Africa Region Human Development Working Paper Series

Cost and Financing of Education

Opportunities and Obstacles for Expanding and Improving Education in Mozambique

(Sumário em português incluido)

Africa Region

The World Bank

Human Development Sector
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Foreword

This study is part of a series of education country status reports (CSRs) that are being prepared by World Bank staff in collaboration with national teams from various Sub-Saharan countries. The immediate objective is to enhance the knowledge base for policy development in the education sector. More broadly, CSRs create a basis for engaging a diverse audience in dialogue on education sector policies and for developing a shared vision for the future. These processes have become increasingly important as governments renew their commitment to reduce poverty, and the international donor community pledge to provide the needed financial assistance.

In this new dynamic of international development assistance, the World Bank has oriented its corporate mission toward supporting governments in the fight against poverty, making the task its defining priority. In practice the strategy is articulated through a two-prong approach: support for policies that accelerate economic growth combined with explicit measures to promote a more equitable distribution of the benefits from growth. Human development, especially through investments in education, plays a central role in both processes. This fact receives recognition in the emphasis placed on education in the debt relief arrangements under the Heavily Indebted Poor Countries (HIPC) Initiative. Governments have also invariably treated education as a priority sector in their Poverty Reduction Strategy Papers (PRSPs). In the case of Mozambique the impressive economic performance over the past decade and the significant human development challenges that persist, have made an even stronger case for such an approach.

In Mozambique, as in other low-income countries, two specific goals in education stand out: ensuring that all children complete basic schooling of adequate quality; and managing the production of graduates at post-basic levels, in terms of quantity and skill level and mix, to match the demand for skilled labor. To fulfill these objectives, an infusion of resources, from both domestic and international sources, may well be needed. However, an equally important issue is to ensure that currently available resources are used efficiently and equitably. The evidence suggests that in many Sub-Saharan countries, substantial scope for progress exists in this regard. Some countries have indeed already embarked on reforms for improving the performance of their education systems. In the 1990s, for example, policies to encourage more effective use of teachers through multi-grade teaching and double-shifting were put in place to boost coverage. In the post-war period in Mozambique this even led to triple-shifts in many schools. More remains to be done, particularly to tackle the structural constraints that encumber the education system. The challenges include defining an appropriate division of responsibility between the public and private sectors for financing and delivering education services, setting sustainable levels of teacher remuneration, and creating institutional arrangements for effective system management. Reform in these areas are key to improving the quality of learning outcomes, which in

turn will be crucial for progress toward the Education for All targets.

In order to identify appropriate measures and address the structural issues, a first step is to develop a country-specific knowledge base that sheds light on the key weaknesses in the education system. In a large number of Sub-Saharan countries, however, that knowledge base remains sparse, reflecting the systematic neglect of analytical work in the past. In order to re-capitalize it, the World Bank has initiated the preparation of CSRs, using a standard format to consolidate the available information in a policy-relevant manner.

Two features characterize the CSRs, one pertaining to its technical content, the other to the process by which it is accomplished. With regard to content, five aspects are worth mentioning. First the CSRs pay close attention to issues of equity and the distribution of public resources for education, given the importance of these topics in the HIPC and PRSP context. Second, the analysis relies on commonly available administrative data as well as household surveys, an approach that has helped to improve the consistency and robustness of the statistical results. Third, the CSRs put a sharper focus on outcomes by emphasizing indicators beyond the usual gross and net enrollment ratios. In particular, it documents the schooling careers of children as reflected in the shares of the population that enter grade 1 and attain the various grades in the educational ladder. The more detailed approach has helped to sharpen the socioeconomic, gender and geographical disparities in schooling, as well as clarified the sources of the disparities. In the case of Mozambique, some unique results emerge from this analysis: widespread grade repetition was identified as an important factor in producing the observed socioeconomic disparities in education; also important is that a large number of schools offer instruction only in grades 1 and 2, an arrangement that reflects severe teacher shortages and poorly-managed deployment of teachers across schools. A fourth example of the technical content of CSRs is the use of school-level data to assess the scope for improving service delivery to the poor. Finally, the CSRs also make use of data on student learning—where they are available—to gauge the education system's performance in this important domain, and to identify cost-effective measures for progress.

Regarding the process for preparing the CSRs, the main feature is that it is a product of a partnership between the World Bank and national teams from the various countries. Because participation in the analytical work is essential for developing a deep understanding of policy issues, an integral part of the process for preparing a CSR involves training and capacity building where these are needed. It is important to note that CSRs are diagnostic documents whose purpose is to help identify the policy questions rather than to offer solutions and make recommendations. The process of policy development is more appropriately led by the national team, and the availability of a CSR provides a good basis for disseminating the findings and stimulating a broad national dialogue on the way forward. The document also serves as a basis for preparing a rational and defensible plan for sector development that informs the country's medium-term budget planning exercise. These processes are already well underway in the Mozambican context. The national team has used the CSR extensively for policy dialogue within the country and to target interventions under the current Education Sector Strategic Program (ESSP). The CSR will play a pivotal guiding role in the Government's current plans to update its ten-year strategic plan as part of the country's poverty reduction strategy and Country Assistance Strategy to be prepared. For the World Bank's part, the document is helping to facilitate ongoing discussions to improve the internal and operational efficiency of the system, and most important to improve quality.

The publication of the CSR for Mozambique is intended to institutionalize our collective knowledge about the country's education sector, including broader macro economic and social issues like HIV/AIDS and the nature of the policy challenges, and to share that knowledge as widely as possible. It is my hope that as new knowledge emerges in the course of implementing the country's poverty reduction strategy, the CSR would be updated to track progress in overcoming the constraints in the education sector that currently impede poverty reduction in Mozambique and which may in the long run slow economic growth.

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The study was initiated by Donald Hamilton. The work also benefited from inputs from others including Noel Kulemeka and Alexandria Valerio. Elizabeth Forsyth, Patricia Tierney and Donald Rau provided expert editorial advice. Julia Anderson managed the production process.

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An informal version of the report in Portuguese has been published by the Ministry of Education.

Definition of Terms/Abbreviations and Acronyms

Abbreviations and Acronyms

ADPP	A Teacher Training Nongovernmental Organization
CSR	Country Status Report
EP1	Lower Primary Education, Grades 1–5
EP2	Upper Primary Education, Grades 6–7
ESG1	Lower Secondary Education, Grades 8–10
ESG2	Upper Secondary Education, Grades 11–12
ESSP	Education Sector Strategic Program
FDI	Foreign Direct Investment
GAR	Gross Admission Rate
GER	Gross Enrollment Rate
GDP	Gross Domestic Product
GNP	Gross National Product
HIPC	Highly Indebted Poor Countries
INE	National Institute for Statistics
MAE	Ministry of State Administration
MINED	Ministry of Education
MTEF	Medium Term Expenditure Framework
MPF	Ministry of Planning and Finance
NER	Net Enrollment Rate
PRSP	Poverty Reduction Strategy Paper
SIDA	Swedish International Development Agency
UP	Pedagogical University
UEM	Eduardo Mondlane University

Definition of Terms

Currency Equivalents
(as of May 2000)
Currency Unit: Metical (Mt); plural: Meticáis
US$1.00 = Mt12,000 (Year 2000, approximately)

Fiscal Year
January 1 to December 31

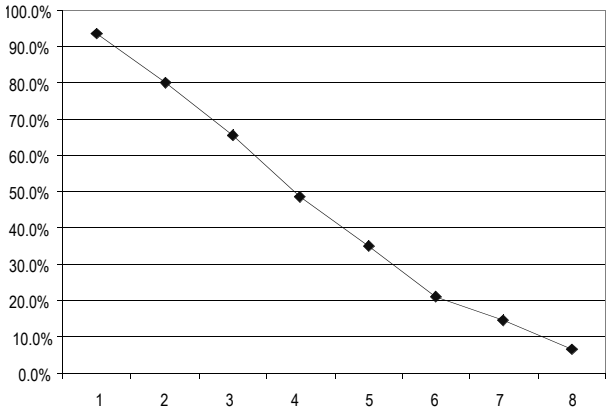
Executive Summary

Enrollment, equity, and children's chances of completing an education

Enrollment rates

Mozambique has made great strides in expanding the total number of students enrolled in primary education. From 1993 to 1999, the national gross enrollment rate[1] increased from 60 to 92 percent at the lower primary level (EP1). By the year 2000 more than 2.1 million children were enrolled in EP1. Nevertheless, repetition and dropout rates are high throughout the system, and access is limited beyond the EP1 level; this combination has led to uneven enrollment by level of education. The Mozambican educational system resembles a rough L shape, with most students enrolled in the beginning grades and very few enrolled beyond grade 5. In other words, there is a steep decline in the gross grade-specific enrollment rate (which can be taken as a measure of the access or gross admission rate[2] to the system at each grade) as shown in figure 1.

Figure 1
Access to the educational system in Cabo Delgado, grades 1–8 (1998)



Source: Mozambique school census, 1998.

Survival rates

Another way to analyze educational opportunities in the system is to assess a student's likelihood of completing a certain grade level and becoming literate. In 1998 the gross admission rate, or access rate, to grade 1 was about 94 percent nationally. Figure 1 shows the access rate in Cabo Delgado, which reflects the rate in Mozambique as a whole. As can be seen from the figure, the country has succeeded, or almost succeeded, in universalizing access to grade 1. However, high repetition and dropout rates (around 25 and 10 percent for EP1, respectively) make the system inefficient and shows that Mozambique is still many steps away from providing universal basic education for all. Thus, while almost all Mozambican children now enter grade 1, 85 percent of the entrants are unlikely to make it

past grade 7. In fact, most pupils are likely to drop out before they attain numeracy and literacy skills.

Mozambique has a very low average retention rate of 45 percent (52 percent for boys and 38 percent for girls) at primary level. Incomplete schools are part of the problem. About 25 percent of primary schools are considered "incomplete," meaning they do not offer the full primary cycle of five grades. In this case it is the system failing to provide the students with the educational opportunities they seek. Making existing schools complete should thus be given high priority because it would improve student retention and lower repetition and dropout rates.

Geographic location of schools presents another challenge. According to the 1997 household survey, the average child travels as far as 45 kilometers one way to reach his or her school, often taking more than one hour to make the journey. To make matters worse, up to 32 percent of rural villages do not have a primary school. Supply-side instruments (implementing complete schools reasonably close to where children live, possibly using multigrade teaching when applicable) are thus likely to help address what probably will be the most important issue in Mozambican education for years to come. However, the ability to address some of these issues also depends on the overall resources available to the sector, as well as an understanding of the different reasons behind low retention as they vary from location to location.

Equity in enrollment

The gross admission rate (or access) to grade 1 is fairly high across localities and population groups but wide disparities in admission rates emerge by grade 5, reflecting the impact of grade repetition and dropping out. The disparities are particularly striking between the southern and northern provinces, between urban and rural areas, and between girls and boys. Girls' gross admission rate to grade 5 is particularly low in some places, falling below 20 percent in such provinces as Cabo Delgado (12 percent); Nampula (13 percent); Niassa (16 percent); Tete (18 percent); and Zambezia (15 percent).

One positive note is that the higher the overall gross enrollment rate, the smaller the disparities across localities and population groups. Thus, increasing the country's overall enrollment rate inevitably implies better chances for schooling among those who are currently marginalized.

Macroeconomic and financial aspects

Macroeconomic and demographic context

The development of education is determined largely by macroeconomic and demographic conditions. However, the capacity of the system to absorb resources efficiently and produce good-quality education varies across countries with similar per capita income. Thus countries with similar gross domestic product (GDP) per capita show widely different levels of education development.

Throughout the 1990s, Mozambique enjoyed a period of unprecedented economic growth during which per capita income rose sharply and the population grew much more slowly than expected. Both factors were favorable for improving and expanding education coverage. The GDP almost doubled between 1992 and 1999 (from Mt17.4 trillion to Mt30.9 trillion in constant prices of 1995), equivalent to a 77 percent growth in constant prices over that period.[3] At the same time, domestic revenues rose 8 times,[4] and government expenditures increased about 10 times.[5] Despite relatively high growth, external funding still contributed about half of the government's budget, a situation unlikely to change in the future.

Education expenditures

Education spending increased about five times in nominal terms during the 1990s.[6] The share of recurrent domestic spending on education in total recurrent government spending remained stable at about 16 percent. Similar to overall government spending, about half of total education spending (mostly for capital expenditure) was financed from external sources. The share of total spending on education declined from about 5.5 percent of GDP in 1991–93 to about 3.5 percent in the late 1990s. This, however, was largely due to the rapid growth in the economy and not as a measure of improved efficiency on education spending due to a lowering of repetition and drop out rates.

The share of domestic spending on education followed a more or less similar downward trend, averaging 2.3 percent of GDP in 1991–93 and only 1.7 percent in the late 1990s. Even if we take into account total spending on education (including external financing), the share of spending on the sector was only 3.5 percent of GDP, which is very low by international standards. There clearly is scope for Mozambique to increase its domestic funding of the educational system.

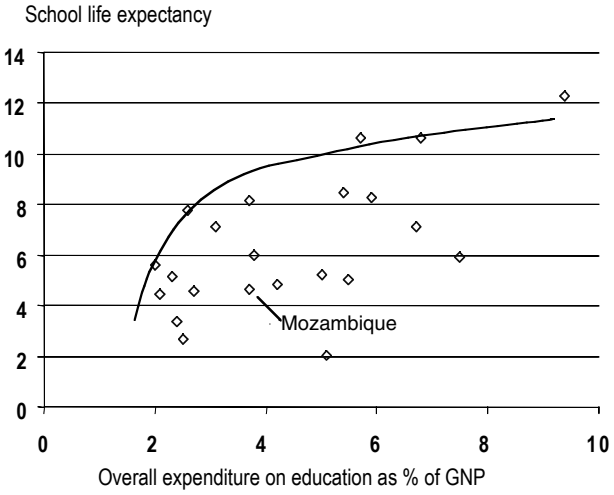
Educational development and efficiency gains

Another way to look at this is to consider the value obtained for the money spent. How many years of education can a Mozambican child expect to receive given current resource allocation? Between 1995 and 1999, the number of years a child could expect to attend school in Mozambique improved from about 3.4 years to 4.6 years on average, but this remained comparatively low for the region; around the same time (1993), the school life expectancy was estimated to be about 5 years in Tanzania, 6 years in Malawi, and 11 years in Zimbabwe.[7] While the situation has changed since then in many of these countries, figure 2 shows there is a clear need in Mozambique not only to improve efficiency in the use of resources but also to increase the overall amount of resources going to the sector.

Budget resources, distribution, and construction costs. In 1999, the lion's share of external funding for the education budget was used for school construction. This is not surprising for the period following the civil war; what is unique, however, is that the cost of construction of a primary school in Mozambique is about 5 to 20 times the cost of construction in neighboring countries. Although construction in general is more expensive in Mozambique, there clearly is room for improvement, balancing recurrent costs with capital investment costs.

From 1995 to 1999, the cost of delivering services (i.e. the amount spent on administration) represented close to 20 percent of recurrent spending for the education sector, of which the central ministry (MINED) accounted for more than half. This figure is very high, particularly when considering it is greater than administration spending for all of the country's EP2 and ESG1 schools. Not counting spending on administration, primary schools received about 44 percent of total spending for the sector, or about 52 percent if we include spending on administration. These proportions were relatively stable over the period 1995–99. Secondary education received less than 10 percent of the total, while higher education received about twice that amount. Overall, these figures raise a question about the balance of spending between the secondary and higher levels of schooling in the country and indicate that there is also clearly room for improving efficiency at the central level with a view to enhance service delivery and reduce overhead costs.

Figure 2
School life expectancy and spending on education in select Sub-Saharan African countries, around 1995



Source: Educational and financial statistics for Mozambique and UNESCO.

Aspects of efficiency, quality, and management

Efficiency in per pupil spending and outcomes

At the primary school level, Mozambique's unit cost is, on average, similar to that of its neighbors, but lower than the average unit cost in Anglophone African countries and to a greater extent, Francophone countries. A relatively similar pattern holds for secondary education. For the post-primary levels, especially higher education, spending per

student is on the high side compared with neighboring countries, but more or less in line with the average of all African countries. Because repetition and dropping out raise the unit costs, additional costs (and resources) are needed to produce a graduate—implying an inefficient use of resources.[8] The index of overall efficiency in EP1 is only 58 percent, indicating that 42 percent (1 – 0.583) of the public resources mobilized in EP1 are de facto wasted[9]—resources that otherwise could have been used to improve the system or enroll new students. The majority of wasted resources were lost in EP1.

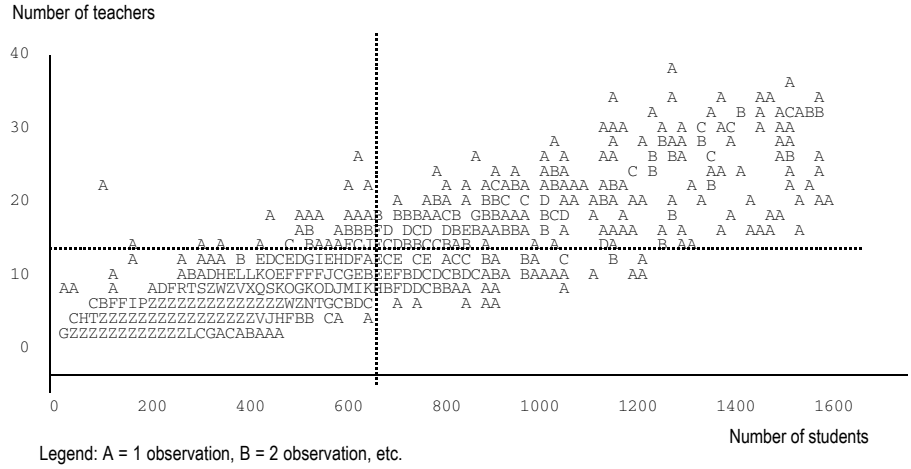
Allocation of teachers across schools. Overall in Mozambique, the allocation of teacher resources is inconsistent[10] across the estimated 6,000 lower primary schools that existed in 1998, both in terms of teacher qualifications as well as the teacher to pupil ratio. Figure 3 shows that even though schools tend to benefit from a larger number of teachers when the size of enrollment is larger, there also is wide variability in the number of teachers for schools enrolling a similar number of pupils. The variance in the allocation of teachers is wider in rural areas[11] than in the country as a whole but is similar to the variance in the allocation of teachers in urban areas.

Teacher deployment across provinces and teacher management. In Mozambique, some provinces with a similar number of teachers service very different numbers of pupils.[12] This fact suggests that there is significant inconsistency in the allocation of teachers among the provinces. More significant is that about 80 percent of the variance in teacher deployment occurs within the provinces themselves. Therefore, the allocation of teacher resources appears to be a function of how teacher resources are managed, particularly at the provincial level. The distribution of available teachers is an issue that will require attention in the years to come, especially as HIV/AIDS increases the attrition rate of teachers. Finally, the budgetary mechanisms and procedures in the sector clearly should be addressed, as this will be one way to ensure the adequate distribution of resources.

Quality of education

Education in Mozambique is characterized by substantial disparities in learning across schools. Without taking into account the characteristics of the student body, the variability in the use of resources had a much greater impact on quality of education, and thus also on outcomes, than did variability in the amount of resources available. The pedagogical management of schools in Mozambique appears to be quite weak. Any mechanism established to improve student learning and school quality will need to (a) measure student learning on a regular

Figure 3
Teacher allocation in public EP1 schools, 1998



Source: Mozambique school census, 1998.

basis at the school level; and (b) help low-achieving schools to do better.

Factors exogenous to the school also are important, such as the parents' mother tongue, availability of books at home, and so forth. School inputs, such as school furniture, learning materials, and classroom materials (chalk, blackboard) clearly do have some bearing. Finally, teacher education and the number of years of teaching have a significant influence on learning, which is not surprising. Addressing the issue of learning and the individual's ability to learn after he or she has left school and apply that knowledge is critical for improving the impact of education on society. This impact relates to external efficiency, which is concerned with the performance of graduates after they have exited the schooling system and have entered their working life.

External efficiency

To what extent does the knowledge imparted to a cohort of youngsters while they are in school (whether for one year or 20) correspond to the best that can be achieved both for the individuals and for society?

Primary education is an all-purpose investment whose results (basic reading and writing, basic arithmetic and problem solving, basic life skills) contribute to improved productivity in the traditional sector. Moreover, the economies in a number of developing countries have difficulty absorbing the graduates from secondary or even higher education, making unemployment of graduates widespread in many African countries. Under these circumstances, overinvesting in higher levels of education is more a burden, rather than an engine for, economic growth. However, it should be emphasized that education is a necessary, but not sufficient condition for economic growth and social development and often the poor returns to investment in higher education is a result of poor quality courses that are irrelevant to the economy. Finally, several research findings show that primary schooling has a smaller impact on economic growth in African countries than in low-income countries situated in other regions of the world.

A basic element to consider is that *the Mozambican economy is, and will remain in the next decades, characterized by a dualistic structure with a dominant traditional sector and a relatively small, but growing, modern sector of employment.* Any strategy for human capital formation in the country should take this structural context into account. The basic objective is to provide the type of human capital that best fits the demand of the two subsectors, while helping the economy modernize and provide livelihoods that alleviate proverty in the long run.

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1. The gross enrollment rate is the total number of students enrolled, regardless of age, over the age-specific population group (for example, pupils ages 6 to 10 for EP1); therefore, it is sometimes higher than 100 percent.
2. The gross admission rate (or gross enrollment rate by grade) is the total number of students enrolled in a specific grade, regardless of age, over the age-specific population group (for example in figure 1, the gross admission rate or gross enrollment rate in grade 4 in the province of Cabo Delgado was 48 percent of the total number of 9 year old age cohort.
3. GDP grew by a factor of 10 in nominal terms between 1992 and 1999.
4. From Mt661 billion to Mt6.3 trillion.
5. From Mt1.5 trillion to Mt13.5 trillion.
6. By 540 percent, from Mt286 billion in 1992 to Mt1,834 billion in 1998.
7. With an average of 4.85 years in Francophone African countries and 7.48 years in Anglophone countries.
8. With the current rates of repetition and dropout, only 42 out of 100 students will complete grade 5. To produce these 42 students in grade 5, it would be necessary to finance 210 (42 x 5) years of schooling, not counting repeaters and dropouts, that is. The consequence is that to finally produce the 42 pupils in grade 5, the system would have to finance 125 (the 100 students in grade 5 plus the 25.4 percent of repeaters in that grade), instead of the 42 that would have been strictly necessary. The same applies to the next grades.
9. We also can use the efficiency ratio to get a sense of the average number of years the budget needs to finance to help one child on average get to grade 5: it takes 8.6 years for all the pupils (including repeaters and dropouts) to pass through EP1; in other words, it costs the government an additional 3.6 years of per pupil spending to allow a child to reach the fifth grade.
10. As far as the quantitative distribution of teachers is concerned, we should aim at providing schools of similar size of enrollment with a similar number of teachers.
11. For example, among all the schools with at least 10 teachers, enrollments vary between 100 and 1,200 pupils; similarly, schools enrolling 600 pupils may have between 5 and 15 teachers.
12. For example, Cabo Delgado and Inhambane both have about 2,500 teachers, but the enrollment in Cabo Delgado is about 134,000 pupils, 41,000 pupils fewer than in Inhambane, which has 175,000 pupils. Similarly, both Tete and Maputo provinces enroll about 140,000 pupils each, but Tete has 3,000 teachers, while Maputo has fewer than 2,000.

RESUMO EXECUTIVO

As matrículas, a equidade e a possibilidade de as crianças completarem a sua educação

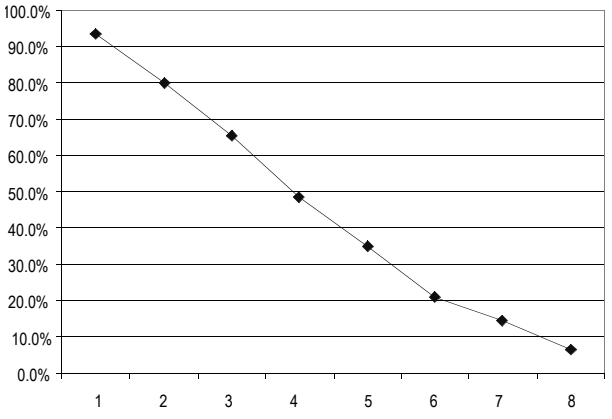
As taxas de matrícula

Moçambique fez grandes progressos quanto ao número total de alunos matriculados no ensino primário. De 1993 a 1999, a taxa bruta nacional de matrícula[1] aumentou de 60 a 92 por cento no primeiro nível primário. Até ao ano 2000, mais de 2,1 milhões de crianças foram matriculadas no EP1. No entanto, as taxas de repetência e de desistência são elevadas em todo o sistema, e o acesso é limitado para além do nível de EP1; esta combinação de circunstâncias levou a uma situação desigual por nível de ensino. Um gráfico das matrículas do sistema educativo de Moçambique tem sensivelmente a aparência de uma curva em forma de L, com a maioria dos alunos matriculados nos primeiros graus e muito poucos matriculados para além de 5º grau. Por outras palavras, verifica-se uma forte queda da taxa bruta de matrícula por nível de graus (usando a taxa de matrícula como um substituto para o acesso ou a taxa bruta de admissão[2] no sistema em cada nível), como se pode ver na Figura 1.

Taxas de sobrevivência

Outra maneira de analisar as oportunidades educativas do sistema é avaliar a probabilidade de um aluno completar o ano de um determinado nível e de ser alfabetizado. Em 1998 a taxa bruta de matrícula, ou taxa de acesso, no 1º grau foi cerca de 94 por cento em todo o país. A Figura 1 mostra a taxa de acesso em Cabo Delgado, o que reflecte a taxa de Moçambique no seu conjunto. Como se pode ver na Figura 1, Moçambique conseguiu no início, ou quase conseguiu, proporcionar *acesso* a todos. Contudo, as elevadas taxas de repetência e de desistência (cerca de 25 e 10 por cento para o EP1, respectivamente) indicam que o sistema é ineficiente, e mostram que Moçambique ainda não conseguiu proporcionar o acesso universal a todas as pessoas. Por conseguinte, se bem que a probabilidade de uma criança moçambicana entrar para o 1º

Figura 4
Acesso ao sistema educativo em Cabo Delgado, graus 1 a 8, 1998



Fonte: Recenseamento das escolas de Moçambique, 1998.

grau tenha aumentado consideravelmente nos últimos anos, 85 por cento dos alunos provavelmente não irão para além do 7º grau. De facto, a maioria dos alunos provavelmente desistirão antes de saberem ler e contar.

