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Public Spending and Poverty in Mozambique

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Abstract

Little is known about the extent to which public spending is targeted towards the poor in Mozambique. The objective of the present paper is to assess whether public expenditures on education and health, in particular, are successful at reaching the poorer segments of the Mozambican population. Standard non-behavioural benefit-incidence methodology is applied, combining individual client information from survey data with provincial-level data on the cost of service provision. Most of the public services we are able to measure turn are moderately progressive, although some of the instruments we could not measure are probably less equally distributed. In Mozambique it appears that regional and gender imbalances in health and education are more significant than income-based differences. Nevertheless, increased public expenditures on health and education—such as that related to the HIPC initiative—are likely to have significant poverty reducing effects.

Keywords: government expenditure, poverty and inequality, Mozambique

JEL classification: H42, H51, H52, O55, F34

Introduction

Poverty reduction and investment in human capital are important concerns of the Government of Mozambique. Following independence in 1975, substantial expansion of basic education and health services took place. Enrollment rates went up and mortality was on the decline. However, these gains were soon undermined by war and economic collapse (Tarp and Arndt, 2000). During the 1980s, the Renamo (*Resistência Nacional de Moçambique*) rebels systematically targeted education and health infrastructure for destruction, and teachers were often killed. The cease-fire in 1992 and peace in 1994 made it possible to turn attention to economic recovery and reconstruction, including the restoration and renewed expansion of basic health, education and economic infrastructure, often with the assistance of foreign donors. Towards the end of the 1990s basic rehabilitation was more or less complete. Macroeconomic stability had also been attained. Nevertheless, poverty remains extremely high, even by African standards. The national poverty headcount ranges from 69 to 82 percent, depending upon the method used (Tarp et al., 2000). With such levels of poverty, little can be achieved from redistribution alone, so the key development challenge faced by Mozambique in the coming years is how to move on from stabilization and reconstruction to high, sustained and equitable economic growth.

Poverty reduction is the central objective in both the Five-year Development Plan for 2000-04 and in the Interim Poverty Reduction Strategy (Government of Mozambique, 2000a, 2000b). However, achieving equitable growth is far from easy. Historically, services—particularly transport and shipping—are a major component of the Mozambican economy, yet these sectors yield few direct benefits to the majority of the population (Addison, 2001). The same goes for the largest export activity, prawn fishing. Another challenge is the low level of education of the poor that makes it difficult for them to be absorbed by the relatively more dynamic urban sector. A third constraint relates to the high prevalence of subsistence farming. Estimates vary, but it appears that less than half of farmers sell agricultural output in any given year, primarily due to high transport costs (even after the post-war reconstruction of infrastructure) and low productivity in traditional peasant farming without modern inputs (Heltberg and Tarp, 2000). In this situation, public and donor budgets perform many important direct and indirect functions necessary for human development, equitable growth and poverty reduction, as explicitly recognized by the Government of Mozambique.

In response to this background, public spending in education, health, water, sanitation and social welfare has been increasing since the early 1990s, particularly after the end of the war. For example, there has been a rapid increase in the availability of schools, clinics and other facilities in the social sectors and expanded coverage of services. Between 1994 and 1997, the number of lower primary, upper primary and basic post-primary schools increased by 66, 56 and 69 percent respectively. These rates of growth were achieved through huge public investments in infrastructure, teacher training and teaching materials, and the budget share of social sectors is quite substantial. According to official budget figures, education and health alone have accounted for 26-28 percent of central government spending from 1998-2000, and all social sectors combined, here defined as education, health, social action, labour, social security and water, constitute around a third of total spending. Yet, although it is clear that spending on social sectors has been growing, there is limited knowledge about the extent to which this spending is

targeted towards the poor and is helping to narrow the disparities within the country. This motivates the present paper. We focus on the incidence of public expenditures in education and health, which are arguably the main fiscal vehicles for improving the welfare of the poor.

Regional distribution is an important dimension of the incidence of public spending. There are clear regional differences in the popular political support for the ruling Frelimo (*Frente de Libertação de Moçambique*) government and the opposition party Renamo. The government gets a majority vote in southern Mozambique, while Renamo is stronger in the central and northern provinces. Traditionally, the South (including the capital city, Maputo) seems to have benefited more in relative terms from public investment and development than elsewhere. During the war regional disparities were maintained and exacerbated. The southern provinces were the safest, leading to concentration of government and donor investment in the South, in particular in Maputo. Using public expenditures to reduce regional gaps in income and in access to infrastructure and public services remains important for conflict avoidance (Addison and Murshed, 2001). The incidence of public spending is also a concern to the donor community. Mozambique is one of the most aid-dependent countries in the world, and donors support public budgets directly in the case of debt relief under the Heavily Indebted Poor Countries (HIPC) initiative as well as through untied budget support that is by definition fungible.[1] There is also scope for fungibility in the case of tied project or sector programme aid (McGillivray and Morrissey, 2001). This further motivates this study.

In sum, the objective of the present analysis is to assess the extent to which public expenditure on social sectors constitute a targeted, efficient and powerful instrument for poverty reduction and human development. This may help underpin analysis of the social impact of debt relief and generate recommendations for a (more) pro-poor allocation of resources. After this introduction we briefly summarize the sources of data. Section 2 is devoted to methodology and a number of important caveats. Results are presented in Sections 3 (on participation) and 4 (on distribution of monetary benefits). We conclude in Section 5.

1 Data sources

Two types of data are necessary for benefit incidence studies: household-level data on participation in public services and information on the unit costs (or benefits) of those services. Whereas participation in public services can be determined quite reliably from the nationally representative household surveys now available for many developing countries, information on the unit costs of service provision is often less reliable, insufficiently disaggregated, or both (see also McKay, 2001).

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[1] For example, of Denmark's annual US$ 25 million aid to Mozambique, around a quarter is untied budget support, and what happens to this money once it enters the fiscal system is beyond the direct control of Danida.

The source of data concerning participation in and access to public services is the first Mozambican national household survey of living conditions, conducted in 1996-97 by the National Institute of Statistics (INE).[2] The household survey, hereafter referred to by its Portuguese acronym, IAF, covered both rural and urban areas in all provinces of the country. A total of 8,289 households were included in the original sampling frame, and 8,250 had information on daily consumption over a seven-day period. The sample design was a three-stage stratified cluster sample. It was designed to be representative at the national and provincial levels (treating the capital city of Maputo as a separate province); it was also representative along the rural/urban dimension. Data collection occurred throughout the year within the rural sample of each province to assure coverage during the different seasons of the year (Cavero, 1998).

Two household-level components of the IAF data set are used here, the principal questionnaire and the daily household expenditure questionnaire. The principal questionnaire covered a broad range of data, including individual-level information on topics such as demographic characteristics, migration history, health, education, and employment status. For health and education, the questionnaire included questions on the use of facilities and on current enrollment in schools at all levels. At the household level, additional information was obtained on landholding, agricultural production, livestock and tree holdings, dwelling characteristics, types of basic services (water and power), asset ownership, major non-food expenditures during a three month period, regular non-food expenditures during the past month, transfers in and out of the household, and basic sources of income. A daily consumption module collected information on consumption of food items and common non-food items (charcoal and matches) consumed during a seven day period. Each household was interviewed three times during the seven-day period.

In addition to data collected at the household level, there were two instruments administered once during the survey period at higher levels of aggregation. First, within each village, a community-level survey was conducted soliciting information on available infrastructure, major improvements in infrastructure carried out, access to services and general community characteristics. Unfortunately, equivalent data were not collected in urban areas. Second, detailed market price information was collected in the major market for each *bairro* (urban areas) or *localidade* (rural areas), taking into account non-standard measurement units.

For unit costs, we rely on government budget data made available by the Ministries of Education and Health. These include budget figures disaggregated by province, and unit costs calculated using statistics on the number of students in each province. Two important cautions should be noted regarding these data. First, the amount of funds received by a province can be quite different from the amount originally programmed for that province. Unfortunately, fiscal accounts are not available. Second, because more disaggregated data were not available, we assume a uniform distribution of the budget within each province, i.e., the expenditure per student at a given educational level does not vary within a province.

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[2] The *Inquérito Nacional aos Agregados Familiares Sobre as Condições de Vida*, or National Household Survey of Living Conditions.

Our analysis—and policymaking more generally—could potentially be greatly improved if investment were undertaken to produce and publish disaggregated fiscal accounts.

2 Methodology

In this paper we estimate the distribution or incidence of public spending by socio-economic status of recipients using the non-behavioural social benefit incidence approach (van de Walle and Nead, 1995). In essence this means that data on costs of service provision are combined with client information to assess how costs are distributed among the various population sub-groups. Specifically, we undertake the following steps:

i)   Identify the households that receive (benefit from) public services.

ii)   Rank all households (recipients and non-recipients alike) by level of welfare. The welfare indicator used here is daily total household consumption per capita.[3]

iii) Graph concentration curves that show the cumulative distribution of total consumption plotted against cumulative participation in public education and health services, as well as the distribution of new rural infrastructure.

iv)   Place a value on services received. This is taken to be the unit cost of service provision, disaggregated by type of service and province whenever possible.

v)   Plot concentration curves that show the cumulative distribution of benefits across households. The concentration curves may be compared to the cumulative distribution of expenditures (often referred to as the Lorenz curve).

vi)   Test for statistically significant differences among the concentration curves, also known as welfare dominance tests.

vii) Conduct supplementary descriptive data analysis to help identify the sources of inequality in education.

