due to the lag in updating the payroll (particularly with regard to new staff), but it is hard to benchmark these figures without comparable data from other countries. On the whole, the Ministry of Education and the Ministry of Finance have evolved an efficient system of delivery for rule-based allocations, with few distortions or diversion of resources to unintended recipients.

DISCRETIONARY ALLOCATIONS

The positive results from the previous section are completely altered when examining discretionary allowances. Both in the case of school funding and payroll disbursements (recall that the payment of all one-time benefits is classified as discretionary) the record of school and teacher receipts of such allocations is very poor. On average, schools receive no such funds, and there are large outstanding amounts of these benefits due to teachers.

Table 13c. Disbursements of Rule-Based Allowances, by Province
(percent)

| Allowance Type | Salaries | Centralized | | Decentralized | |
		Northern	Eastern	Copperbelt	Lusaka
Double class[a]	Those who are supposed to receive	4.0	13.0	9.0	11.0
	Up to date (of those who receive)	0	27.3	5.26	11.11
	1–6 months overdue	25.0	0	10.53	16.67
	> 6 months overdue	75.0	72.73	84.21	72.22
	Average Monthly Amount Due (Median)	*60,000*	*45,000*	*52,500*	*45,000*
Hardship[b]	Those who are supposed to receive	45.0	59.0	14.0	16.0
	Up to date (of those who receive)	82.0	82.0	42.3	80.0
	1–3 months overdue	0	4	7.75	0
	> 6 months overdue	18.0	14.0	50.0	20.0
	Average Monthly Amount Due (Median)	*46,500*	*40,000*	*59,000*	*46,500*
Student trainee[c]	Those who are supposed to receive	16.0	10.0	4.0	2.0
	Up to date (of those who receive)	22.2	22.2	55.5	50.0
	1–3 months overdue	66.6	77.7	44.4	50.0
	> 6 months overdue	11.1	0.0	0.0	0.0
	Average Monthly Amount Due (Median)	*100,000*	*100,000*	*100,000*	*108,500*
Other[d]	Those who are supposed to receive	20.0	17.0	14.0	13.0
	Up to date (of those who receive)	69.5	60.0	39.3	66.7
	1–3 months overdue	8.7	6.7	25.0	0
	> 6 months overdue	21.7	33.3	35.7	33.3
	Average Monthly Amount Due (Median)	*50,000*	*40,000*	*50,000*	*41,500*

Note: a. Double-class allowance is for teachers teaching more than the stipulated number of hours in their contract.
b. Hardship allowance is for teachers teaching in rural areas.
c. Student-trainee allowance is for trainee-teachers deputed to teach in rural schools.
d. Other allowance is primarily the "Responsibility Allowance" for teachers who have taken on additional responsibilities.
Source: ESD data.

Table 14. Percentage of Schools That Receive No Funds, by Source and Location

| Funding category | Source | Centralized provinces | | Decentralized provinces | | |
		Northern	Eastern	Copperbelt	Lusaka	All provinces
Rule-based	Fixed–grant allocation	5.70	0	5.88	28.57	10.93
Discretionary	Case I–III donor pool and domestic sources	94.20	94.8	80.00	89.10	89.20
	Case IV pool: PAGE	71.15	97.44	100.00	97.06	90.66
	Case IV pool: other sources	98.00	92.31	96.00	85.29	93.96
	Other sources	98.00	97.44	98.00	85.29	95.60

Source: ESD survey data.

Discretionary school funding. Table 14 shows the percentage of schools that receive *no* funds, by source and province. The first row shows the percentage for the rule-based component. The remaining rows examine each of four potential funding sources: the Case I—Case III donor pool and domestic funding; Case IV donors administering the PAGE program; Case IV donors administering other programs, and non-GRZ and donor sources, which may include churches and NGOs. The shocking result from this disaggregation is that while 90 percent of schools receive the rule-based funding, less than 6 percent of schools receive money from all four sources of discretionary funding. Although such low receipts could be justified in the case of the Case IV pool (one could argue that Case IV donors support only a small number of schools), the fact that just over 10 percent of schools receive money from discretionary GRZ sources is troubling.

An instructive exercise decomposes receipts in schools by different sources in terms of *average shares* and *average amounts*. While the former provides information on whether a school receives money from a certain source or not, the latter provides information on *how much* schools receive from each source.

In this example, three schools each receive $10 from Source 1, but while schools 1 and 2 each receive $0 from source 2, school 3 receives $90. In this case, source 1 accounts for 100 percent of the share of funding in schools 1 and 2, but only 10 percent in

Example

School	Source 1	Source 2	Share of source 1 in school funding
School 1	10	0	100
School 2	10	0	100
School 3	10	90	10

school 3. Thus, the *average share* of source 1 is (the sum of the share of source 1) divided by 3 which equals 70 percent. Of the total contribution from each source, source 1 contributes $30 to all schools, while source 2 contributes $90. Thus, the *average amount* from share 1 is ($30 + $90)/$120 which equals 25 percent while share 2 accounts for the remaining 75 percent. In this example, the high-average shares but low-average amounts from source 1 indicate that this source of funding is received by most schools, but the amounts received are relatively small compared to source 2.

Similar to the example above, rule-based funding accounts for a large proportion of average funding-shares (88 percent), but a much smaller proportion of average funding-amounts (43 percent). Hence, public funding of schools can be thought of as the outcome of two distinct processes. Rule-based funding tends to reach every school, thus accounting for the large, average funding-share of this component. Discretionary funding reaches few schools (low funding-shares), but conditional on a school receiving such funds, average amounts are likely to be large (high funding-amounts).[29] This is further explored in table 15, which shows the average disbursement by province of rule-based and discretionary funding *conditional* on receipt. Except for Northern province, discretionary allocations are orders of magnitude higher ranging from six times (Copperbelt) to 30 times (Lusaka) their rule-based counterparts. Thus, rule-based funding consists of smaller funding amounts disbursed to *all* schools, while discretionary funding consists of larger (mean) funding amounts disbursed to *few* schools.

Discretionary transfers to teachers. A similar story emerges about the disbursement of discretionary funds to teachers.[30] Teachers may receive three basic categories of one-time benefit transfers:

Table 15. Average Amounts Conditional on Receipts, by Province
(Kwacha per pupil)

Type of funding	Centralized provinces		Decentralized provinces	
	Northern	Eastern	Copperbelt	Lusaka
Rule-based	6,951	7,326	3,305	2,132
Discretionary	7,593	25,679	21,008	62,236

Source: ESD survey data.

leave benefits, transfer benefits (allowances given to teachers when they are transferred across schools), and other benefits (notably funeral benefits). For all three categories, the percentage of teachers who have not received their allotted amount are high. Moreover, the amounts due represent 200 percent or more of their net salaries. Table 16 shows the percentage of teachers overdue for such benefit payments, as well as the average amount owed. Although the proportion of teachers with benefits outstanding are similar to those with outstanding allowances, the significant difference is in the amounts owed. While the allowances seldom account for more than 25 percent of net salary (table 13c), in the case of these benefits, outstanding amounts are between 200 percent (Northern) and 500 percent (Lusaka) of net salary.

SUMMARY

The discussion of leakage in public expenditure has relied on the classification of payroll and school funding into rule-based and discretionary components. For rule-based components of school and payroll funding, the Zambian administrative system is working efficiently, and there is little evidence that funds earmarked for disbursements are not reaching intended beneficiaries (schools or teachers).

The reverse is true for discretionary components. In the case of school funding, less than 20 percent of schools receive *any* funding from all discretionary sources combined, while for teachers there are substantial amounts overdue for one-time benefits and payments. The crucial importance of rule-based funding at the level of the school is also highlighted by the change in the relative shares by sources when moving down the administrative hierarchy. At the level of the province, the share of rule-based funding ranges from 8 to 40 percent, with a median of 12 percent. Moving down to the districts, this share increases to between 19 and 44 percent, with a median of 44 percent. Finally, at the level of the school, this share ranges from 2 to 100 percent, with a median of 99 percent. More than 75 percent of all schools received cash resources *only from rule-based* sources in the current year.

One explanation for these results advanced in the study of Uganda is based on political economy considerations (Reinikka and Svensson 2002). Since rule-based funding is clearly defined with a simple allocation rule, the capture of funds is difficult. Because discretionary funds are not associated with any rule, the pattern of funding thus reflects the difference between rules and discretion. The few schools that receive large amounts have greater bargaining power with higher levels of the administration.

NOTES

25. One-time benefits include leave, transfer, and funeral benefits.

26. This still constitutes a problem since it suggests that delays in Lusaka are much higher than for other

Table 16. Discretionary Transfers to Teachers, by Province

Salaries	Centralized provinces		Decentralized provinces	
	Northern	Eastern	Copperbelt	Lusaka
Percent who have no benefits outstanding	73.68	55.17	65.85	60.25
Percent who have at least one benefit outstanding	26.32	44.83	34.15	39.75
Average amount of outstanding benefit (K)	579,033	1,292,744	1,303,629	1,511,751

Note: Benefits include leave, transfer and other benefits (mostly funeral benefits).
Source: ESD data.

provinces, despite these schools being closest to the Ministry of Education.