Moçambique tem uma taxa média de retenção muito baixa, 45 por cento no nível primário (52 por cento para os rapazes e 38 por cento para as raparigas). O problema de as escolas "serem incompletas" leva a uma retenção ainda mais baixa. Cerca de 25 por cento das escolas primárias são consideradas "incompletas", o que significa que não oferecem um ciclo primário completo de 5 graus. Neste caso, é o sistema que não proporciona aos alunos as oportunidades de ensino que eles buscam. Deveria ser dada a mais alta prioridade a fazer com que as escolas existentes sejam "completas", porque isso levaria a uma melhor retenção dos alunos e a baixar as taxas de repetência e de desistência.

A situação geográfica das escolas coloca mais outro problema. Sabemos que, segundo o levantamento de 1997 às famílias, a distância média entre a casa e a escola se eleva a 4,5 quilómetros, e que o período de tempo médio que um aluno do EP1 leva a chegar à escola é frequentemente de mais de uma hora. Trinta e dois por cento das aldeias nas zonas rurais não têm uma escola primária. Melhorar os instrumentos da oferta (pôr em funcionamento escolas "completas" a uma distância razoável do lugar onde vivem as crianças, em classes que abrangem vários graus, quando isso for praticável) é uma boa maneira de abordar o que provavelmente será o problema mais importante do ensino em Moçambique nos anos vindouros. Todavia, a capacidade de abordar alguns destes problemas também depende dos recursos globais disponíveis a este sector, assim como da compreensão das diferentes razões subjacentes à baixa retenção, pois elas variam de lugar para lugar.

A equidade nas matrículas

A taxa bruta global de admissão (ou de acesso) ao EP1 varia conforme as províncias e é nitidamente inferior para as raparigas do que para os rapazes. A taxa de acesso ou taxa bruta de admissão que é bastante alta no 1º grau é consideravelmente inferior quando se chega ao 5º grau em algumas províncias, o que reflecte as taxas elevadas de repetência e de desistência. É de notar que, para as raparigas, a taxa de admissão ao 5º grau é inferior a 20 por cento em várias províncias (Cabo Delgado, 12 por cento; Nampula, 13 por cento; Niassa, 16 por cento; Tete, 18 por cento; e Zambézia, 15 por cento).

Contudo, um aspecto positivo é evidentemente o facto que, quanto mais alta for a taxa bruta global de matrícula numa província, mais numerosas são as matrículas de raparigas. Portanto, aumentar a taxa global de matrícula provavelmente fará subir a taxa de matrícula das raparigas. As taxas de matrícula variam entre as províncias do sul e do norte, e a disparidade é evidente nas taxas de sobrevivência escolar nas zonas urbanas e rurais. As crianças matriculadas em escolas urbanas ou semi-urbanas têm uma maior probabilidade de completar a sua educação do que as crianças que frequentam uma escola rural.

Aspectos macro-económicos e financeiros

O contexto macro-económico e demográfico

O desenvolvimento da educação é, em grande medida, determinado pelas condições macro-económicas e demográficas do país. Contudo, a capacidade do sistema de absorver recursos eficientemente e de produzir um ensino de boa qualidade varia entre países com um rendimento per capita semelhante. Assim, entre os países que têm um produto interno bruto (PIB) per capita semelhante verificam-se amplas diferenças no nível de desenvolvimento da educação.

Durante toda a década de 1990, Moçambique desfrutou de um período de crescimento económico sem precedentes, tendo o seu rendimento per capita passado de USD 179 em 1990 para cerca de USD 260 em 1999, e a população crescido muito mais lentamente do que se esperava. Ambos esses factores foram favoráveis para melhorar e ampliar a cobertura da educação. O PIB quase duplicou entre 1992 e 1999 (tendo passado de Mt 7,4 trilhões para Mt 30,9 trilhões em preços constantes de 1995), o equivalente a um crescimento de 77 por cento em preços constantes durante esse período.[3]

Simultaneamente, o rendimento interno aumentou 8 vezes,[4] e as despesas governamentais multi-

plicaram-se cerca de 10 vezes.[5] Apesar de o crescimento ser relativamente alto, o financiamento externo contribuiu ainda com metade do orçamento do governo, situação que provavelmente não mudará no futuro.

As despesas com a educação

As despesas com a educação também subiram certa de cinco vezes em termos nominais durante a década de 1990.[6] A participação das despesas internas recorrentes com a educação nas despesas recorrentes totais do governo permaneceu estável em cerca de 16 por cento. De maneira semelhante às despesas governamentais globais, aproximadamente metade das despesas totais com a educação (a maioria para despesas de equipamento) foi financiada por fontes externas. A participação das despesas totais na educação decresceu, tendo passado de cerca de 5,5 por cento do PIB em 1991-93 para aproximadamente 3,5 por cento em fins da década de 1990. Isto, contudo, foi devido em grande medida ao célere crescimento da economia, e não a uma maior eficiência nos gastos educacionais devida a taxas de repetência e de desistência mais baixas.

A participação das despesas internas com a educação seguiu uma tendência descendente mais ou menos semelhante, sendo em média de 2,3 por cento do PIB em 1991-93, e apenas 1,7 por cento em fins da década de 1990. Mesmo se levarmos em conta os gastos totais com a educação (e inclusivamente o financiamento externo), a participação das despesas no sector foi de apenas 3,5 por cento do PIB, o que é muito baixo segundo os padrões internacionais. É claro que está dentro das possibilidades de Moçambique aumentar o financiamento nacional do seu sistema de educação.

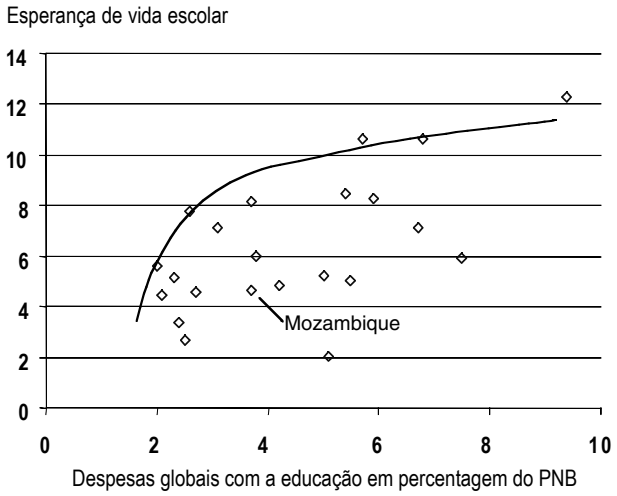
O desenvolvimento educacional e os ganhos em matéria de eficiência

Outra maneira de ver a questão é ponderar o valor obtido pelo dinheiro gasto. Quantos anos de educação pode esperar receber uma criança moçambicana de acordo com a actual distribuição de recursos? Entre 1995 e 1999 o número de anos que uma criança pode esperar frequentar a escola em Moçambique melhorou, tendo passado de uma média de cerca de 3,4 anos para 4,6 anos, mas isso continua a ser comparativamente baixo para a região: aproximadamente na mesma altura (1993), a esperança de vida escolar foi calculada em aproximadamente 5 anos na Tanzânia, 6 anos no Malawi, e 11 anos no Zimbabwe. [7] Se bem que a situação tenha mudado desde então em muitos desses países, a Figura 2 mostra que existe uma necessidade evidente em Moçambique não só de melhorar a eficiência na utilização dos recursos, mas também de aumentar o montante global de recursos afectados a esse sector.

Recursos orçamentais, distribuição e custos de construção. Em 1999 a parte mais importante do financiamento externo para o orçamento de educação foi utilizada na construção de escolas. Isto não é surpreendente no período subsequente à guerra civil; porém, o que é singular é que o custo de construção de uma escola primária em Moçambique é cerca de 5 a 20 vezes o custo de construção nos países vizinhos. Embora a construção seja em geral mais cara em Moçambique, é evidente que esta situação pode ser melhorada, ao equilibrar os custos recorrentes com os custos de investimento do capital.

Entre 1995 e 1999, o custo da prestação de serviços ou as despesas de administração representa-

Figura 5
Esperança de vida escolar e gastos com a educação em países seleccionados da África Subsariana, cerca de1995



Fonte: Estatísticas educacionais e financeiras relativas a Moçambique e à UNESCO.

ram quase 20 por cento das despesas recorrentes no sector da educação, das quais o ministério central, o MINED, usou mais de metade. Este montante é muito elevado, especialmente se considerarmos que ele é superior às despesas de administração de todas as escolas de EP2 e ESG1 do país. Sem contar as despesas de administração, as escolas primárias receberam em torno de 44 por cento das despesas totais para o sector, ou seja, aproximadamente 52 por cento se incluirmos as despesas de administração. Estas proporções foram relativamente estáveis durante o período de 1995 a 1999. O ensino secundário recebeu menos de 10 por cento do total, enquanto que o ensino superior recebeu cerca do duplo desse montante. Em termos globais, estes números suscitam a questão do equilíbrio das despesas entre os níveis secundário e superior de ensino no país, e indicam que existe uma possibilidade evidente de melhorar a eficiência a nível central com vista a melhorar a prestação de serviços e os custos gerais.

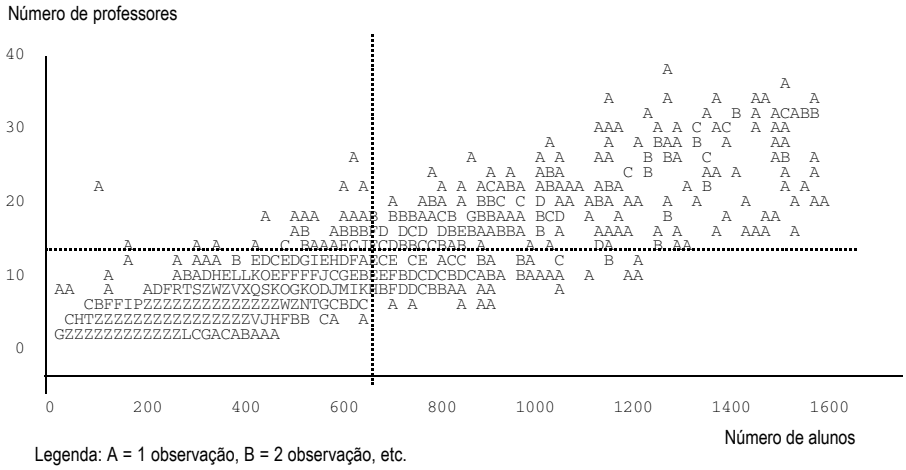
Os aspectos de eficiência, qualidade e gestão

A eficiência dos gastos por aluno e os resultados

A nível da escola primária, o custo unitário de Moçambique é em média semelhante ao dos países vizinhos, mas inferior ao custo unitário médio nos países africanos de expressão inglesa e, em maior medida, nos países de expressão francesa. Para o ensino secundário, a situação é sensivelmente semelhante. Para os níveis de grau posteriores aos do ensino primário, especialmente do ensino superior, as despesas por aluno são relativamente altas comparadas com as dos países vizinhos, mas sensivelmente semelhantes à média em todos os países africanos. Contudo, os gastos por aluno parecem ser relativamente baixos na escola primária e relativamente altos no ensino superior. Visto que as repetências e desistências fazem aumentar o custo unitário, são necessários custos (e recursos) adicionais para produzir um graduado (diplomado), o que subentende uma utilização ineficiente de recursos.[8] O índice de eficiência global no EP1 é de apenas 58 por cento, o que indica que 42 por cento (1 – 0,583) dos recursos públicos mobilizados no EP1 são de facto desperdiçados[9]— recursos que de outra maneira poderiam ter sido utilizados para melhorar o sistema ou matricular novos alunos. A maioria dos recursos desperdiçados foram gastos no EP1.

A repartição de professores nas escolas. Em termos globais, a repartição dos recursos docentes em Moçambique é desproporcionada[10] entre as escolas primárias do primeiro ciclo, calculadas em 6.000, que existiam em 1998, tanto em termos de qualificações dos professores como do rácio professor-aluno. A Figura 3 mostra que, apesar da

Figura 6
Repartição dos professores nas escolas públicas do EP1, 1998



Fonte: Recenseamento das escolas de Moçambique, 1998.

tendência de as escolas beneficiarem de um grande número de professores quando o número de matrículas é maior, o número de professores das escolas com um volume semelhante de matrículas também varia imensamente. A variância na distribuição de professores é maior nas zonas rurais[11] do que no conjunto do país, mas é semelhante à variância na distribuição de professores nas zonas urbanas.

A distribuição de professores por província e a gestão dos docentes. Em Moçambique, algumas províncias com um número semelhante de professores oferecem serviços educacionais a um número bastante diferente de alunos.[12] Este facto sugere que existe uma grande discordância na distribuição de professores através das províncias. Ainda mais significativo é o facto que cerca de 80 por cento da variância na repartição dos professores ocorre dentro das próprias províncias. Por conseguinte, a repartição de recursos docentes parece ser feita em função da maneira como os recursos docentes são geridos, especialmente a nível provincial. A distribuição dos professores disponíveis é uma questão à qual terá que ser prestada atenção nos próximos anos, especialmente à medida que o VIH/SIDA aumenta a taxa de eliminação natural dos professores. Finalmente, os mecanismos e procedimentos orçamentais no sector deveriam claramente ser abordados, por ser essa a maneira de assegurar uma distribuição adequada dos recursos.

A qualidade da educação

A educação em Moçambique caracteriza-se por uma grande disparidade na aprendizagem em todas as escolas. Sem levar em conta as características do corpo discente, a variabilidade no uso de recursos produziu um efeito muito maior na qualidade do ensino, e portanto também nos resultados, do que a variabilidade no montante de recursos disponíveis. A gestão pedagógica das escolas em Moçambique parece ser bastante débil. Qualquer mecanismo que seja instituído para melhorar a aprendizagem dos alunos e a qualidade do ensino terá que (a) medir a intervalos regulares o aproveitamento dos alunos a nível escolar, e (b) ajudar as escolas pouco eficientes a funcionarem melhor.

Os factores exógenos à escola também são importantes, tais como a língua materna dos progenitores, a disponibilidade de livros em casa, etc. Os insumos escolares, tais como, mobiliário escolar, materiais para o ensino e as salas de aula (giz, quadro negro, etc.) têm evidentemente uma incidência sobre os resultados. Finalmente, a educação dos docentes e o número de anos de prática do ensino exercem uma grande influência no aproveitamento dos alunos, o que não é surpreendente. A abordagem da questão do aproveitamento e a capacidade de a pessoa aprender depois de sair da escola, e aplicar os conhecimentos adquiridos, é crucial para melhorar o impacto da educação na sociedade. Esse efeito está relacionado com a eficiência externa.

A eficiência externa

A eficiência externa diz respeito ao desempenho dos diplomados depois de estes terem saído do sistema escolar e entrado na vida de trabalho. Em que medida os conhecimentos proporcionados a um grupo de jovens quando frequentavam a escola (seja durante 1 ano, seja durante 20 anos) corresponde ao melhor que se pode alcançar para essas pessoas e para a sociedade?

O ensino primário é um investimento com múltiplas finalidades, cujos resultados (capacidade básica de ler e escrever, aritmética básica e solução de problemas, e competências básicas para a vida) contribuem para melhorar a produtividade do sector tradicional. Adicionalmente, as economias em alguns países em desenvolvimento têm dificuldade em absorver os diplomados do ensino secundário e mesmo superior, o que faz com que o desemprego de diplomados seja generalizado em muitos países africanos. Nestas circunstâncias, o investimento excessivo nos níveis superiores de ensino é mais um peso do que um motor de crescimento económico. Contudo, deve-se frisar que isso é uma condição necessária, mas não suficiente, para o crescimento económico e o desenvolvimento social, e a fraca rentabilidade do investimento no ensino superior é o resultado da fraca qualidade dos cursos e da pouca relevância destes para a economia. Finalmente, alguns trabalhos de investigação mostram que o ensino primário produz um

efeito menor no crescimento económico dos países africanos do que em países de baixos rendimentos situados noutras regiões do mundo.

O elemento básico a considerar é que *a economia de Moçambique é, e continuará a ser nas próximas décadas, caracterizada por uma estrutura dualista, com um sector tradicional dominante e um sector moderno, relativamente pequeno, e crescente em termos de emprego.* Qualquer estratégia para a formação do capital humano no país deverá levar em conta este contexto estrutural. O objectivo fundamental é o de proporcionar o tipo de capital humano que melhor se coaduna com a procura dos dois sub-sectores, ajudando simultaneamente a economia a desenvolver-se, passando do tradicional ao moderno e, a longo prazo, aliviando a pobreza.

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1. A taxa bruta de matrícula é o número total de alunos matriculados, irrespectivamente da idade, de todo o grupo populacional de uma idade específica (por exemplo, os alunos entre os 6 e os 10 anos no caso do EP1); por conseguinte, ela é por vezes superior a 100 por cento.

2. A taxa bruta de admissão (ou taxa bruta de matrícula por grau) é o número total de alunos matriculados num grau específico, irrespectivamente da sua idade, num grupo populacional específico de idade (por exemplo, na Figura 1 a taxa bruta de admissão ou a taxa bruta de matrícula no 4º grau na província de Cabo Delgado foi de 48 por cento do número total de coortes do grupo etário de 9 anos.

3. O PIB cresceu num factor de 10 em termos nominais entre 1992 e 1999.

4. De Mt 661 biliões para Mt 6,3 triliões.

5. De Mt 1,5 triliões para Mt 13,5 triliões.

6. Em 540 por cento, tendo passado de Mt 286 biliões para Mt 1.834 biliões em 1998.

7. Com uma média de 4,85 anos nos países africanos de expressão francesa e 7,48 nos países de expressão inglesa.

8. Com as taxas actuais de repetência e de desistência, apenas 42 de 100 alunos irão completar o 5º grau. Para produzir esses 42 alunos do 5º grau seria necessário financiar 210 (42–5) anos de escolaridade, isto é, sem contar os repetentes e os desistentes. A consequência é que, para finalmente produzir os 4 alunos do 5º grau, o sistema teria de financiar 125 (os 100 alunos do 5º grau mais os 25,4 repetentes desse grau), em vez dos 42 que seriam estritamente necessários. O mesmo se aplica aos graus seguintes.

9. Também podemos usar o coeficiente de eficiência para ter uma ideia do número médio de anos que o orçamente precisa de financiar para ajudar uma criança, em média, a chegar ao 5º grau: leva 8,6 anos para que todos os alunos (inclusivamente os repetentes e os desistentes) passem por todo o EP1; por outras palavras, custa ao governo mais 3,6 anos de gastos por aluno para que uma criança possa chegar ao 5º grau.

10. No que respeita a distribuição quantitativa de professores, o objectivo é o de fornecer às escolas com o mesmo número de matrículas um número semelhante de professores.

11. Por exemplo, entre as escolas que têm pelo menos 10 professores, as matrículas variam entre 100 e 1.200 alunos; de maneira semelhante, as escolas nas quais estão matriculados 600 alunos poderão ter entre 5 e 15 professores.

12. Por exemplo, Cabo Delgado e Inhambane têm ambos cerca de 2.500 professores, mas o número de matrículas em Cabo Delgado é em torno de 134.000 alunos, isto é, 41.000 menos do que em Inhambane que tem 175.000 alunos. Paralelamente, nas províncias tanto de Tete como de Maputo foram matriculados cerca de 140.000 alunos em cada uma, mas Tete tem 3.000 alunos, enquanto que Maputo tem menos de 2.000.

1

Macroeconomic and Demographic Context

The characteristics of an educational system and the development of education are determined largely by macroeconomic and demographic conditions and by the capacity of the system to absorb existing and increasing resources and to use them efficiently. Other important aspects relate to the social, cultural, and religious contexts within which the system operates. Although these constraints and conditions set the framework under which an education system can develop, the level of education, in turn, is a determinant of economic development and, depending on the choices made, has an impact on poverty alleviation in the country. In this chapter, we focus on the broad characteristics of the macroeconomic and demographic context in Mozambique and the capacity of the system.

Evolution in gross domestic product and fiscal resources

For almost 20 years after it became an independent country in 1975, Mozambique stagnated at extremely low levels of per capita income as a result of both the weak physical and human capital infrastructure inherited from the former colonial power and the centralized model of economic management adopted by the socialist government. In addition, the protracted civil war between 1976 and 1992 decimated the scant capital infrastructure that existed or was being created in the country. With an average annual per capita gross domestic product (GDP) hovering close to US$100 through the 1980s, Mozambique was one of the poorest countries in the world. However, since the government's adjustment program began in 1987 and peace was declared in 1992, Mozambique's economy has experienced strong growth. Economic liberalization and large inflows of external aid have contributed to significant economic recovery, albeit from very depressed levels. The economic liberalization policies were made even more effective by the signing of the General Peace Agreement in 1992, which ended the state of civil war, and by the return of democratic rule following the 1994 elections. The combined effects of these events have exceeded the expectations of both national policymakers and the international donor community, and Mozambique is now one of the fastest-growing economies in the world. At the same time, annual inflation fell from around 50 percent in 1995–96 to around 5 percent in 1998–99.

As shown in table 1.1, GDP almost doubled between 1992 and 1999 (from Mt17.4 trillion to Mt30.9 trillion in constant prices of 1995), equivalent to a 77 percent growth in constant prices over that period. Measured against the growth in population, estimated at an annual rate of 2 percent, GDP per capita increased by more than two thirds: from Mt1.2 million per capita (1995 constant prices) in 1992 to about Mt1.9 million in 1999 (this translates into an increase from US$144 per capita in 1992 to about US$260 in 1999 at current prices and exchange rates) implying a real increase in per capita GDP of about 10 percent a year. From this perspective, Mozambique has

Table 1.1
Population, GDP, and total public expenditures, 1990–99

Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population (millions)[a]	14.1	14.2	14.4	14.6	14.7	14.9	15.1	15.3	15.7	16.1
GDP (current trillions of meticáis)	2.3	3.6	4.8	7.8	13.1	21.3	32.1	397	46.2	52.9
GDP (constant 95 trillions of meticáis)	18.1	19.0	17.4	19.0	20.4	21.3	22.8	25.4	28.4	30.9
GDP per capita, US$ (new population census)	179	175	136	144	151	160	188	225	249	259
Real growth rate per year (percent)	—	5	–8	9	7	4	7	11	12	9
Ratio of total government expenditures to GDP (percent)	29.6	26.8	31.2	29.4	31.2	24.2	21.1	23.9	22.1	25.4
Ratio of revenue to GDP (percent)	12.8	12.5	13.9	14.0	11.6	11.3	10.8	11.6	11.5	11.8
Exchange rate (metacal to U.S. dollar)	929	1,435	2,433	3,723	5,918	8,890	11,294	11,546	11,850	12,711

a. Population growth from 1990 to 1997 is based on a growth rate of 2 percent per year. After 1997 the growth rate is estimated at 2.3 percent.
Source: GDP, total government expenditures: International Monetary Fund; public education expenditures: Ministry of Education; GDP per capita in U.S. dollars: estimates based on 1997 population census figures and end-of-year exchange rate.

been doing quite well. This is confirmed by the fact that domestic revenues (in current prices) increased almost nine times (847 percent), from Mt661 billion to Mt6.3 trillion, over the same period. Although impressive, this growth in domestic revenues was slower than the growth in GDP, which may reflect a lag in the government's ability to mobilize public funding.

As shown in table 1.1 and Annex 2, domestic revenue as a share of GDP declined from 14 to about 12 percent between 1992 and 1998. Moreover, during this period Mozambique's external grant financing grew by a factor of nine (when external assistance is expressed in meticáis terms). External funding still finances about half of the government's expenditures, the largest share being for investment items. At the same time, as shown in table 1.3 total public expenditures grew about eight times, from Mt1.5 trillion to Mt13.5 trillion between 1992 and 1999; in other words, total expenditures grew more slowly than revenue. This means that dependence on external financing has remained unchanged, and the government's budget will continue to rely on external support to remain sustainable. These characteristics are further exemplified by the share of total public expenditures in GDP, which fell from about 31 to 25 percent during the same period.

In absolute terms, the resource envelope, measured as both per capita income and total public spending, has grown substantially since 1992. This implies that increasing investments in education are possible. One important caveat is the high and increasing dependency on external grant funding, a reflection of the government's difficulty in raising revenues at the same pace.

To further consider the prospects for educational development, it is important to assess the outlook for economic growth and an increase in revenues. The Mozambican economy is expected to continue growing at 7 to 8 percent a year over the next five years. To estimate the impact of this growth on revenues, we look at the composition of the labor force and the economic sector's contribution to GDP (formal sector contribution to revenue), as shown in table 1.2.

The National Statistical Institute (INE) estimates that the labor force was 5.6 million in 1980, 6.0 million in 1990, and 9.7 million in 2000, an increase of about 60 percent between 1980 and 2000.[1] However, although the relative share of people working in agriculture has declined slightly, agriculture still employs about 79 percent of the population. Using the figures presented in table 1.2, only about 9 percent of the workforce, or about 800,000 people, are employed in the formal sector,[2] of which about

Table 1.2
Output and employment, 1998

	Value added		Share of formal labor force (percent)
	Millions of U.S. dollars	Share of total (percent)	
Agriculture	1,224	34.5	79.0
Industry	742	20.9	6.0
Services	1,578	44.5	15.0
Total	3,544	100.0	100.0

Source: World Bank, "Growth Performance and Reform Agenda," Report No. 20601-M2, June 30, 2000.