Thus, in this paper we follow the standard procedure where the monetary valuation of the benefits, an individual receives from using a certain public service, is not based on any behaviourial information such as opportunity cost or willingness to pay.[4] Instead, all those who used the service are assigned the same monetary value of benefits received. This value is the unit cost of providing the service. As such, the term benefit incidence is really a misnomer in the present context. Rather than measuring the exact value to recipients of government-sponsored services, we are looking at the distribution

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[3] Total expenditures are the sum of food and non-food consumption expenditures. The food expenditures include all items consumed by the household (from purchase, own production or donation) and the non-food expenditures include all non-food items, such as clothing, house rents, cooking fuel, durable goods, transport, education, etc., as well as imputed values for rents if the household lives in owner-occupied housing.

[4] For an example, see Younger (1999), who estimated monetary benefits based on estimated demand functions for public services.

of beneficiaries from those services. It follows that *beneficiary incidence* would be a more precise term for this kind of study.

The main advantage of the non-behaviourial benefit incidence methodology is its simplicity and the relatively modest data requirements. A potential problem occurs when quality of the service varies systematically with the level of welfare. If poorer individuals receive lower quality services, the results will be biased in the direction of finding progressive results. Since the war resulted in massive destruction of infrastructure in remote and rural areas, there are good reasons to expect the quality of public service delivery to vary extensively across the country; these expectations are reinforced by observations in the field. This potential problem can be handled in various ways. Most important is to use data for the unit costs of service provision that are as disaggregated as possible. In this way, variation in the quality of service may be captured (to the extent quality variation shows up in the unit costs), and bias will be reduced.[5] We therefore obtained unit costs at levels that are disaggregated by both province and kind of service provided as further discussed below. As a form of sensitivity test, one may complement the analysis using direct information on quality of public services that can be obtained, for example, from participatory techniques or from outcome data such as student pass rates, grades attained, and to some extent, mortality and morbidity rates.[6]

Before proceeding, a further caveat should be noted. We study the incidence of average public spending. It is not known whether *average* spending is different from the *marginal* spending that, for example, donors are funding directly (through untied aid and debt relief) or indirectly (through fungibility). Lanjouw and Ravallion (1999) have argued, using data from rural India, that marginal spending affects the poor more than average spending because when programmes are expanded or reduced the composition of beneficiaries tends to change. Thus, expanding programmes may increase coverage of the poor, and likewise contraction may hurt the poor relatively more. Hence, benefit incidence studies based on *average* incidence are likely to underestimate the impact on poverty of marginal fiscal changes. This may also hold true for Mozambique. Reconstruction started in relatively more accessible and high-potential areas, and it is likely that the expansion of coverage over time will gradually improve access for the poor to those services. This effect will tend to make marginal benefits more pro-poor than average benefits. In this paper, we seek to shed light on marginal incidence by analyzing the distribution of recent rural infrastructure investment (in Section 3) and by assessing the gains from the expansion of education during the 1990s by looking at variations in cohort-specific schooling experience.

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[5] To the extent that quality variation is not captured in the cost data, e.g., because of systematic variation in teacher absenteeism between the poor and the non-poor (which is plausible), bias in the direction of finding progressivity still prevails. Alternative methods for adjusting for differences in the quality of services delivered are necessary but difficult to identify.

[6] Strictly speaking, one cannot attribute all differences in outcomes (pass rates, health status, etc.) to differences in the quality of services, as other factors inevitably come into play. A health service in a poor area with inadequate public sanitation is likely to be associated with inferior outcomes when compared with an identical service located in an area with good public sanitation.

The identification of the utilization of services was based on the IAF data. In the survey data we identified those individuals who reported that they were enrolled in a school during the survey period or who had consulted any health service during a period of one month prior to the date of the interview. Ideally, we should only include in the analysis benefits from public services, and to the extent possible, private services (such as *curandeiros*, or traditional healers) were excluded from the analysis. Unfortunately, the survey does not allow complete identification of whether the health service or school in question is public or private. This introduces a potential bias in the direction of finding benefits to be regressive to the extent that the non-poor are more likely to attend private facilities. However, as private health and education services are extremely limited (apart from *curandeiros*), this does not appear to be a serious problem.[7]

More generally, the strength of this survey-based approach to identifying beneficiaries of public services is that the data come directly from the household survey, and hence is unlikely to have been tampered with in political processes. The drawback is that only a fraction of total public expenditures can be assessed. This is because the household survey does not identify the beneficiaries of many categories of spending, including administration, military spending and, within the education sector, university spending.[8] The omitted spending categories are likely to be less progressive than those categories of services we include, and our results may therefore not be representative for overall public spending. An additional limitation, along these same lines, is that the intensity of the use of health services—that is, the number of visits during the reference period and the type of treatment received—is not captured in the survey data.

As already mentioned, the unit cost of service provision was calculated, by province and type of service, by dividing the total expenditures for providing the service by the number of individuals who used the service. For education benefits, we used the 1997 budget data provided by the Department of Finance and Administration of the Ministry of Education (MoE) to obtain the cost of service provision and 1997 Annual Statistics produced by the Planning Department of the MoE to obtain the number of students enrolled in public schools, by level of education and by province. We followed the same procedure for the health sector, where the budget and the health services utilization data were provided by the Planning Department of the Ministry of Health. The data were disaggregated by province and by type of facility (health posts, health centres and hospitals). One should note that average unit cost is only a rough approximation for value of service provided. For example, for the same level of service quality, unit costs are likely to be higher in more sparsely populated areas. We are also aware that actual distribution of service provision can be quite different from that estimated using budget unit costs (as done for this study). Hence, the results for the distribution of monetary benefits have to be interpreted with caution. Nevertheless, this caveat does not apply for the participation results, which make no attempt to assign a monetary value to services received, thus implicitly assuming that all participants receive the same level of benefit. All analysis was done using the individual (not the household) as the unit of analysis,

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7   For example, according to the IAF data, only 1.4 percent of those who sought medical treatment for an illness or accident went to a private clinic (Lindelow, 2000).

8   The proportion of university students in Mozambique is too small for that category to be adequately represented in the survey.

with the application of sampling weights so that the results are representative at the national and provincial levels.

Finally, it is worthwhile to define the concepts of progressivity used in what follows. We say that the distribution of benefits is progressive if it is more equal than expenditure, that is, if the concentration curve for benefits lies everywhere above the Lorenz curve for expenditures. In this case, public benefits are helping to equalize the distribution of welfare. Furthermore, if the distribution of benefits is such that the poor receive more per capita in absolute terms than the non-poor, we say that the distribution is per capita progressive (also referred to as absolute progressivity). Graphically, per capita progressivity appears as a concentration curve of benefits above the 45-degree line. Per capita progressivity indicates successful targeting of benefits towards the poor. If benefits are distributed more unequally than expenditures (i.e., the concentration curve lies below the Lorenz curve), services are said to be regressive. When curves cross, no determination of progressivity or regressivity can be made using the Lorenz criterion, although one could resort to other welfare measures—such as the Gini coefficient, Atkinson index, or generalized entropy measures—for a complete ordering.

3   Participation in public services

The empirical results are presented in three parts. In this section, results for participation or utilization are reported, measuring incidence as a binary variable that indicates whether an individual utilized a given type of service or not. This approach is less demanding of the data, but is limited in that no allowance is made for the level of expenditure related to the benefit received. In Section 4, the analysis is done using the unit costs of each type of service. This approach takes account of the level of public expenditure, and allows to some extent for variations in service quality as discussed above. Section 5 explores the education results in greater depth to gain a better understanding of the underlying reasons for inequality in education.

The Lorenz curve (or expenditure/consumption concentration curve) that is shown in Figures 2-9 plots the cumulative distribution of per capita household expenditure. By inspecting Figure 2, for example, it may be seen that the poorest 50 percent of households account for only about 24 percent of total expenditure. However, compared to many other African countries, Mozambique is not an especially unequal society. In South Africa, the poorest 50 percent account for less than 10 percent of total expenditures. In Côte d'Ivoire, Guinea, Madagascar, Uganda and Madagascar the poorest half account for less than 20 percent, while in Ghana and Tanzania the share of the poorest half of the population is around 25 percent (Sahn et al., 2000; Sahn and Younger, 1998). The present high rates of economic growth may well result in rising inequality, as the market-oriented growth process is likely to reward those relatively few Mozambicans who possess human and physical capital of any magnitude. The large majority of people, virtually without assets and with minimal education risk not sharing in economic growth, at least in the absence of equalizing government action (Wuyts, 2000).

3.1 Education

The education system in Mozambique is divided into the following levels and age groups:

EP1   Lower primary school (*ensino primário de primeiro grau*, or EP1), from 1st through 5th class, which is intended to correspond to the ages of 6-11, but in practice also takes in many children who are much older, because they have started school late, had interruptions in their schooling, repeated grades, or some combination of these. Naturally, this also has an impact on the ages of students in subsequent levels of schooling.

EP2   Upper primary school (*ensino primário de segundo grau*), 6th and 7th class and intended for those 12-13 years old.

ES1   Basic post-primary technical or lower secondary school (*ensino técnico básico and ensino secundário geral, primeiro ciclo*, ESG1), intended for those 14-16 years old.