27. Iterviews with teachers suggest that this is probably a reflection of delays in adding new teachers to the centralized payroll rather than outright leakage in the disbursement of salaries.

28. In a number of interviews, teachers were surprised that the double-class allowance was still operative. They had not applied for this allowance despite being eligible.

29. One particular case amounted to more than 60 times the rule-based allotment. As the introduction mentions, however, not all discretionary amounts are large. Some schools receive exceptionally large sums, while others receive smaller amounts.

30. In this case the use of the term discretionary may be a bit misleading. Teachers are supposed to receive these benefits, but the disbursement of these amounts is left to the discretion of the district.

7

Equity in Education Funding

This sections concentrates on the *equity* considerations of school funding. It examines the impact of rule-based funding on per-pupil receipts in rich and poor schools, as well as the flow of discretionary funds. Figure 5 demonstrates why an analysis of equity is critical to the understanding of school funding.[31] The average per-pupil receipts per district in the sample shows immense variation. The most-funded district, at K 80,000 per pupil, receives almost eight times the funding received by the least-funded district, and this difference arises primarily due to variation *within* provinces. A simple variance decomposition confirms that while 9 percent of variation in district funding is due to variation across provinces, 90 percent is due to variation *within* provinces. A similar result obtains at the school level. The most-funded school receives more than 3,000 times the amount received by the least-funded school, and again, most of the variation in school funding (83 percent) arises from differences *within* districts, with only 19 percent explained by variation across districts.

The following variables are used to examine funding differences across districts and schools, and the equity aspects of rule-based funding, discretionary funding, and staff remuneration. The analysis focuses on correlations between district and school funding, and three important variables.

- *Urbanization*. The analysis examines two aspects of the relationship between location and funding. First, at the school and district level, it looks at whether significant rural and urban biases in per-pupil funding emerge. Second, at the school level, it looks at whether there are different patterns of funding *within* rural and urban schools. If there are systematic differences in the cost of monitoring between urban and rural schools, this may lead to differences in funding equity depending on the location of the school. The measure of urbanization at the school level is based on the location variable in the school census (which categorizes a school as rural or urban). A district is defined as urban if 50 percent or more of the children are enrolled in a school in an urban location.

Figure 5. Variation in District Receipts
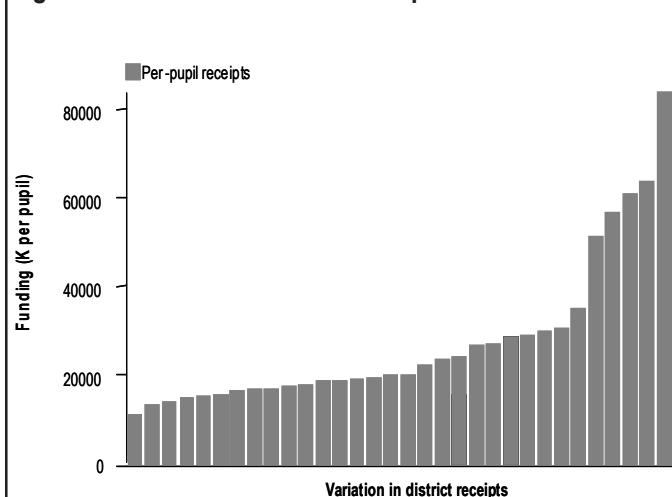
Source: ESDS.

- *Distance.* Preliminary discussions with district officers and head teachers suggested that another important source of variation in funding is the distance of the district office from the province office, and distance of the school from the district office. The analysis looks at the role of physical distance in explaining funding variation. The measure of distance is based on questions regarding the time taken (and the physical distance) to the school and the district office administering to district officers and head teachers.

- *Wealth.* Perhaps the most important correlate is the wealth of the recipients. Although the urbanization and distance variables can help explain the system of funding, correlations with school funding do not allow us to make any claims regarding the equity of the funding system. One major innovation of the current study is the use of an index based on the assets of students' households (obtained through a survey), rather than on proximate determinants, such as district-level wealth or school infrastructure, which suffer from severe endogeneity biases and measurement error.[32, 33]

Table 17 reports the summary statistics for these three variables. As expected, Copperbelt and Lusaka provinces are predominantly urban, and Eastern and Northern provinces are mostly rural. Furthermore, urban schools are richer than rural schools, with more than a one standard deviation difference in the value of the index.[34] Moreover, schools in Northern and Eastern province tend to be further from district and province offices than their counterparts. Finally, Copperbelt and Lusaka are the richest provinces, even after controlling for school location. The asset index for pupils in schools located in the former two provinces are one standard deviation higher than in Northern and Eastern province. Although the differences are smaller after conditioning on the location of the school, they remain significant.

EQUITY IN RULE-BASED FUNDING

Another aspect of equity involves the variation in rule-based funding at the district and school level, and how this relates to urbanization, distance, and wealth. Given that there is no evidence of leakage in the distribution of rule-based funds, the equity aspects of rule-based funding will depend crucially (both at the district and the school level) on the relationship between school size and these three variables. At the district and school levels, schools with smaller average enrollments will receive higher funding.

Table 18 examines the relationship between enrollment and the three variables of interest. The variables are summarized by three terciles of enrollment. At the district level, schools with low enrollment are significantly poorer and less urban. When moving from those districts with the lowest average enrollments to those with the highest average enrollments, the standard deviation difference in the asset index is more than one, and there is a 64 percent increase in the number of urban schools. Schools with lower enrollments are almost one and one-half standard deviations poorer than those with high enrollments. Low-enrollment schools are also predominantly rural (95 rural percent compared to 18 percent urban) and tend to be further from administrative offices (less than 5 percent are within 5 km compared to 62.3 percent for the high-enrollment schools).

Table 17. School and District Characteristics, by Province

Variables	Centralized provinces		Decentralized provinces	
	Northern	Eastern	Copperbelt	Lusaka
Percentage of urban schools	7.69	5.13	72.70	59.46
Percentage of rural schools	92.31	94.87	27.30	40.54
Districts with at least 50 percent urban schools (percent)	0.00	0.00	60.00	50.00
Schools with the district office less than 5 km away (percent)	23.00	17.90	33.90	29.70
Schools with the province office less than 5 km away (percent)	7.70	5.20	16.00	24.30
Average Wealth Index of Urban Schools	0.64	0.34	0.80	0.71
Average Wealth Index of Rural Schools	–0.50	–0.67	–0.32	0.15

Source: ESD data.

Table 18. Enrollment, Urbanization, Wealth, and Distance

Level	Urbanization, wealth, and distance	Enrollment in schools		
		Low	Medium	High
District	Average district wealth	−0.52	0.14	0.67
	Schools in urban locations (percent)	2	4	66
School	Average enrollment	275	719	1,695
	Urban schools (percent)	5	25	82
	Schools less then 5 km from the district office (percent)	4.84	22.11	62.3
	Schools less than 5 km from the province office (percent)	5.2	13.1	21.5
	Average wealth index	−0.66	−0.07	0.75

Source: ESD data.

Note the large differences in enrollment across these three categories. Moving from the lowest to the highest average enrollment terciles increases enrollment by almost a factor of six. The table thus allows us to naturally think of districts and schools as falling in one of two clusters: (1) low enrollment, poor, and rural; and (2) high enrollment, rich, and urban.

This immediately suggests that the rule-based allocation, as implemented in the Zambian context, will be progressive. Rich (and urban) districts and schools will receive *less* per-pupil funding than poor (and rural) schools, since they will tend to have higher average enrollments. Tables 19a and 19b confirm this intuition. Districts with low average wealth receive more than double the amount of high average wealth districts, and urban districts receive half the amount received by rural districts. At the school level, these differences are even larger: schools with children from low-income households receive three times more than those with children from high-income households, and rural schools receive two and one-half times more than urban schools. A simple test of differences in means shows that these differences are significant. Further, the result that poorer schools receive higher per-pupil funding continues to hold in a multiple regression framework, where the asset index is interacted with the location of the school. Thus even *within* rural (urban) locations, rich rural (urban) schools receive significantly less than poor rural (urban) schools (the coefficient on the interaction varies from K 1,800 to K 2,100 depending on the specification used and is always significant).

Thus, rule-based allocations have a progressive impact on school funding, at least in terms of equity, and is propoor even after controlling for rural-urban differences. Because of the inverse relationship between wealth and enrollment, as well as urbanization and enrollment, a one standard deviation decrease in the asset index is associated with almost a 100 percent increase in per-pupil funding. In combination with the findings on the allocation of this funding component, it appears that rule-based funding has had a positive impact on school funding in Zambia. The amount allocated has reached almost every school, and poorer schools have received higher per-pupil amounts than their richer counterparts.