120,000 are employed in the public sector (excluding the armed forces). The formal sector accounts for more than one-third of gross domestic product and about 60 percent of domestic revenues. While Mozambique's favorable prospects for long-term growth are strengthened by the country's untapped economic potential in natural resources,[3] future revenues will be generated largely from the formal sector (agricultural exports, industry, and the service sector). Therefore, the fiscal burden is likely to be borne by a small fraction of the labor force in the near future.

With the introduction of the value added tax, the country's fiscal base may expand to cover more taxpayers. But fiscal pressure is only one measure of the prospects for increasing revenues. The other is the size of the labor force compared with the size of the nonworking population, which is known as demographic pressure or the dependency ratio. The dependency ratio, which provides a proxy for the fiscal burden borne by the working population, declined until 1995, easing slightly the fiscal burden as the labor force expanded and life expectancy rose. However the ratio has been consistently on the rise since 1997. In order to forecast the ratio in the future, we have to take into account the spread of HIV/AIDS.

If HIV/AIDS in Mozambique follows the pattern of its neighboring countries, it will surely reduce life expectancy and have a severe impact on the population's number of active working years and productivity. Although the dependency ratio in the short run will remain stable or may even improve slightly, the marginal output per worker probably will increase as a result of HIV/AIDS (as in the short run output remains the same, but workers die).[4] However, the issue is whether HIV/AIDS will affect the average output per worker. Judging by the case of Uganda, HIV/AIDS will have a negative effect on average productivity, productivity that would normally be an alternative means to increase the value added in the formal sector and thereby increase revenues. In addition to the long-term effects on average productivity per worker, productivity levels in Mozambique will continue to be depressed by the already low level of education and the resulting low productivity.

As a whole, in the immediate future Mozambique will continue to be dependent on the growth of the formal economy and a small formal sector (tax-paying) labor force in addition to revenues generated from taxes on primary products and on value added.

Evolution in education spending, absorptive capacity, and highly indebted poor countries

As can be seen from table 1.3, total spending for the education sector, including higher education, grew, in nominal terms, about four times between 1992 and 1998, from Mt286 billion to almost Mt1.8 trillion. However, a more precise picture emerges if the evolution in constant 1995 prices is considered. As can be seen from table 1.3 total education expenditures fluctuated significantly over the period with drastic decline and increases during the periods 1993-1995 and after 1996. Overall from 1992 to 1998 total education expenditures grew 9.4% over the period or about 1.5 percent per annum, while the domestically financed share of the expenditures grew by twice as fast or about 2.9 percent per annum. The volatility in the level of education spending demonstrate the dependency of external financing and difficulty in predicting flows of resources to the sector. External funding (mostly for capital expenditure) represents a large share of total spending: about half of total spending on education until 1997 and 45 percent in 1998. The absolute increase in funding of education, especially domestically financed, is a positive development. However, as will be discussed, the share of education spending of GDP has shown a slightly downward

Table 1.3
Public Spending on education as a share of GDP and total government spending, 1990–1999[a]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
GDP (billions of meticáis)	2,334	3,580	4,757	7,829	13,145	21,267	32,093	39,693	46,134	52,913
Total government spending (billions of meticáis)	690	958	1,483	2,305	4,097	5,157	6,773	9,498	10,207	13,460
Total government of spending as a percentage of GDP	29.6	26.8	31.2	29.4	31.2	24.2	21.1	23.9	21.8	25.2
Ministry of Education spending	109	171	263	380	653	799	1,300	1,322	1,468	1,645
Total domestic expenditures (billions of meticáis)	50	75	125	171	203	268	486	648	875	1,005
Total external expenditures (billions of meticáis)	59	96	138	209	450	531	814	674	593	640
Ministry of Higher Education spending	—	—	—	—	—	—	—	237	400	476
Total domestic expenditures (billions of meticáis)	7	12	22	34	58	65	109	123	163	21
Total external expenditures (billions of meticáis)	—	—	—	—	—	—	—	114	237	262
Total domestic expenditure on education (billions of meticáis)	57	87	148	206	260	333	595	771	1,038	1,219
Total external expenditure on education (billions of meticáis)	(59)	(96)	(138)	(209)	(450)	(531)	(814)	788	830	902
Total expenditure on education (domestic + external)	(116)	(183)	(286)	(415)	(710)	(864)	(1,409)	1,559	1,868	2,121
Total expenditures on education (domestic + external in constant 95 billions of meticáis	900	971	1,049	1,005	1,101	864	1,000	996	1,148	1,239
Total domestic expenditures on education (in constant 95 billions of meticáis)	442	461	543	499	403	333	422	493	638	712
Annual growth rate in total domestic education expenditures on education in constant 95 prices		4%	18%	–8%	–19%	–17%	27%	17%	30%	12%
Total expenditure on education as a percentage of GDP)	5.0	5.1	6.0	5.3	5.4	4.1	4.4	3.9	4.0	4.0
Domestic spending on education as percentage of GDP	2.4	2.4	3.1	2.6	2.0	1.6	1.9	1.9	2.2	2.3
Exchange rate (meticáis per US dollar)	929	1,435	2,433	3,723	5,918	8,890	11,294	11,546	11,850	12,711

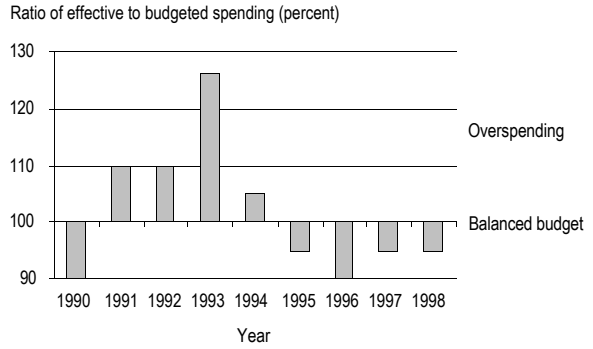
— Not available.
a. Figures denote actual expenditures, except for 1999, wich denotes the amount budgeted.
Source: Ministry of Education and World Bank, *1997 Mozambique Population Census.* (Washington, D.C.: World Bank, 1997

trend. This combined with the increase enrollments over the same period point to a concern about the overall funding of education.

When spending on education is contrasted with government spending, the share of the education sector in total public expenditures declined from around 19 percent in 1991 to 18 percent in 1998. If we focus on domestic spending and on recurrent expenditure for both the sector and the government as a whole, the share was reasonably stable over the decade, around 16 percent (with a low of 10 percent in 1994).

Measured against GDP, the share of education spending declined from about 5 percent in 1992 to about 4 percent in 1998. The share of domestic spending on education in GDP followed more or less a similar trend, with figures averaging 2.6 percent in 1990–93 and about 2 percent in the late 1990s.

Figure 1.1
Overspending and underspending in proportion to total budget, 1990–98



Note: Overspending or underspending is defined as the ratio between the amount effectively spent at the end of the year and the approved budget for that year. A balanced budget is indicated by 100 percent, while any block above 100 percent represents spending above the budget (and vice versa).
Source: Ministry of Education, Department of Administration and Finance.

Domestic spending only produces the even lower figure of 1.7 percent of GDP allocated to education.

These figures are very low indeed, since domestic spending comprises about 4 percent of GDP, on average, in African highly indebted poor countries (HIPCs). Although the fiscal capacity of Mozambique is on the low side (around 12 percent of GDP), it is not worse than that of Niger or Burkina Faso, which spend around 3 percent of their national product on education. Mozambique allocates a much smaller share of total government spending to education; the figure was around 14.5 percent in 1997–99, compared with around 25 percent in a number of African countries.

There clearly is scope for the country to channel more finances toward funding of its education system, even while external funding may continue to play a significant role. The absorptive capacity of the country and the budgetary mechanisms and procedures in the sector need to be improved in order for these resources to be effective. Figure 1.1 shows that the education sector was overspending in the early 1990s, but since 1995 has not been able to spend all of the resources allocated to it. This is worrisome in light of persistent claims that more resources are needed to run the sector effectively. Underspending in the sector could be due to a shortage of liquidity or cash flow transfer to provincial and district levels, as well as to difficulties in preparing annual budgets.

Despite weakness in budgetary mechanisms and in the country's capacity to implement budgeted actions, arguments exist for expanding the system in both effective coverage and quality. This will undoubtedly require the mobilization of additional resources. In the context of HIPC and debt relief, conditions should be favorable to a move in that direction.

In 1998, the domestic education budget was about US$85 million, and it is expected that debt cancellation will release, on average and on a yearly basis, about US$120 million for the coming years. This amount is expected to grow gradually, reaching about US$167 million in 2017. Even if only one-quarter of these annual amounts is allocated to the education sector, this would still amount to an additional US$30 million in 2001 and about US$40 million in 2017. Though the increase would help to bring the share of domestically funded education in GDP from 1.7 percent to something below 2.5 percent, this figure remains low. Even as the HIPC resources can help, the development of the sector will require additional resources and more effective use of said resources.

The likely impact of HIV/AIDS on children and teachers

Developing the system of education in Mozambique entails increasing the number of children enrolled in school and the number of teachers recruited. However, the prevalence of HIV/AIDS undoubtedly will affect the educational system and its prospects for both children and teachers. Clearly, the supply of and demand for teachers will be affected: sick teachers likely will miss classes, and the attrition rate from an increase in adult deaths likely will rise, necessitating a larger recruitment of teachers every year. Based on some reasonable assumptions, Annex 3 shows the development of total population, school-age population, teacher stock, and the dependency ratio over a 10-year period with and without HIV/AIDS. The growth rates for the total population and school-age population are assumed to be 2.3 and 3.0 percent, respectively, in the absence of HIV/AIDS.[5]

The attrition rate under the scenario without AIDS reflects current attrition rates due to retirement, death, or change in employment. This scenario assumes that, with the current growth in the school population (3 percent in 1998), the number of teachers should increase from 40,000 in 1997 to 58,741 in 2010. Furthermore, given the number of teachers who would retire, die, or change jobs, as reflected by the annual attrition rate of 4 percent, in addition to the new teachers required by 2010, an estimated 2,350 teachers would need to be replaced due to attrition.

Based on evidence from the HIV/AIDS pandemic in Uganda, Malawi, and Zambia, the scenario with AIDS assumes that the growth rates in total population and school-age population will decline, respectively, by 0.8 and 0.2 percent, which would bring them down to 1.5 and 2.8 percent; both population groups would grow at a slower pace, although growth of the school population would remain almost unchanged. It is assumed that the attrition rate due to death from AIDS would increase 3 percentage points to 7 percent.

HIV/AIDS will impact the fertility and mortality rate of women, resulting in a lower growth rate in the population of school age children. Therefore, fewer teachers will be needed to maintain the ratio of pupils per teacher. Instead of requiring 58,741 teachers by 2010, only 57,276 teachers will be required because of the slightly smaller school-age population. However, because HIV/AIDS also will affect the mortality rate of teachers, the replacement of teachers due to deaths caused by AIDS will increase 70 percent in 2010, from 2,350 teachers due to normal attrition to 4,009 teachers due to normal attrition and the impact of AIDS.

On average, calculated over the period from 1997 to 2010, the government will have to increase the annual replacement of teachers by 50 percent as a result of deaths from AIDS. This phenomenon clearly has important implications for the development of the pre- and in-service training system, as is discussed later in this report.

Another critical issue that has not been touched on is the impact that HIV/AIDS will have on the conditions under which education will be delivered. With a larger number of orphans and a higher level of teacher and student absenteeism due to illness, delivering quality education will become increasingly difficult. Alternative and flexible delivery modes have to be considered, and putting schools closer to the communities may become increasingly important.

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1. This is based on population projections that proved to be overestimated, as illustrated by the head count of the 1998 population census; in fact, the labor force in 1999 was probably around 7.5 million, rather than the 9.7 million of the INE projection (suggesting an increase of 33 percent instead of 60 percent in the size of the labor force between 1990 and 1999).

2. Employment in industry includes one-third of services (5 percent of total formal sector employment), including public administration, and 10 percent of the agricultural sector employment (the lion's share of employment in the agricultural sector is small-scale or subsistence farming); this figure is consistent with the proportion directly observed in the 1996 household survey.

3. For example, although agriculture accounts for about one-third of GDP and 80 percent of exports (representing 6 percent of GDP, or US$233 million, in 1998), less than 10 percent of arable land is currently under cultivation.

4. Jill Armstrong, *Uganda's AIDS Crisis: Its Implications for Development,* World Bank Discussion Paper 298 (Washington, D.C.: World Bank, 1995).

5. The scenario in Annex 3 builds on the assumption that there will be no change in coverage (no change in enrollment rates) or in the ratio of the number of pupils to the number of teachers. Thus it describes the system as it was in 1998 and its evolution with or without the impact of HIV/AIDS. The 1997 figures for total population and school-age population are based on the 1997 Mozambique census. The school-age population covers the age group 6 to 15 years old, or grades 1 to 10 (lower and upper primary education and lower secondary education); the teacher stock is based on 34,000 lower primary teachers, 4,000 upper primary teachers, and 2,000 lower secondary teachers, as registered in 1997.

2

Enrollment Pattern

Chapter 1 described education in the context of macroeconomic trends in government revenue and expenditures, education spending, and issues related to demographic changes and the impact of AIDS in Mozambique. This chapter describes the overall education system and changes in enrollment patterns by level and type of education. It then examines the link between attainment of education and public education spending and investigates student flow by presenting access, survival, and transition rates. Finally, it provides possible explanations for factors related to the demand for or supply of education.

Structure of the educational system

Today, formal education in Mozambique comprises a 7-3-2-4 system: seven years of primary education, three years of lower secondary education, two years of upper secondary education, and four years of higher education. In addition, preprimary education consists of kindergarten and nursery schools for children under the age of 6. Primary education is compulsory and targets children between the ages of 6 and 13. It is divided into the lower level (grades 1–5), known as *ensino primario 1* (EP1), and the upper levels (grades 6–7), called *ensino primario 2* (EP2); these, however, will be gradually merged. Lower and upper secondary education is known as *ensino secundario geral,* ESG1 (grades 8–10) and ESG2 (grades 11–12). Higher education consists of three public and three private institutions.[1]

The government also provides technical education and vocational training, teacher training, and adult education. Several public and private providers offer technical education and vocational training.[2] The Ministry of Education offers three levels: (a) elementary technical education, (b) basic technical education, and (c) middle technical education. The basic and middle levels offer three areas of specialization: agriculture, industry, and commerce. In relation to general education, the elementary level lasts for two years and is equivalent to EP2; the basic and middle levels last for three and four years, respectively, and are equivalent to ESG1 and ESG2.

Teacher training institutes are divided into three categories: (a) basic level (primary teacher training institutes, before 1998), (b) middle level, and (c) an additional middle level after 1998, known as IMAP. To qualify for basic-level entry, a student needs to complete grade 7, while a tenth-grade graduate is qualified to enter a middle-level teacher training institute. Graduates from teacher training institutes are qualified to teach only in primary schools. In order to become a qualified secondary school teacher, a student has to graduate from the Pedagogical University or Eduardo Mondlane University. The requirement for entrance into these institutions is ESG2 (grade 12).

Adult education, which is targeted to persons 15 years of age or older, includes primary, general, and middle levels of instruction. These three levels are equivalent to EP2, ESG1, and ESG2, respectively.

After Mozambique's independence in 1975, evening classes were created for adults to participate in literacy campaigns or in technical and general education.

Enrollment trends

The distribution of enrollment by level of education in 1998 is presented in table 2.1. The Mozambican education system could be described figuratively as an "L-shape", with the bulk of students enrolled in lower primary education. Less than 8 and 3 percent of the total student population are enrolled in upper primary (EP2) and lower secondary education (ESG1), respectively, while 87 percent of total enrollment is in lower primary education (EP1). This suggests that the overall structure of education in the country is not in balance, leading to questions about both internal efficiency and issues of supply and demand. However, the actual structure of enrollment is affected by two facts: the system is relatively new, and primary education has expanded so recently. The younger and larger cohorts have not yet reached the higher levels of schooling.

To assess whether the current shape of the Mozambican education system is a result of the recent expansion in primary education, it is useful to put the situation observed in 1998 in a time perspective. Table 2.2 shows the evolution in the number of students enrolled as well as the gross enrollment rate (GER)[3] across the different levels and types of education between 1993 and 1999.

Table 2.1
Distribution of enrollment, by level of schooling, 1998

Level of schooling	Number of students	Percent
Preschool	18,000	0.8
Lower primary (EP1)	1,880,949	86.7
Upper primary (EP2)	168,777	7.8
Lower secondary (ESG1)	53,693	2.5
Upper secondary (ESG2)	7,352	0.3
Technical and vocational education	27,068	1.2
Teacher training	4,855	0.2
Higher education	8,536	0.4
Total	2,169,230	100.0

Source: Mozambique school survey data and census, 1998.

Primary education (EP1 and EP2)

As seen in table 2.2, the enrollment in EP1 grew by 871,000 between 1993 and 1999, from 1.2 million pupils to 2.1 million pupils. This is equivalent to a 32 percentage-point increase in the gross enrollment rate, from 60 to 92 percent during the same period. Figure 2.1 depicts graphically the dramatic changes in the gross enrollment rates in EP1. The increase in enrollment is partly a result of the rapid expansion in the number of primary school classrooms, which nearly doubled between 1993 and 1999, and which were built mostly in rural areas and in areas previously inaccessible due to the war.

During the same period, the number of students enrolled in EP2 also increased nearly 65 percent, from 119,000 students in 1993 to 193,000 students in 1999. However, the change in the gross enrollment rate was not as large as that in EP1. The gross enrollment rate in EP2 increased only 8 percentage points: from 17 percent in 1993 to 24 percent in 1999. During the same period, the number of classrooms in EP2 increased by 1,500: from 2,600 in 1993 to 4,100 in 1999. One of the possible reasons for the low enrollment in EP2 could be the lack of classrooms (schools).

Secondary education (ESG1 and ESG2)

Access to secondary education is very limited, and few Mozambicans proceed to this level. Both lower and upper secondary education are important because they produce a professionally trained and qualified workforce and prepare people for higher education and eventual positions of leadership in the public and private sectors. Graduation from ESG1, or the tenth grade, is particularly important, as this level of education is required to enter teacher training institutes. Table 2.2 shows that the absolute number of pupils in secondary education increased rapidly between 1993 and 1999. However, the gross enrollment rate remains very low at 6.6 percent in

Table 2.2
Enrollment and gross enrollment rates, by level and type of education, select years, 1993–99

	1993		1995		1997		1999	
	Number of students	GER (percent)	Number of students	GER (percent)	Number of students	GER (percent)	number. of students	GER (percent)
Primary								
EP1	1,237,063	60.3	1,436,831	68.3	1,780,881	82.7	2,108,790	92.3
EP2	118,909	16.7	136,464	18.7	164,078	22.0	193,523	24.4
Secondary								
ESG1	31,761	3.2	40,588	4.0	51,821	4.9	72,914	6.6
ESG2	1,612	0.3	4,927	0.8	4,253	0.6	9,142	1.3
Technical or vocational	17,637		20,810		23,119		20,996	

— Not available.
Source: School survey data, 1993, 1995, 1997, and 1999; census data, 1997.

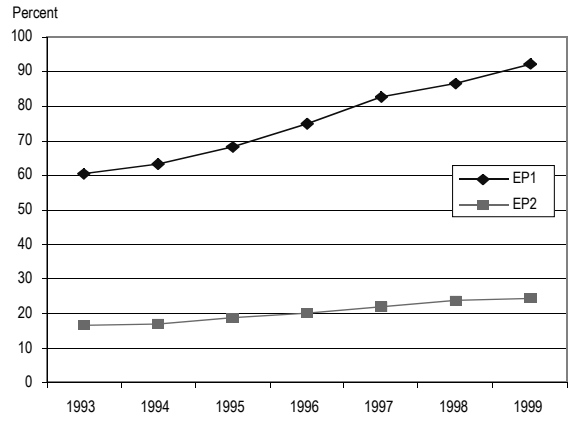
ESG1 and 1.3 percent in ESG2, again indicating a very low admission rate. Figure 2.2 presents these changes graphically.

As the GER for lower primary education before 1993 remained at the same level, the pupils who were enrolled in the first grade in 1993 or before should have proceeded to secondary education, which they did not. Therefore, the recent expansion does not seem to have resulted in an increased admission and enrollment into secondary education in related terms. The reasons for this, as will be shown, include a low internal efficiency and low survival rates at each grade level, and finally the number of students and admission to secondary education.

Teacher training

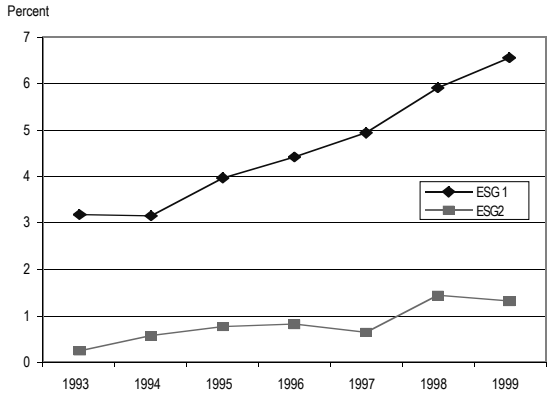
The overall number of students enrolled in teacher training institutions for primary teachers increased by 1,500: from 4,116 in 1993 to 5,683 in 1999 (see Annex 4), utilizing the capacity of the institutions to

Figure 2.1
Gross enrollment rates in primary education, 1993–99



Source: Mozambique school survey data and census, 1993–99.

Figure 2.2
Gross enrollment rates in secondary education, 1993–99



Source: Mozambique school survey data and census, 1993–99.

their limits. Every year nearly 1,000 students graduate from the three levels of teacher training institutes. In addition to this, the number of graduates from the ADPP teacher institute was expected to rise from 180 graduates in 1998 to about 400 by 2001.[4]

Secondary level (grades 8–12) teacher training is undertaken by the Pedagogical University and the Eduardo Mondlane University education faculty with different entry requirements for teachers at different grades. Altogether, about 150 students graduate each year from the Pedagogical University and Eduardo Mondlane University.

Attrition among teachers and growth in the school-age population outweigh the slow increase in the number of graduates from the teacher training institutions in recent years. To attract more students to the teaching profession and retain them, the government adopted new salary scales for the public sector, including teachers, in 1999.

Technical education and vocational training

Enrollment in technical education and vocational training increased by about 3,000 students between 1993 and 1999 (see Annex 4).[5] The shares of enrollment in basic and middle levels for 1998 were 10 percent for agriculture, 40 percent for commerce, and 50 percent for industry, with industrial and commercial programs clearly favored over agricultural programs.

Higher education

Many empirical studies mention the importance of science and technology for economic growth, and the need for a skilled workforce in that sector to efficiently use available technologies. In Mozambique, the importance of this area is well recognized. UNESCO indicators show that the share of natural sciences, engineering, and agriculture in Mozambique's tertiary education was above that of other Sub-Saharan African countries in 1998. Mozambique had the largest share, estimated at 50 percent, among the Sub-Saharan African countries, followed by Nigeria (41 percent), Tanzania (39 percent), and Ethiopia (36 percent). However, the higher education system in Mozambique is relatively small, and the gross enrollment rate was only about 1 percent in 1999. But progress is being made and enrollment in higher education institutions was gradually increased in the past six years.

Of Mozambique's three universities and four higher education institutions, the Eduardo Mondlane University is the largest, with an enrollment of nearly 7,000 students in 1999. While enrollment in Eduardo Mondlane University grew by nearly 3,000 students over the past six years, enrollment in the Pedagogical University also increased by about 800 students (see Annex 4), to about 2,000. The Higher Institute of International Relations, the other public institution, had an enrollment of 234 students in 1999. (The Naval Academy is not discussed in this study.) Enrollment in private institutions has remained low, however, they are taking on an increasingly critical role. It is estimated that, by 2002, more than one-third of students will be enrolled into a private higher education institution.

Adult education

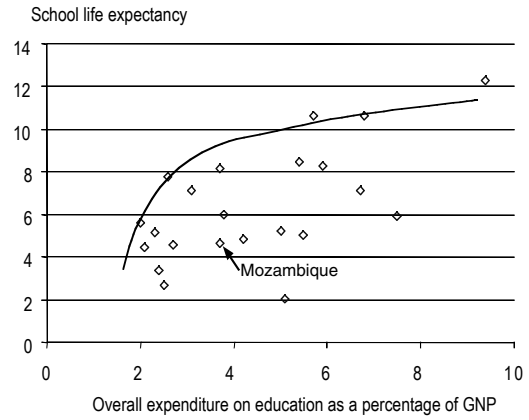
Although adult education is not discussed in detail in this study (other than the brief discussion in chapter 6 on the issue of external efficiency), it should be noted that the adult literacy rate (within the age group of 18 to 65 years) in Mozambique was estimated at 40 percent in 1997, and the rate for females was even lower (24 percent). Both rates were lower than the Sub-Saharan average of nearly 60 percent (almost 50 percent for females).

Conclusions on educational enrollment

In conclusion, regarding the pattern of educational enrollment in Mozambique, the system's characteristic "L-shape" of enrollment by grade is a consequence of the clear focus that was placed on providing physical access to education, especially primary education, in the years after the war. This focus succeeded in increasing enrollment at all levels. However, it does not appear to have changed the internal efficiency of the system and therefore the attainment levels.

Another way to view this pattern is to look at school life expectancy, which is the sum of the age-specific enrollment rates for primary, secondary, and tertiary education. As previously shown,

Figure 2.3
School life expectancy and Spending on education in select Sub-Saharan African countries, around 1995



Source: Educational and financial statistics for Mozambique and UNESCO.

because both overall resources and enrollments increased, a logical expectation is for the number of years of formal education to increase as well; this is discussed next.