ES2   Intermediate post-primary technical or upper secondary school (*ensino técnico médio and ensino secundário geral, segundo ciclo*, ESG2), intended for those 17-18/19 years old.[9]

Enrollment data are presented in Table 1. The enrollment rates shown are the proportion within each age group currently studying any level of schooling. Hence, the data pertain to a certain age group, not to a specific level of schooling. Nationally, 54 percent of boys and 45 percent of girls aged 6 to 11 years are enrolled in schools according to the survey,[10] while 36 and 13 percent of males and females aged 17 to 18 years attend school. Enrollment rates are highest among those in the age range of 12-13 years. Enrollment rates of boys (but not girls) 14-16 years old are almost equal to those for the 6-11 years old. As further discussed below, to a large extent this does not reflect enrollment in secondary education, but is rather an indication of starting school late and delays in passing through primary school. Enrollment is highest in Maputo city, which has more developed infrastructure and higher incomes, followed by the rest of the southern provinces. Gender gaps in enrollment are smallest in Maputo city for all age groups. However, if we leave aside for a moment the unusual case of Maputo city, we note that in the youngest age group, inter-regional differences are greater than within-region gender differences. For example, the largest male/female enrollment rate gap in the 6-11 group is 11 percentage points in the central region; this compares with south/central gaps of 19 and 24 percentage points for boys and girls, respectively. In older age groups the pattern is reversed, with girls leaving school faster than boys in all regions. A particularly striking gender feature is that enrollment rates for girls drop

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[9] Regular secondary education is intended to end at 18 years of age while technical education is intended to end at age 19, although as with primary education, students are often older than this. Lower and upper secondary school is sometimes referred to as secondary school, first and second cycle, respectively.

[10] According to other, more recent data, primary enrollment is now above 60 percent. However, this is the gross enrollment rate, which includes children of higher age who are still enrolled in primary education, and hence is not directly comparable to the figures used here.

sharply at age 14 in all provinces, perhaps reflecting parents' unwillingness to send their girls to secondary schools that are often located at some distance from the residence. The analysis of equity in schooling is pursued in greater depth in Section 5.

Table 1

Gross enrollment rates by age group, region and gender

| | Age 6-11 | | Age 12-13 | | Age 14-16 | | Age 17-18 | |
	M	F	M	F	M	F	M	F
North	0.50	0.40	0.61	0.46	0.52	0.25	0.25	0.06
Central	0.48	0.37	0.59	0.42	0.48	0.33	0.41	0.13
South excl Maputo C	0.67	0.61	0.71	0.68	0.53	0.42	0.33	0.15
Maputo City	0.87	0.83	0.82	0.88	0.73	0.71	0.45	0.37
Total	0.54	0.45	0.63	0.53	0.52	0.37	0.36	0.13

Figure 1 (a)

Enrollment for boys, by age and decile
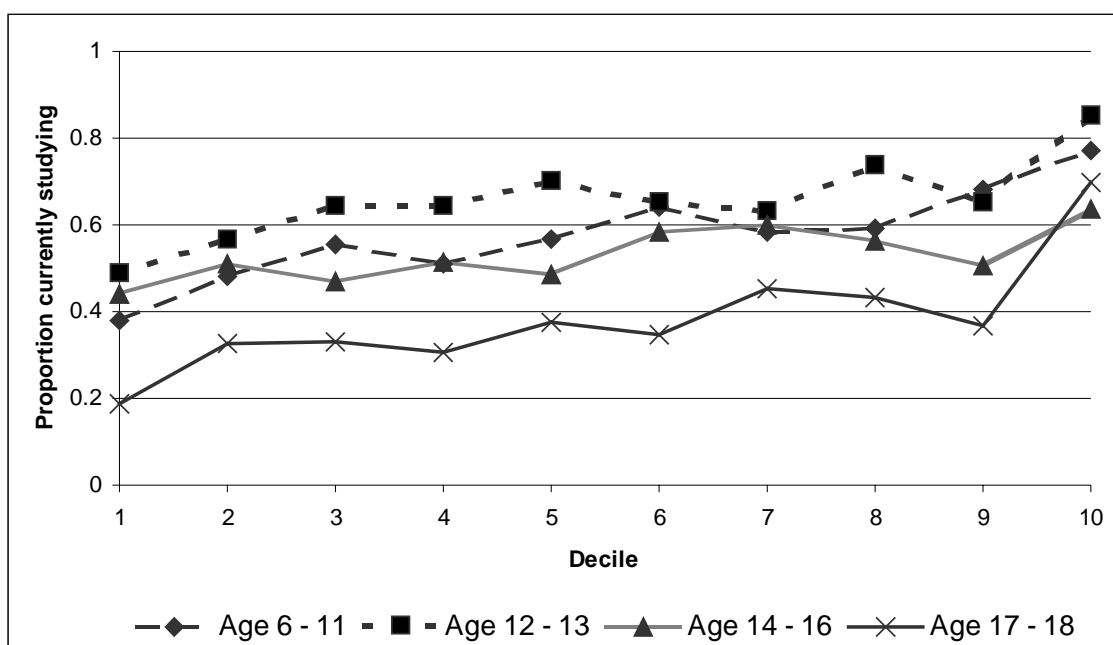

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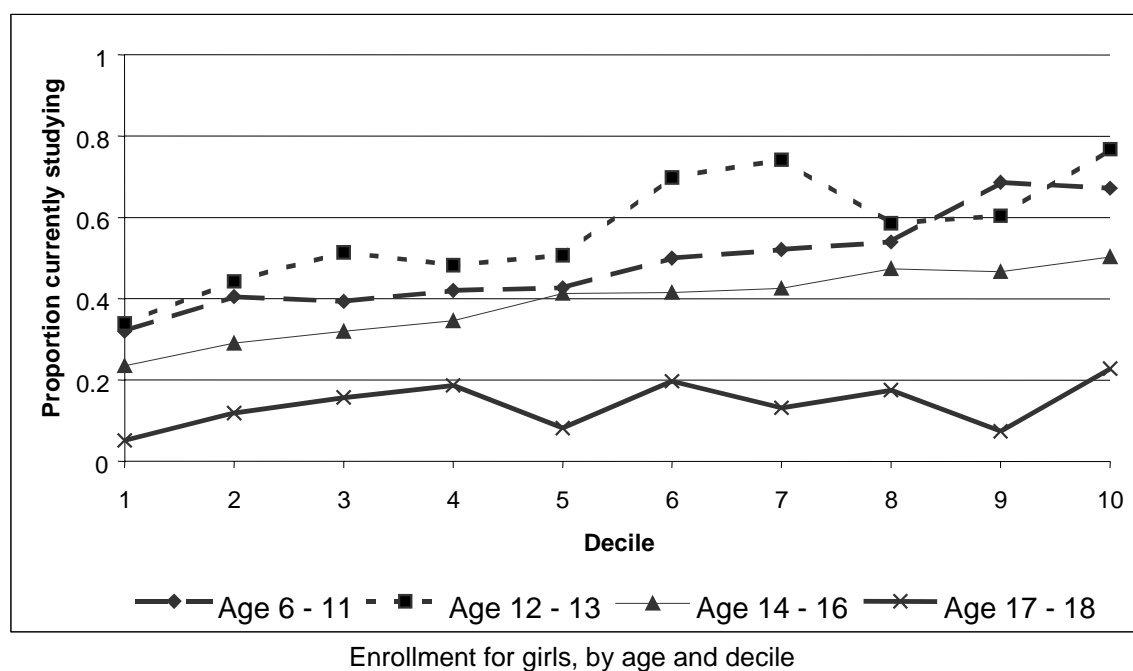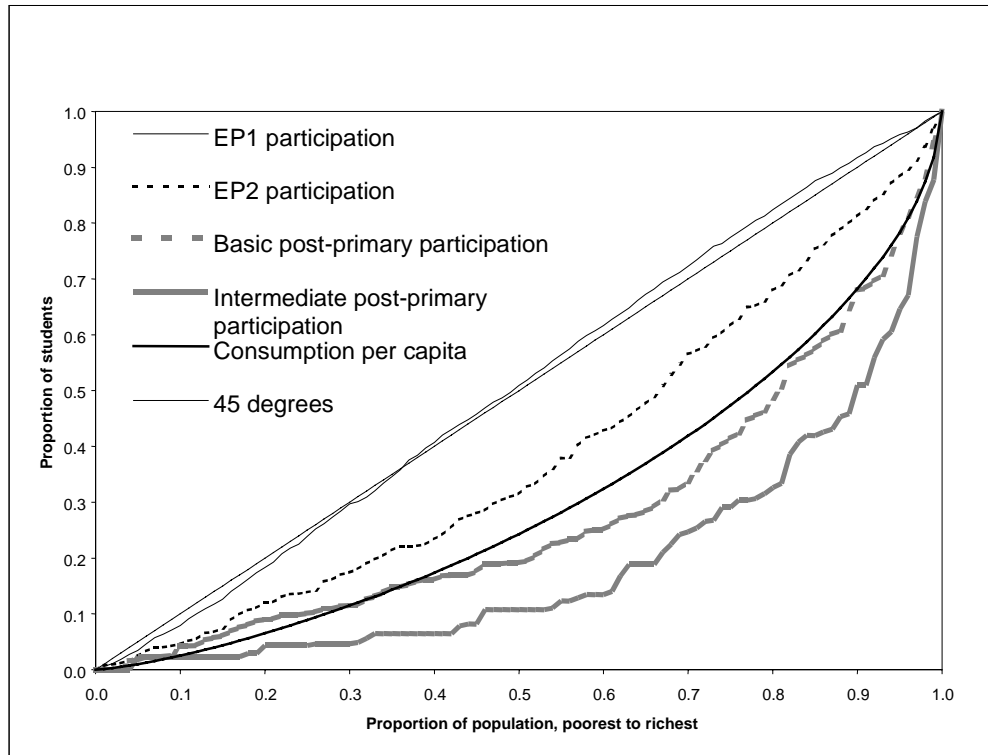Figure 1 (b)

Enrollment for girls, by age and decile

Figure 1(a and b) plots age-specific enrollment rates for each decile of real per capita consumption for boys and girls, respectively. Enrollment in the education system increases markedly with expenditure for all age groups and for both boys and girls. For example, among children aged 6-11, in the 1st decile only 38 and 32 percent of boys and girls, respectively, are currently enrolled in school as compared to 77 and 67 percent of boys and girls in the 10th decile. Among those 12-13 years old, 49 and 34 percent of boys and girls, respectively, in the 1st decile are currently enrolled against 85 and 77 percent in the last decile. With few exceptions, boys have higher enrollment rates than girls within the same decile. However, from some perspectives the level of consumption appears to be a more significant factor than gender. For example, non-poor girls are more likely to be enrolled than poor boys across all age groups.