EQUITY IN DISCRETIONARY FUNDING

The previous section demonstrates the progressive impact of rule-based funding. But as the tracking exercise previously established, such funding accounts for only 30 percent of the total funds in the system. Overall equity in the educational system will also depend on the allocation of discretionary funds. If these funds are allocated primarily to poor districts (schools), the progressive nature of rule-based funds will be further accentuated. But if discretionary funds are primarily distributed to richer districts and schools, the overall progressive nature of the

Table 19a. Equity in Rule-Based Funding at the District Level
(Kwacha per pupil)

Urbanization, wealth, and distance	District level funding
Low average wealth	13,429
Medium average wealth	11,392
High average wealth	5,754
Districts with 50 percent or more schools urban	5,206
Districts with 50 percent or more schools rural	11,394

Note: District averages weighted by primary enrollment.
Source: ESD data.

Table 19b. Equity in Rule-Based Funding at the School Level
(Kwacha per pupil)

Urbanization, wealth, and distance	Rule-based funding
Pupils from low-income households	8,276
Pupils from middle-income households	4,063
Pupils from high-income households	1,868
Urban schools	2,150
Rural schools	6,223
Less than 5 km from the district office	2,380
More than 5 km from the district office	5,716
Less than 5 km from the province office	1,911
More than 5 km from the province office	5,137

Source: ESD data.

funding system may be severely undermined. To address this concern the methodology used is similar to the previous section. Attention is restricted to the relationship between discretionary funding and urbanization, distance to administrative offices, and the household wealth of children attending the school.

The results from this exercise are presented in tables 20a and 20b. First, at the level of the district, discretionary funding remains progressive, but much less so than rule-based allocations. While low average wealth districts receive almost equal amounts from discretionary and rule-based allocations, districts with high average wealth now receive nearly twice as much discretionary funding compared to rule-based funding. Further, districts that are more urbanized receive less than those that are more rural, but the difference is smaller than

Table 20a. Equity in Discretionary Funding at the District Level
(Kwacha per pupil)

Urbanization, wealth, and distance	District level funding
Low average wealth	13,046
Medium average wealth	9,101
High average wealth	8,341
Districts with 50 percent or more schools urban	7,984
Districts with 50 percent or more schools rural	10,671

Note: District averages weighted by primary enrollment.
Source: ESD data.

that for rule-based funding. Thus, discretionary flows from the province to the district continue to favor poor districts, but funding differences between rich and poor districts are much reduced. Consequently, at the district level it is not possible to reject the hypothesis that discretionary transfers from provinces and the center are the same across all districts.

At the level of the schools, equity in discretionary funding is more complicated. Table 20b shows that differences in the probability of receipts by distance from an administrative office and the location of the school tend to be small, and if present, tend to favor more disadvantaged schools.[35] These results, however, are not statistically significant. In terms of the asset index, schools with children from middle-income (34 percent) households have a much higher probability of receipt compared to those from either low- (15 percent) or high-income households (23 percent), although again, these differences are not statistically significant.

Table 20c further decomposes the allocation of discretionary funding *within* urban and rural schools.

Table 20b. Equity in Discretionary Funding at the School Level

Urbanization, wealth, and distance	Discretionary receipts (Kwacha per pupil)	Probability of receiving any discretionary funding
Pupils from low-income households	1,229	0.15
Pupils from middle-income households	11,759	0.34
Pupils from high-income households	5,986	0.23
Urban schools	4,076	0.24
Rural schools	7,594	0.24
Less than 5 km from the district office	1,330	0.31
More than 5 km from the district office	8,375	0.21
Less than 5 km from the province office	962	0.18
More than 5 km from the province office	7,055	0.25

Source: ESD data.

The disaggregation between rich and poor schools within urban (rural) locations suggests that for schools in urban areas there is no difference in probabilities of receiving discretionary funding by either distance to administrative offices or the wealth of the pupils.[36] Among rural schools, however, there is a statistically significant difference between schools with richer students compared to those with poorer students, and a positive (but not significant) difference between schools that are closer to the district office compared to those further away. This difference in receipt probabilities converts into a significant difference in the amounts received as discretionary payments in rich (K 13,893 per pupil) compared to poor (K 1,295 per pupil) rural schools.

In fact, the difference in discretionary funding between rich and poor schools in rural areas is large enough to overturn the progressive nature of rule-based allocations, with the rich (K 18,129 per pupil) receiving almost double the amount received by the poor (K 9,507 per pupil) in rural areas. Contrast this with urban schools. Although the progressive nature of rule-based funding is reduced once discretionary allocations are taken into account, greater funding of poorer schools is maintained with richer schools (K 5,068 per pupil) receiving marginally less than poorer schools (K 7,430). When discretionary and rule-based components are combined it alters the nature of funding equity in the Zambian educational system. Note, however, that all nonsalaried funding in basic and primary schools accounts for a small percentage of total funding, with the rest paid out in staff compensation. The discussion of equity now turns to the issue of staff remuneration using the same three variables.

EQUITY IN STAFF COMPENSATION

Although teachers are allocated to schools, they may request transfers or leave the workforce.[37] As a result, rural schools (and schools that are far from the road) have a smaller number of teachers than their urban counterparts.[38] As a result, differences in staff funding stem either from systematic salary differentials *or* systematic class-size differentials (or a combination of both) across different schools. These issues are examined using data on teacher's salaries and allowances collected as part of the survey.[39]

The results are presented in tables 21a and 21b. The first column of table 21a shows only the salary component of staff remuneration. Along all dimensions, per-pupil funding of more privileged schools is higher. Richer schools receive more than double the amount (K 8,318 per pupil) poor schools receive (K 3,963 per pupil). Similarly, schools in urban areas and those closer to administrative offices receive one and one-half times their counterparts. This difference is partially mitigated when adding in allowances that teachers are *supposed* to receive (column 3), but re-emerges when teacher allowances *actually* received are considered (column 4).

Part of this inequity arises from salary differentials across teacher types. The greater use of teacher trainees in rural and poorer schools (14.4 percent in rural schools compared to 6.4 percent in urban schools) implies that the average salary bill per student is lower in rural schools and in schools with

Table 20c. Equity in Discretionary Funding at the School Level, by Location

	Rural locations		Urban locations	
	Discretionary receipts	Probability of receiving any	Discretionary receipts	Probability of receiving any
Urbanization, wealth, and distance	(Kwacha per pupil)	funding	(Kwacha per pupil)	funding
Pupils from poorer households	1,295	0.16	5,003	0.22
Pupils from richer households	13,893	0.32	3,178	0.25
Less than 5 km from the district office	1,442	0.33	1,271	0.29
More than 5 km from the district office	8,772	0.23	7,364	0.17
Less than 5 km from the province office	0	0	1,113	.21
More than 5 km from the province office	7,803	0.24	5,355	0.25

Note: The classification of schools by wealth is done *within* location in this table, so that schools that are rich in the rural locations may be middle-income in the entire sample, and schools that are poor in the urban locations may similarly be middle-income in the entire sample.
Source: ESD data.

Table 21a. Equity in Per-Pupil Staff Remuneration at the School Level
(Kwacha per month)

		Per-pupil total (salary + allowances)	
Urbanization, wealth, and distance	Per-pupil salary	What teachers are supposed to receive	What teachers actually receive
Pupils from low-income households	3,963	5,128	4,445
Pupils from middle-income households	5,190	6,334	5,755
Pupils from high-income households	8,318	8,997	8,662
Urban	7,308	7,755	7,423
Rural	5,065	6,344	5,728
Less than 5 km from the district office	7,422	8,062	7,654
More than 5 km from the district office	5,198	6,332	5,750
Less than 5 km from the province office	7,702	8,169	7,760
More than 5 km from the province office	5,602	6,660	6,113

Source: ESD data.

children from poorer households, an effect that is further exacerbated by higher class sizes. Table 21b shows the interaction of these two effects. The average class size is significantly different for rural and poorer schools. Moving along a continuum from schools with children from low- to high-income households, average class size decreases from 64 to 39, and moving from urban to rural schools, class size increases by almost 50 percent from 43 to 61. Significant differences in salaries also exist. The average teacher salary in a low-income school is almost 25 percent lower than a high-income school, and in rural schools salaries are16 percent less than in urban schools.[40]

SUMMARY

This section explores the equity aspects of rule-based and discretionary funding in the Zambian education system. The results show that the rule-based component of educational funding is progressive with significant positive differences in per-pupil receipts both at the district and school levels and between rich and poor schools. The findings for discretionary funding suggest a disturbing trend. Expenditure flows from provinces to districts are only mildly progressive, and hence total receipts at the district level retain a progressive nature, although this is smaller than what it would be under rule-based funding only.

Once the money reaches the district, discretionary funding in rural schools is disbursed to wealthier schools with higher probabilities. Because the discretionary disbursements are larger than the rule-based allotment, the progressive nature of the funding system disappears. Funding that flows from the district to the school is wealth

Table 21b. Equity in Per-Pupil Staff Remuneration, Class Size and Salaries

Urbanization, wealth, and distance	Average teacher salary (Kwacha per month)	Average class size
Schools with pupils from low-income households	212,135	64
Schools with pupils from middle-income households	235,606	60
Schools with pupils from high-income households	277,750	39
Schools that are urban	270,107	43
Schools that are rural	228,195	61
Schools less than 5 km from the district office	273,929	41
Schools more than 5 km from the district office	228,823	60
Schools less than 5 km from the province office	286,344	41
Schools more than 5 km from the province office	235,976	56

Source: ESDS.

neutral (and potentially regressive in rural regions). Factoring in staff compensation, the results show that the *only* progressive component of the Zambian education system is the rule-based allocation. Once teacher funding is added in, the entire education funding system becomes regressive, with poorer schools receiving less than richer schools.