Overall index of educational development and a global measure of efficiency

Between 1995 and 1999, school life expectancy in Mozambique improved from 3.4 to 4.6 years. However, in spite of the progress made, the figure remains relatively low by international standards. For 1993, the year for which international comparison data are available, the average school life expectancy was about 5 years in Francophone African countries and about 8 in Anglophone African countries; it was about 8 in low-income countries of Asia and 9 in those of Latin America. If we focus on the neighboring countries of Mozambique, the school life expectancy was estimated to be about 8 in Zambia, 5 in Tanzania, 5 in Malawi, and 11 in Zimbabwe. These figures suggest that the overall quantitative coverage of education in Mozambique is still lagging behind that of most comparable countries in the region and elsewhere.

To get a sense of efficiency in resource use, at least as far as coverage is concerned, it is useful to contrast these statistics with the amount of resources that are mobilized by the country for the sector. Total public spending on education represented 4.1 percent of the country's gross national product (GNP) in 1995 and only 3.4 percent in 1999. Efficiency improved from 1995 to 1999, not as a result of informal spending, but because the economy grew faster than government spending, as explained earlier. However, Mozambique remains low compared to Francophone and Anglophone countries, as well as low-income Asian and Latin American countries.[6]

To illustrate the level of efficiency of resource use for education coverage, Figure 2.3 plots school life expectancy on the y axis and spending on education as measured by the share of GNP on the x axis. Figure 2.3 shows the location of select Sub-Saharan African countries in these two dimensions around 1995. Mozambique's position in this graph, mapped as the large dot, is significant. The arrow indicates the move taken by the country between 1995 and 1999.

In 1995, Mozambique spent 4.1 percent of public expenditure on education as a percentage of GNP, and school life expectancy was estimated as 3.4 years. As can be seen in figure 2.3, the large dot representing Mozambique was way below the frontier line linking the most efficient countries (those whose coverage was maximum given what they spent). For example, Cameroon spent a similar amount of public resources on education (3.7 percent of GNP), but its education outcome was more than double that of Mozambique (8.1 years). One reason is that in Cameroon private contributions to education are bigger. Zambia also managed public resources effectively, spending only 2.6 percent of GNP on education, but attaining an outcome of 8 years of school life. If Mozambique would use its resources more efficiently, it could improve school life expectancy with the same amount of resources.

In 1995, there was substantial potential for improvement in the country's school system. Between 1995 and 1999, school life expectancy increased (from 3.4 to 4.6 years), while spending on education, as a proportion of GNP, declined from 4.1 to 3.4 percent. By definition, efficiency improved, as documented in figure 2.3 by the arrow and by a move toward the pseudo-efficiency frontier. Nevertheless, there is still room for improvement.

Pattern of student flow over the system

More students are able to enroll in formal education than ever before, and the increases in the gross enrollment rates and school life expectancy have begun to reflect this improvement in access, particularly the rapid growth in the gross enrollment rate in EP1. However, the enrollment rates in EP2 and higher levels of education remain relatively low. This section investigates the efficiency of student flow in education, particularly in EP1 and EP2, by presenting the rates of school access, survival, and transition.

As table 2.3 shows, the admission rate into the first grade was estimated at 94 percent in 1998, a strong indication that Mozambique has succeeded, or is gradually succeeding, in providing educational *access* for all. The picture becomes less rosy as pupils progress through the system. The high access rate in grade 1 declines dramatically to a low 35 percent in grade 5 and continues to decline to 14 percent in grade 7. When pupils reach grade 12, they represent only 1 percent of their cohort. In other words, hypothetically, if 100 pupils were to enter grade 1, only 37 pupils would survive to grade 5. By grade 7, only 15 pupils would survive. After that, the number of pupils would continue to decline until only 1 pupil would enter grade 12. These figures underline the low level of survival (retention) and the inefficiency of the system of education in Mozambique.

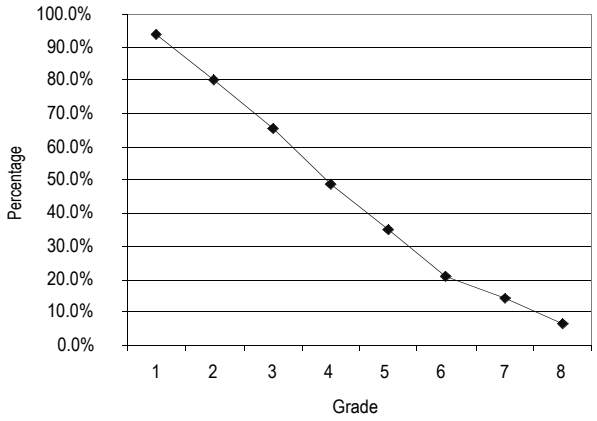
Figures 2.4 and 2.5 illustrate the continual decline from one grade to the other, which is most significant between grades 5 and 6 (the transition from EP1 to EP2). This continual decline between each grade in EP1 and EP2 reflects the large number of dropouts in each grade; the system also has a fairly high rate of grade repetition (24 percent in EP1, 25 percent in EP2, and 24 percent in ESG1 on average). This high level of repetition generates a high gross enrollment rate in EP1 and disguises high dropout that should be a major concern for education policy for the years to come.

Table 2.3
Pattern of school access and survival, 1998
(percent)

Grade	Access rates	Survival rates
Student in grade 1	93.7	100.0
Student in grade 5	34.9	37.3
Student in grade 6	20.8	22.2
Student in grade 7	14.3	15.3
Student in grade 8	6.4	6.8
Student in grade 10	3.1	3.4
Student in grade 11	1.6	1.7
Student in grade 12	1.1	1.2

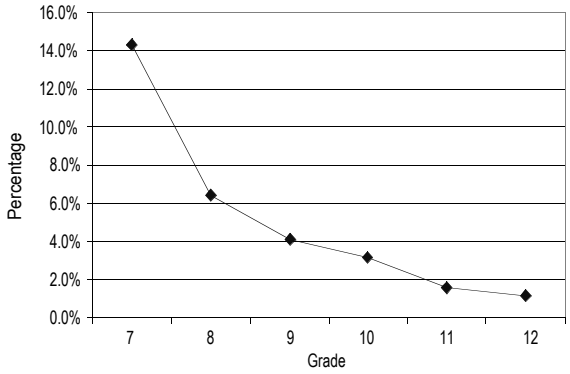
Source: Mozambique school survey data, 1998.

Figure 2.4
Admission rate in primary education, 1998



Source: Mozambique school survey data, 1998.

Figure 2.5
Admission rate in secondary education, 1998



Source: Mozambique school survey data, 1998.

Using access and survival rates by each grade, this study also examines how the transition rates vary from one level of education to the other when combined with survival rates. Hypothetically, although 37 out of 100 pupils survive by the end of EP1, only 22, or 60 percent of these 37 pupils, move up to EP2 (see table 2.4). Similarly, nearly 70 percent of these 22 pupils survive EP2, but fewer than half of the surviving pupils then move on to ESG1. Since the survival rates in ESG1, as well as the transition rates from ESG1 to ESG2, are extremely low, very few pupils continue until grade 12.

Based on the figures provided in table 2.4, the dropout rate is very high throughout the system: on average, across every consecutive grade in any cycle, from EP1 to ESG1, about 13 percent of students drop out or do not make it to the next grade (13 percent in EP1, 15 percent in EP2, and another 13 percent in ESG1); in ESG2, the pattern is even more pronounced. Such a pattern is surprising because a high dropout rate in one cycle normally ensures that the remaining students have the relevant characteristics (cognitive and social skills, for example) to succeed in further studies.

Demand- and supply-side perspectives on the development of education

The reasons for the low internal efficiency (drop-out and repition) relate mostly to the dropout cycle, and are compounded by the high repetition rate (the more times a student repeats, the higher chance that student will drop out). This cycle generally may be explained by demand-side or supply-side factors. Two specific cases are considered here.

Table 2.4
Survival and transition rates, 1998
(percent)

Indicator, by grade level	Rate
Survival rate between grade 1 and grade 5	37.3
Transition, EP1–EP2	59.6
Survival rate in EP2	68.8
Transition, EP2–ESG1	44.8
Survival rate in ESG1	49.1
Transition, ESG1–ESG2	49.9
Survival rate in ESG2	70.5

Source: Mozambique school survey data, 1998.

The first case occurs when a student who gets to grade j during a certain year t cannot move to grade $j + 1$ the next year because his or her school is "incomplete"; in other words, it does not offer that grade. Therefore, the pupil cannot be said to drop out of school, but rather is pushed out due to incomplete service (absence of school building, lack of teachers). This is clearly a supply-side issue that can be addressed by providing educational continuity at the local level (possibly using a multigrade formula if the school-age population in the community is small). Supplying a standard number of available grades, however, may not produce a 100 percent retention rate since some pupils may decide to drop out anyway.

The second case occurs when the school offers the next grade, $j + 1$, but the children end their studies anyway. Two factors may account for this behavior:

(a) *School characteristics do not fit the expectations of the children or their parents.* The school may be too far from home, or the "quality" (language of instruction, curriculum content, dedication or behavior of teachers) may not be perceived as relevant enough to the needs of the locality. The school calendar may not match that of agricultural activities in the community. In circumstances where demand for the type of schooling offered is weak, adjustments in the supply could be made to encourage children to remain in school.

(b) *Schooling is not affordable.* Parents may be unable to afford the direct costs of education (the payment of fees, the purchase of books or uniforms required by the school) or may need their children's labor (for productive activities—agricultural or pastoral—or for housekeeping activities—fetching water or fuel wood, taking care of infants).

From an education policy perspective, it is crucial to determine the role that these two factors play in the high dropout rate in primary grades. For

example, it would not be relevant to provide a school with more of the same educational services currently offered if the parents are not sending their children to school now. Table 2.5, established from a secondary analysis of the individual school data set of the Ministry of Education, provides some interesting pieces of information.

There were 6,031 EP1 schools in the 1998 school survey; of these, 3,271 did not have students enrolled in all five grades of the cycle, while only 2,760 (or 46 percent of the total number of EP1 schools) were offering all five grades during that school year. However, the complete schools accounted for 73 percent of total enrollment in EP1 and 62 percent of the new entrants in grade 1, which leaves 27 percent of new students enrolling in a school that did not offer all the grades during that year. One possibility is that some of the schools that did not offer the five grades in 1998 had been recently established and perhaps would have offered the full cycle in due course.

The data in table 2.5 reveal that out of the 175,659 pupils who entered schools that offered all five grades in 1998, 69,454 pupils were enrolled in newly established schools, while 106,205 were enrolled in schools that had been operating for a long time. Therefore, at least 23 percent of entrants to grade 1 had limited chances to progress through grade 5 because the school they entered was incomplete, although the figure may be slightly higher based on grade 1 enrollment in incomplete schools..

With 25 percent as a conservative estimate, assuming for the moment that students would remain enrolled until grade 5 if exposed to a complete school, it follows that out of the 63 (1–0.37) percent of dropouts between grades 1 and 5, about 40 percent would be accounted for by the incompleteness of some of the schools in the country. Following this line of argument, the majority of low-retention problems in Mozambique would not be resolved simply by extending to five grades those EP1 schools that are currently incomplete. (Obviously, this is not to say that it should not be done;

Table 2.5
EP1 students in complete and incomplete public schools, 1998

Type of public schools	Number of schools	Number of nonrepeated students, by grade				
		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Incomplete	3,271					
Recently established	1,289	69,454	44,322	23,920	8,127	
	150	12,178				
	325	15,544	12,418			
	462	22,935	16,950	12,639		
	352	18,797	14,954	11,281	8,127	
Long established	1,982	106,205	70,635	43,886	18,521	
	71	6,234				
	341	16,717	12,186			
	699	35,891	24,473	18,863		
	871	47,363	33,976	25,023	18,521	
Complete Schools	2,760	285,436	240,348	203,775	161,846	130,789
Total	6,031	461,095	355,305	271,581	188,494	130,789

Source: Mozambique school survey data, 1998.

there is no doubt that all EP1 schools should be complete.) The point is that, by itself, making incomplete schools complete would be not be sufficient to attain a high retention rate in EP1.

Analysis leads to the same conclusion: making existing schools complete will help, but much more is needed to improve student retention. Two factors may account for the problem: either the cost (direct as well as opportunity cost) of schooling is too high for some parents (a demand-side issue) or some of the characteristics of existing schools are not attractive for parents (a supply-side issue) or both.

It is tempting to conclude that the problem lies mostly on the demand side and that educational policies are not applicable. However, the results at hand call for further and more rigorous analysis of the factors accounting for low retention in various cycles of study. Information from the 1997 household survey indicates that progress also can be made on the supply side; for example, the average distance to school is as high as 4.5 kilometers, and the average time needed to reach an EP1 school is often longer than one hour. The survey data also show that as much as 32 percent of rural villages do not have a primary school. This suggests that supply-side instruments (establishing complete schools reasonably close to where children live, possibly using multigrade teaching when applicable) may be well suited to improve on what is probably the most important issue in Mozambican education for the years to come.

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1. Public higher education institutes are the Eduardo Mondlane University, the Pedagogical University (teacher training institute for secondary school teachers), and the Higher Institute of International Relations (an institute for diplomacy and political sciences). In addition, the government runs a number of technical or higher education institutions like the Naval Academy and some agricultural training centers. Private higher education institutes are the Catholic University, with campuses in Beira, Nampula, and Niassa, and the Higher Institute of Science and Technology and the Polytechnic University in Maputo.

2. Public providers include the Ministry of Education, Ministry of Higher Education and Science Development, Ministry of Labor, Ministry of Agriculture, and Ministry of State Administration.

3. The GER is defined as the total number of students enrolled not counting their age over the age-specific population group (for example, for EP1, this means pupils ages 6–10); therefore, it is sometimes higher than 100 percent. In this study, the GER is calculated based on school survey data (1993, 1995, 1997, 1999) and census data (1997). School survey data are collected at the beginning (March) and the end (December) of each school year; this study only uses the data collected at the end of each school year.

4. ADPP is a teacher training institute run by a nongovernmental organization and the only nonpublic teacher training institute recognized by the government.

5. This only includes the technical education and vocational training run by the Ministry of Education.

6. A straightforward way to assess efficiency is to determine the ratio of coverage to spending. The figure obtained is 0.76 (3.1/4.1) years per percentage of GNP in 1995 and 1.35 (4.6/3.4) years per percentage of GNP in 1999, demonstrating substantial efficiency gains over the four-year period. There is a slight discrepancy in the numbers as spending in some years in Mozambique in this study are measured against GDP and not GNP. For comparative analysis above they are not signigicant.

3

Financial Aspects of Education

The preceding chapters raised concerns about the efficiency and effectiveness of the education system. In this chapter, we quantify these inefficiencies in financial terms. We examine the present trend of education finance, distinguishing it by level and type of education as well as by type of expenditure. Beyond the global financial amounts, we propose estimates of unit cost at the different levels of education and analyze the factors affecting their variations, in particular, the level of teacher salaries and the pupil to teacher ratio. On this basis, we estimate the cost of some of the inefficiencies discussed in chapters 1 and 2.

Recent trends in budget allocation by economic purpose and level of education

The Ministry of Education (MINED) is responsible for all educational institutions, except for Eduardo Mondlane University, the Research Institute for International Relations, and the Pedagogical University, whose budgets are presented to the Ministry of Planning and Finance. Regarding technical education and vocational training, besides MINED, the Ministry of Labor, Ministry of Agriculture, and Ministry of State Administration also run their own technical education and vocational training programs. This chapter reviews only the expenditure of MINED and that of the three above mentioned main higher education institutions.

Table 3.1 shows the education budget allocation by economic purpose between 1996 and 1999. Mozambique has a relatively high level of external financing of its social sector in general and of education in particular. To a large extent, external financing corresponds to capital expenditure financing, but the borderline is fuzzy between recurrent and capital expenditure in the social sector.[1] Moreover, external financing tends to be more volatile than ordinary national budget spending, in particular for recurrent expenditure. As a whole in 1999, external financing represented about 30 percent of total spending (on and off budget) on education, or 43 percent of government spending for the same year. These figures used to be even higher in previous years; for example, in fiscal years 1996 and 1997, off-budget figures exceeded those of the government budget.

The high level of external financing for education in Mozambique means that relatively little of the state budget is spent on capital expenditure, which receives only about 10 percent of public education outlays. Within recurrent expenditure for education (excluding higher education, for which the breakdown by type of expenditure has not been made), 76.5 percent was devoted to wages and salaries in 1999, while 23.5 percent was for goods and services. The share of salaries within recurrent expenditures for MINED increased slightly from 72.5 percent in 1996 to 76.5 percent in 1999—a consequence of both an increase in the number of teachers and the adoption of a new teachers' salary scale in 1998.

Assessing the allocation of public expenditure by level and type of education is key to understanding

Table 3.1
Distribution of public spending on education, by economic purpose, 1996–99
(billions of meticáis)

Purpose	1996	1997	1998	1999
Ministry of Education (on and off budget)	1,299,700	1,321,755	1,468,482	1,645,814
Budget	485,770	647,755	875,482	1,005,814
Recurrent	441,089	583,219	798,039	907,711
Wages and salaries	319,317	422,699	591,893	694,942
Goods and services	121,773	160,520	206,146	212,768
Capital	44,680	64,536	77,443	98,104
Construction	35,897	49,369	58,583	71,668
Equipment and repair	8,783	15,167	18,861	26,436
Off budget	814,000	674,000	593,000	640,000
Higher Education (under Ministry of Planning and Finance budget)	109,000	123,000	163,000	214,000
Total	1,408,770	1,434,755	1,631,482	1,859,814

Note: For the years 1996 to 1998, figures refer to actual spending, while those for 1999 are budget figures.
Source: Ministry of Education and Ministry of Planning and Finance.

the government's true expenditure priorities and its ability to sustain policy objectives. By looking at the total recurrent budget of the sector between 1996 and 1999 and presents its distribution by level of education. Two types of comments can be made from these data (see Annex 5)

The first concerns budget distribution across levels of education. Aside from spending on administration, primary schools received about 44 percent of total spending for the sector, or about 52 percent if we include spending on administration. These proportions were relatively stable over this four-year period. Secondary education got less than 10 percent of the total, and higher education received about twice that amount. These figures do not address efficiency or equity, but they do raise a question about the balance of spending between the secondary and higher levels of schooling in the country.

The second comment concerns spending on administration. In each of the four years, spending on administration represented about 20 percent of recurrent spending for the education sector. This figure is very high by international comparisons, particularly given the fact that spending for administration in the central ministry was larger than spending for running all the country's EP2 and ESG1 schools. There is no doubt that this high level of spending needs to be investigated further.

Annex 5 suggests that teacher training and, to a lesser extent, secondary education were relatively favored over the 1996–99 period, as table 3.3 suggests. However, it is important to remember that national spending on capital items represents only a small fraction of effective spending, given the magnitude of external financing.[2]

A closer look at recurrent budget data for 1998

The data provided so far are either actual or budgeted (1999) spending. However, it appears that the criteria used for distributing resources across the levels and types of education may not be completely consistent with what is seen from the surveys conducted, at the school level in particular.

We reconstructed spending, in part the cost of wages, to produce an aggregate figure that is fairly

Table 3.2
Distribution of public spending on capital, by level and type of education, 1996–99
(billions of meticáis)

Level of education	1996 Amount	1996 Share of capital spending	1996 Share of recurrent spending	1997 Amount	1997 Share of capital spending	1997 Share of recurrent spending	1998 Amount	1998 Share of capital spending	1998 Share of recurrent spending	1999 Amount	1999 Share of capital spending	1999 Share of recurrent spending
Primary	12,675	28.4	72.8	28,044	43.5	69.3	33,653	43.5	69.6	45,555	46.4	72.9
Secondary	14,372	32.2	14,4	22,492	34.9	15.1	26,990	34.9	16.5	32,389	33.0	15.4
Technical	4,866	10.9	7.5	5,000	7.7	7.7	6,000	7.7	9.4	7,200	7.3	6.7
Teacher training	12,767	28.6	5.3	9,000	13.9	7.8	10,800	13.9	4.5	12,960	13.2	5.0
Total	44,680	100.0	100.0	64,536	100.0	100.0	77,443	100.0	100.0	98,104	100.0	100.0

Source: Bank calculation based on Ministry of Education and Miinistry of Planning and Finance data.

close to the national global budgetary figure (Mt773 billion instead of MT798 billion), which increases our confidence in these estimates.[3] Table 3.3 provides the estimated figures for 1998.

Unit cost estimates and analysis

The macroperspective

From the aggregate financial estimates, it is possible to propose figures for the level of spending per pupil in the different levels of education. Table 3.4 provides the details, using 1998 meticáis and per capita GNP units.

Focusing on unit cost at the school level (not including administration costs), we give unit cost in EP1 the value 1. Per pupil spending is estimated to be 3.1 in EP2, 5.5 in ESG1, 13.1 in ESG2, 9.2 in technical education, 22.6 in teacher training, and 120 and 72, respectively, at Eduardo Mondlane University and Pedagogical University.[4] The unit cost is three times higher in EP2 than in EP1, and the unit cost in ESG2 is more than twice that in ESG1. This obviously raises questions about the allocation of spending.

Estimates of spending per pupil in per capita GNP indicate whether the cost of education in the country is low or high, especially by international standards. Table 3.5 presents estimated unit costs for primary level (EP1 and EP2 combined) and secondary level (ESG1 and ESG2 combined), as well as for higher education. The table also contrasts Mozambican figures with data from neighboring countries and some country groupings.

At the primary level, Mozambique has a level of unit cost that is, on average, similar to that of its neighbors, lower than that in Anglophone African countries, and lower still than that in Francophone countries. A relatively similar pattern holds for secondary education. For the higher level, spending per pupil is globally on the high side compared with that of neighboring countries, but more or less average for African countries (which is very high if compared with the unit cost of low-income countries in either Asia or Latin America).

As a whole, there is some scope for efficiency gains in the Mozambican system of education by tapping the benefits of a return to scale in upper primary and secondary education especially in urban areas. Nevertheless, with a view to issues like distance to school, safety of girls, and lack of boarding facilities, education goals need to be carefully weighed against the economy. However, when compared with a number of other African countries, the magnitude of the returns to scale in Mozambican education appears to be less. This being said, there is nevertheless scope for increasing efficiency in EP2 and ESG1 schools in order to avoid school enrollments of fewer than 200 students. This would obviously entail some changes in school mapping, or the distribution of students to schools offering grades 6–7 and 8–10.

Table 3.3
Public recurrent spending on education, by level and type of education, 1998

	Personnel (number)			Spending (millions of meticáis)				
Level of education	Teachers	Non-teachers	Total	Teachers	Non-teachers	Total personnel	Goods and services	Total budget
Ministry of Education	44,931	10,318	55,249	530,851	70,385	601,236	172,076	773,312
Administration		2,949	2,949		39,807	39,807	95,313	135,120
Central (MINED)		502	502		11,494	11,494	64,515	76,009
Provincial Directorates of Education		951	951		13,714	13,714	22,010	35,724
District Directores of Education		1,496	1,496		14,599	14,599	8,788	23,387
EP1	34,563	2,831	37,394	322,526	7,150	329,676	13,170	342,846
EP2	4,997	1,438	6,435	81,950	3,284	85,234	11,516	96,750
ESG1	2,077	991	3,068	42,578	2,035	44,613	9,421	54,034
ESG2	378	266	644	13,230	1,067	14,297	3,311	17,608
Technical education	1,158	738	1,896	31,862	1,941	33,803	11,786	45,589
Teacher training	328	456	784	11,906	969	12,875	7,193	20,068
Adult education	710	20	730	5.758	33	5.791	316	6.107
Other	720	629	1,349	21,041	14,099	35,140	20,049	55,189
Higher education (under Ministry of Planning and Finance)	—	—	—	—	—	—	—	163
Eduardo Mondlane University	458	1,665	2,123	—	—	—	—	145
Pedagogical University	—	—	—	—	—	—	—	17
Total for the sector								926,312

n.a. Not applicable.
— Not available.
Source: Ministry of Education, Ministry of Planning and Finance, Eduardo Mondlane University, Bank calculation.

The unit costs provided in table 3.4 correspond to the actual level of spending per student, on the one hand, and per year, on the other. This does not mean, for example, that the cost for one pupil to complete a given cycle of schooling is equal to the product of that unit cost per year and the number of years in the cycle. Grade repetition and dropping out may occur in the course of studies. Consequently, the cost of studies for those completing the cycle is larger than what would be strictly necessary without these disruptions in the flow of students during the cycle of study. These disruptions in the Mozambican system of education have a substantial bearing on the real cost of providing a complete cycle of schooling in the country, as shown in table 3.6.

Taking into account the fact that repetitions and dropouts lead to an increase in unit cost, the increase in spending per pupil for completed cycles varies between about 23 percent in upper secondary and 45 percent in lower primary levels. In all cycles of education, the proportion of public resources wasted is relatively large, amounting to about Mt219 billion in 1998 (or about US$15 million) within MINED; the larger share of the wasted

Table 3.4
Recurrent unit cost, by level and type of education, 1998

Leel of education	Public spending (billions of meticáis)	Enrollment (public)	Per-pupil spending (meticáis)		
			Without (Mt)	With administration[a]	Per capita GNP (without administration)[b]
EP1	342,846	1,880,949	182,300	231,400	0.06
EP2	96,750	168,777	573,200	696,900	0.19
ESG1	54,034	53,693	1,006,400	1,208,200	0.34
ESG2	17,608	7,352	2,395,000	2,752,100	0.81
Technical education	45,589	27,068	1,684,000	1,879,600	0.57
Teacher training	20,068	4,855	4,133,500	4,550,300	1.40
Eduardo Mondlane University					
Pedagogical University	17,000	1,564	10,870,000	—	3.69

— Not available.
a. Figures for spending on administration (inside the Ministry of Education) were based on the total cost of salaries for each level or type of schooling (spending by District Directorates of Education and Provincial Directorates of Education has been distributed over EP1 to ESG2, while spending by the Ministry of Education has been distributed over EP1 to ESG2 as well as technical education and teacher training).
b. The value used for the country's per capita GNP in 1998 is Mt2.946 million.
Source: Ministry of Education, Ministry of Planning and Finance, authors' calculations.

resources is in EP1, with a figure of Mt166 billion (or about US$11 million). However, the phenomenon is not limited to primary and secondary education; efficiency in resource use is also quite low in higher education. The university is characterized by both a high rate of repetition (35 percent the first year, 30 percent the second year, and down to 5 percent the fifth year) and a relatively low capacity to produce graduates (fewer than half of the students entering the university finish). These factors have a significant impact on unit cost (the loading factor is 1.84) of a graduate, amounting to almost Mt200 million.