Figure 2

Education participation

Participation in education is plotted using concentration curves in Figure 2. This shows that the lower the level of education, the more progressive is the distribution of its utilization. The figure shows that enrollment in primary education (EP1 and EP2) is progressive, i.e., school enrollment is distributed more equally than expenditure. Lower primary education, EP1, has the most progressive distribution, closely following the 45-degree line, but as it crosses the 45-degree line we cannot say it is per capita progressive. The EP1 and EP2 results are cases of Lorenz-dominance, i.e., the concentration curve for lower primary education lies everywhere above other levels of education, meaning that access to lower primary education is more equal than access to other education services.[11] Participation in upper primary education is also progressive, and more equally distributed than post-primary education.

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[11] Preliminary tests show that EP1 and EP2 both statistically dominate per capita consumption. Here, and elsewhere in this paper, we say that one curve dominates if the ordinates at the 5th, 10th, 15th, ..., 95th percentiles of per capita consumption are all statistically significantly different from one another at the 5 percent significance level This is a more stringent test than is usually found in the literature, so it is difficult to find results of statistical dominance (Sahn et al., 2000). All tests allow for the dependence between the distributions, however, they do not incorporate the effects of the stratified cluster sample design. Other analysis shows the cluster design to have a significant effect on computed standard errors (MPF, 1998). As such, the significance of dominance in our dominance tests is likely to be overstated. Thanks are due to Steve Younger and Jean-Yves Duclos for providing Gauss programmes for statistical dominance testing.

The concentration curves for post-primary basic and intermediate education cross the Lorenz curve, meaning that they are neither progressive nor regressive by the Lorenz criterion. However, post-primary intermediate education crosses the Lorenz curve at 0.1 on the horizontal axis, and lies well below the Lorenz curve for the rest of the distribution, so it would be considered regressive by most other criteria. From the concentration curves it might be observed that the poorest 50 percent of school-age children constitute 50 percent of all students enrolled in lower primary education (EP1) and 32 percent of students in upper primary education (EP2). At higher levels, participation by the poor drops drastically with the poorest half accounting for only 19 percent of students in post-primary education and 11 percent of students in the intermediate post-primary category.

The pattern observed in Figure 2 cannot be explained by the fact that the poor tend to have more children. The calculations are done on an individual (rather than household) basis. Hence, the effect coming from higher demand from poor households due to more children has been removed by scaling the concentration curves to individuals. The observed trend has to be explained by relatively easy access to lower primary education in the areas where the poor live, and conversely by constraints (in terms of access, financing and other) for the participation of the poor at higher levels of education, something to which we return below. To this comes that to enter higher levels of schooling, an individual must first pass through lower levels.

3.2 Health

In the analysis of the distribution of benefits from public health services, the following types of health service utilization are considered:

(i)   Children from 0-5 years old, who were vaccinated at least once.

(ii)   Women who were pregnant at least once and received antenatal care.

(iii)   All individuals who accessed health services (hospital, health centre, or other medical facility) during the month preceding the interview, seeking treatment for an illness or accident.

The results are presented in the concentration curves in Figure 3 for preventive care (i.e. item i and ii above) and in Figure 4 for curative care (item iii), allowing comparison with household consumption expenditure. The participation of infants and pregnant women in basic preventive health care is progressive and appears particularly progressive for infant vaccinations. For most of the distribution, the curve for infant vaccinations lies above the 45-degree line; vaccinations cannot be classified as per capita progressive because it crosses the 45-degree at about the 5th percentile. The dominance testing of these preventive health services finds that the curve for infant vaccinations statistically dominates both antenatal care and the Lorenz consumption curve. Access to basic preventive care helps to equalize the income distribution curves, although the caveats previously noted apply here as well. The data show that among the group of children who have received at least one vaccination, 54 percent come from the poorest 50 percent of children, i.e., the poor are disproportionately represented in this

group. For antenatal services, the poorest 50 percent of pregnant women account for 45 percent of those who receive at least some antenatal care.[12]

Figure 3

Use of preventive health care
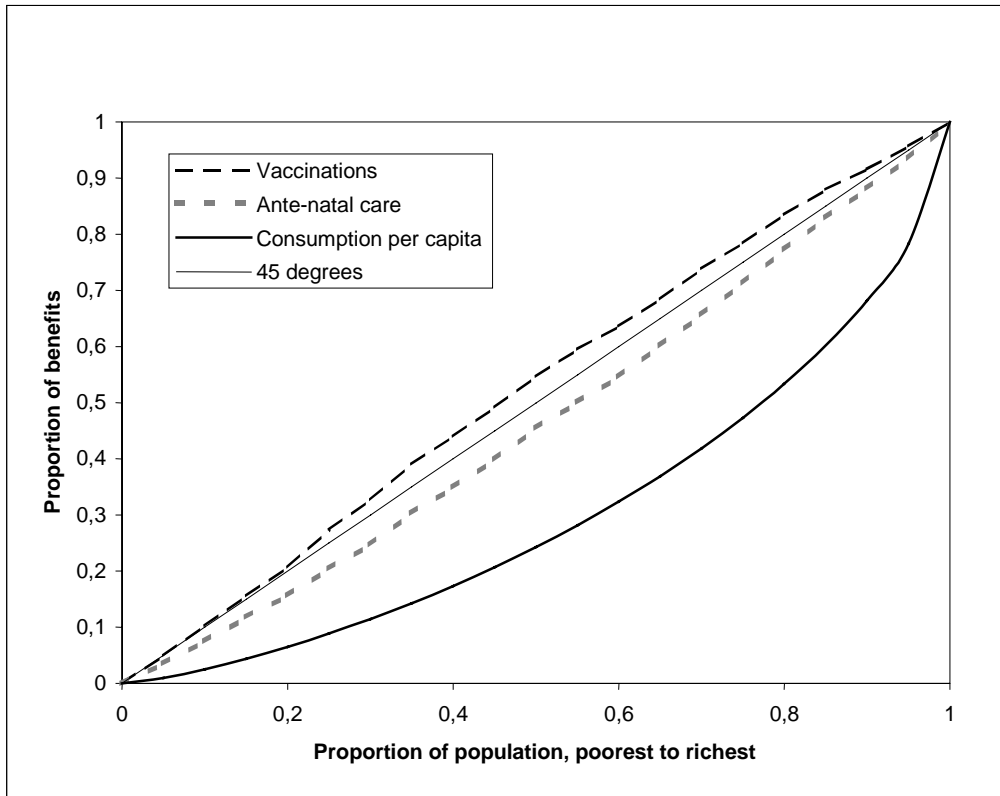
[12] A data limitation should be kept in mind in the discussion of health service utilization. The operative variables at the individual level are binary indicating whether or not a person accessed a given service during the reference period of the survey. However, multiple visits for antenatal, and multiple vaccinations are possible; indeed, they are recommended. Thus, there is a degree or intensity of participation that is not captured in the results reported here. For example, while it is estimated that 45 percent of women who received some antenatal care were from the bottom 50 percent of the income distribution, one cannot infer from this that same group of women accounted for 45 percent of all antenatal care visits.
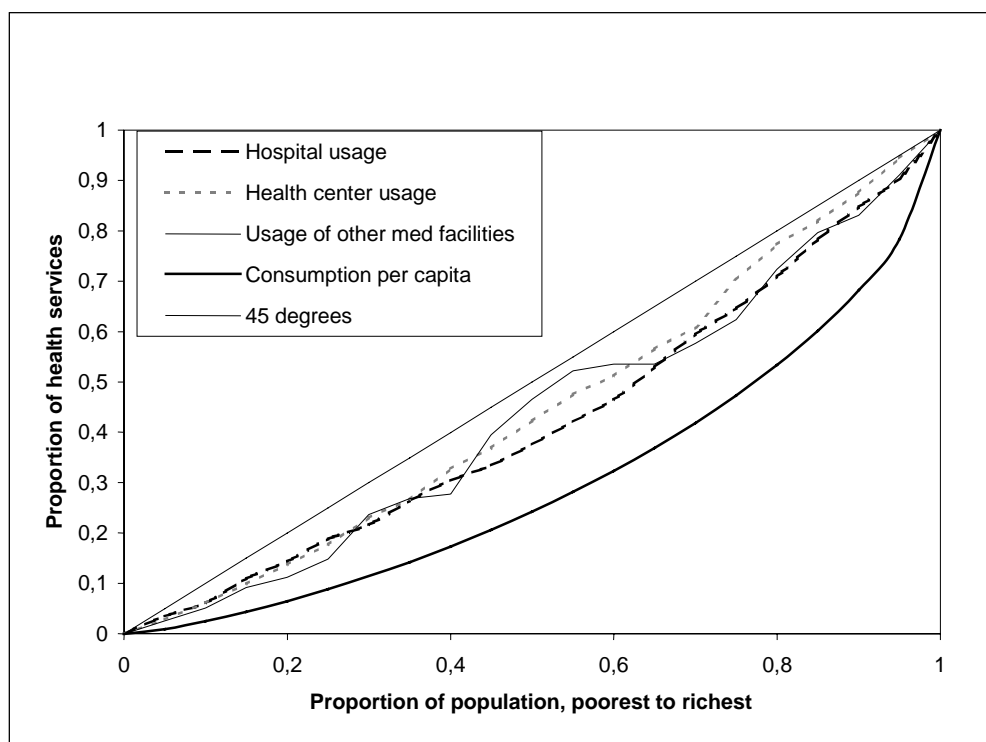
Figure 4

Use of curative health care

Figure 4 plots concentration curves for visits to curative health services by people who were ill during the month prior to being interviewed. The curves for hospital and health centre utilization are both situated between the Lorenz curve for consumption expenditure and the 45-degree line. This implies that access to these levels of health care is progressive, but not per capita progressive. The curve for other health services largely follows the same pattern, except that it crosses the Lorenz curve near the origin. Subject to the qualification already noted in footnote 12, we observe that 38 percent of those who were hospital patients, and 42 percent of those who attended health centres, come from the poorest 50 percent of the population. In comparison, the poorest 50 percent account for only 24 percent of total consumption. Dominance tests show that both the hospital and health centre curves dominate the consumption curve and neither of these two services dominates the other.