These findings are summarized in figure 6. The horizontal axis is the cumulative wealth distribution and the vertical axis is the share of public funding that each group receives. Each curve in the graphs shows the share of public funds that accrues to (for instance) the poorest percent of the population. The line of perfect equality is the diagonal that shows funding shares if all funds were distributed equally among the population.

The graphs in figure 6 clearly demonstrate the following:

- *Rule-based funding is always progressive with higher shares for the poorer schools.* The curve always lies *above* the diagonal so that (for instance) in the entire sample, the poorest 20 percent of the population receives 38 percent

of all rule-based funding. Such funding is progressive not only for the entire sample of schools, but also within urban and rural schools.
- *Staff compensation is always regressive*, with the curve lying below the diagonal for all three samples (the entire sample, and within urban and rural).
- *Discretionary funding is regressive in the entire sample.* A closer look at such funding within urban and rural schools shows that discretionary funding is progressive within urban schools and regressive within rural schools.

If there are huge funding differentials between schools (for instance, the rule-based component implied that per-pupil funding could vary from K 1,889 to over K 8,000 depending on the school), and some schools receive a lot less than others, does household spending adjust? Evidence that household spending is crucial for schools can be obtained from a survey of head teachers regarding potential funds that the school could access during a normal school year. For every issue that was asked in the survey

Figure 6. Inequalities in Public Funding in Basic Zambian Education
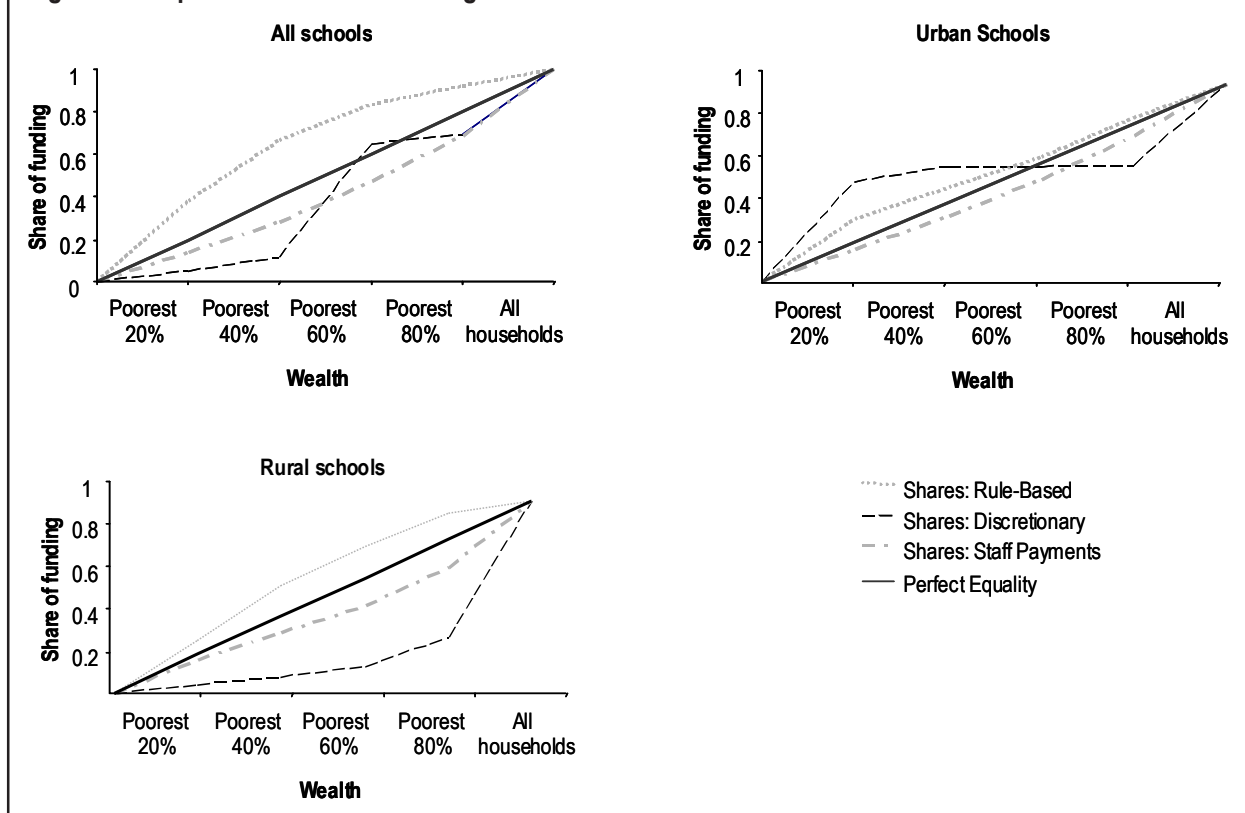
(ranging from money to repair a borehole to money for buying chalk and textbooks), *at least* 60 percent of all head teachers cited community sources and parents as the primary source of funding. Traditionally, these funds were raised through Parent Teachers Association (PTA) fees. However, with the recent ban on such fees, parents may have shifted spending on education to *within* the household. Prior to the ban, funding might have consisted of contributions to the school fund. After the ban, households are now spending more on private educational goods, such as textbooks.

NOTES

31. A concern that arises from the restricted emphasis on cash flows is the following: if provinces and districts systematically provide more in-kind transfers (rather than cash) to a particular type of district or school, the results would not accurately reflect the equity implications of school funding. For instance, if districts provided only cash to rich schools nearby, but educational materials to poor schools further away, by focusing only on cash we would find large differentials. The data on the distribution on educational materials shows that this is not the case. The receipts of such materials has been very small, and if anything, this information further strengthens the results.

32. For instance, one measure of wealth often used is the infrastructure of the school. As the preceding section clearly shows, since school infrastructure is a combination of household and public contributions, if the government has a stated policy of systematically subsidizing poorer schools, measures of wealth based on this variable will severely understate the difference between rich and poor schools.

33. The constructed asset index is a standardized (mean 0 and standard deviation 1) distribution constructed using item response theory methods. The appendix provides details of the index and its properties. While there have been some concerns about the use of asset indexes, these methods allow us to gauge the accuracy of the index through computation of the standard errors at each point of the wealth distribution. The results from this exercise are presented in the appendix. The main finding is that the index is fairly reliable with standard errors less than 0.2 for most values of the index, reaching a maximum of 0.6 for the poorest households. Across provinces, the asset index suggests that Eastern and Northern provinces are the poorest, with a difference of more than one standard deviation from Copperbelt and Lusaka. This is also in line with the LCMS (World 1998) that suggested poverty rates of 53 percent in Lusaka, 65 percent in Copperbelt, 79 percent in Eastern, and 81 percent in Northern.

34. Recall that the index is a standardized distribution with a mean of zero and standard deviation of one.

35. For instance, 21 percent of schools less than 5 km from the district office receive such funds compared to 31 percent of schools further away.

36. Wealth terciles are computed within urban and rural samples, so that a school classified as middle-income in the full sample may be classified as rich within rural areas (or poor within urban areas).

37. The lack of housing—one reason to request a transfer—is the norm rather than the exception, with only 32 percent of teachers reporting that they are living in staff housing.

38. This has been a consistent cause for concern and the Ministry of Education has taken several steps, including the establishment of hardship allowance and field-based training for those in training college, to increase the supply of teachers to rural regions.

39. As part of the survey, teachers for grades 5 and 6 were interviewed. We compute staff funding by taking the average salary of all teachers interviewed in a given school. This is then multiplied by the total number of teachers to provide the total staff bill, and finally divided by total school enrollment to provide the per-pupil staff bill for the school. This estimate will be biased if there are systematic differences between grades 5 and 6 teachers and those teaching other grades. This issue is currently under investigation using data from the school census.

40. This is not due to differential salaries per se, but to the significant presence of trainee teachers with lower net payments in rural areas—for example, they account for 16 percent of all teachers interviewed in Northern province.

8

Private Expenditures for Education

This section explores how household spending impacts funding equity in the Zambian education system, and presents preliminary results from a household survey that complements the public expenditure tracking method.

## HOUSEHOLD CONTRIBUTION TO SCHOOLS

The issue of school funding from household contributions is at an important juncture in Zambia. Anecdotal evidence from a number of studies during the 1990s suggested that schools had started charging higher PTA fees and were using direct and more subtle means to ensure that students who could not pay these fees stayed home. The concurrent decline in net enrollment during the same time period led to an association between enrollment and PTA fees. Parents were not sending their children to school because they could not afford PTA fees. In April 2002 (three months prior to the fielding of the ESDS), PTA fees were abolished for primary and basic schools (although secondary schools could and do continue to charge fees) and the government reiterated its commitment to free basic education. This was the final step in a reversal from the former era of user fees, and schools became limited to fundraising though community fetes and events, where private funding could not be tied to any specific child.