The microperspective

So far, we have estimated unit cost from a macroperspective, that is, by relating aggregate spending to the number of students enrolled at each level of schooling. In this way, we arrive at figures that are valid for the average national schooling conditions and that derive from the various elements of the educational policy followed in the country. Because these elements are subject to change, it is important to assess how the level of unit cost is linked with the schooling conditions and

Table 3.5
International comparison of recurrent unit cost as percent of per capita income, by level of schooling, 1998

Level of schooling	Mozambique	Kenya	Zambia	Madagascar	Malawi	Anglophone Africa	Francophone Africa	Asia
Primary	0.07	0.12	0.04	0.06	0.06	0.10	0.15	0.08
Secondary	0.40	0.34	0.37	0.20	1.01	0.66	0.49	0.19
Higher	6.41[a]	4.0	2.3	2.6	8.4	6.3	5.6	0.9
Spending on higher education as a ratio of primary	91	33	57	43	140	63	32	11

a. Higher education: (Mt145,000 + Mt17,000 billion)/(Mt6,772 + Mt1,564)/Mt2,946 million per capita = 6.41 spending per pupil of per capita GNP.
Source: World Bank Sector Studies.

Table 3.6
Per student spending at the school level, by level of education, with and without adjustment for repetitions and dropouts within the cycle of schooling, 1998
(meticáis)

	Unit cost per year		Unit cost per cycle	
Level of schooling	Without adjustment for repetitions and dropouts	With adjustment for repetitions and dropouts	Without adjustment for repetitions and dropouts	With adjustment for repetitions and dropouts
EP1	182,300	350,700	911,500	1,753,600
EP2	573,200	798,800	1,146,400	1,597,600
ESG1	1,006,400	1,585,300	3,019,200	4,755,900
ESG2	2,395,000	3,097,900	4,790,000	6,195,800
Higher education (Eduardo Mondlane University)	21,417,000	39,407,000	107,085,000	197,036,000

Source: Ministry of Education, Ministry of Planning and Finance, authors' calculations.

elements of educational policy. Moreover, at any given moment in time, variations in schooling conditions exist across geographic locations (provinces, districts) or, more frequently, across individual schools. This implies some variation in unit cost around the national average. To assess how variations in educational policies affect the unit cost of schooling and to understand how differences in schooling conditions across locations and schools help to explain variations in unit cost around the national average, we need to understand why unit costs vary with regard to schooling conditions.

Analysis shows that policy interventions can improve cost efficiency. For example, the recurrent unit cost (of a level of schooling as a whole, in a particular province, or in a specific individual school) varies depending on multiple policy-related decisions: (a) the average salary of the teachers (which depends on the distribution of teacher qualifications and on the average salary at each skill level), (b) the pupil to teacher ratio (which is close to class size when a given group of students is taught full time by a single teacher, but is smaller than class size when students have specialized teachers and when the teaching duty of a teacher is less than the time of students' instruction, as in secondary schooling), (c) the average salary of nonteaching staff and the student to nonteaching staff ratio at the school level, (d) the average amount of resources per student for pedagogical materials, and (e) the average spending per pupil on administration (at the national and decentralized levels) (see Annex 6 for model).

Following are the relevant pieces of information regarding these components. Table 3.7 provides data on the pupil to teacher ratio and the pupil to nonteacher ratio by level of education, while table 3.8 provides data on personnel salaries.

In Mozambique, the ratio of pupil to teacher (as well as the ratio of pupil to nonteaching staff) tends to be lower the more advanced is the level of education (from 54 in EP1 down to 12 in higher education for teachers and from 664 to as low as 3 for nonteaching staff). This pattern is relatively standard. Within EP1, in particular, the same tendency also exists, with classes being larger, on average, in the first grades than in the last grades of the cycle.

This pattern may contribute to the low retention of pupils in EP1, as what pupils learn during their initial years of schooling depends, more than at higher levels in their schooling career, on the attention they receive from their teacher. In contrast, the proportion of nonteaching staff at the school level (notwithstanding those in administrative or support positions) is relatively high. This is the case in teacher training and even more so in higher education, where the support staff outnumber the teachers.

From an international perspective, Mozambique's pupil to teacher ratio is, on average, on the

Table 3.7
Pupil to teacher ratio and pupil to nonteacher ratio, by level of education at the school level, 1998

	Mozambique			Pupil to teacher ratio in low-income countries		
Level of schooling	Pupil to teacher ratio	Pupil to nonteacher ratio	Teacher to nonteacher ratio	Anglophone Africa	Francophone Africa	Asia
EP1	54.4	664	12.2	—	—	—
EP2	33.8	117	3.5	—	—	—
EP1 and EP2	51.8	—	—	39	53	38
ESG1	25.9	54.2	2.1	—	—	—
ESG2	19.4	27.6	1.4	—	—	—
ESG1 and ESG2	24.9	—	—	22	: 31	23
Teacher training	14.8	10.6	0.7	—	—	—
Technical education	23.4	36.6	1.6	—	—	—
Higher education	12.0	3.3	0.3	15	18	15

— Not available.
Source: Ministry of Education, World Bank Sector Studies. Bank calculation.

high side in primary education (in EP1, not in EP2), but on the low side in higher education. As a whole, the distribution of teachers by level of schooling is skewed for the benefit of students in higher education (and to the detriment of pupils in the lower primary cycle).

The fact that the pupil to teacher and pupil to nonteacher ratios vary substantially across levels and types of education, as well as across schools in the different levels of schooling (see chapter 4), partly explains the large variance observed in unit cost. A second potentially important explanation is linked to the level of qualification and pay of staff employed at these different levels of schooling. Table 3.8 provides basic data in this regard.

Table 3.8 shows that the professional qualifications of teachers (particularly at the primary level) vary as a result of the diversity of training models used to confront the shortage of teachers. During the pre-independence period, most teachers attended teacher training colleges, which comprised four years of primary school and four years of preservice training; in 1998, few teachers received this training. After independence, teacher training institutes replaced teacher training colleges as the basis for training primary school teachers. Training has taken various forms, from a one-year to a three-year program with a sixth- and seventh-grade exam as an entry requirement, respectively. Today they only offer the 7 + 3 years program and have produced, on average, about 950 teachers per year since the mid-1990s; this figure is expected to grow slowly in the future. The ADPP teacher institutes (which are run by a teacher training nongovernmental organization) are the only nonpublic teacher training institutes recognized by the government. In 1997, the government initiated a new teacher training program. The program hires tenth-grade graduates and provides two years of training. Due to the relatively low output of teacher training institutions, untrained teachers represent a substantial share of the teaching force, especially in the lower primary cycle, where about one-third of teachers in 1998 had not received any kind of preservice training.

Table 3.8 also shows, in the last column, wide variation in the average teacher salary across the different categories. Using a private rate of return to education of, say, 10 percent a year would imply

Table 3.8
Distribution of teachers by level of qualification and level of schooling (in percent), and the average teacher and nonteacher salary, by level and type of education, 1998

Teacher categories	Percent				Teacher training	Technical education	Average salary (thousands of meticáis)
	EP1	EP2	ESG1	ESG2			
Categories 1, 11	0.3	1.4	1.6	4.9	—	—	40,800
Categories 2, 4 (6+3; 7+3)	27.3	4.6	0.2	0.0	—	—	12,200
Categories 3, 15	43.0	7.7	8.8	18.0	—	—	8,200
Category 5 (8+2)	0.4	10.1	0.9	0.0	—	—	16,700
Categories 6, 7, 8, 9, 10, 12 (10+2; 9+3)	0.7	50.4	55.6	8.9	—	—	21,100
Category 13 (bachereis)	0.0	0.6	5.2	11.1	—	—	42,300
Category 14 (licenciados)	0.0	0.6	5.6	46.6	—	—	53,500
"Nonqualified"	28.4	24.5	22.0	10.5	—	—	7,500
Total	100.0	100.0	100.0	100.0	—	—	
Annual average salary							
Teachers							
In thousands of meticáis	9,332	16,488	20,456	35,754	36,299	27,515	—
In per capita GNP units	3.2	5.6	6.9	12.1	12.3	9.3	—
Non-teaching staff (thousands of meticáis)	2,526	2,284	2,053	4,011	2,125	2,630	—

n.a. Not applicable.
Source: Ministry of Education and Ministry of Planning and Finance. Bank calculation.

that *licenciados,* who teach in upper secondary schools, earn about 2.2 times as much as category 3 teachers (recruited on the formula "6 or 7+1). Such a range is neither economically justified nor sustainable in the medium run (it will be a major impediment to the expansion of coverage for secondary education in the future), The question, therefore, is the extent to which the benefit in terms of effective student learning matches the difference in cost. A similar case can be observed for teachers beyond EP1, and the same question should be raised for higher levels of schooling.

The structure of teacher pay by category, together with the distribution of teachers by level of education, translates into wide variations in the average level of teacher remuneration (and ultimately into variations in spending per pupil) across the different levels of schooling. In lower primary education, the average annual salary for an EP2 teacher is 1.77 times that of an EP1 teacher. Expressed in per capita GNP of the country in 1998, the figures for teacher pay range from 3.2 in EP1 to 12.1 in upper secondary schooling.

For primary education as a whole (amalgamating EP1 and EP2), the average teacher salary is estimated at 3.5 times the per capita GNP of the country; however, if the incidence of low retention and the flow of recruitment of new teachers is taken into consideration, primary teacher pay is actually around 5.0 times the per capita GNP of the country.

To assess the relevance of the level of teacher remuneration in the country, we can compare the level of teacher salaries (expressed in per capita GNP units) with the pay of other workers holding similar credentials and experrience. For primary schooling, the average figure is 3.6 times the per

capita GNP in English-speaking Sub-Saharan African countries, 6.3 times that in French-speaking Sub-Saharan African countries, and 2.6 times that in non-African low-income countries. With these figures as references, actual primary teacher pay in Mozambique (3.2 or 3.8 in the definitions above) appears relatively close to that in Anglophone African countries. However, if we use the average pay associated with the credentials of new recruits (about 5.0 times the per capita GNP), teacher salaries in primary education are more on the high than on the low side in Mozambique. This is likely to be even more the case as we consider secondary education, where teachers receive a relatively high premium compared with primary school teachers. Nevertheless, it should be pointed out that GNP per capita in Mozambique is below the Sub-Saharan Africa average and therefore the pay of teachers appears on the high side.

It is now possible to reconstruct the unit cost and provide the following breakdown, reconciling the macro and micro perspectives in unit cost analysis. Table 3.9 provides the results.

As tables 3.4 and 3.9 show, the macro and micro calculations of unit costs are consistent, with only very small variations. The identity of the unit cost, on which this microanalysis is based, can also be used to simulate the impact on the unit cost of changes in the variables that characterize the logistical context of schooling and together account for the unit cost of education.

The total unit cost per primary pupil is Mt230,550, or about US$18, excluding external financing (which, for example, covers about 75 percent of the cost of textbooks and learning materials).[5]

Accordingly, the unit cost per primary pupil depends on the weight of each variable. It is clear that the average salary cost of teachers and the pupil to teacher ratio have more weight than some of the other parameters. However, some of these inputs have less influence on student outcomes—for example, school buildings and class size within a certain margin. Yet the availability of learning materials, the relevance of curriculum, the language of instruction, and the pedagogical management methods do affect student outcomes. For now, we simply assess which variables cause the largest changes in per pupil spending. Table 3.10 shows the sensitivity of per pupil spending as a result of changes in the equation's input variables.

To simplify the analysis, each variable is increased or reduced by 50 percent,[6] while the remaining variables are held constant (unchanged). As can be seen from table 3.9, an increase in the

Table 3.9
Reconstructing the unit cost of education by level and type of schooling, 1998

	EP1	EP2	ESG1	ESG2	Technical education	Teacher training
Pupil to teacher ratio	54.4	33.8	25.9	19.4	23.4	14.8
Average teacher salary (thousands of meticáis)	9,332	16,488	20,456	35,574	27,515	36,299
Per pupil spending on teacher (meticáis)	171,544	487,811	789,807	1,833,711	1,175,855	2,452,635
Pupil to nonteacher ratio	664	117	54.2	27.6	36.6	10.6
Average nonteacher salary (thousands of meticáis)	2,526	2,284	2,053	4,011	2,630	2,125
Per pupil spending on nonteacher (meticáis)	3,804	19,521	37,878	145,326	71,858	200,472
Per pupil spending on goods and services (meticáis)	7,002	68,232	175,460	450,353	435,422	1,481,566
Per pupil spending on administration (meticáis)	48,200	123,700	201,800	357,100	195,600	416,800
Total per pupil spending (meticáis)	230,550	699,264	1,204,995	2,786,490	1,878,735	4,551,473

Source: Ministry of Education and Ministry of Planning and Finance. Bank calculation.

Table 3.10
Change in per pupil spending as a result of changes in input variables, 1998

Variable in sensitivity analysis	Average salary cost of teachers (millions of meticáis)	Pupil to teacher ratio	Average salary cost of nonteaching staff (millions of meticáis)	Pupil to teaching staff ratio	Spending on pedagogical materials per pupil (thousands of meticáis)	Spending on administration per pupil (thousands of meticáis)	Recurrent unit cost (thousands of meticáis)	Change from actual (percent
Actual figures	9.3	54.4	2.5	664	7.0	48.2	230.550	n.a.
50 percent increase in average salary cost of teachers	**14.0**	54.4	2.5	664	7.0	48.2	316.322	+ 37.2
50 percent reduction in pupil-teacher ratio	9.3	**27.2**	2.5	664	7.0	48.2	402.094	+ 74.4
50 percent increase in average cost of nonteaching staff	9.3	54.4	**3.8**	664	7.0	48.2	232.452	+ 0.8
50 percent reduction in pupil-teaching staff ratio	9.3	54.4	2.5	**332**	7.0	48.2	234.355	+ 1.7
50 percent increase in spending on pedagogical materials per pupil	9.3	54.4	2.5	664	**10.5**	48.2	234.052	+ 1.5
50 percent reduction in spending on administration per pupil	9.3	54.4	2.5	664	7.0	**24.1**	206.450	– 10.5

n.a. Not applicable.
Source: Ministry of Education and Ministry of Planning and Finance. Bank calculation.

average annual primary teacher salary from Mt9.3 million to Mt14.0 million will increase per pupil spending 37 percent. Such an increase could be the result of, for example, a decompression of the wide range in salaries or an increase in the qualification of teachers, from the 7 + 1 formula to the 7 + 3 formula for the recruitment of EP1 teachers. A salary level of Mt14.0 million represents about five times the per capita GNP of the country and is above the average for English-speaking countries, but below the average for French-speaking countries, in Sub-Saharan Africa. Although such an increase may or may not produce better student outcomes, it would help to attract and retain teachers.

Similarly, reducing the pupil to teacher ratio by half would increase per pupil spending 74 percent, since the number of teachers would have to be doubled. Again, as the salary bill is the largest posting in the budget, this is not surprising. However, while the pupil to teacher ratio is adequate compared with that in other Sub-Saharan African countries, Mozambique has certain characteristics that will influence this ratio: (a) the pupil to teacher ratio varies widely across schools, districts, and provinces, (b) double and triple shifts are the rule rather than the exception in urban areas, and (c) as access to schooling expands into more remote areas, this ratio will be difficult to maintain.

As can be seen from table 3.10, the remaining variables do not affect the spending per pupil significantly. However, one of the variables that is known to have a positive impact on student outcomes—spending on pedagogical materials per pupil—could be doubled with a 50 percent reduction in administrative costs per student. Furthermore, because the provision of learning materials is so small, it is likely that an increase in this component would have a more far-reaching impact on student outcomes than a general increase in salary and at a lesser cost.

High costs of school buildings and construction

In Mozambique, there are about 6,500 primary schools, half of which are built of traditional materials. Since the peace agreement in 1992, the government has placed a priority on rebuilding the school infrastructure and improving the standards of existing schools. By almost doubling the number of primary schools since 1992, the government has been successful in this endeavor. However, there is a dire need to improve the school environment beyond the physical infrastructure with such items as training, materials, and teacher incentives. Therefore, the costs of construction relative to the amount of resources spent on these softer components—and in comparison with the level of teacher salaries—are important measurements. Although the borderline between capital and recurrent spending is imprecise, since 1992 a significant proportion of external financing has been targeted at construction. In some years, as much as US$20 million has been spent on construction, equivalent to about one-third of all education spending. This has a significant impact on both the total resources available for components such as textbooks and on the costs of construction, which determines how many classrooms can be built.

In Mozambique, the cost of constructing one primary classroom is equivalent to 20 years, or 13.7 years, of the annual salary of a primary school teacher, depending on the design used. In other words, the costs of constructing one classroom could finance a full-time teacher for 20 years or 20 full-time teachers for one year (or 13.7 years, depending on the design). Construction costs are very high in Mozambique compared with the costs in Madagascar or Senegal (only 3.9 and 2.2 years of the annual salary of a primary teacher, respectively). Even if we take Madagascar (3.9 years) and the least costly of the two designs in Mozambique (13.7 years), the costs of constructing a school in Mozambique are more than three times what they are in neighboring countries (see Annex 7).

In light of the current target under the Education Sector Strategic Program of building 12,000 new classrooms over the next five years, reducing the costs of construction by half, for example, could finance 82,200 teacher-years (12,000 × 50 percent × 13.7 years), or 4,110 new teachers for the next 20 years (82,200 teacher-years/20 years of work).

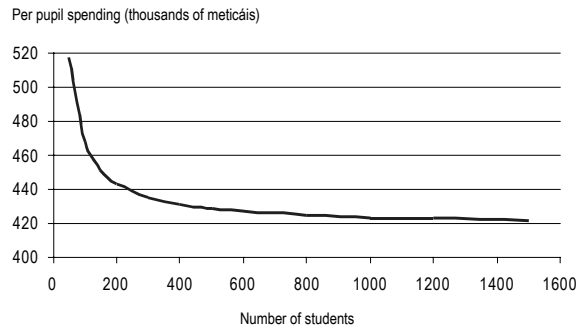
The annualized value of classroom usage is about Mt16.6 million and Mt11.5 million, depending on the design, using a 20-year lifespan and an opportunity cost for capital of 5 percent. The annualized value represents, respectively, 133 percent and 92 percent of the recurrent unit cost of primary education, here again with huge differences between Madagascar (where the annualized cost of building represents 29 percent of the recurrent unit cost) and Senegal (where the cost of building represents only 16 percent of the unit cost). In the Africa region, the annualized value of classroom building is between 15–25 percent of the recurrent cost; in Asia, this statistic is generally even lower.

Although there is a minimum construction cost for a durable, good-quality school, it is clear from Annex 7 that, in comparison with the level of teacher salaries and with other countries like Madagascar and Senegal, the cost of construction in Mozambique is too high. The high cost of construction has two implications: (a) it limits the total number of classrooms that can be constructed or rehabilitated, and (b) it limits the amount of available resources for softer components like learning materials, recruitment, and teacher pay. The high investment in physical infrastructure gives little or no return, yet there remains a need both to provide students with facilities that allow a complete cycle of study in a number of localities and to improve existing facilities.

Unit costs and economies of scale

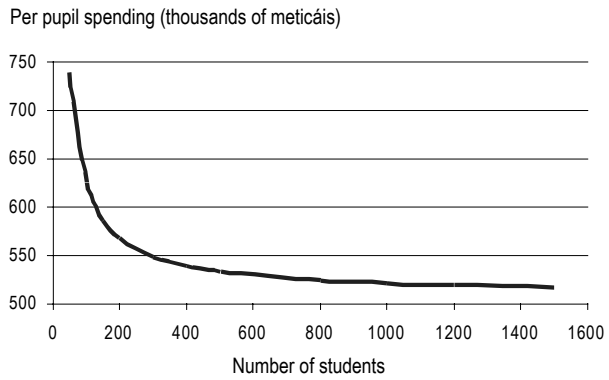
In this final section, we analyze the efficiency opportunities that lie in the economies of scale in education production at the school level. The most straightforward way to do this is to calculate the level of per pupil spending in each individual school and relate it to the size of enrollment. The different schools are somewhat scattered in figure 3.1, which is not surprising given the pattern of teacher deployment in the country. However, an average pattern in the relation between unit cost and size of enrollment is also apparent. This pattern (analyzed with the help of a regression of the unit

Figure 3.1
Unit recurrent costs as a function of enrollment size in public EP2, 1998



Source: Mozambique school census, 1998, and microunit cost function.

Figure 3.2
Unit recurrent costs as a function of enrollment size in public ESG1, 1998



Source: Mozambique school census, 1998, and microunit cost function.

cost against the inverse of the size of enrollment at the school level) implies that per pupil spending tends to decline as the size of enrollment of the school increases. If average per pupil spending declines, marginal costs are lower than average costs. This pattern, which is generally very strong when the size of enrollment is low, tends to fade as enrollment increases. There is a point beyond which the decline in unit cost becomes minimal; this level of enrollment is said to be economical.

In EP1, we do not observe a decline in per pupil spending as the number of pupils enrolled increases. Returns to scale, however, are apparent in EP2, and even more in secondary education, as can be seen from figures 3.1 and 3.2, which are constructed from individual school data for EP2 and ESG1.

In EP2 (figure 3.1), the average unit teacher cost plateaus around Mt420,000 to Mt430,000 when the size of enrollment in the school is larger than about 500 pupils. However, in schools with enrollments below 250 pupils (137 schools out of the 363 EP2 schools of the country, about 38 percent, have fewer than 250 students), the increase in unit cost becomes significant. Schools enrolling fewer than 100 pupils have unit costs that are, on average, larger than Mt500,000; of the 363 EP2 schools in the country, 31 can be so characterized.

A similar, although slightly more pronounced, pattern is evident for ESG1 schools (figure 3.2): the plateau in per pupil spending (around Mt530,000) is reached in schools enrolling more than 600 students. Here, again, the shape of the curve suggests that when enrollment is below 250 students, unit costs rise significantly (18 of the 78 ESG1 schools of the country are in this category). Ten ESG1 schools have even fewer than 180 students, implying a teacher cost per pupil larger than Mt600,000.

As a whole, there is some scope for efficiency gains in the Mozambican system of education by tapping the benefits of a return to scale in upper primary and secondary education especially in urban areas. Nevertheless, with a view to issues like distance to school, safety for girls, and lack of boarding facilities, education goals need to be carefully weighed against the savings from the economy of scale: if larger schools imply a reduced admission in particularly rural areas it would not be appropriate. In general, the cost of providing education would be expected to rise with the inclusion of the most remote and marginalized population. However, when compared with a number of other African countries, the magnitude of the returns to scale in Mozambican education appears to be less. This being said, there is nevertheless scope for increasing efficiency in EP2 and ESG1 schools in order to avoid school enrollments of fewer than 200 students. This would obviously entail some changes in school mapping, or the distribution of students to schools offering grades 6–7 and 8–10.

1. For example, the textbooks used by students over a three-year period may be considered a capital expenditure because the good acquired is not consumed over a single calendar period. However, it may be necessary to distribute one-third of the stock of textbooks every year, making the spending on this item regular on a yearly basis; in other words, it would be quite similar to a recurrent expenditure. The same principle applies to a variety of the goods and services paid for by external assistance.

2. This study examines data on capital spending only for the Ministry of Education.

3. For various reasons, caution is advisable when using financial data, whether budgeted or actual spending figures. Therefore, we reconstruct spending, in particular the cost of wages, by estimating (a) the number of personnel employed in the different levels of education and services, adjusted for new recruits, and (b) the salary scales prevailing in the country for the different categories of teachers and nonteaching staff. The distribution of spending by level of education differs somehow from that shown in the previous tables, but we are reasonably confident that these estimates are more accurate.

4. Because the range of variation in unit cost is very wide across the different levels and types of education, we focus on unit cost at the school level (not including spending on administration) and give the value 1 to unit cost in EP1.

5. The following equation reflects the current unit cost of a primary pupil in EP1:
RUC = AVT/PTR + AVNT/PNTR + PEDPP + ADMU. Thus
RUC = Mt9,332,000/54.4 + Mt2,526,000/664 + Mt7,002 +Mt48,200 = Mt230,550.

6. This does not impact on the variability of any policy intervention, but its cost-effectiveness impact.

4

Internal Efficiency and Management Issues

In chapters 1 to 3 we explored some of the problems and inefficiencies of the Mozambican education system and the cost implications. These problems are related to the internal efficiency of the system, the variance across schools, and the relationship between inputs into the education system and student achievement. This chapter investigates these areas further.

The term efficiency describes the relationship between inputs and outputs, and this relationship can be analyzed from several perspectives. From the public sector's perspective, internal efficiency is particularly concerned with the relationship between inputs and outputs, within the education system or within individual institutions, and how public resources are used and how they influence student outcomes. The chapter begins with a review of the efficiency in student flow, which was discussed briefly in chapter 2. Following is an examination of how well public resources are distributed, in particular the allocation of teachers and their salaries. This is important because a substantial portion of public resources is spent on teacher salaries, and an even distribution of teacher resources contributes to student outcomes. The chapter ends with a discussion of the quality of education and factors affecting that quality.

Efficiency in student flow

The education system in Mozambique is not very efficient because the majority of students do not complete the first cycle of primary education (EP1) and reach grade 5. Table 4.1 summarizes the index of internal efficiency in education by different grades and levels of education. The gross enrollment rate in EP1 was 92 percent in 1998, but 24 percent of the pupils enrolled were repeaters. The proportion of repeaters is highest (25 percent) in grade 1, since this is where the bulk of students are enrolled.