3.3 Rural infrastructure

As previously mentioned, the IAF questionnaire had a section designed to collect community data regarding construction and rehabilitation of public infrastructure during the two years prior to the survey. We linked this community data with data on consumption expenditure on individual households residing in the community and then identified those communities (rural villages) that received new investment (for rehabilitation or construction of infrastructure), classified by the level of well-being of individuals in the respective villages. This analysis is (as discussed in Section 2) useful as it allows an incidence analysis of *marginal* (investment) spending, whereas the analyses of education and health services are only concerned with *average* incidence.

Table 2

Percentage of households in villages that benefited from rehabilitation or construction of infrastructure (health, education and roads) by terciles of household expenditure

Regions

	Construction and improvements of schools			
	1st tercile	2nd tercile	3rd tercile	Total
National	20	22	23	21
North	13	16	19	16
Centre	18	20	20	20
South	32	37	41	37

	Construction and improvement of health infrastructure			
	1st tercile	2nd tercile	3rd tercile	Total
National	8	9	10	9
North	13	9	9	10
Centre	5	7	9	7
South	9	16	18	14

	Paving and improvement of roads			
	1st tercile	2nd tercile	3rd tercile	Total
National	14	17	17	16
North	24	20	25	23
Centre	11	14	7	11
South	8	17	21	25

Table 2 shows the proportion of rural households whose villages have received various types of public infrastructure investment, broken down by expenditure tercile and region. We see that due to the rapid post-war reconstruction and rehabilitation of Mozambique there is a fairly large proportion of the population whose communities have recently benefited from public investment. The most common investment received by rural communities is a new or rehabilitated school, followed by roads and health facilities. Investments in all types of public infrastructure appear to be more widespread in the southern regions than in the other regions. In the education sector, in particular, big regional differences in the incidence of fresh investment are apparent.

Figure 5

Benefits from rehabilitation or construction of infrastructure education, health, roads)
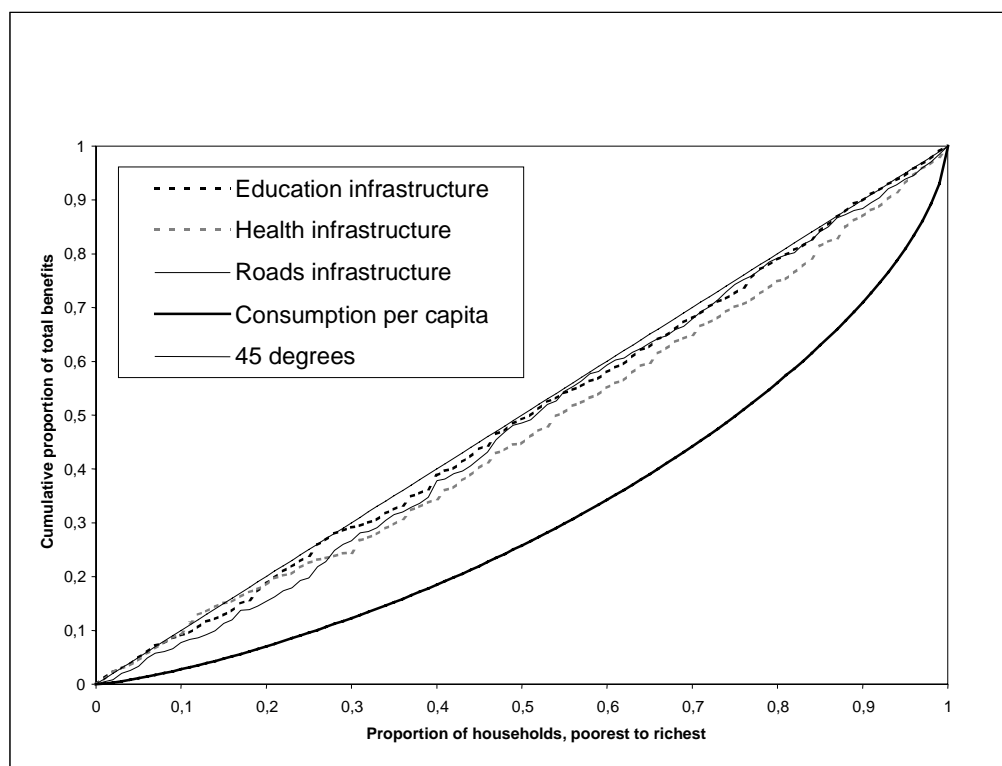
Differences in the incidence of recent infrastructure investments among expenditure terciles appear to be small. It should be kept in mind that this analysis is confined to rural areas due to data limitations, but it appears that rural public investment is fairly evenly spread across income groups, but not across regions.[13] This line of analysis is further pursued using concentration curves in Figure 5. This figure confirms that construction and rehabilitation of public infrastructure is progressive and close to the equality line. This means that recent public investments in rural areas have gone to the poor and the non-poor more or less in the same proportion. A key fact underlying this result is the observation that the majority of inequality in Mozambique is within-village.[14] In other words, it is not especially useful to categorize rural Mozambique into "poor areas" and "non-poor" areas, because the poor and the non-poor live side by side in the same villages.

Our understanding of the optimal geographic distribution of infrastructure is still limited. From a poverty reduction perspective, an even spread of investment is unlikely to be desirable. The social return to infrastructure investment may be higher in areas with relatively good agro-ecological characteristics and market access. However, there is no assurance that the benefits of this investment will reach the poor in these high-

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[13] This result may obtain in part because of the two year time reference period for the data, compounded by the inherent"lumpiness" of infrastructure investments.

[14] We have calculated a Theil index of inequality from the IAF data. It is 0.255 for rural Mozambique, which may be decomposed into 0.145 within-village and 0.110 between-villages. Put differently, approximately 60 percent of rural inequality in Mozambique is within-village inequality.

potential areas, much less those situated in marginal areas or more isolated locations.[15] Conversely, infrastructure investment in remote, low-potential and relatively poor areas is not always the most efficient way of combatting poverty. Spending on education and health, however, remains warranted, also in low potential areas. The benefit incidence approach is not well suited to capture the indirect effects of public spending, say on agricultural prices or employment. Other work exploring these issues in more detail include Arndt et al. (2000) using a Social Accounting Matrix (SAM) based approach.

4   Incidence of monetary benefits

4.1 Unit costs

Table 3 provides the unit costs of education services by level of education and by province (whenever available).[16] In general, the cost of providing education increases as we move from lower to higher levels of education. The second cycle of general secondary education (ESG2) is particularly costly. The major reasons for these variations in unit costs are that teachers at upper levels of education have higher qualifications and receive higher wages than those at lower levels and that classes tend to be of smaller sizes at higher levels. Most of the variation in unit costs across provinces at the same level of education can be explained by a combination of variations in the qualifications of teachers and their salaries, variation in student/teacher ratios and in the provision of pedagogical materials. It was not possible to place a separate monetary value on preventive care, and the same goes for investment in new infrastructure. As in the education sector, there is substantial variation in the cost of service provision across provinces. These variations are a combined result of the professional qualifications and salaries of personnel in each province, the level of demand of services by the population and the type of services available in each province. Thus, the higher the ratio of hospitals to basic care facilities in a given province, the higher are the average qualifications and average salaries of health personnel. The same holds for maintenance costs. This means that variation in unit costs are likely to be linked to differences in the type of facility and quality of service, and that the provincial break down of unit costs as carried out here is highly relevant to the analysis.[17]

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[15] Poor people living in low-potential areas can also benefit from investment in relatively better endowed areas, for example, through migration to areas where new opportunities for paid employment arise.

[16] Regionally disaggregated unit costs are not available for the intermediate post-primary technical education category. This group is therefore left out of the monetary analysis of total educational benefits as discussed further below.

[17] As noted in Section 4, the household survey does not have complete information on the number of visits and the specific services received. Within each province we therefore had to assign the same benefit to anyone who utilized the service during the reference period. To the extent that better off individuals made more visits and/or received more costly services than poorer individuals, the results reported here may overstate the progressivity of the benefit incidence.