Since the announcement was made in the middle of the school term (which starts in January), some families had already paid the PTA fees and this is reflected in figure 7 as the collection of positive fees by most schools. As the graph shows, the result of this announcement has been dramatic. From a high point of K 10,554 in 2000, fees per pupil have dropped to an average of K 3,269 per school at the time of the survey.[41]

However, the experience of different provinces and locations has been very different from the average experience shown in figure 7. A disaggregation in the decline in PTA fees by province and location (figure 8) shows that major declines have occurred in Lusaka and Copperbelt provinces, primarily in urban areas. In the rural areas of Northern and Eastern provinces, PTA fees were *already* minimal to start with so the abolishment of such fees had little impact. The major declines in urban Copperbelt and Lusaka account for 67 percent of the total decline in fees.

Figure 7. Declining Fees since 2000

Fees per student

Source: ESDS.

51

Figure 8. Fee Decline by Province and Location
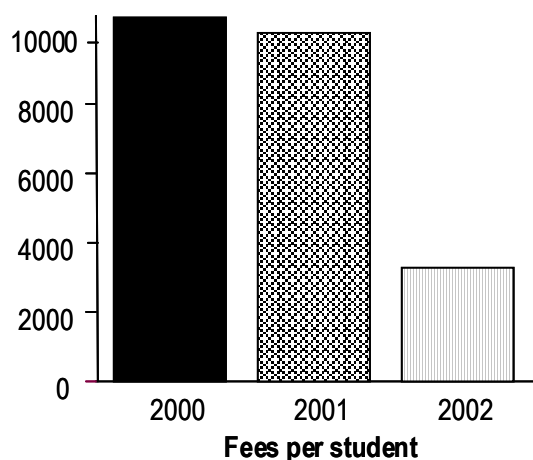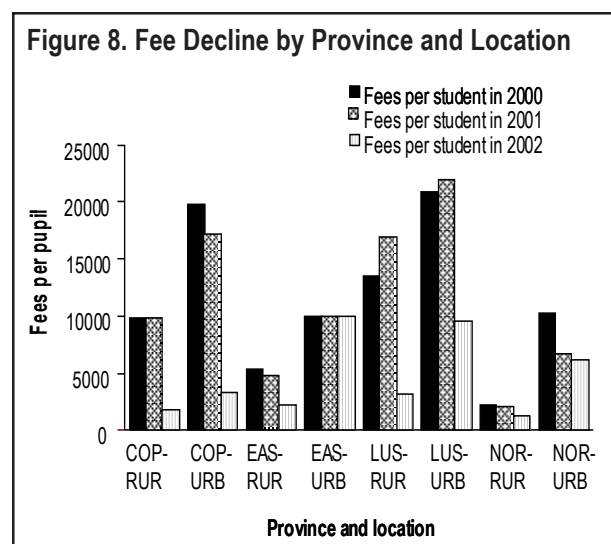
Adding in the rural schools in these provinces takes the total up to 87 percent, with less than 14 percent of the total decline being accounted for by Eastern and Northern provinces (table 22).[42]

Table 22. Decomposing the Decline in Fees

Province	Urban	Rural
Copperbelt	46.63	7.77
Lusaka	19.27	13.77
Eastern	0	8.4
Northern	0.77	3.38

Note: This table shows that percent decline in PTA fees that can be attributed to each province/location combination.
Source: ESD data.

Finally, anticipating the discussion on equity, figure 9 shows the relationship between the average wealth of children and PTA fees in the school.[43] The vertical axis corresponds to predicted PTA fees and the horizontal axis plots the value of the average wealth index for the school. By 2002 this relationship had completely changed from 2000 (and to a slightly lesser degree in 2001), where a one standard deviation increase in the average wealth of children attending the school led to almost a K 10,000 increase in PTA fees. In 2002 this relationship is much weaker with a similar increase in average wealth resulting in less than a K 1,000 increase in PTA fees.

The changes in household contributions is summarized in table 23, which provides a detailed breakdown, by province, of every funding source available to schools. For all provinces, but especially for Eastern and Northern provinces, public funds are the most important financial flow to the school. Public funds comprise 96 percent of the total funding in Eastern province (the most reliant on public funds) and 82 percent in Lusaka (the least reliant on public funds). Of these public funds, between 24 and 40 percent arrive in the form of staff remuneration, with the rest split between rule-based and discretionary allocations. Once private funding is taken into account, schools in Northern and Copperbelt provinces seem to have the lowest access to funds at the school level (K 15,400 per pupil), while those in Eastern province are slightly better off (K 18,085 per pupil). Finally, schools in Lusaka are the best-funded, receiving an average of K 35,000 per pupil, and this is a result primarily of high discretionary (K 18,300 per pupil) and private funding (K 6,810 per pupil) at the school level.

The decreased importance of household contributions to school funding suggests that the addition

Table 23. Public and Private Sources of Funding
(percent of total in brackets)

	Public funding (Kwacha per pupil)			Household funding (Kwacha per pupil)	
Province	Staff remuneration	Discretionary funds	Rule-based funds	Cash raised from households	Total funding
Copperbelt	6,759 (43.0)	3,296 (20.9)	3,111 (19.8)	2,546 (16.2)	15,711 100
Lusaka	8,465 (24.1)	1,8331 (52.2)	1,523 (4.3)	6,811 (19.4)	35,130 100
Eastern	5,477 (30.3)	4,609 (25.5)	7,326 (40.5)	673 (3.7)	18,085 100
Northern	5,031 (33.2)	2,629 (17.3)	6,551 (43.3)	944 (6.2)	15,154 100

Figure 9. The Relationship between PTA Fees and Wealth, 2000–2002

Source: ESD study.
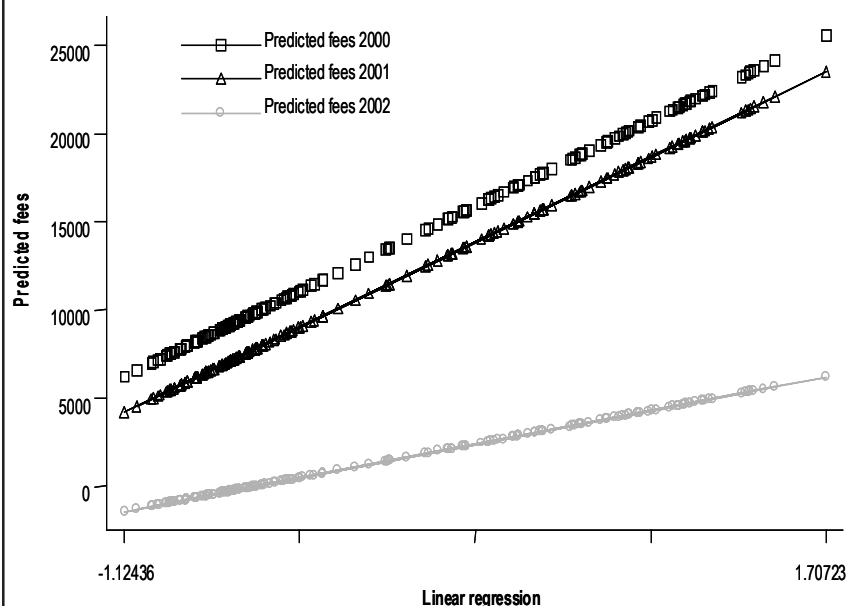
this increases to K 3,100 in the case of public funds. Similarly, schools that are closer to the district office raise K 300 more per pupil, but this difference is dwarfed by the K 8,200 difference in public funds within the same categories. Consequently, the addition of private contributions to schools in educational funding does *not* exacerbate differences in funding between rich and poor schools by any significant amount (or alter results from section 7).

This does not imply that household expenditures have no impact on equity. And the key point to recognize is the important difference between household contributions to school funds, and household expenditure on education. Even if the former is small compared to total funding in the system, the latter can be large and have significant equity implications. In fact, the latter would be expected to increase precisely when the former is small. An example clarifies this point. In a system with PTA fees, these fees may be used to buy textbooks that are then distributed to students. In a system with zero PTA fees, however, the household may still buy textbooks. So it could well be that textbooks are now bought and

of such sources of funds should not alter results regarding the equity of school funding obtained in the previous section. Table 24 shows that this is indeed the case. Using the same variables as before, we find that richer schools closer to administrative offices and located in urban areas raise more money through private sources. However, the difference between any two categories in private funding is always much less than that across public funding. For instance, the difference between schools with poorer and richer households in private funding is K 1,300 per pupil, and

Table 24. Equity in Public and Private Funding at the School Level
(Kwacha per pupil)

Urbanization, wealth, and distance	Public funding (Rule-based, discretionary and staff allocations)	Private funding (PTA, registration, sports and other fees)
Pupils from poorer households	13,863	1,371
Pupils from richer households	16,919	3,102
Urban	19,473	3,202
Rural	13,203	1,720
Less than 5 km from the district office	21,266	2,474
More than 5 km from the district office	13,019	2,134
Less than 5 km from the province office	10,424	3,338
More than 5 km from the province office	16,038	2,085

Note: This table shows the per-pupil funding raised at the school level from public and private sources.
Source: ESD survey.