What is surprising is the fact that this share of repeaters remains almost unchanged for grades 2 to 5 and onward (about 13 percent in each grade), in spite of the normal assumption that, as the cohort progresses, more of the better qualified students remain (yet the assumption does hold true for girls; see chapter 5). The repetition may not be related directly to the performance of the students; instead, it may be related to structure and culture, whereby teachers are expected to ask a number of students to repeat or pupils repeat for some other reason. This argument, of course, is based largely on the anecdotal information that some parents prefer their children to repeat because they believe that repetition is necessary to learning. In the last part of the chapter, we investigate this point further.

Due to the high dropout rate in EP1 and low transition from EP1 to EP2 (grades 5 to 6), the gross enrollment rate in EP2 is only 24 percent. The average proportion of repeaters in EP2 is also high (25 percent). The proportion of repeaters is 24 percent in ESG1, but it is even higher (35 percent) in grade 10. The increase in the repetition rate at grade 10 may be explained by the fact that (a) a large number

Table 4.1
Index of internal efficiency, by cycle of study, 1998
(percent unless otherwise indicated)

Rate	EP1	EP2	ESG1	ESG2
Gross enrollment rate	92.3	24.4	6.6	1.2
Net access to first grade	93.7	20.8	6.4	1.6
Net access to last grade	39.4	14.3	3.1	1.1
Proportion of repeaters				
Average	23.7	24.7	24.2	10.1
By grade leve				
1 / 6 / 8 / 11	25.4	24.3	22.3	7.4
2 / 7 / 9 / 12	24.5	25.2	19.4	13.2
3 / / 10 /	24.4	34.6		
4 /	20.2			
5 /	18.8			
Index of overall efficiency				
Percent	58.3	71.8	63.5	77.3
Number of years necessary to complete	8.6	2.8	4.7	2.6
Index of efficiency with dropouts				
Perdent	73.1	90.8	81.1	84.6
Number of years necessary to complete	6.8	2.2	3.7	2.4
Index of efficiency with repeaters				
Percent	79.7	79.0	78.2	91.4
Number of years necessary to complete	6.3	2.5	3.8	2.2

Source: Mozambique school survey data.

of students fail the grade-10 examination, cannot be promoted to ESG2, and therefore repeat, (b) a number of the students who pass the examination cannot enter ESG2 because the existing spaces are taken up by repeaters, and (c) students who pass the examination, but are unable to find a job, decide to remain in the same grade. The final point relates to the notion that students who have gone through some sort of formal education are most likely to seek formal employment and not return to traditional activities, such as farming.

These reasons for the low survival rates hold true for every grade throughout the education system in Mozambique, particularly the crowding out of students being promoted. Obviously, if a grade level is populated by a large number of repeaters, these repeaters occupy the places that would otherwise accommodate new students; many pupils therefore are prevented from moving up to the next level or from entering school at all. This situation implies some waste of public resources.

Using a cross-sectional perspective, the survival rate in EP1 is estimated at 42 percent in 1994, 40 percent in 1995, 37 percent in 1998, and 38 percent in 1999, indicating deterioration in retention in EP1.[1] However, using the quasi-time-series perspective, which we believe provides better estimates, the survival rate is estimated at 43 percent between 1994 and 1995 and 44 percent between 1998 and 1999, indicating an improvement of 1.4 percentage points between the periods.[2] Finally, by taking the full time-series perspective (which may provide estimates that are subject to bias), we get a retention rate of 47 percent over the 1994–99 period (see Table 4.2).

Considering these figures, as well as the confidence we place in the different methods, the 1998 survival rate in EP1 was around 42 percent, and some improvement took place over the 1994–99 period. Nevertheless, the figure for 1998 (42 percent) is very low by any standard, and the improvement over the five-year period was very modest. This indicates that out of 100 pupils entering grade 1, approximately 42 will attain grade 5.

To produce these 42 students in grade 5, it would be necessary to finance 210 (42 × 5) years of schooling in the absence of repetition and dropouts. However, given the high number of repeaters, the system has a larger number of pupils in the early grades and progressively fewer in the higher grades. Therefore, in order to produce the 42 pupils in grade 5, the system has to finance 125 students (the 100 students in the grade loaded by the 25.4 percent of repeaters in that grade), instead of the 42 that would have been strictly necessary. The same applies to the next grades. The outcome is that the system is financing many more years than the 210 necessary to produce 42 grade-5 students in five years.

Table 4.2
Survival rate in EP1, 1994–99
(percent)

Method of estimation	1994	1995	1994–95	1998	1999	1998–99	1994–99
Cross-sectional estimate	41.5	39.5		37.3	37.6		
Quasi-time-series estimate		47.0	42.6			44.0	
Full time-series perspective							47.0

Source: Mozambique school survey data, 1994–99.

Dividing by 210 the number of school-years the system effectively finances to produce these 42 grade-5 students, we get the efficiency ratio, in which the value of 1 describes a system without dropout or repetition. As seen in table 4.1, the index of overall efficiency in EP1 is only 58 percent, indicating, by complement to 1, that about 42 percent (1 - 0.583) of the public resources mobilized in EP1 are wasted. We can also use the efficiency ratio to get a sense of the average number of years the budget must finance to help one child, on average, reach grade 5. It takes 8.6 years for all the pupils (including repeaters and dropouts) to pass through EP1,[3] and it costs the government an additional 3.6 years of spending per pupil to allow a child to reach the fifth grade.

Similarly, the index of efficiency at the higher levels of education is low: 72 percent in EP2, 64 percent in ESG1, and 77 percent in ESG2, indicating that it takes students a number of additional years to pass through each level of education and the standard curriculum. Table 4.1 also presents the index of efficiency without repeaters and dropouts, and these indexes become slightly better than that of overall efficiency (which includes repeaters and dropouts), since fewer years are required for all pupils to pass through each level of education.

Allocation of teachers to individual schools

Efficiency also concerns the way resources are distributed and used. The distribution of teachers is one of the most critical resources in relation to cost, equity, and student outcomes. We now explore how teachers are deployed in Mozambique, that is, how they are allocated to both provinces and individual schools. Two factors are related to the allocation of teacher resources. One is qualitative and concerns the characteristics of the teachers (their qualifications, years of experience, and so forth). The second is quantitative, with two complementary dimensions: (a) Are the teachers who are currently available deployed in an efficient or—better—in a consistent way? (b) Are there enough or too many teachers in the country given the need to provide a reasonable quality of education to the country's children?

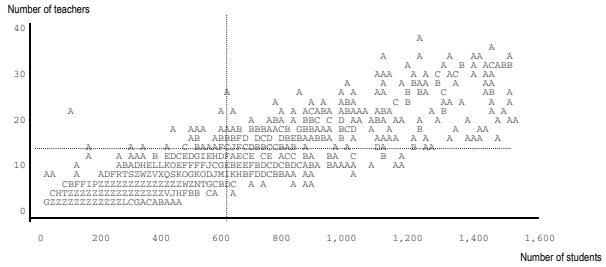
To gauge whether the current pattern of teacher allocation is efficient and consistent, we need a general criterion for assessment. As far as the quantitative distribution of teachers is concerned, a clear yardstick is balance: providing schools of similar size of enrollment with a similar number of teachers. The task is therefore to document the extent to which the current allocation of teachers in Mozambique is consistent with this principle.

Lower primary education (EP1)

Overall in Mozambique, the allocation of teacher resources is inconsistent across the roughly 6,000 lower primary schools that existed in 1998. Figure 4.1 shows that, even though there is a general tendency for a school to benefit from a larger number of teachers when the size of enrollment is larger (R^2 = 85.5 percent), there is wide variability in the number of teachers for schools enrolling a similar number of pupils.

To what extent does this inconsistency stem from differences across provinces or from differences within each (or some) of the different provinces? Similarly, does the urban or rural location of the schools affect teacher allocation? We first investigate whether there is any disparity between urban and rural areas.

Figure 4.1
Allocation of teachers in public EP1 Schools, 1998



Legend: A = 1 obs, B = 2 obs., etc.
Source: Mozambique school survey data, 1998.

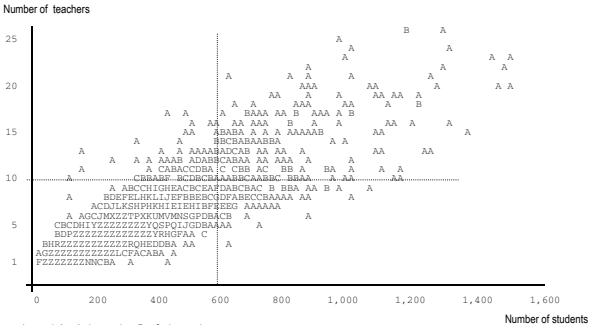
As can be seen from figure 4.2a, even though the positive relationship between the number of pupils and teachers in rural areas holds, the magnitude of the disparities is wider than for the country as a whole. In the rural areas, 77 percent of the disparities of teacher allocation can be explained by the rural location of the schools, versus 85 percent for the whole sample.[4] For example, among all the schools providing 10 teachers, we find that enrollments vary between 100 and 1,200 pupils; similarly, schools enrolling 600 pupils may have between 5 and 15 teachers. Figure 4.2b depicts a similar case for urban areas, where 78 percent of the variance can be explained by the school location.[5] In a sense, this is surprising because it is often thought that organizing the deployment of teachers is easier in urban than in rural settings.

If the inconsistency in teacher allocation cannot be explained by differences between urban and rural areas, perhaps it is the result of how teacher resources are managed. If this is a management issue, it is important to determine the extent to which the variance (or inconsistency) is similar across provinces, which reflects how the budget is distributed across provinces.

Statistical modeling can be used to assess the extent of the variance between provinces or within a province.[6] Annex 8 shows the average variations between provinces in the allocation of teachers at the EP1 level, and Annex 9 shows the interprovince variations.

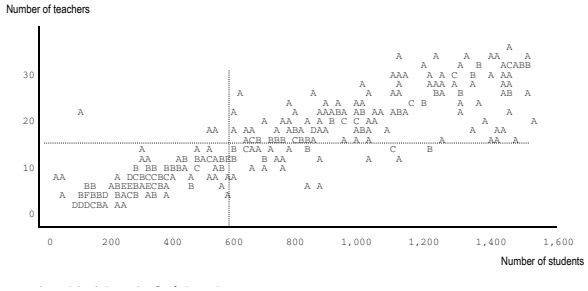
When we first consider the total number of pupils and teachers at the provincial level, it is clear

Figure 4.2a
Allocation of teachers in public EP1 schools in rural areas, 1998



Legend: A = 1 obs., B = 2 obs., etc.
Source: Mozambique school survey data.

Figure 4.2b
Allocation of teachers in public EP1 schools in urban areas, 1998



Notes: Legend: A = 1 obs, B = 2 obs, etc.
Source: Mozambique school survey data.

that some provinces with a similar number of teachers are servicing quite different numbers of pupils. For example, Cabo Delgado and Inhambane both had about 2,500 teachers in 1998, but the enrollment in Cabo Delgado was about 134,000 pupils, or 41,000 fewer than the 175,000 enrolled in Inhambane. Similarly, both Tete and Maputo Province enrolled about 140,000 pupils each, but Tete had almost 3,000 teachers, while Maputo Province had fewer than 2,000. Maputo City and Tete both had relatively generous endowments of teachers given the number of pupils enrolled. These figures suggest that there is indeed a significant level of inconsistency in the allocation of teachers between the provinces and that some provinces benefit more than others.

Allowing for variations between the provinces reduces the residual variability of the model (the R^2 goes from 85.5 to 87.2 percent). Of the 14.5 percentage points of total inconsistency (or variance in the distribution of teachers), 12.8 percentage points correspond to the inconsistency of distribution of resources within the provinces. In relative terms, this means that 87 percent of total inconsistency is found within the provinces in their allocation of teachers to individual schools and that only 13 percent stems from variations between provinces.

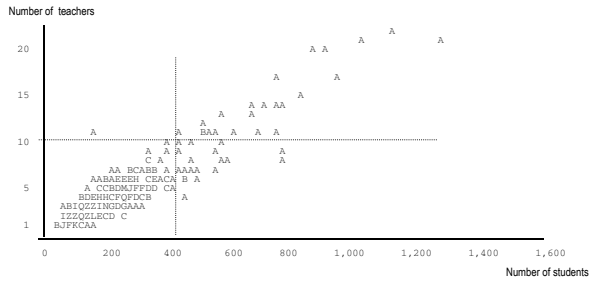
These results do not imply that the allocation of resources between the provinces is adequate and efficient or that all provinces have an equal degree of inconsistency in allocating teachers to individual schools. According to this method, Gaza, Inhambane, and Maputo Province are underendowed in teachers given the number of pupils enrolled, while Tete, Niassa, Nampula, and Maputo City are relatively overendowed. A second and preferred analysis (as it provides a better description of the reality) estimates the relationship between teachers and pupils at the school level separately for each of the 11 provinces.

Looking at simulations of the average number of teachers in schools of 300 pupils, which is close to the average size of EP1 schools in the country (see Annex 9). Interprovince disparities are quite substantial: Gaza, Inhambane, and Maputo Province are clearly underendowed in relative terms, with schools of 300 pupils having, on average, around four teachers. In contrast, the provinces of Niassa and Tete, and especially Maputo City, have, on average, more than six teachers for the same size of enrollment. This means that it would be necessary to increase the number of teachers in the three underendowed provinces by more than 50 percent to reach equality. The case of Maputo City is special: a school in Maputo City enrolling 300 pupils has 9.7 teachers, which is 2.6 times more than an average school of the same size in Gaza Province. Maputo City is a special case due to the concentration of teacher training colleges and activities during the war.

The global allocation of teachers varies widely across the different provinces, and this variance should be addressed (perhaps by improving the procedure by which the budget is prepared). However, a substantial degree of inconsistency in teacher allocation to individual schools also exists within the different provinces. If we use the value $[1 - R^2]$ as a measure of inconsistency in teacher deployment, Maputo Province, Nampula, Sofala, and Tete show reasonably good performance on this account: R^2 exceeds 90 percent (less than 10 percent of inconsistency). In contrast, Gaza, Niassa, Zambezia, and Maputo City have a much higher degree of randomness in teacher deployment, demonstrating relatively poor management of the public resources with which they are endowed. To illustrate the existence of intraprovince disparities in the allocation of teachers, figure 4.3 shows the case of Cabo Delgado, in which the randomness is moderate (R^2 = 0.89); Zambezia or, particularly, Maputo City would show a more scattered picture.

There is ample room for improvement in the allocation of teachers in EP1 (and probably generally in the allocation of resources) to the different provinces and to the different EP1 schools within most of the provinces. Adopting criteria for both dimensions and finding ways to implement them progressively over time are clearly the direction in which to proceed. Across provinces, the government should seek to define criteria so that the budget allocation to provinces is in line with the needs of each province in an equitable manner. Within provinces, a similar mechanism should be established so that the distribution of personnel and resources to different schools is consistent and the conditions of schooling are reasonably equitable across locations. To do that

Figure 4.3
Allocation of teachers in public EP1 schools in Cabo Delgado, 1998



Legend: A = 1 obs., B = 2 obs., etc.
Source: Mozambique school survey data.

would require a plan implemented over time, since it might be difficult to redeploy the teaching force at the provincial and national level overnight. The attrition and recruitment of teachers can be used to adjust the allocation of teachers, but creating incentives for teachers to move to other schools may also be necessary. This policy may be pertinent to the idea of merging EP1 and EP2 schools.

Upper primary (EP2) and lower (ESG1) and upper (ESG2) secondary education

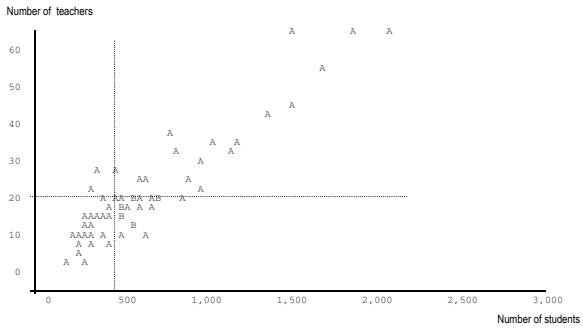
The allocation of teachers in upper primary and secondary education shows characteristics similar to those analyzed for the lower primary schools. For example, for upper primary schools, which have about 15 teachers, enrollment ranges between 200 and 1,200 students, indicating extensive variation in the ratio of teachers to students from school to school. The same pattern applies to schools at the lower secondary level, as figure 4.4 shows. Some lower secondary schools have between 400 and 1,000 students enrolled, but these schools, which differ so widely in terms of enrollment, have the same number of teachers on average, namely, about 20.

In addition to the wide disparities in teacher allocation at all levels of education, does some similarity exist in the pattern of teacher allocation across the different levels of schooling? This question obviously pertains only to the pattern across provinces. In other words, (a) to what extent are provinces that are relatively under- or overendowed in teachers in EP1 also under- or overendowed in the other levels of schooling? and (b) to what extent are provinces that deploy teachers efficiently in EP1 able to perform better than other provinces in EP2?

As in EP1, provinces do not receive resources that match the number of students they enroll in a totally consistent and equitable way. For example, schools with about 300 students enrolled (the average size of enrollment at the country level in EP2 schools) have, on average, 8.6 teachers, but the figure varies from below 7 in Gaza, Inhambane, and Sofala to around or over 11 in Niassa, Tete, and Maputo City. This is a wide range for provincial differences; it would be necessary, on average, to increase the number of EP2 teachers in Sofala by a factor larger than two to get to an endowment similar to that of Niassa. The degree of consistency in teacher allocation across EP2 schools also varies across provinces: a relatively high level of randomness exists in Cabo Delgado, Gaza, Maputo Province, and Zambezia (R^2 below 0.80), while Manica, Sofala, and Tete perform better in the management of teacher deployment (R^2 around 0.90).

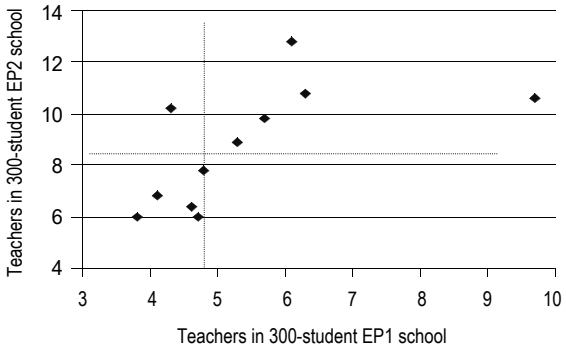
Contrasting the endowment of EP1 and EP2 teachers by province (estimated as the average number of teachers in schools of average size) shows that the provinces that are overendowed in EP1 tend to be at an advantage in EP2, as figure 4.5 shows. Only Maputo is relatively underendowed in EP1 but overendowed in EP2. Provinces such as

Figure 4.4
Allocation of teachers in public ESG1 schools, 1998



Legend: A = 1 obs., B = 2 obs., etc.
Source: Mozambique school survey data.

Figure 4.5
Endowment of teachers in EP1 and EP2 schools, by province, 1998



Source: Ministry of Education, school survey data, 1998.

Gaza, Inhambane, and Sofala suffer in teacher endowment in both EP1 and EP2, while Niassa, Tete, and Maputo City benefit from a relatively generous allocation of teachers in both cycles.

What are some of the reasons for this pattern? To what extent is it the result of a historical development or of budgetary procedures? Regardless of the reasons, there clearly is substantial room for improvement and policy change.

Some elements regarding the quality of primary education

Inputs, like the endowment of teachers, often relate to the quality of education. Many factors might affect the quality of education: teachers who are not trained (unqualified), classes that are overcrowded, a dearth of pedagogical material, or a static curriculum. Obviously, these considerations do have some bearing. However, a school's quality may also be judged by student outcomes—in other words, the average level of student learning, schooling careers, or the disparities in learning across students. We can analyze these conditions by (a) relating student outcomes to school inputs (mobilized at the school or class level), (b) costing the inputs, and (c) designing a cost-efficient strategy to maximize outcomes for a given unit cost or, conversely, to minimize spending per pupil for a given level of student outcome (identifying which mix of school inputs is the optimal combination). In the following section, we investigate these issues further as well as factors that may affect these variables.

Student outcomes and school and student characteristics

We have not been able to locate data to conduct a full analysis in the Mozambican context. However, we have been able to use some of the data collected by the National Institute of Educational Development for the Assessment Project, also referred to as PASE (see table 4.3). The PASE survey collected data from 90 EP1 schools located in Cabo Delgado, Maputo City, Maputo Province, and Zambezia. More than 4,200 students were tested in Portuguese and mathematics at the end of grades 2 and 3. Unfortunately, very few pieces of information are available on students (only age and gender are known) and the schooling context (only the proportion of teachers with more than 10 years of formal education and the proportion without teacher training are known at the school level).

Table 4.3
Regression analysis of student outcomes, 1999

Indicator	Result
Student female/male	– 2.75*
Student age	—
Urban/rural	– 4.59*
Suburban/rural	– 3.91**
Share of teachers with more than 10 years of education	+ 0.029*
Share of teachers with no formal training	– 0.039*
Maputo City	Reference
Cabo Delgado	– 9.20*
Maputo Province	– 0.85
Zambezia	– 6.85*

— Not available. * Significant at 1 percent. ** Significant at 5 percent.
Source: Project assessment data, 1999.

The results of multivariate regression show that the share of variance of student test scores accounted for by these variables is relatively small (10.7 percent), but some results are significant: girls tend to perform less well than boys (-2.75 points in the test scale), and rural students tend to perform better than urban ones; within cities, students tend to do better in the suburbs than in the inner city. However, other things being equal, the level of learning achievement is considerably lower in Zambezia (-6.85 points) and lower still in Cabo Delgado (-9.20 points) than in Maputo, with no significant difference between Maputo Province and Maputo City.[7]

Having more educated and better trained teachers has a positive impact on student learning (see table 4.3 and 4.4). In the sampled schools, 44 percent of teachers had more than 10 years of formal schooling, with values at the school level ranging from 0 to 100 percent; similarly, 30 percent of teachers had

Table 4.4
Teacher experience for sampled schools, by province, 1999
(percent)

	Share of teachers with more than 10 years of schooling	Share of teachers with no formal training
Cabo Delgado	47.7	40.3
Maputo City	80.1	7.8
Maputo Province	44.9	33.9
Zambezia	33.5	28.8

Source: Project assessment data, 1999.

no formal training (ranging from 0 to 100 percent at the school level).[8]

Between a school where 20 percent of the teachers have 10 or more years of education and another school where the percentage is 60 (these are not extreme cases), the variation in student test scores was estimated at 1.2 points for formal teacher education and 1.6 points for teacher training. These figures are sizable, but the magnitude remains relatively modest.

Differences in student outcomes across schools can stem from three sources: (a) variations in the characteristics of the student body, (b) variations in the amount and distribution of resources made available, and (c) variations in the capacity of individual schools to transform the resources they have into student learning. Student learning tends to differ widely across the different schools of the sample (and probably of the country). In fact, the share of variance of test scores is as high as 38 percent.[9] For reference, it is useful to compare this figure (38 percent) with that found in similar studies conducted elsewhere in the Africa region: 23 percent in Togo, 28 percent in Mali, 28 percent in Senegal, and 31 percent in Burkina Faso. Only Mauritania has a figure higher than that of Mozambique (47 percent).

Mozambique therefore has substantial disparities in learning across different schools. In Burkina Faso, Mali, Mauritania, Senegal, and Togo, variability in the use of inputs had a much larger impact than the capacity of schools to transform the available resources into effective student learning. This pattern also applies to Mozambique.

A marginal gain of 9.1 points would account for interschool variations in both student characteristics and school inputs, and 18 points would be associated with interschool variations in the capacity of schools to produce learning in the students they enroll out of the resources they receive.[10]

Even though the figures provide only orders of magnitude, *the variation in resource use at the school level probably makes more difference to outcomes than the amount of the resources themselves.* It follows that the pedagogical management of schools in Mozambique is weak and that any strategy aimed at improving student learning and the effective quality of schooling should not focus exclusively on the input side (however important inputs are). It should also pay attention to improving the pedagogical management of the system at the school level, which includes relevance of the curriculum, teaching methods, and so forth. Thus to achieve significant improvements, it is important to (a) measure student learning on a regular basis at the school level and to (b) design a system by which low-achieving schools are led to do better. Toward this end, the role of inspectors and school heads could be clarified, and a firmer structure of responsibility and incentives could be set in place.

Beyond these logistical factors, we now examine the influence of other factors that are important, but exogenous, to the school, such as the parents' mother tongue, availability of books at home, and the like. In addition, we elaborate on the cultural aspect of teaching and learning from a study by Mikael Palme that addresses the quality and culture in primary teaching on the basis of recent research findings on Mozambique.[11]

The social and cultural context of learning in Mozambique

In addition to this analysis, the PASE study assessed the impact of a number of factors on the pupils' achievement in mathematics and Portuguese: those affecting the student's characteristics and inputs, such as socioeconomic background, the language of instruction versus the mother tongue spoken at

home, availability of school supplies and classroom equipment, and repetition of students.

It is not surprising that factors such as exposure to Portuguese at home and the availability of books at home have a positive effect on student outcomes. Hearing Portuguese spoken at home has a positive correlation with both Portuguese and mathematics test scores, but the correlation is much more important in relation to the language scores than to the mathematics scores. In addition, the study found a positive correlation between the presence of books in the child's home and performance in Portuguese; however, this factor did not affect the mathematics grade. Another factor was the education of the parents or other family members: students whose parents or siblings knew how to read and write in Portuguese scored higher than those whose parents did not. Moreover, students who had repeated a grade actually scored lower than students who had not repeated: test scores for a large sample of students indicated that those who had never failed had average grades of 12.71 and 10.60 in mathematics and Portuguese, respectively, as opposed to 12.2 and 9.67 for those who had repeated once and 11.9 and 9.51 for those who had repeated more than once. This finding is particularly interesting because many parents believe that if their children do not repeat, they will not learn. Of course, this analysis does not take into account the characteristics of the students who do not repeat.

School inputs, such as school furniture, learning materials, and classroom materials (chalk, blackboard) do have some bearing. For example, Cabo Delgado and Zambezia, which have the lowest gross enrollment rates in the country, have the least amount of classroom furniture (around 70 percent of their students sit on the floor). This tends to confirm the high variance between provinces and between schools.