Table 3

Unit costs of education and health services (in 1000 MT)

	Hospital care	Other health care	EP1	EP2	ESG1	ESG2	Basic technical	Intermediate technical
Niassa	1159	253	167	307	1578	3064	959	-
Cabo Delgado	993	517	101	462	1932	2407	3859	-
Nampula	1682	141	153	598	1256	1901	2815	-
Zambézia	891	251	138	441	598	5009	1762	-
Tete	1701	652	135	384	1094	-	2057	-
Manica	1254	314	112	215	1101	2379	1475	-
Sofala	1784	408	138	397	695	5172	995	-
Inhambane	509	258	110	318	446	3486	2092	-
Gaza	294	1314	100	160	585	1972	1636	-
Maputo Province	-	-	100	186	1174	4312	1372	-
Maputo City	-	-	144	253	645	3782	1392	-
National	-	-	128	325	901	3400	1567	4807

EP1 is lower primary (grades 1 – 5), EP2 is upper primary (grades 6 – 7), ESG1 is lower secondary (grades 8 – 10), and ESG2 is upper secondary (grades 11 – 12).

4.2 Concentration curves for monetary benefits

Figure 6 shows the concentration curves that result from matching the unit costs of provision with the household data on participation in education. The pattern found for participation remains intact once we look at monetary benefits. Thus, the lower the level of education the more equal its distribution, with primary education being clearly progressive. For lower primary education (EP1), there is an almost equal distribution with the exception of the poorest 25 percent of the population who receive slightly less. Despite this very equal distribution the EP1 concentration curve does not dominate the other curves because the confidence intervals overlap within the first 5 percent of the poorest. Yet overall, EP1 benefits in Mozambique are progressive. For example, the poorest 50 percent receive around 51 percent of all expenditures on EP1 education, whereas they only account for around 24 percent of total consumption expenditures.

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Figure 6

Education benefits
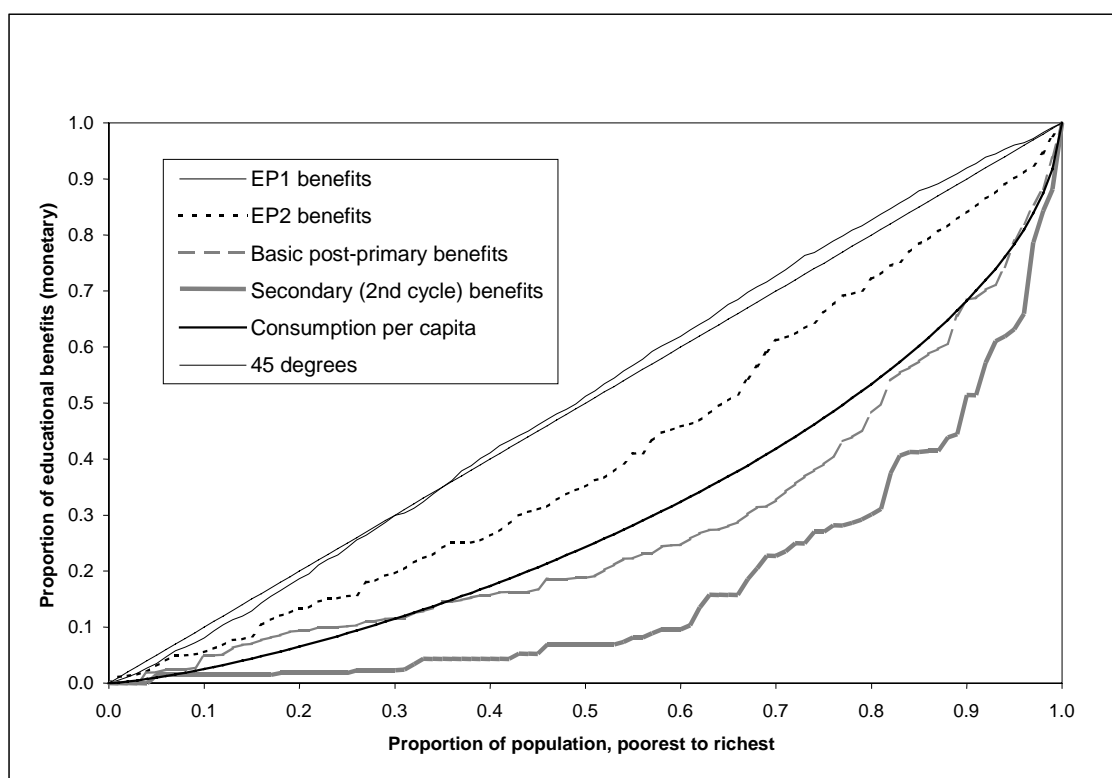
For upper primary education (EP2) a progressive trend can be noted, and the EP2 curve statistically dominates the consumption curve. However, except for a crossing at the poorest tail end of the distribution, EP2 is less progressive than EP1 with the poorest half receiving 35 percent of all EP2 education expenditures. The curve that represents the benefits of post-primary basic education crosses the consumption distribution, so the Lorenz criterion cannot indicate whether this kind of education is progressive or regressive. The poorest 50 percent of the population receive less than 19 percent of expenditures on basic post-primary education (general and technical) and the 10 percent richest receive more than 32 percent. Note also that upper (second cycle) secondary education is distributed especially unequally. As already noted, the data are weak when it comes to the post-primary intermediate technical and university categories, which therefore had to be left out of the analysis both here an in what follows below.

An analysis of total benefits of education (all benefits added together - except the post-primary intermediate technical category) shows a progressive situation in relative, but not in absolute terms, as EP1 is strongly progressive. We estimate that the poorest quintile receives 14 percent of total education spending, the poorest half receives 36 percent of public spending in the education sector, while the richest quintile receives 33 percent. Compared to other African countries surveyed by Castro-Leal et al. (1999), this distribution is (i) more unequal than in Kenya, Ghana and Malawi, (ii) roughly comparable to Côte d'Ivoire, Tanzania, Uganda and South Africa, and (iii) more equal than in Madagascar and Guinea.

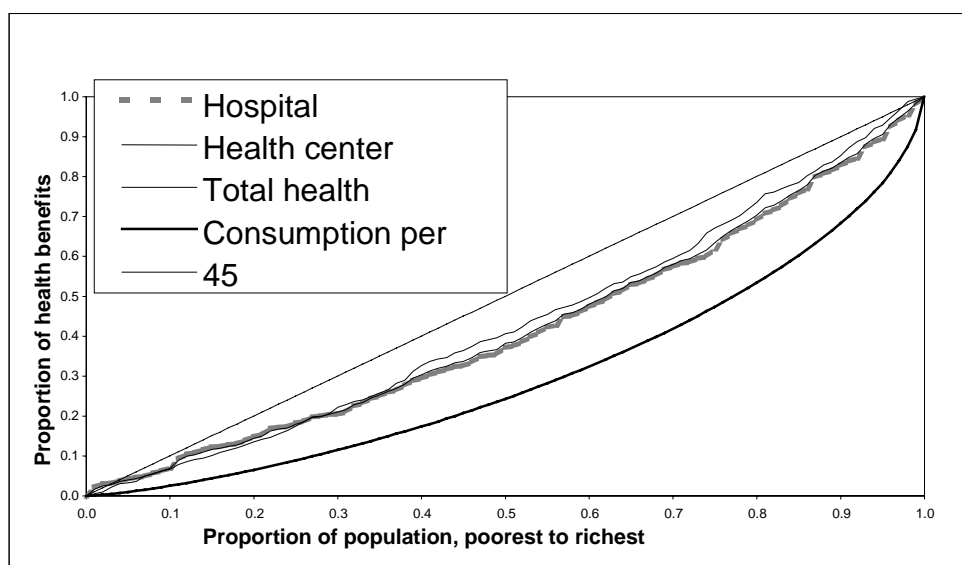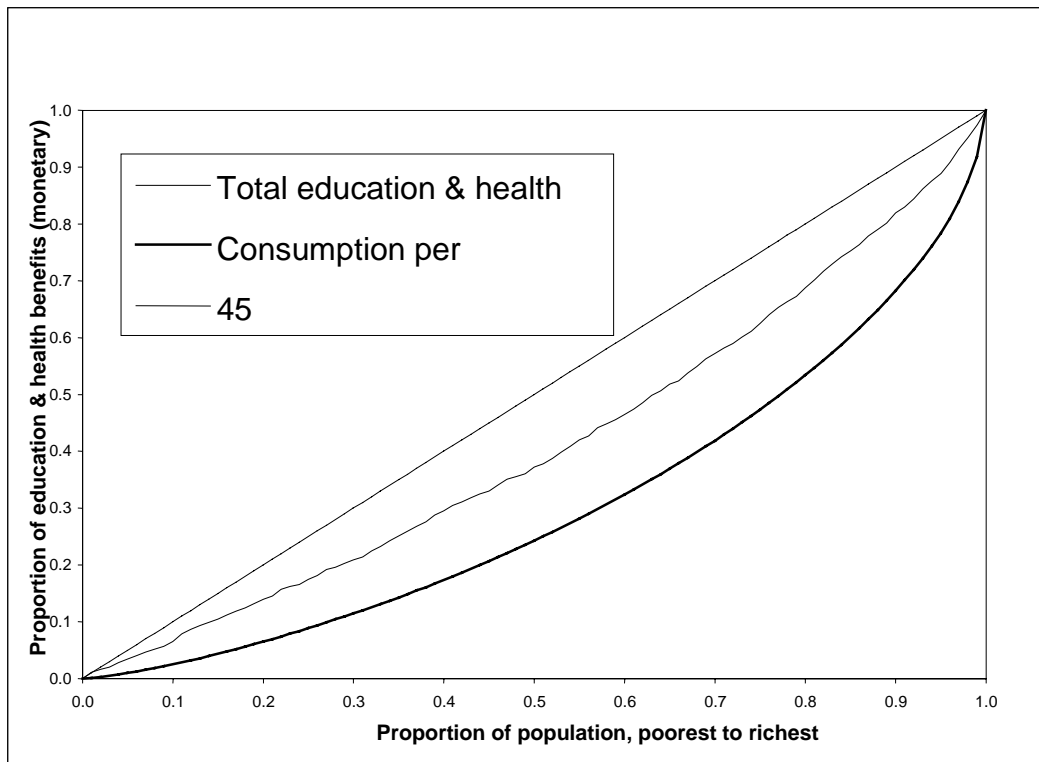Figure 7

Incidence of health benefits in monetary value

Figure 7 shows the concentration curves for the incidence of benefits associated with public health expenditures. In broad terms, there is little difference in the incidence of hospital and other health care medical facilities, but both types of expenditure are clearly progressive in the sense that they dominate the Lorenz curve. It is common for benefit incidence studies undertaken in other developing countries to find non-hospital facilities to be more progressive than hospitals, so the degree of progressivity of hospital benefits in Mozambique is remarkable.