Table 25. Fee and Nonfee Expenditures, by Province
(Kwacha per pupil)

Province	Mean fees per child	Mean nonfee expenditure per child
Copperbelt	5,825	18,458
Lusaka	5,083	20,459
Eastern	2,453	15,018
Northern	1,063	9,854

Source: ESD survey.

consumed at the household rather than the school level. While private spending in both systems could be higher for the rich compared to the poor this would be picked up at the school level in the first case, but similar data in the second case would lead to the erroneous conclusion that the contribution of household spending to funding equity is small. To examine the role of private educational spending on equity it is necessary to disaggregate spending at the household level.

This immediately creates two problems. The first is that data on household expenditures cannot be obtained from a survey of schools. Such information must be gathered at the level of the household. And to create a total picture of public and private expenditure, it is critical to have *matched* data between households and schools, so standard household surveys will not work. We would need to know not only the level of household expenditures on education, but also the level of public funding in the school where the child is currently enrolled.[44]

The current survey deals with this problem in an innovative way. Using Geographical Information Systems the location of every school was plotted and households were surveyed only in those areas where schools were sufficiently far apart. Thus the data is based on the household survey conducted alongside the school survey in a limited sample of schools.[45]

This technique solves both problems arising from the need for matched data between schools and households, and the more technical problem detailed in note 45. One problem with this technique is the lack of widely separately schools in urban areas. The sample of households is exclusively chosen from rural and remote regions of the school sample; hence the results should be understood as relating only to the sample of schools

matched to households and not for the entire survey.

HOUSEHOLD-LEVEL SPENDING ON EDUCATION: METHODOLOGY

Our concern regarding the inability of household contributions at the school level to accurately capture differences in household-level spending on education is laid out in table 25 and figure 10. Table 25 decomposes household expenditure on fee and nonfee items at the level of the household.[46] As this decomposition shows, nonfee expenditures are several times higher than current expenditure on fees, and this difference is consistent across provinces. Households in Copperbelt province (which report the smallest proportional difference) spend three times as much on nonfee items compared to fee items, and this increases to a factor of nine in Northern province. Finally, as figure 10 shows, these expenditures are a large potential source of inequalities in schooling inputs, with the rich spending far higher amounts than the poor.

The first step to incorporating private expenditure into the analysis of equity in school funding is to continue with the previous methodology of examining the association between funding and wealth for the households in the household survey after incorporating spending on education at the household level.[47] The second step is to examine a related issue. To the extent that there is *substitution*

Figure 10. Household Spending on Education by Wealth Terciles
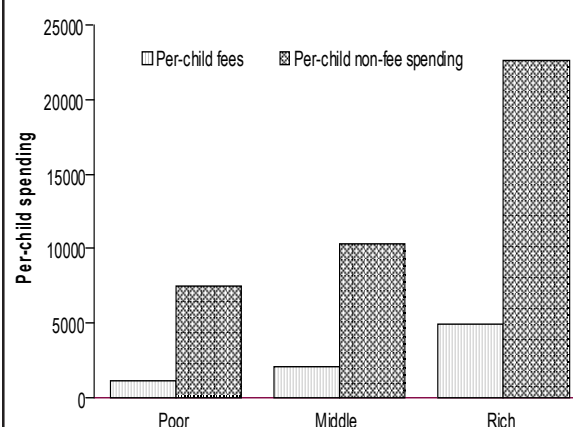
Source: ESD study.

between nonfee spending at the household level and public funding at the school level, it may be possible to increase funding equity by increasing disbursements of such funds to schools. The table below shows two different scenarios of public and private expenditures.

Under both scenarios, moving from a low to a high level of public funding decreases expenditure at the household level. However, under the first scenario, this decline is the same for both rich and poor households. Households decrease expenditures by exactly the amount of the increase in public funds. In this case increased public funding does not increase total expenditure for education and does not change the equity of public funding. Under the second scenario, however, while again the level of household expenditures decreases with an increase in public funding, the decline does not equal the increase in public funds. As a result total funding in the system increases, and since the poor increase total expenditure on education (public + private) *more* than the rich, this improves equity in the funding system. Clearly the impact of public funding on equity will thus depend on the exact relationship between public funds and household expenditures, and theoretically either scenario is possible.[48] We therefore look at two related questions: (1) will an increase in external funding decrease household schooling expenditures? and (2) will the extent of this decrease differ by the wealth of the household?

The next two sections examine the implication of private spending for equity, and the issue of substitutability between private spending and public funds.

The Impact of Private Spending on Equity

Table 26 shows the results of incorporating household-level spending on funding equity. The first two columns show public funding per child in the household survey, while the next two columns show private funding, disaggregated by nonfee and fee expenditures per child. One effect of the sample of remote schools is that there is a much smaller difference between the poorest (K 3,951 per pupil) and the richest (K 4,530 per pupil) quintile in salaried funding per pupil. Furthermore, there is also no difference in the rule-based component of funding across quintiles, although differences in discretionary funding result in greater public funding for the top 40 percent. The fee component of private funding increases fourfold as we move from the poorest to the richest quintile (K 1,164 to K 4,109), but these amounts tend to be relatively small compared to other sources of funds in the system. The single largest source of inequality comes from nonfee household expenditures, which doubles from K 8,659 per child to K 19,563 per child. Since this component is almost six times as large as the fee component, it accounts for a larger share of inequality in the funding system.

Figure 11 clearly shows the relationship between funding and wealth. It plots the modified Lorenz curves for public and private funding, where the horizontal axis represents the share of the population and the vertical axis represents the share of funding. While there is inequality in both public and private funding, inequality in the private funding *dominates* (the Lorenz curve is always further below the diagonal).

The addition of private expenditures to public funds exacerbates funding inequalities in the educational system. For the sample of schools with household survey data, the bottom 50 percent receive just over 40 percent of all funding, if we don't add private funds. Once we factor in spending at the household level, this share decreases to 34 percent, suggesting

Example

Scenario	Level of public funding	Per-pupil public funding	Per-pupil private spending (rich)	Per-pupil private spending (poor)	Equity: percent of total spending accounted for by the rich
Scenario 1: Increase in public funding does not change equity	Low	1,000	9,000	4,000	66
	High	3,000	7,000	2,000	66
Scenario 2: Increase in public funding increases equity	Low	1,000	9,000	4,000	66
	High	3,000	8,000	3,000	64

Table 26. Equity in Public and Private Spending
(Kwacha per child)

| | Public funding | | Private funding | | |
| | Public (nonsalary) funding | Salary funding | Nonfee expenditure on child | Fee expenditure on child | Total funding |
Wealth quintile					
Poorer households	14,831	3,951	1,164	8,659	28,605
Richer households	23,089	4,530	4,109	19,563	51,291

Source: ESDS.

that even among the relatively poor households in this particular sample, funding inequalities are maintained and further strengthened through household-level inputs. The next section examines the relationship between public and private funding, and whether these inequalities could be offset through increases in public funding.

The Substitutability of Private for Public Funding

This section examines the relationship between public funding and private expenditures, with two related questions in mind. First, to what extent are public and private funds substitutable (so that households decrease spending on education when public funding increases)? Second, to what extent does an increase in public funding *differentially* impact private spending across rich and poor households? The household data is used to examine the impact of school funding on household nonfee expenditures. The sample is divided into those that receive high per-pupil funding and those that receive low per-pupil funding.[49]

Table 27 shows the startling difference in the means of household spending when we move from a school with low per-pupil funding to one with high per-pupil funding: nonfee expenditures more than halves from K 20,000 to K 9,400 when funding increases from K 3,600 to K 11,500. Moreover, total funding in the system (the sum of private and public funding) actually *decreases* across schools with low and high public funding.[50] Similar results obtain in a multiple regression framework:

Log of household nonfee expenditure = Constant + a. Wealth + b. School Funding + c. School Funding x Wealth + d. Village Wealth

Here the wealth variable is used to classify households into different income groups based on the asset index of household possessions. The term *school funding x wealth* captures the interaction of public funds with wealth. If this term is positive and significant it would imply there are *differential* impacts of public funding across different income groups. Finally, the village wealth variable is the average wealth of the village that captures, to a limited extent, other characteristics of the village that may be correlated with household expenditure on schooling.[51]

Table 28 shows the results from this estimation. Three specifications are presented. The first column uses wealth terciles and the second column uses a continuous wealth index. Since some households report zero fungible expenditures, and the dependant variable is the log
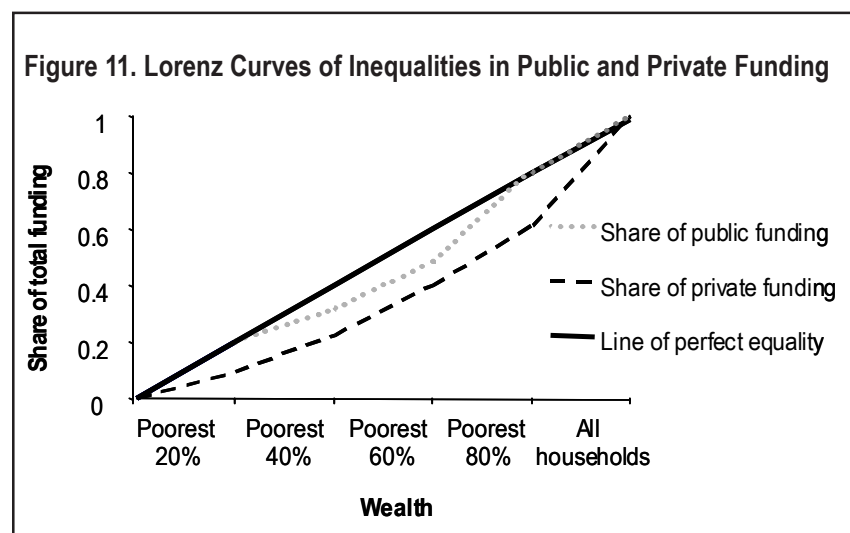
Figure 11. Lorenz Curves of Inequalities in Public and Private Funding

Table 27. Substitutability between Public and Private Spending

Public funding (rule-based)	Mean public funds received (Kwacha per child)	Mean household expenditure (Kwacha per child)	Mean wealth	Average net enrollment rate
Low	3,633	20,085	.005	0.892
High	11,547	9,440	−.139	0.890

Source: ESDS.

of this variable, the linear regression treats these households as if they were spending K 1.00. This may result in biased estimates, and to check for robustness the third column presents the results from the Tobit specification with left censoring at zero.