On the issue of the schools' capacity to manage the inputs, we return to the study conducted by Mikael Palme.[12] The study draws on a national evaluation of primary education textbooks undertaken by a joint national and international team between 1990 and 1992[13] and on a 1993 study of 30 Makua peasant families in Nampula. In this study, two factors that influenced effective teaching related to the culture of teaching and the nature of schooling and its lack of relevance to the local community. In particular, the study found the following.

First, in the sampled Mozambican schools, teaching was characterized by strong ritualization and a high level of formal, functional interaction between the students and the teacher. This promoted student passivity. Teachers had poor mastery of their subjects and few teaching skills; in fact, teachers tended to rely on explanations in the textbooks, providing few opportunities for students to ask exploratory questions. As a consequence, the teachers did not know whether the students had attained adequate skills. The language of instruction further exacerbated this problem, since most pupils, and most teachers as well, did not command a high level of proficiency in Portuguese. Since so much of what was supposed to be taught and learned in early grades was not totally learned, teachers constantly demanded skills and knowledge that the majority of students did not have. As a result, students repeated or dropped out. This finding appears to be somewhat consistent with that of learning outcomes and teachers' experience and qualifications. Thus teachers with a better education and longer experience are assumed to have mastered their subjects more completely.

Second, the interviews with 30 Makua families in Nampula revealed a strong view of schooling as belonging to a closed universe to which ordinary people have no access. In this context, schooling was ascribed a purely functional value, one that could open up the door to modern society, but was not relevant to the local community. More important, the school and teacher, although highly respected, were considered to be outside the norms and values of the community. In this context, the proximity of the school became quite important since continued education beyond EP1, and especially after grade 6, required arrangements through the extended family network.

Besides being considered a costly endeavor (from lost income and cost associated with sending food or money), school also was seen as a contradictory one: those who managed to "succeed" usually changed, rejecting the traditional community (and farming), but many also were excluded from the "modern" society. This had special consequences for girls, as a man could not marry a girl

with more education than himself and girls played a key economic role in peasant Mozambique. In accordance with the matrilineal society, the labor and products of the men who married into the family remained the rightful property of the mother-in-law. On the one hand, this argues strongly for placing the school in the community and expanding grade levels, rather than forcing the children to move. On the other hand, if matrilineal tradition is commonplace in rural Mozambique and placing schools in the community is necessary, it is still not a sufficient condition to ensure the retention of girls.

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1. To analyze the survival rate in a cross-sectional manner, the survival rate is calculated as the ratio between the net enrollment rate (calculated as the ratio between the number of nonrepeaters and the number of children of the relevant age in the population) in the last and the first year of the cycle.

2. A "compact" or reduced form of a time-series analysis looks at the survival rate between two consecutive grades over two consecutive years, and the estimates for each grade are then assembled to get a figure for the cycle as a whole. These estimates can be made at different points in time, allowing one to assess whether things are improving or deteriorating.

3. 5 years/0.583 = 8.6 years.

4. This is documented by the lower value of the R^2 (77 percent against 85 percent for the whole sample).

5. This is documented by an R^2 that is very much like that observed in rural areas (78 percent).

6. Model 1 indicates that inconsistency in teacher allocations to individual schools represents 14.5 percent (100-85.5) of total variability in the number of teachers at the school level. Model 2 indicates that, allowing for disparities in teacher allocations between provinces, the inconsistency (or variance) within each province accounts for 12.8 percent (100-87.2).

7. We constructed a standardized measure of student learning, aggregating mathematics and language for each of the two years (the mean was set to 100, and the standard deviation was set to 15). This score was then regressed against the age and gender of students, the geographic location of the school (urban, suburban, or rural setting), and the two available characteristics of teachers at the school level (the proportion of teachers with more than 10 years of education and the proportion of teachers with no formal training).

8. The figures for the proportion of teachers with more than 10 years of education and the proportion of untrained teachers in the sample are very close to the national average, suggesting that the structure of the sample is not distorted. Beyond this global structure, the two teacher characteristics are not distributed evenly across the different provinces, as documented in Table 4.5. Teachers in Maputo City are both better educated (80 percent of teachers have more than 10 years of formal education) and better trained (only 8 percent have no formal training) than in the central-northern provinces. Only 33 percent of teachers in the Zambezia sample have more than 10 years of education, while 40 percent of teachers in Cabo Delgado have no formal training.

9. Using a dummy variable for each school is a simple way to categorize each school as unique, while estimating the global impact of the three sources of variation.

10. We used the average level of student learning in grade 3 (grade 2) as a proxy for both the characteristics of the students enrolled in the school and the resources made available to it, as a complementary variable to account for the variability in individual test scores in grade 2 (grade 3). Inclusion of this variable increased the share of variance in test score accounted for by the model from 10.7 to 19.8 percent. The marginal gain in R^2 is 9.1 points, while the difference between 19.8 percent and the 37.8 percent of the model, using the set of school dummies, is 18 points.

11. Mikael Palme, "Cultural Ambiguity and the Primary School Teacher," in *Education, Cultures, and Economies,* chap. 14 (Upsala University, 1997).

12. Palme, "Cultural Ambiguity and the Primary School Teacher."

13. "Cadernos de pesquisa," National Institute of Educational Development, 1997, funded by Swedish International Development Agency (SIDA); the research team involved researchers from National Institute of Educational Development, the Stockholm Institute of Education, and the Center for Research on Bilingualism at Stockholm University. The study comprised 150 lessons in grades 1 to 5 in eight schools in two regions; more elaborate observations of 22 lessons in four schools focused on the qualitative aspects of language use.

5

Analyzing Equity

As we saw in the previous chapters, many of the issues facing the government relate to the allocation and distribution of resources to education. Equitable distribution of educational resources is important because the distribution of income, wealth, opportunities, and power in society is a broad measure of equity and a reflection of government policy choices. Education, in particular, forms the basis from which many individuals obtain access to these services in the future and is an important tool for poverty reduction. In the previous chapters, we discussed some of the inequities in resource allocation, school enrollment, student to teacher ratio, and unit cost; these are supply-driven inequities. In this chapter, we further analyze the extent to which the increase in the gross enrollment rate between 1993 and 1999 has helped to reduce gender and geographic gaps (or inequities) as well as disparities in public resource distribution.

Since 1992 the government has sought to ensure more equitable distribution of educational resources. This chapter explores these equity-related issues from the perspective of the beneficiaries. In the educational equity literature, there are various ways to assess equity in education: (a) evaluate differences in access to specific levels or types of education, (b) compare the distribution of benefits among people with different education and socioeconomic backgrounds, and (c) assess who pays for and who benefits from education.

To identify the extent and nature of existing inequities in the distribution of education and the policy interventions needed to address them, we analyze the gender-disaggregated gross enrollment trends in Mozambique as a whole, by province, and by geographic area (rural and urban). This analysis will indicate whether there is gender or geographic inequity and the magnitude of that inequity; it also will document whether the inequity resides more in access, retention, or both. Second, we examine the extent to which the public resources for education are evenly distributed within a cohort of youngsters.

Enrollment patterns by gender and by geographic location

An overall perspective

We start by analyzing disparities in enrollment by level of education. On this count, Mozambique has made encouraging progress in the past few years. As discussed in earlier chapters, the overall gross enrollment rate grew from 60 percent in 1993 to 92 percent in 1998. However, table 5.1 shows fewer girls than boys were enrolled in the various grade levels from primary to secondary in 1997. Out of 1,780,881 students enrolled in EP1 in 1997, 59 percent were boys, and 41 percent were girls. In the same year, 60 percent of those enrolled in EP2 were boys, and 40 percent were girls. In ESG1, boys made up 58 percent of enrollment (girls, 42 percent), while in ESG2 boys comprised 60 percent (girls, 40 percent) of enrollment. Thus in 1997, we find more or

Table 5.1
Enrollment, by gender and level of education, 1997

Level of education	Number of boys	Number of girls	Total enrollment	Girls as a a share of total enrollment
EP1	1,041,958	738,923	1,780,881	41.5
EP2	97,724	66,353	164,078	40.4
ESG1	30,237	21,583	51,821	41.6
ESG2	5,441	3,701	9,142	40.5
Technical education[a]	18,937	8,131	27,067	30.0
Teacher training[a]	2,289	2,566	4,855	52.0
Higher education[a]	7,328	2,994	10,322	29.0

a. Figures refer to 1998.
Source: Ministry of Education statistics.

less the same proportion of boys (60 percent) and girls (40 percent) from EP1 to ESG2.

When the distribution of education is analyzed from a provincial perspective, an interesting picture emerges, as shown in table 5.2. Whereas the overall gross enrollment rate in EP1 was 92 percent in 1998, the provincial GER ranged from 71 percent in Nampula to around 130 percent in Gaza and Maputo Province. The GER takes into account the repeaters as well as under- and overage children, and the magnitude of interprovincial disparities highlights the existence of real inequities in the chances offered to youth in various provinces.

In all provinces, girls lagged behind boys. On average, the gender gap was 27 percentage points, ranging from a low of 7 percentage points in Maputo City or 9 percentage points in Maputo Province, to 30 percentage points in Nampula, and a high of 38 percentage points in Zambezia. Obviously, the gender gap tends to narrow as the overall gross enrollment rate increases, as seen in figure 5.1.[1] Such a finding confirms the assertion that broader educational provisions in the system as a whole are key to achieving higher female school participation.[2]

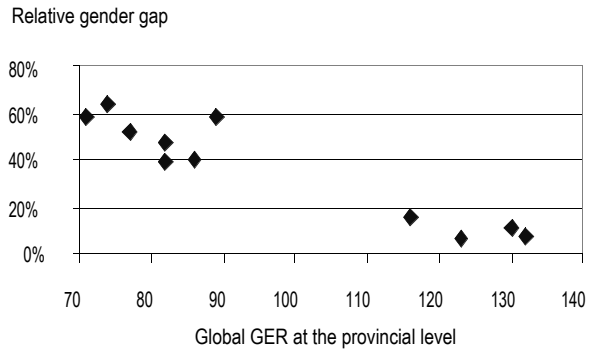
This pattern indicates that regional and gender differences tend to compound, thus creating a double jeopardy for girls living in low-enrollment provinces. In addressing these inequities, the government might consider both regional and gender disparities jointly. To understand the possible reasons for these disparities, we look at access, repetition, and retention trends, by province and by gender.

Table 5.2
Gross enrollment rate in EP1, by province, 1998

Province	Boys	Girls	Total
Cabo Delgado	88	58	77
Gaza	130	117	126
Inhambane	119	103	116
Manica	93	63	82
Maputo Province	130	121	128
Nampula	82	52	71
Niassa	95	68	86
Sofala	87	53	74
Tete	90	65	82
Zambezia	103	65	89
Maputo City	121	114	118
Total	101	74	92

Source: Ministry of Education, school survey data, 1998.

Figure 5.1
Relative gender gap and GER in different provinces, 1998



Source: Ministry of Education, school survey data, 1998.

Table 5.3
Access to grades 1 and 5, by province, 1998

Province	Access to grade 1 (percent) Ratio of boys to girls	Access to grade 5 (percent) Ratio of boys to girls	Retention, grade 1 to grade 5
Cabo Delgado	1.33	2.33	0.18
Gaza	1.05	1.23	0.42
Inhambane	1.06	1.29	0.46
Manica	1.30	2.00	0.32
Maputo Province	1.05	1.06	0.42
Nampula	1.31	2.31	0.26
Niassa	1.22	2.06	0.21
Sofala	1.56	1.77	0.46
Tete	1.21	2.00	0.25
Zambezia	1.31	2.40	0.27
Maputo City	1.04	1.06	0.79
Total	1.24	1.56	0.37

Source: Ministry of Education, school survey data, 1998.

Gender and geographic disparities in schooling profiles

Enrollment rates can vary between boys and girls as well as across provinces. However, as underscored in chapter 2, the enrollment rate may not be sufficient to describe the system's effective coverage given the high level of repetition and the low level of within-cycle (or intracycle) retention in Mozambique. Gender and geographic location must be considered. Table 5.3 provides data, by province, on access rates in grade 1 as well as on enrollment rates in grade 5 (the end of the lower primary cycle).

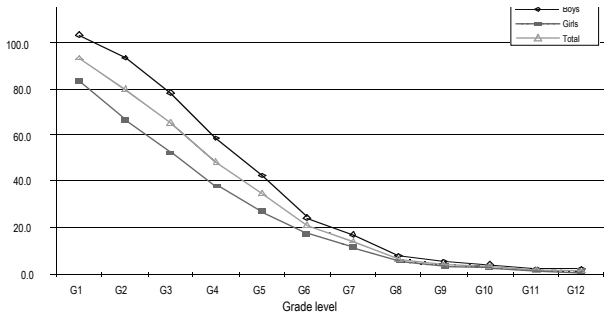
In access to both grade 1 and grade 5, gender disparities are striking. The boy to girl ratio is estimated at 1.24 (104:84) in grade 1 and 1.56 (42:27) in grade 5. These figures indicate that (a) probably all boys have access to grade 1, while only 84 percent of girls have access and that (b) gender disparities widen in the course of the lower primary cycle of schooling; thus girls' retention lags behind that of boys. From an analysis of disparities across provinces, the access rate of boys was generally high, but universal access may not be achieved in Sofala and Nampula or even in Maputo City, unless the supply of schools keeps pace with population growth. The figures in table 5.3 also show that girls progressed less than boys in the province of Sofala and, to a lesser extent, in Cabo Delgado, Manica, Nampula, and Zambezia. In these provinces, the demand for girls' schooling is relatively low; special attention ought to be paid to this finding.

Regarding access to grade 5, only 35 percent of the eligible age group gets to the last grade of lower primary education, meaning that nearly two-thirds of entrants in school drop out during the first four years of primary school. To a certain extent, this pattern holds true in all provinces. The best case in the country is Maputo City, where only 20 percent of new entrants failed to reach grade 5. In all other provinces, less than half of grade-1 entrants reached grade 5. The worst cases are Cabo Delgado, Nampula, Niassa, Tete, and Zambezia, where only one-fourth or fewer reached grade 5. In these provinces, both boys and girls suffered, but the situation was especially acute for girls. In Cabo Delgado, only 12 percent of girls of the relevant age group enrolled in grade 5 in 1998; a similar figure was observed in Nampula (13 percent) and in Zambezia (15 percent).

In addition to a between-province comparison, this type of analysis can inform calculations for specific groups such as boys and girls, on the one hand, or for urban and rural settings, on the other. Although the enrollment rates of rural girls are likely to be lower than those for either girls in general or urban dwellers as a whole. Annex 10 provides the basic data used.. As a whole, differences by sex are important, but geographic disparities are even stronger, as can be seen in figures 5.2 and 5.3.

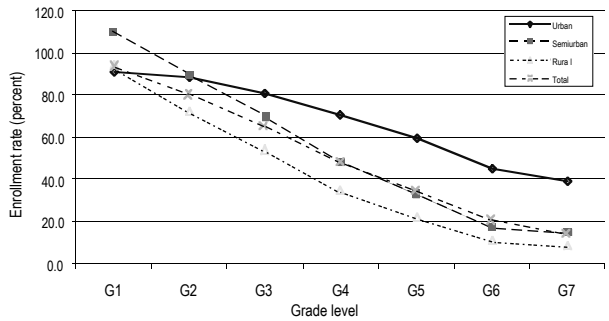
Boys have better access to primary grade 1, as their enrollment rate at this level is 20 points above that of girls. In the course of EP1, the gap between boys and girls narrows in absolute terms but widens in relative terms because boys outnumber girls by more than 50 percent at that level. After this point in the schooling process, disparities between boys and girls remain on the same order of magnitude until grade 11. The main source of gender dis-

Figure 5.2
Enrollment rate in EP1 through ESG2, by gender and grade level, 1998



Source: Ministry of Education, Table 5.4.

Figure 5.3
Enrollment rate in EP1 and EP2, by geographic location and grade level, 1998



Source: Ministry of Education, Table 5.4.

parities lies in retention in the lower primary cycle, followed by access to that cycle. These patterns provide some clue as to where interventions are likely to make a greater difference.

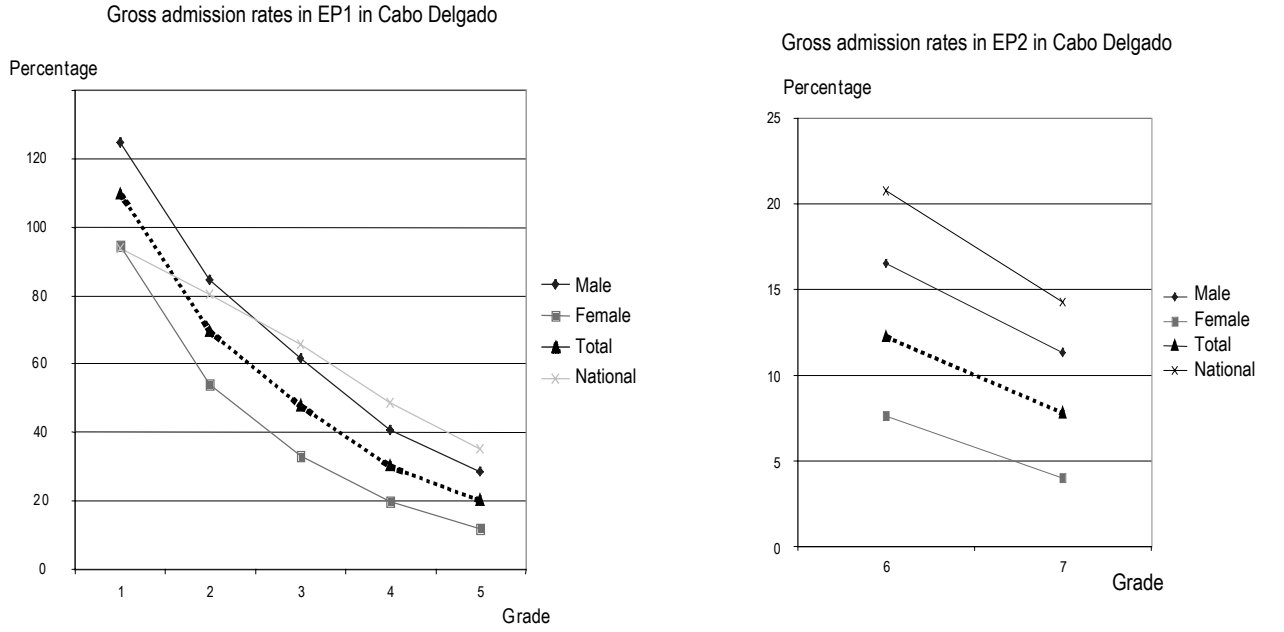
Geographic disparities are much more alarming. However, the pattern is different from that by which gender disparities occur since, as far as data indicate, there may be no geographic differences between rural and urban areas in terms of access to grade 1.

However, an urban, semiurban, and rural comparison shows three features of the problem. First, the semiurban trend is a steep slope that starts in EP1 above the national trend (110 percent against 93 percent total access to grade 1). By grade 2, the figure becomes the same for semiurban as for urban (about 92 percent), both being above the national average. By grade 3, however, the semiurban trend falls below urban performance to become nearly the same as the national average. Starting in grade 5, the semiurban trend starts gradually falling behind the national trend, and, by grade 7, in EP2, the semiurban trend becomes very close to the national average again. Second, as shown in figure 5.3, urban children start at the same level as rural children but survive in much higher rates along the way. Urban children clearly are privileged in the system. Third, while the semiurban and urban trends follow these paths, the rural trend clearly lies at the bottom after grade 1, where it starts at the same level as both urban and national averages. An important shift occurs at this transitory point in terms of access to and retention in secondary schooling. It would be important to understand what explains the differences in performance in order to address them effectively.

A complementary way to illustrate the blend of gender and geographic disparities is to construct schooling profiles at the provincial level. For that purpose, we present the cases of Cabo Delgado and Gaza. The situation in Cabo Delgado illustrates the magnitude of both weak performance and wide gender disparities in the distribution of education. Here, there is a high overenrollment in grade 1 for boys, while girls are within the national limits (94 percent). By grade 5, the overall enrollment falls to 20 percent, much lower than the national access rate, with a 12 percent enrollment rate for girls. In this regard, Cabo Delgado is comparable to other provinces such as Nampula (13 percent) and Zambezia (15 percent), but it represents the worst case. Throughout EP1, there is a constant gap between boys and girls. By grade 6, in EP2, this gap between the sexes becomes much wider, leading to even less female access in EP2 than occurred in EP1.

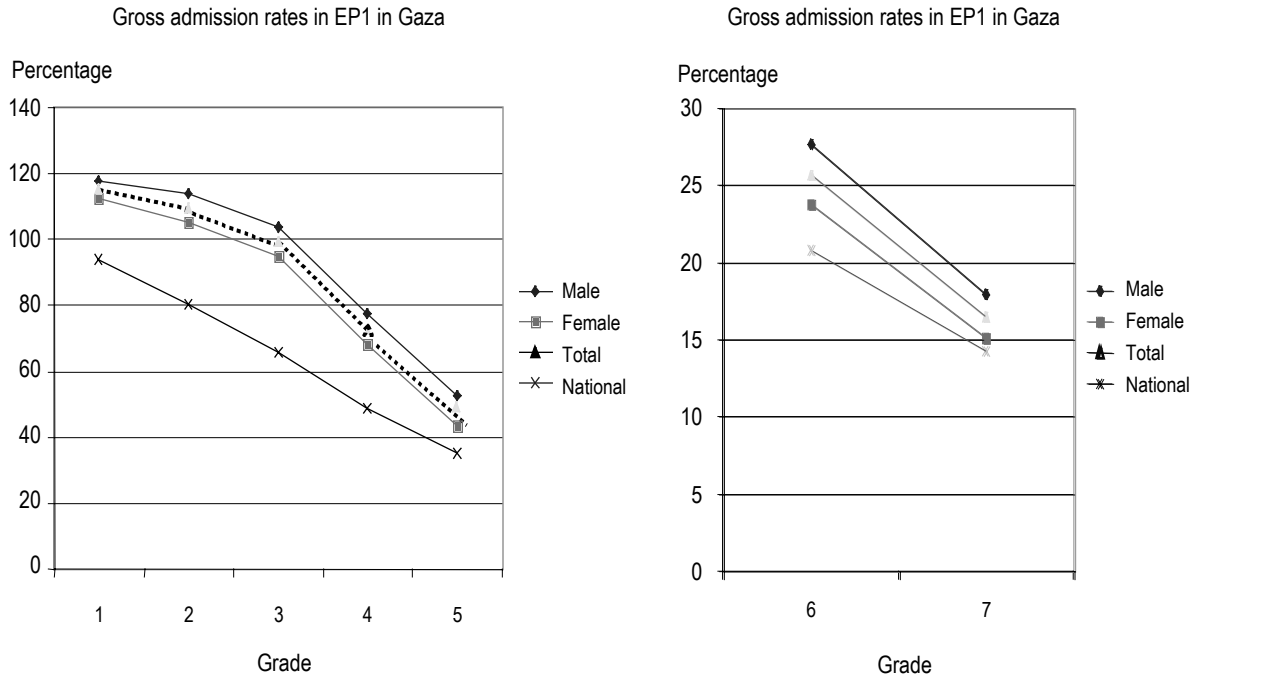
The province of Gaza, in contrast, has a grade-1 overenrollment in common with many other provinces but also displays a more equitable performance. The GER in this province is above the national averages (115 percent). The gender gap remains among the lowest in both EP1 and EP2 (boy to girl ratio is 1.05 and 1.23 in EP1 and EP2, respectively). In EP2, the gender gap is wider in grade 6 than in grade 7. Girls survive at higher rates relative

Figure 5.4. Admission rate in EP1 and EP2 in Cabo Delgado, by gender, 1998



Source: Ministry of Education, school survey data, 1998.

Figure 5.5
Admission rate in EP1 and EP2 in Gaza, by gender, 1998



Source: Ministry of Education, school survey data, 1998.

to their number than do boys. Thus there is a need to understand what factors contribute to this relative gender balance in order to replicate it in other provinces.

The results presented for Cabo Delgado and Gaza confirm the importance of provincial disparities and the fact that the equity dimension of education in Mozambique has a different magnitude in different provinces. Targeted actions may be warranted to redress provincial imbalances.

Inequity in secondary enrollment

While these inequities tend to limit the chances of having significant female participation beyond the lower primary level, in 1998, girls represented 42 and 47 percent of the total enrollment in ESG1 and ESG2, respectively, which is low, particularly in ESG1. Across provinces, the disparities are striking, with girls' representation ranging from 21 percent in Niassa to 55 percent in Maputo City in ESG1 and from 21 percent in Manica to 53 percent in Maputo City in ESG2. In the provinces of Cabo Delgado, Nampula, Niassa, and Manica, girls constituted about 25 percent of the student population in ESG2, while in the other provinces, female participation was between 30 and 49 percent, as shown in table 5.4.

It is worrisome that the provinces with the widest gender gaps at the secondary level, such as Cabo Delgado, Manica, Nampula, and Niassa, are the ones where females were already lagging in primary education. This suggests that the source of gender disparities at the secondary level emanates from a disadvantage at the primary level. Regarding access to the secondary level, analyses of world trends by Alain Mingat[3] show that, in the beginning of the 1990s, girls' chances to enroll in secondary school were lower than boys' in most countries. Although girls are more advantaged in countries such as Nicaragua and Honduras, they are at or near parity in countries like the Philippines, Zimbabwe, Colombia, and Madagascar. In Sub-Saharan Africa, girls remain very disadvantaged in most

Table 5.4
Enrollment in absolute figures in ESG1 and ESG2, 1998

	ESG1			ESG2		
	Girls			Girls		
Province	Number	Percent	Total	Number	Percent	Total
Cabo Delgado	680	22	3,116	84	25	332
Gaza	2,203	46	4,739	226	37	604
Inhambane	1,961	43	4,571	128	38	335
Manica	892	33	2,710	76	21	366
Maputo City	9,891	55	18,096	2,154	53	4,068
Maputo Province	2,707	49	5,525	202	33	612
Nampula	2,036	32	6,312	212	27	771
Niassa	554	21	2,633	104	23	455
Sofala	2,888	39	7,348	455	38	1,191
Tete	1,520	35	4,308	148	32	465
Zambezia	1,455	33	4,429	221	38	587
Total	26,787	42	63,787	4,010	47	8,786

Source: Ministry of Education; authors' calculation.

countries. In an effort to reverse these trends in EP1 and EP2, the Mozambican government proposes to increase the number of female teachers and improve the image of females in general.