Figure 8

Total education and health benefits

From Figure 8 it is seen that the incidence of 'total' education and health benefits (i.e. the total of primary education, part of secondary education and curative health care) while not per capita progressive are clearly progressive in the relative sense that public spending on these items is more equally distributed than per capita consumption. The 'total' education and health benefit line lies everywhere above the Lorenz curve.
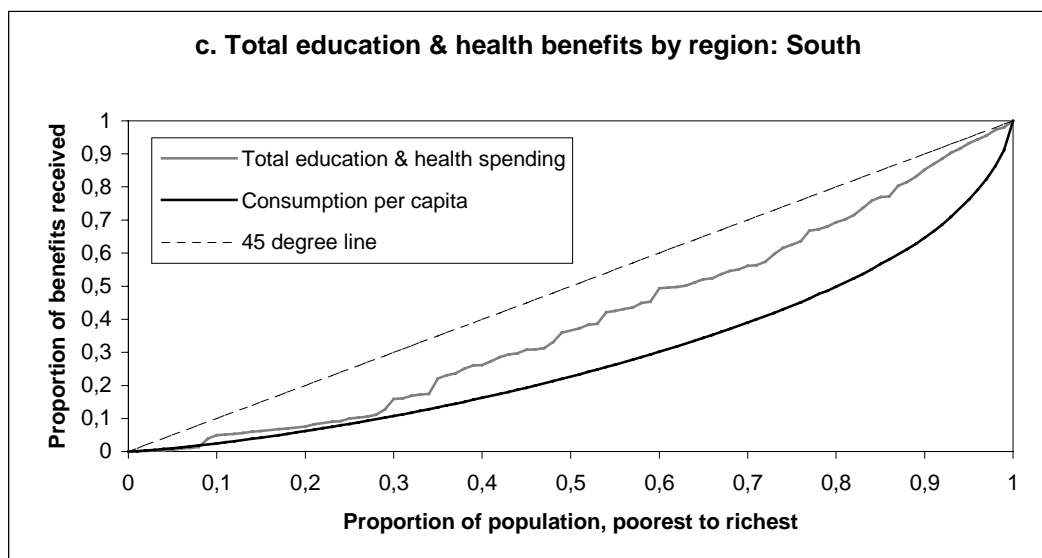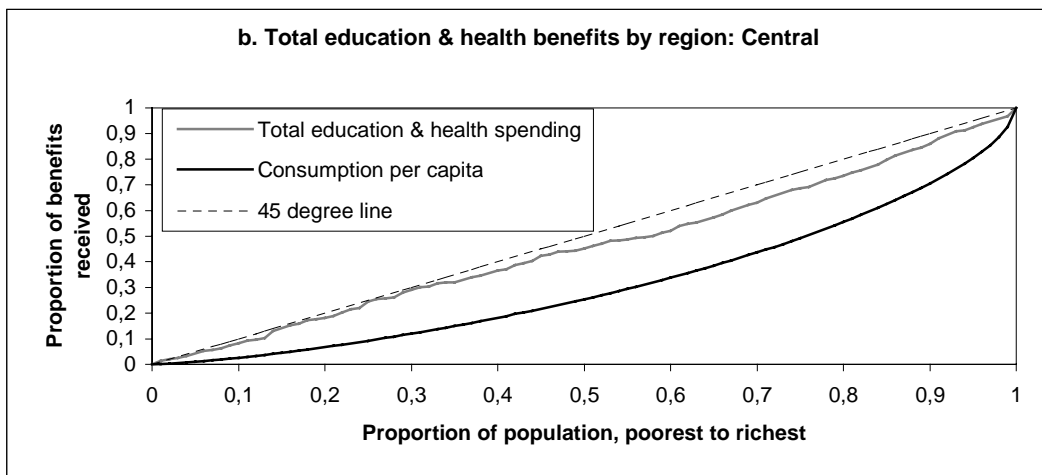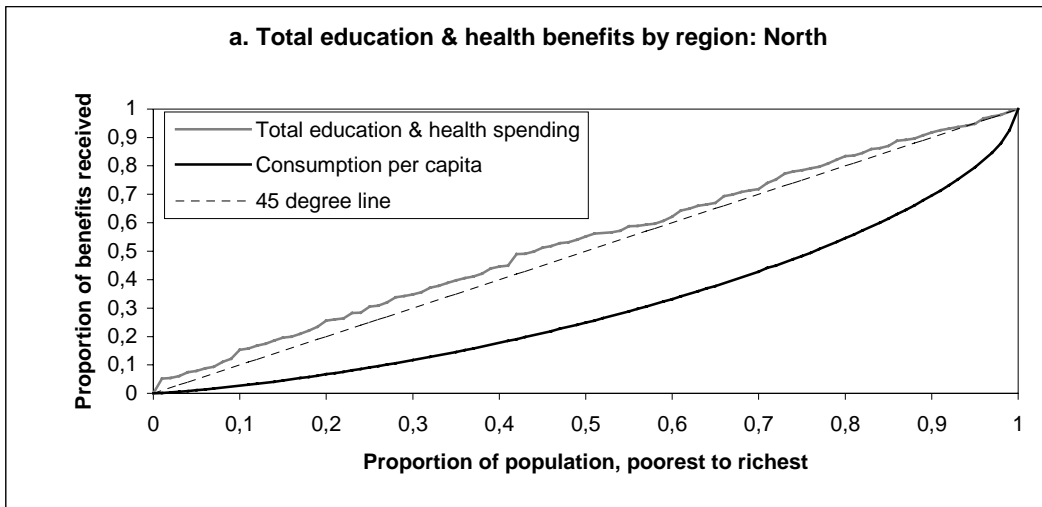
4.3 Regional analysis

We next analyze how benefits are distributed within each region. In Figure 9(a-c) the concentration curve for 'total' education and health benefits (with the same omitted categories as before) is plotted for each region. It can be seen that total benefits are distributed most equally in the North, where the curve lies slightly above the 45-degree line. Benefits are still very equal in the Central provinces while the distribution of benefits is least equal in the South, where the benefits curve crosses the Lorenz curve near the lower tail of the distribution. These results are caused in large part by higher enrollment in post-primary education the further south one moves. Hence, above-primary education, which is less progressive, gets a higher weight in the total picture as one moves south.[18] Several caveats apply: the present analysis has only captured a fraction of total public expenditure and even among thoseservices that we have in fact

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18 Disaggregated analysis (not shown here) confirms that lower primary education closely follows the 45-degree line in each of the three regions.

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Figure 9

Total education and health benefits by region

a. Total education & health benefits by region: North

Proportion of benefits received

Total education & health spending
Consumption per capita
45 degree line

Proportion of population, poorest to richest

b. Total education & health benefits by region: Central

Proportion of benefits received

Total education & health spending
Consumption per capita
45 degree line

Proportion of population, poorest to richest

c. Total education & health benefits by region: South

Proportion of benefits received

Total education & health spending
Consumption per capita
45 degree line

Proportion of population, poorest to richest

been able to analyse there is potential for biases in the unit costs on which analysis is based.

The distribution of benefits across regions is, as already mentioned, an issue of considerable political interest. Table 4 shows the population share and the proportion of public service benefits (those we are able to measure) of each region. The most striking observation is that the capital city, Maputo, receives almost a third of the benefits, yet accounts for only six percent of the population. Part of this is because Maputo provides services such as secondary schools and hospitals that serve a wider catchments area throughout the southern region. Even so, the share of benefits received by the southern region excluding Maputo is roughly in proportion to its population, leaving the northern region and especially the central region under-served when measured as per capita benefits received. Given the regional imbalances already referred to and the political differences from one region to the next, it would be wise to design future spending programmes carefully so as to avoid tension and conflict (Addison and Murshed, 2001), and maximise the human and social impact of social spending.

Table 4

Regional distribution of population and monetary benefits

Share (%)	North	Centre	South excluding Maputo	Maputo city	Total
Population	32.5	42.6	18.8	6.1	100
Education	18.8	26.2	22.7	32.2	100
Health	27.3	30.0	10.9	31.8	100
Total benefits	23.0	28.1	16.8	32.0	100

5   Education: what drives the results?

It is important to understand the decline in progressivity as we move up the educational ladder. There are many possible reasons, and for policy to be appropriately designed, it is particularly important to understand the factors causing inequalities in access to education. The more widespread availability of lower primary schools (EP1) in rural areas and the supply of education materials to all students benefit poorer groups. For other levels of education, there are much greater barriers in terms of access (long distances to schools) that increase with the level of education. This is especially the case for rural areas where the incidence of poverty is higher. Furthermore, family work obligations that increase with age may be a particularly important constraint for children from poor and rural households to complete primary school and to undertake to further study; and students need to pass primary exams before entering secondary school.