The results confirm that households significantly reduce spending on nonfee expenditures if their children go to schools that receive high public funding. Further, this difference is similar across income groups with a small and insignificant coefficient on the interaction term between wealth and public

funding. To characterize the coefficients, recall that the asset index is a standardized (0,1) distribution, so that the roughly equal size of the coefficient on external funding and the asset index implies that households who send their children to a school that moves from low to high external funding reduce spending, similar to what it would be if their wealth was reduced by one standard deviation.

The results show household spending is an important source of inequality across households. There is also evidence of substitution between

Table 28. Household Expenditure and Public Funding

	(1) Linear regression: wealth categories	(2) Linear regression: asset index	(3) Total regression
High external funding	−0.860	−0.746	−0.885
	(1.50)	(3.67)[b]	(2.34)[a]
Medium wealth household	0.821		0.853
	(1.41)		(2.43)[a]
Rich household	1.554		1.582
	(2.96)[b]		(4.54)[b]
Interaction: high funding and medium wealth	0.341		0.359
	(0.48)		(0.77)
Interaction: high funding and high wealth	0.071		0.086
	(0.11)		(0.19)
Mean village assets	0.484	0.400	0.489
	(2.02)	(1.61)	(2.12)[a]
Asset index		0.731	
		(3.32)[b]	
Interaction: high funding and asset index		0.151	
		(0.56)	
Constant	8.129	8.929	8.101
	(16.29)[b]	(47.55)[b]	(25.54)[b]
Observations	436.00	436.00	436.00
R-squared	0.20	0.21	

Robust *t*=statistics in parentheses clustered at school level, provincial level dummies included.
a. Significant at 5 percent
b. Significant at 1 percent
Note: This table shows the relationship between external funding and private household expenditures using three different specifications: a linear regression with wealth as a categorical variable, a linear regression with wealth as a continuous asset index and a tobit regression, left censored at 0.
Source: Based on data from the ESD survey.

public funding and household expenditures, with higher public funding reducing household expenditure on education, but retaining the difference between rich and poor households. The net result is that well-allocated funds could address inequalities *across* villages. However, the impact of allocated funds on inequalities *within* villages may be smaller than imagined due to the substitutability between public funds and household spending. Nevertheless, to the extent that such public funding will free up other resources at the household level, it is still possible to argue that the *overall* utility of the poor will increase relative to the rich with increases in such funds.

NOTES

41. These fees are for registration, sports, PTA, and the like. Note that this may be an underestimate if head teachers felt that the survey information would be used against them to enforce the government's stated policy of zero PTA fees.

42. Note that the provinces with problems of low enrollment are Northern and Eastern, and these problems tend to be concentrated predominantly in rural areas, exactly the locations that have seen almost no change from their already very low PTA fees.

43. This relationship is based on predictions of a linear regression of PTA fees on wealth and province and district-level controls.

44. An equally severe problem arises when households have a choice of schools. In this case, a school-choice equation needs to be estimated to ensure that the relationship between public and private funding is not biased by household-level variables related to the choice of the school. But this would require that all schools the child could potentially enroll in are surveyed for the matched data.

45. For every school in the sample catchment areas were constructed as Thiessen polygons around each school. Based on this catchment area, 36 schools at least 5.5 km from a neighboring school were selected. This guaranteed that in each of the villages surveyed, household-level variables could be perfectly matched with school-level variables, since choice in schooling would be extremely limited. In other words, households were surveyed only in areas where schools are relatively remote so there are no viable alternatives to the specific school

surveyed as part of the sample. For each school, one nearby village or community was selected and 15 households with children were randomly chosen for the household survey. The weights applied in these tables and regressions are individual child weights, essentially calculated without applying further weights, from a child-level file in which household-level variables were introduced. There may be an issue of sampling: for direct comparison with school characteristics, each village should get equal weight irrespective of village size, but no such weights were applied. Since the same numbers of households were sampled in each village, this may be such a problem, but note that larger households with more children will get a higher weight.

46. Nonfee items include expenditures on textbooks, uniforms, and the like.

47. Note that the other two variables of interest—the location and the distance from administrative offices—cannot be used due to lack of variation in the data. This follows directly from the sampling methodology.

48. With homothetic preferences, the expenditure on education, $E = aY$ after normalizing $P_e = 1$. An educational subsidy with an interior solution will simply shift the budget constraint outward by the amount of the subsidy, S, so that the new $E_{new} = a(Y+S)$. However, the household expenditure is $E_{newhh} = a(Y+S) - S = aY + S(a-1)$. The gradient of expenditures with income remains unchanged, and the parameter measures the degree of substitutability with the subsidy.

49. We use only rule-based funding for this exercise, since arguably this is uncorrelated to any other school characteristics besides school size, and is an amount that can be budgeted for by households prior to making their spending decisions.

50. There could be other systematic differences between households sending children to a high- or low-funding school. The sampling methodology reduces these problems since there is no school choice in the sample, and further, all households are based in similar locations. For instance, the third and fourth columns of table 27 show that, at least for average wealth and net enrollment rates, villages with schools that receive high funding are not significantly different from those that receive low funding (the difference of 0.15 standard deviations in wealth is insignificant).

51. Since we control for village wealth our analysis relates to within and not across school inequalities.

9
Discussion and Conclusions

This report makes three contributions to understanding education funding in the Zambian context. First, it shows that funding characteristics are closely linked to the *type* of funding that is disbursed. In the case of rule-based funding, we find that the administrative system works efficiently, and there is no evidence that such funds are diverted from their stated purpose. For discretionary funding, however, the majority of such funds are spent at the district and province levels, and the rest is allocated to less than 20 percent of all the schools.

Second, using the wealth of pupils in the school we find that rule-based allocations have led to greater per-pupil funding for poorer and more rural schools. However, these allocations are the *only* progressive disbursements in the survey; staff allocations per pupil are higher in urban and richer schools. For discretionary allocations we find evidence of higher disbursements to *richer* schools *within* rural areas and wealth-neutral allocations *within* urban areas. Once all sources of public funding are factored into the analysis, public school funding in Zambia is regressive, with almost 30 percent higher allocations to richer schools.

Third, the report shows how private expenditures at the level of the household impacts equity in educational funding. It argues that nonfee expenditures incurred by households, rather than contributions to school funds through PTA and other fees, are the major source of inequalities in the current environment. The report also presents evidence that households decrease private contributions when public funds to the schools increase.

These findings suggest that rule-based allocations ensure that schools will receive a larger share of funds (either in cash or kind) in the system. It was initially thought that the process of decentralization would partially fulfill this need. Since more money would flow directly to districts, accountability and therefore disbursements would be higher. Unfortunately the evidence does not support this assumption. Decentralization seems to have only *shifted* spending from the province to the district, and, in terms of funding equity, it is *precisely* at the district level that richer schools are now receiving higher discretionary funds than their poorer counterparts.

Even if rule-based funding were to increase, two subsidiary implications would need to be carefully evaluated. First, the current rule-based allocation has the unfortunate implication that schools would fare better in terms of per-pupil funding if they could *decrease* enrollments. The more common school-funding rule is based on transfers that increase the number of enrolled children. Unfortunately, there is no guarantee this would work as well as the current, unambiguous rule. One suggestion would be to continue with the current rule, which has the desired equity implications), but monitor enrollment carefully through the regular data collected under the school census.

Second, an increase in public funds to schools crowds out private spending. Although the results presented here are preliminary, there is evidence that this crowding-out can be fairly large. Thus, public funds may be far more effective at addressing inequalities *across* rather than *within* villages. This would suggest targeting at the level of schools with greater funding to poorer regions.

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Appendix

This appendix describes the asset indexes created for the ESDS exercise using the pupil questionnaire for 2001.