In the following, we address a different but related question: at which step in the educational ladder do the poor drop out? If education is to become more egalitarian, it is important to know at which level of schooling the constraints on the poor and girls are most binding. Additional data analysis was therefore undertaken in order to help pinpoint the location of inequalities within the education system. For example, it was observed in the previous sections that participation in and benefits from upper primary education (EP2) are much less progressive than basic lower primary education (EP1).

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The reason for this decline in progressivity may be located either at the EP2 or at the EP1 level: either the poor do not enroll in or do not pass EP2, or the poor are less likely to complete EP1 and hence do not qualify for admission into EP2, or both. Policy implications depend on which of the two factors are at work.

Table 5 describes the schooling experience of all sampled individuals 10 to 20 years old, inclusive. For each level of schooling and tercile of real total consumption, it shows the percentages of those who completed the level in question are still studying, or did not complete (either never enrolled at that level or enrolled and then subsequently left school before completing). The main insight from the table is that inequalities are present at all levels of education. The first row looks at the proportion of each tercile that replied in the affirmative to the question whether they ever went to school. A marked difference is found, as expected. In the first tercile, 59 percent of this age group have gone to school, compared to 74 percent in the third tercile. Next, the table shows the proportion of those who went to school that either (i) passed EP1, (ii) is still enrolled in EP1 or (iii) did not pass EP1. It may be noted that students from the third tercile are much more likely to have passed EP1 than others. Students from the first two terciles are more likely to remain at the EP1 level at age 10-20, because of late school start and/or delays in passing through the relevant grades (1-5). Family work obligations keeping the children from the lower terciles away from school part of the time and low quality of schooling services provided in relatively poor areas may account for this.

Table 5

School experience by tercile and gender (percent)

	Tercile			Gender		
	1	2	3	Male	Female	Total
Ever went to school						
Yes	59.4	69.7	74.1	73.2	58.8	66.2
No	40.6	30.3	25.9	26.8	41.2	33.8
Total	100	100	100	100	100	100
EP1 Status						
Passed EP1	16.8	25.1	34.2	24.1	24.3	24.2
Still studying EP1	58.2	52.2	42.5	55.6	47.3	52.0
Did not pass/enroll	25.0	22.7	23.3	20.3	28.4	23.8
Total	100	100	100	100	100	100
EP2 Status						
Passed EP2	19.7	18.1	35.2	25.4	24.2	24.9
Still studying EP2	33.9	40.2	37.8	39.9	34.5	37.6
Did not pass/enroll	46.3	41.7	27.1	34.7	41.3	37.5
Total	100	100	100	100	100	100
Post-primary Status						
Passed post-primary	2.9	3.7	4.5	5.1	2.4	4.4
Still studying post-primary	32.7	47.1	58.3	48.1	52.4	50.4
Did not pass/enroll	64.4	49.3	37.1	46.8	45.3	45.2
Total	100	100	100	100	100	100

This pattern continues up through the education hierarchy. The table goes on to show the status of students with respect to EP2, conditional on already having passed EP1, for each tercile. Students from the third tercile are almost twice as likely as students from the first and second terciles to have passed EP2 (given they previously passed EP1). This difference is not due to delays: the proportion still enrolled in EP2 is the same across terciles. The difference is entirely attributable to the fact that those students from the two lower terciles that qualify either never enrolled in upper primary school, or they enrolled in EP2 and then dropped out. The analysis is repeated for all post-primary education, combining general secondary education with post-primary technical education. In the third tercile 63 percent of those students who passed EP2 are enrolled in post-primary education or have already passed it, compared to 36 percent in the first tercile.

Turning next to gender inequalities, a similar picture of cumulative inequality appears. Table 5 shows that gender imbalance arises from early on—boys are more likely than girls have gone to school. Compared to boys, those girls who actually did get to school are somewhat more likely to drop out before completing EP1, and those who pass EP1 are more likely to drop out from or never enroll in EP2. Hence, it is concluded that

inequalities arise at all levels of schooling, starting from the most basic levels and accumulate up through of the school system. It is therefore the accumulated effects of inequalities at all previous levels that make intermediate and higher education regressive, as well as unequal in the gender dimension.

Next we analysed as shown in Table 6 differences in schooling across age cohorts, based on the question: "Did you ever go to school?" The highest rate of "yes" was found for those aged 13-14, at 72 percent. This contrasts markedly with the schooling experience of those aged 20-28, which is only 61 percent. Those aged 20-28 at the time of survey were of school age during the worst period of the war in the mid- and late-1980s, and they suffered from massive displacements and destruction of schools. Comparing the cohort aged 13-14 with the cohort aged 20-28 gives an indication of the impact of the massive school investment and reconstruction programme that took place starting from the early 1990s.

Table 6

Education experience by cohort and gender

	Proportion that ever went to school (%)								
	Age 20-28					Age 13-14			
	Tercile			Total		Tercile			Total
	1	2	3			1	2	3	
by gender:									
Males	68	76	82	76		71	82	87	78
Females	43	52	58	51		54	73	76	64
by region:									
North	61	64	67	64		64	70	71	68
Central	42	52	60	51		58	79	72	66
South excl. Maputo C.	58	70	86	70		70	79	96	79
Maputo city	95	96	99	97		88	96	97	95
Total	53	62	69	61		63	78	82	72

The results of the cohort-analysis in Table 6 are disaggregated by gender, tercile, and region.[19] Women have enjoyed the largest increase in schooling, i.e., the expansion of educational opportunities has led to a more rapid growth in the enrollment of females than in the enrollment of males. Growth has been sharpest for girls in the 2nd and 3rd terciles, with an increase in enrollment of 21 and 18 percentage points, respectively. Part of this is because of the simple fact that because they had lower enrollment rates in earlier years, females had more scope for increasing enrollment than males.

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[19] Terciles are measured with respect to expenditure per capita today, not at the time education took place.

Regionally, the largest gains in schooling occurred in the central and the southern (excluding Maputo city) regions, where the first and second terciles enjoyed substantial increases in the likelihood of receiving schooling. In the other two regions, schooling exposure remained lower (North) or stagnated at a fairly high level (Maputo city) and inequality in schooling access appeared to increase.

6   Conclusions

The 'conventional wisdom' of the benefit incidence literature is that spending on primary health care and primary education are the most progressive items on developing country public sector budgets, particularly if spending is targeted to rural areas. Nevertheless, previous studies conducted in other African countries indicate that public spending may not be very progressive due to the high budget shares of non-primary education and health services (Castro-Leal et al., 1999; Sahn and Younger, 1998). The objective of the present study was to provide additional country case evidence on these issues based on budget allocation practices in Mozambique.

Poverty is widespread and deeply rooted in Mozambique, and poverty reduction is a fundamental goal of fiscal policy. This implies there are two basic challenges for fiscal policy: (i) to help spur rapid economic growth, and (ii) to ensure that economic growth is distributed in a fair and equitable manner. The analysis in this paper focussed on the second point, and most of the public services we were able to measure have a progressive distribution. Mozambique is poor, but is not a very unequal society, and most of the public services analysed seem to reduce inequality relative to the distribution of consumption. The major exceptions at the national level are (i) upper secondary school benefits, which are less progressive than consumption expenditure, and (ii) university training, on which we don't have data, but which is almost certainly highly regressive. Moreover, inequalities in public spending appear to some extent to be more of a regional nature. On this basis, we conclude that regional imbalances need to be addressed carefully in future spending programmes. Imbalances are important and can fuel conflict, so not addressing them in time may have undesirable human and political implications.

The analysis revealed that inequalities in school education and attainment accumulate up through the educational ladder, resulting in increasingly unequal distribution. This does not in itself constitute an argument for scaling back post-primary education. Instead, those factors that constrain poor students from fully sharing in education or advancing up through the system need to be addressed, for example, by expanding coverage and improving quality of services in rural and other less-advantaged areas. This way, the incidence of public spending can become more progressive, yet it will require more fiscal resources devoted to education at all levels.[20]

Other barriers for access by the poor to further education should also be addressed. For example, at present there are great difficulties in recruiting and attracting qualified teachers for primary schools in many areas, constraining the continued expansion (and

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[20] For expanded schooling to be most effective, it will also be necessary to take actions that reduce the opportunity costs of sending children to school.

quality improvement) of primary schooling. This problem is related to the poor state of secondary education. Hence, even if secondary education is not particularly progressive, it requires attention. It would be unwise to place exclusive emphasis on primary education because of immediate equity arguments as this would compromise long-run growth by not addressing the need for people with higher levels of education. In this context, an economy-wide perspective on bottlenecks in skills and education is required to better guide investments in education. In addition, it has been shown in Mozambique that the presence of a secondary school nearby has a positive impact on enrollment rates at the primary level (Handa and Simler, 2000).

With reference to the health sector, even hospital care appears to be distributed progressively, and hence should not be scaled back on equity grounds per se. What appears more relevant is to highlight that there are possibilities for directing welfare benefits to poor people through well designed public interventions in the health area and the same goes for the access of poor people to health, education and road infrastructure.

In sum, in the case of Mozambique we find the incidence of public services to be fairly progressive, and cautions relating to data and methodology were noted. In particular, we had to assume that the benefit from a given service is uniform throughout a province. This ignores the heterogeneity of quality that no doubt exists on the ground. To the extent that poorer individuals receive lower quality services, the progressivity of benefits is diminished unless the quality of services in these areas is improved. Investment in better data generation, especially proper fiscal accounts, are necessary to improve future analyses and better guide budget priorities. However, it appears safe to assert that alleviating fiscal constraints in Mozambique (through debt relief) is likely to have significant poverty reducing effects and help poor people access public services in one of the poorest countries in the World. The implications for the donor community of the present study would therefore certainly seem to suggest that debt relief is warranted. This is even more so if the marginal impact of public services is higher than the average.

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