ITEM RESPONSE METHOD

Item Response Theory (IRT) methods are used to generate the asset indexes. The findings show that the IRT asset index performs more or less similarly to the principal components methods (comparisons based on Monte Carlo simulations). The correlation between the IRT index and the principal components method was more than 0.98 in all the countries looked at. The main advantage of using IRT methods is that, in addition to providing the index, it also provides standard errors of the index at each wealth level. This is useful for evaluating the accuracy of the index at different levels of wealth.

The IRT method assumes a structural relationship (the logistic function) that defines the probability of ownership (in this case) with wealth. The curve is defined by three parameters:

- *Difficulty*. The level of the curve—an asset is more difficult to own if the probability of ownership is 0.5 at a higher level of wealth.
- *Discrimination*. The slope of the curve—an asset has higher discrimination if the slope is steeper, measured at the level of difficulty of the asset. Thus, an asset with greater discrimination makes it easier to distinguish between the two groups on either side of the difficulty parameter.

- *Guessing parameter*. The lower asymptote of the logistic curve—the probability of ownership for the lowest wealth level in this case.

The main assumption in IRT is that difficulty and wealth share the same dimensionality, an "x" point increase in difficulty is identical to an "x" point increase in the value of the index.

INDEX COMPONENTS

Unfortunately, the pupil questionnaire has very few assets for constructing the index (Table A1). The

Table A1. Variables Used in Construction of the Asset Index

Asset number (for graphs)	Description of asset	Used for
item1	Is house made of brick?	All sample
item2	Is their electricity?	All sample
item3	Does hh own:TV	All sample
item4	Does hh own: Radio-Cassette	All sample
item5	Does hh own: Radio	All sample
item6	Does hh own: Video	All sample
item7	Does hh own: Sewing Machine	All sample
item8	Does hh own: Stove/Cooker	All sample
item9	Does hh own: Fridge/Freezer	All sample
item10	Does hh use: Plough	Rural only
item11	Does hh use: Crop sprayer	Rural only
item12	Does hh use: Hammer mill	Rural only
item13	Does hh use: Hand-grinding mill	Rural only
item14	Does hh use: Tractor	Rural only
item15	Does hh own: Cattle	Rural only
item16	Does hh own: Goats/Sheep	Rural only

Figure A1. Asset Index Characteristics for All-Sample
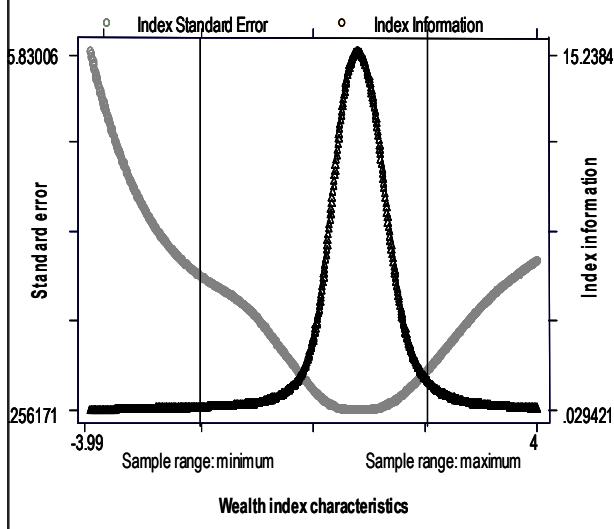
wealth index created for the entire sample uses nine assets, and the rural wealth index uses 16 components. A potential seventeenth component (does household own donkeys?) had to be discarded, since only 29 out of 3,656 reported yes. The reason for creating a separate index for rural and all-sample is, of course, based on the fact that nonownership of the last seven assets reveals no information about wealth in an urban area. Potential questions regarding the regularity of meals had absolutely no discrimination across wealth levels, and was also discarded.

RESULTS

The all-sample wealth index seems to be reasonably accurate in the range of the sample. Copperbelt comes out as the richest province, followed by Lusaka, Northern, and Eastern provinces. Further, the index was much higher for children going to private schools, and correlated fairly well with 2001 test scores. The rural index, however, does much worse in terms of measurement error, since the statistical precision of the index is additive with respect to the number of assets, and we use a super set. This difference arises entirely from differences in the sample, and the fact that we are now trying to predict asset information for a much tighter distribution (compared to that of the all-sample). The goal is to divide the poor in the all-sample into further subdivisions of poor, middle, and rich, and the information is not good enough to make the distinctions finer. The graphs for the different samples are presented below, where the

vertical lines show the maximum and minimum range of the wealth index in each sample.

The standard errors are much worse in the case of the rural sample, arising primarily from the fact that we are trying to predict wealth for a much smaller range of wealth values than the all-sample. This does not imply that the estimation of the wealth index is worse; if we construct the index using only the limited asset set, the prediction worsens. Predictions for the all-sample and rural samples in the range of the data set seem reasonably precise (see Figures A1 and A2).

Figure A3 (panel a and b) show the distribution of wealth in the all-sample. The left part of the distribution is driven almost entirely by rural households, and the right part is driven by urban households (see bottom panel). This is the main problem with this asset index. Since the weights of the assets are computed from the all-sample, the estimates are essentially a reflection of the variation *across* the rural and urban samples rather than *within* them. As a result, both within urban and rural samples the precision of the index falls dramatically. Figure A4 shows how the index computed from the all-sample compares with the index computed from the rural sample for rural households only. The correlation between the two indexes is 0.82, and the graph shows that the lower correlation arises due to wealth index values in the lower part of the distribution. The axes do not match up since the index is standardized over different populations.
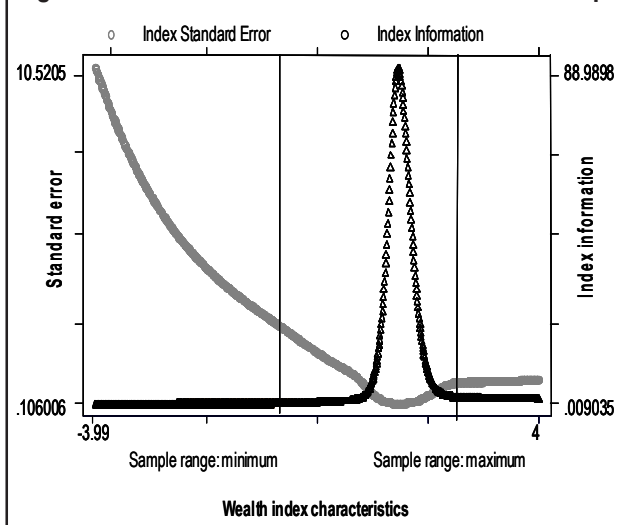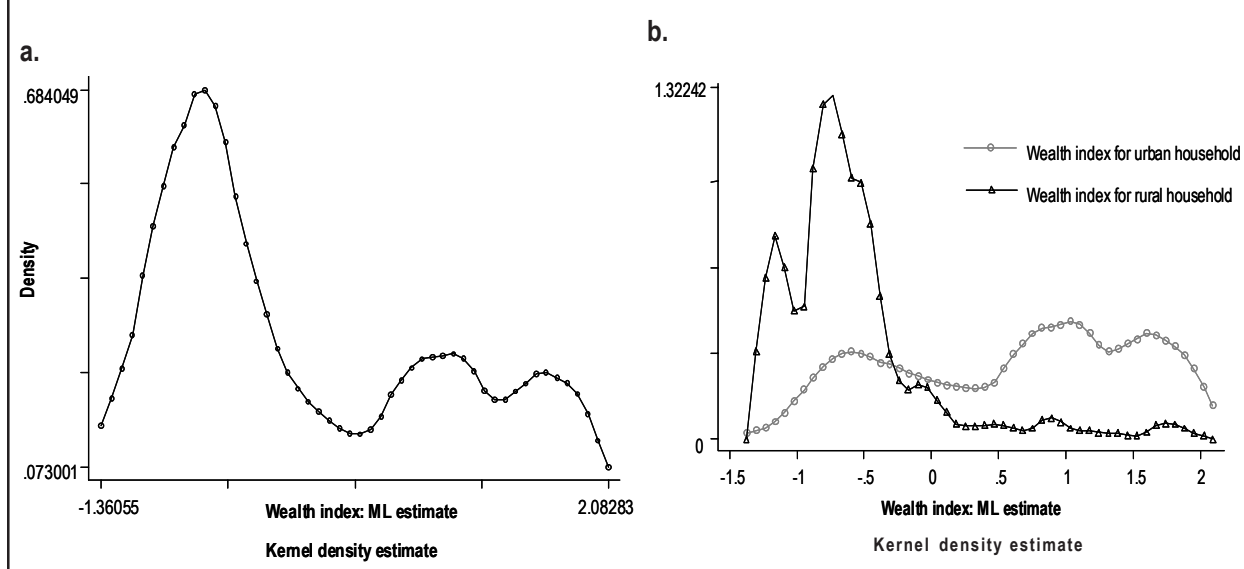

Figure A2. Asset Index Characteristics for Rural Sample

Figure A3. Distribution of Wealth in All-Sample and Separated by Location

a.

Kernel density estimate

b.

Kernel density estimate

Figure A4. Comparison of All Sample and Rural Index