Some factors that may affect gender equity

Having established that, beyond provincial differences, girls are generally at a disadvantage, it may be useful to identify which of the supply and demand factors may account for the persistent gender disparities. In general, girls are more sensitive than boys to the organization of schooling. Among these elements, availability of school and distance between home and school seem to play a significant role, as do the availability and characteristics of teachers.

Availability of schools. The provinces with the lowest retention rates are those with around a 30 percent gender gap in enrollment in EP1. Analyses conducted in 1998 indicated that northern provinces had the lowest percentage of complete schools; less than 60 percent of their children were in complete schools. A closer look at distribution during the year in which the schools were established shows that about 60 percent of the incomplete schools were not newly established schools and thus corresponded to a structural scenario. Therefore, although other explanations such as family conditions might contribute to low female retention, the distance from home to school seems to affect access and retention for both boys and girls, but it has a much stronger impact on girls than it does on boys.

Availability and distribution of teachers. The availability and qualifications of teachers are without doubt among the key determinants of school quality and student survival. In the last several years, more attention has been paid not only to teacher training but also to the gender consciousness of teachers and the need to increase the number of female teachers. This advocacy for more female teachers was first governed by a concern over the lack of role models for female students. Today, the evidence is even more compelling that increasing the number of female teachers substantially boosts girls' school survival.[4] Reassessing teacher deployment may also be needed.

Equity in the distribution of public resources for education among cohorts of students

In order to assess structural inequity in education, this report examinesthe overall distribution of resources among members of a given cohort, irrespective of the social characteristics of those who benefit from the resources. Secondly, the report explores how social characteristics (such as gender, geographic location, and income), impact equity.

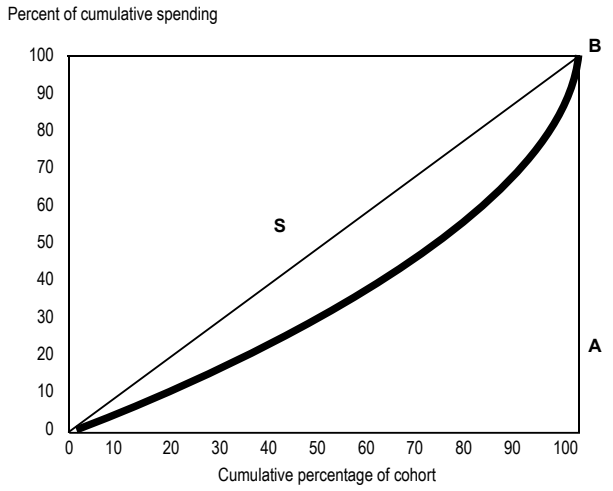
Structural inequity in the distribution of public resources in education

Individuals appropriate public resources in education through their schooling. Those who do not access the education system do not benefit from these resources, while the longer individuals remain in the schooling system, the more resources they appropriate. Consequently, the distribution of public resources derives from (a) the distribution of the terminal level of schooling of the members of the cohort and (b) the structure of public unit cost across the various levels of education. For example, for EP2, the enrollment ratio is 22 percent, but, as 7 percent of the cohort moves up to ESG1, 15 percent of the cohort has EP2 as their terminal level of schooling. Examining the cumulative resources associated with each terminal level shows that those whose terminal level is EP2 will have appropriated Mt1.2 million in EP1 and another Mt1.4 million in EP2, amounting to Mt2.6 million. Annex 11 displays the data used to compute the distribution of public resources in education among a hypothetical cohort of 100 children.

Using cumulative information on the terminal level of schooling, on the one hand, and the resources appropriated, on the other hand, we constructed the Lorenz curve (see figure 5.6). The first diagonal in the graph indicates equitable distribution of public resources, while the Lorenz curve shows by how much the reality of the country deviates from the equitable line.

The Gini coefficient is useful in quantifying the degree of structural inequity.[5] By definition, the

Figure 5.6
Lorenz curve of the distribution of public resources in education, 1998



Source: Ministry of Education; school census and population census data; author's calculation.

value of the Gini coefficient varies between 0 and 1; smaller values indicate less inequity in the structural distribution of public resources. In Mozambique, the value of the Gini was 0.53 for 1998. For a more directly interpretable figure, it was estimated that the best educated 10 percent of a cohort appropriated about 63 percent of the total resources mobilized for education in Mozambique in 1998; this represents a case that is not close to equity. However, to put the analysis in a comparative perspective over time, the Gini coefficient was estimated to be 0.66 in 1992, suggesting that there was some improvement in the structural distribution of public education resources in the country.

Social inequity in the distribution of public resources in education

The second method by which to assess equity in an educational system is to examine the social characteristics of targeted groups in order to determine who benefits more from the public resources made available to the system. Based on school survey data, we conducted analysis of equity by gender. The data on the distribution, by terminal level of schooling, of a cohort of 100 children (50 boys and 50 girls) and on the distribution of public resources in education by sex are given in table 5.5.

The table provides a breakdown by gender of the total amount of public resources spent on education for a cohort of 100 children. Out of the Mt197.1 million that represent the total spending for the cohort (table 5.5), Mt77.7 million was appropriated by girls and Mt119.4 million by boys, representing, respectively, 39 and 61 percent. Thus, in a population of 50

Table 5.5
Distribution of public resources in education, by gender, 1998

	Enrollment ratio (percent)		Terminal level of schooling		Cumulative per pupil spending (millions of meticáis)	Aggregate cumulative spending (millions of meticáis)	
Level of schooling	Girls	Boys	Girls	Boys		Girls	Boys
No schooling			15.0	2.0	0	0	0
EP1	70.0	96.0	26.1	34.9	1.2	31.3	41.9
EP2	17.8	26.2	6.1	9.2	2.6	15.9	23.9
ESG1	5.6	7.8	2.2	3.0	6.8	15.0	20.4
ESG2	1.2	1.8	0.45	0.45	14.9	6.7	6.7
Higher education	0.3	0.9	0.15	0.45	58.9	8.8	26.5
Total	—	—	50.0	50.0	—	77.7	119.4

— Not Available.
Source: Ministry of Education, school survey data, 1998.

boys and 50 girls, boys get more than 50 percent (61/39) more resources than girls do.

From this equity analysis, we can conclude that (a) the very few who persist in the system absorb a significant proportion of the resources (the 10 percent best educated appropriate as much as 63 percent of the public resources used in the sector and that (b) boys appropriate about 50 percent more of these resources than girls. Both structurally and socially, the serious inequities in the Mozambican educational system ought to be addressed.

1. To document this pattern, we computed the relative gender gap (the ratio of the difference between the enrollment rate of boys and girls to the GER of girls) and plotted that statistic against the global GER at the provincial level. Figure 5.1 shows that, on average, the wider is the coverage, the narrower is the gap.

2. A. Mingat and Suchaut, B. "Les systèmes éducatifs africains: Une analyse économique comparative." DeBoeck Université. Brussels, Belgium

3. A. Mingat and V.M. Kenghe (forthcoming). "La scolarisation des filles dans le contexte de l'Afrique noire."The World Bank. Washington, D.C.

4. V.M. Kenghe and Mingat, A. 2000. *Intgernational Comparative Analysis of Female Teachers; Assessing the Impact of the Gender of the Teacher upon the Performance of Primary Education in Africa.* The World Bank. Washington, D.C.

5. The Gini coefficient is determined as the ratio of the area between the Lorenz curve and the first diagonal (*S*) and the area of the triangle *OAB.*

6

A Reminder on External Efficiency

Contrary to the analysis of internal efficiency, which assessed the operation of the schooling system using results observed while the students were still enrolled (student learning, schooling career, or the level of disparities in outcomes among different groups), external efficiency is concerned with the performance of graduates after they exit the schooling system and enter their working life. The relevance of education and training activities in a country is therefore found in the social and productive life of individuals. To what extent does what a cohort of youngsters learns while in school (even though for quite different amounts of time, from 0 to 20 years) correspond to the best that can be achieved both for the individuals and for society given the amount of resources made available to the sector?

From this perspective, one can distinguish economic and social effects, on the one hand, from individual and collective effects, on the other. Social effects may concern dimensions such as health (for example, more educated mothers tend to be more effective vis-à-vis the health of their children), civic life (more educated people are likely to contribute more to community relations and make informed political choices), or population (more educated societies are more likely to control demographic growth). Concerning the impact of education in the economic sphere, the relationships with both employment and economic growth are obviously of primary importance. These impacts in the economic or social domains may themselves be seen both at the level of the individual (better educated people command higher earnings than less educated ones) and at the level of society (better educated societies enjoy higher levels of economic growth or achieve a better level of health indicators).

To be sure, the collective effects of education generally go beyond what is appropriated privately by individuals, and education carries what economists call positive externalities. To illustrate the concept of externality, one can take the example of the educated farmer who improves his agricultural techniques (choice of new crops, use of better seeds, adequate use of fertilizers). This change results for him in higher earnings (private impact), but it may also lead his less educated neighbors to imitate what he did and result, for them too, in a higher level of productivity (the individual who originated the change in agricultural techniques did not capture the positive externality).

To analyze a system of education and training in terms of external efficiency, we address two complementary objectives. First, how can a government allocate the available public resources across the different levels and types of education and training in order to get the maximum amount of social benefits from its investments in human capital? Second, given the importance of externalities, as well as the dual nature (private and social) of the investments in human capital, what mechanisms (institutional and financing arrangements, in particular) would help to align the behavior of individuals with what would be optimal from a social point of view?

Providing answers to these two questions requires consideration of country-specific conditions, such as the characteristics and status of the labor market. Despite a dearth of labor market documentation in Mozambique, existing data does indicate an education and training strategy that could help the country to marshal and distribute the type of human capital likely to maximize social and economic development.

A basic element to consider is that the Mozambican economy is, and will remain in the next decades, characterized by a dualistic structure with a dominant traditional sector and a relatively small, but growing, modern sector of employment. Any strategy for human capital formation will have to provide the type of human capital that best fits the demands of the two subsectors and will have to help the economy move from its traditional to its modern segment.

In 1998, Mozambique's per capita GDP was estimated at about US$250 following a six-year period of relatively strong growth (7 percent per year on average between 1992 and 1998). If the economy were to grow 8 percent per year for the next 10 years, per capita GDP could increase from the US$250 in 1998 to about US$400 in constant terms in 2010.[1] However, even experiencing such impressive economic growth, Mozambique would be considered a low-income country.

In 1998, employment in the modern sector of the economy represented something like 9 percent of the workforce, leaving 91 percent for the traditional sector, which is predominantly agricultural. This structure is typical of countries sharing similar levels of economic development, in particular in the African context. International comparative analysis of trends in the distribution of employment between the traditional and the modern sector, along with economic development (estimated from either a time-series or a cross-sectional perspective), demonstrates a consistent pattern. The traditional sector and agriculture will still be major contributors to overall employment in 2010. The share of employment in agriculture may diminish, but only by about 5 percent, while the share of employment in industry will remain minimal; employment in services and construction likely will develop. Based on these estimates, the country will have to provide human capital to satisfy, as efficiently as possible, the demands from the two sectors of the economy. If this is indeed the case, what is the implication for the traditional sector and for the modern sector of the economy?

General social benefits and the impact of education in the traditional sector of the economy

Education helps to improve the living conditions of individuals by improving their earnings (this is observed in all poverty studies, the 1996 survey in Mozambique being no exception), their health status, and those of their children, and it contributes to reducing fertility rates. In Mozambique as elsewhere, basic education has a larger impact on these outcomes for females than for males. To a large extent, the impact of education on these results may go beyond what is directly appropriated by the individuals. The positive effects of basic education on health are large enough in themselves to justify investments in basic education (in fact, the health impact of one dollar spent on girls' education may be larger than that of the same dollar spent on standard health activities).[2]

A recent analysis of all low-income countries of the world (with per capita GDP below US$2,000, in 1993 U.S. dollars) showed that countries that demonstrated the best economic performance were those that had previously invested more in education.[3] However, two complementary and more specific results are of even greater importance. First, for countries in the low-income group, only primary education had a positive and significant impact on economic growth; investments in both secondary and higher education did not have a consistent or significant positive impact on economic performance in the countries under consideration. Second, the impact of primary education on economic growth, even though positive, was weaker, on average, in the African context than in other regions of the world. What do these two aspects suggest for Mozambique?

The fact that primary education had a positive impact on economic growth was expected; the fact that no such impact was found for secondary and higher education was less predictable. This leads to two simple ideas. The first point is that primary

education is an all-purpose investment whose content (basic reading and writing, basic arithmetic and problem solving, basic life skills) fits the variety of activities concerned with improving productivity in the traditional sector, however simple those activities are. The second point is that, in a number of developing countries (African countries being no exception), secondary education and even higher education have been expanded to such an extent that their economies are incapable of using the graduates in an efficient way (unemployment of graduates is widespread in a number of African countries). Under these circumstances, over-investing in these levels of education becomes more a burden on economic growth than an engine for it. Nevertheless, it should be pointed out that often it is not the investment in post-primary education, that constitute the problem, but rather the quality and relevance of education offered and its linkages to the economy and labor market.[4] It is self-evident that no country can develop socially or economically without investment in secondary and higher education. However, such investment needs to be balanced with the rest of the education system on in the context of the social and economic development of the country.The results of a number of research studies show that the impact of primary schooling on economic growth is less in African countries than in low-income countries in other regions of the world. Two types of explanations can account for this result. First, African pupils tend not to work in agriculture or in traditional trades, as schooling is meant to enable them to get a job in the civil service. Second, the impact of primary education on the labor productivity of farmers is especially significant when agricultural activities are supported by a facilitating environment (for example, a land policy, a price policy both for inputs and outputs, active extension workers). When these conditions are not met (less in the African than in the Asian context), primary education has a smaller impact on productivity in agriculture (as well as on productivity in general).[5] Besides, the impact of primary education on economic development (or on success in World Bank projects) is much larger when the proportion of literate workers exceeds approximately half of the labor force; Mozambique is still below this threshold.

This being said, even though the impact of primary education is not as large in Africa as it is in other regions of the world, its estimated global social rate of return (from a growth model, which includes the influence of social benefits on economic outcomes) would still be around 16 percent per year, a substantial figure.[6] Micro studies confirm that primary education does positively impact the informal sector by enhancing the ability of primary students to capitalize on work experience in that sector, and to command higher earnings from these informal activities.

In general, social and economic external efficiency clearly supports the development of primary education. Mozambique therefore should design a strategy that would lead to effective and full coverage of a reasonably good quality of basic education. As a minimum, all children in a given cohort should, in the near future, complete the last grade of EP1 (with five years of education validated) and, probably later on, continue through the full EP1 and EP2 cycles of study.

Such a policy also would be supported by equity considerations, since those who currently do not get to the last grade of EP1 come disproportionately from deprived households. In the context of poverty reduction and the country's debt reduction initiative, there is no doubt that improvements in coverage and quality of primary education will be a priority for Mozambique in the years to come. This does not mean that other levels of education should be left out of the overall strategy for the development of human capital in the country.

Education and training for the modern sector of the economy

If primary education is to be considered the all-purpose human capital investment that fosters productivity in the traditional sector, the growth path for the country undoubtedly rests on development of the modern sector of the economy, particularly as this often forms the fiscal basis for revenue collection. Since the productivity per worker is much higher in the modern than in the traditional sector, Mozambique should do as much as it can to foster the expansion of its modern productive sector. From this perspective, human capital plays an obvious

role, and this probably will be even more the case in light of the technological changes currently under way and anticipated.

However, the experience accumulated in the developing countries over the last three decades clearly indicates that (a) although the expansion of the modern sector can be hampered by a lack of qualified manpower, the sector's dynamics are determined by macroeconomic policies that are exogenous to the sector, and (b) the supply of educated manpower must be driven by the demands for quantity and quality. In other words, the availability of human capital is a condition that is necessary, but not sufficient, for development of the modern sector. Even though some possibilities of substitution exist in the labor market (substitution between labor and capital, on the one hand, and between different types of human capital, on the other), there is a point beyond which a further increase in the supply of graduates would result in unemployed graduates and wasted resources.[7] This concerns, in particular, technical education, vocational training, and higher education. We do not have well-established, factual documentation of the case for Mozambique, but anecdotal observations suggest that some employment problem may exist for the graduates in technical education and vocational training. The contrary may be true for higher education, where students in certain fields—like engineering and information technology—leave before completing their studies.

Tracer studies and recruitment studies do not exist in Mozambique, thereby presenting difficulties in assessing the extent to which higher education and technical education and vocational training are in line with demands from the economy (quantity and distribution of trades and fields of specialization, relevance of the curriculum content). Also lacking is a basic system of data collection on employment in the various segments of the modern sector (for example, civil service, state enterprises and parastatals, private sector, cooperatives).

Mozambique needs a system of data gathering in order to document the relationship between the output of education and the labor market, as well as to assess the degree of external efficiency of technical and higher education and its evolution over time. However, experience demonstrates that such a system is not sufficient per se to enable effective regulation of the flow of graduates in relation to labor market demands.

Mechanisms are needed for taking effective action, and these need to address both supply and demand. The first mechanism is administrative in nature. The state monitors the development of the system (controls supply) through (a) the admission of students (number and characteristics) in different segments, trades, and fields of specialization of technical education, vocational training, and higher education and through (b) control of the budget and operation of the institutions delivering the services. The state establishes a system of data gathering (for example, general data on employment, direct and reverse tracer studies) and uses this information to inform its strategy for monitoring the development of the system over time. Sometimes this type of regulation performs poorly. One reason is that it rests on confidence in labor market studies, and these studies sometimes are not conducted in a rigorous enough manner. A second, and probably more important, reason is that the method depends substantially on the capacity of the policymaker to make difficult decisions when they are justified on well-documented efficiency and equity grounds.

The second type of mechanism relies on market forces to regulate the output of graduates and the operation of the education and training institutions (controls demand) so that the supply of graduates reasonably matches the demands of the economy. Such a mechanism relies on the invisible hand of the market, and must first identify the interests of the actual or potential individuals implied in the game. In addition, the mechanism must determine how to set up a structure in which there is convergence between private and public interests. Along this line, investment in human capital is partly a public good and partly a private good. It is private in that individuals privately appropriate a substantial share of the benefits accruing from the investment in the form of higher earnings and often contribute to its financing.

In higher education, three players are involved: the students, the providers of education and training services, and the employers. The first two agents—students and school management—may play the major role in higher education, while employers and

the final users may have a more central role in technical education and, especially, vocational training or applied research. In higher education, the system is all the more likely to operate on its own if students are strongly inclined to choose trades and fields of specialization that are in high demand in the labor market (they are even more likely to do so if they contribute to the financing of their studies). The same is true when the providers have an interest in developing these types of studies and in delivering the services at a low cost to attract fee-paying customers and reap some benefit from their activities. This does not imply that the students pay the full cost; if a school pays even a small fraction of the cost, students behave in an efficient way. It also does not imply that all students should pay the same or that the contribution should be either now or in monetary terms—payment can be deferred to a time when the graduate has started to earn a living, and students might be asked to work as primary teachers for two years before becoming eligible for admission to higher education. On the institutional side, structural and financing arrangements might be discussed. The institutions might be private and be partly subsidized; they might also be fee-paying public institutions. In both cases, some of their resources might eventually be linked to the performance of their students in the labor market.

For technical education and vocational training, similar mechanisms might be discussed, but it might be useful to allow employers to enter the picture. In particular, instruments such as matching grants have proven useful for matching the output of training institutions with demand from the economy; requiring one or two years of employment in the trade of specialization before graduation also might be discussed.

In conclusion, although virtues and flaws can be found in both the administrative and market types of mechanisms, elements can be borrowed from each to correspond to the specific social and economic circumstances of the country. In other words, there is clearly a wide array of choices to consider in implementing an instrument that would help to align human capital formation at the uppermost levels with the evolving demands of the economy. However, keeping the status quo—the absence of such a mechanism—should not be considered a reasonable option.

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1. Eight percent growth and 3 percent population growth yields approximately 5 percent real growth.

2. Lawrence H. Summers, "Investing in all the people", (World Bank, Washington D.C., 1992).

3. Alain Mingat and Bruno Suchaut, "Les systèmes éducatifs africains: Une analyse économique comparative" (World Bank, Washington, D.C., 2000).

4. Constructing Knowledge Societies: New Challenges for Tertiary Education (World Bank, Washington D.C., 2002)

5. This was demonstrated by Mark Rosenzweig, who compared green revolution zones with areas where no such activities were undertaken in the Indian context. Mark Rosenzweig, "Where Are There Returns to Schooling?" *American Economic Review, Papers and Proceedings* 85 (May 1995): 153–48.

6. Mingat and Suchaut, "Les systèmes éducatifs africains: Une analyse économique comparative" (World Bank, Washington, D.C., 2000).

7. The fact that higher education does not present a positive marginal impact in the growth models discussed in the previous section illustrates the case.

Annexes

Annex 1
Population, GDP, and total public expenditures, 1990–99

Indicator	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population (millions)[a]	14.1	14.2	14.4	14.6	14.7	14.9	15.1	15.3	15.7	16.1
GDP (current trillions of meticáis)	2.3	3.6	4.8	7.8	13.1	21.3	32.1	397	46.2	52.9
GDP per capita, (US dollars, new population census)	179	175	136	144	151	160	188	225	249	259
GDP (trillions of constant 1995 meticáis)	18.1	19.0	17.4	19.0	20.4	21.3	22.8	25.4	28.4	30.9
Real growth rate per year (percent)	—	5	–8	9	7	4	7	11	12	9
GDP per capita (thousands of constant 1995 meticáis)	1,287	1,334	1,211	1,301	1,383	1,425	1,509	1,660	1,811	1,926
Total revenue domestic (billions of meticáis)	298	447	661	1,093	1,526	2,413	3,479	4,623	5,311	6,262
Total external grants, before loans (billions of meticáis)	226	397	652	932	1,857	2,090	2,291	3,705	3,818	6,381
Total revenues (billions of meticáis)	524	844	1,313	2,025	3,383	4,503	5,770	8,328	9,129	12,643
Total government expenditures (billions of meticáis)	690	958	1,483	2,305	4,097	5,157	6,773	9,498	10,207	13,460
Recurrent spending	343	458	757	1,167	1,978	2,188	3,077	4,272	5,268	6,606
Capital spending	347	501	726	1,137	2,119	2,969	3,696	5,226	4,939	6,855
Overall balance after grants (billions of meticáis)	–166	–114	–169	–280	–714	–654	–1,003	–1,170	–1,078	–817
Ratio of total government expenditures to GDP (percent)	29.6	26.8	31.2	29.4	31.2	24.2	21.1	23.9	22.1	25.4
Ratio of revenue to GDP (percent)	12.8	12.5	13.9	14.0	11.6	11.3	10.8	11.6	11.5	11.8
Exchange rate (metacal to U.S. dollar)	929	1,435	2,433	3,723	5,918	8,890	11,294	11,546	11,850	12,711

a. Population growth from 1990 to 1997 is based on a growth rate of 2 percent per year. After 1997 the growth rate is estimated at 2.3 percent.
Source: GDP, total government expenditures: International Monetary Fund; public education expenditures: Ministry of Education; GDP per capita in U.S. dollars: estimates based on 1997 population census figures and end-of-year exchange rate.

Annex 2
Public Spending on education as a share of GDP and total government spending, 1990–1999[a]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
GDP (billions of meticáis)	2,334	3,580	4,757	7,829	13,145	21,267	32,093	39,693	46,134	52,913
Total government spending (billions of meticáis)	690	958	1,483	2,305	4,097	5,157	6,773	9,498	10,207	13,460
Recurren spending	343	458	757	1,167	1,978	2,188	3,077	4,272	5,268	6,606
Capital (domestic + external) spending	347	501	726	1,137	2,119	2,969	3,696	5,226	4,939	6,855
Total government of spending as a percentage of GDP	29.6	26.8	31.2	29.4	31.2	24.2	21.1	23.9	21.8	25.2
Ministry of Education spending	109	171	263	380	653	799	1,300	1,322	1,468	1,645
Total domestic expenditures (billions of meticáis)	50	75	125	171	203	268	486	648	875	1,005
Recurrent domestic spending	45	65	104	145	142	249	441	583	798	907
Capital domestic spending	5	10	21	26	61	19	45	65	77	98
Total external expenditures (billions of meticáis)	59	96	138	209	450	531	814	674	593	640
Ministry of Higher Education spending	—	—	—	—	—	—	—	237	400	476
Total domestic expenditures (billions of meticáis)	7	12	22	34	58	65	109	123	163	21
UNESCO	0	0	0	0	0	1	1	1	1	1
Eduardo Mondlane University	5	10	19	29	49	52	92	106	145	195
Pedagogical University	1	2	3	5	8	12	16	16	17	18
Research Institute for International Relations	0	0	0	0	0	0	0	0	0	0
Total external expenditures (billions of meticáis)	—	—	—	—	—	—	—	114	237	262
Total domestic expenditure on education (billions of meticáis)	57	87	148	206	260	333	595	771	1,038	1,219
Total external expenditure on education (billions of meticáis)	(59)	(96)	(138)	(209)	(450)	(531)	(814)	788	830	902
Total expenditure on education (domestic + external)	(116)	(183)	(286)	(415)	(710)	(864)	(1,409)	1,559	1,868	2,121
Share of total expenditure on education in total government expenditure (percent)	16.8	19.1	19.3	18.0	17.3	16.8	20.8	16.4	18.3	15.8
Share of recurrent domestic spending on education in total government recurrent spending (percent)	15.2	16.8	16.6	15.3	10.1	14.4	16.4	15.4	17.6	15.8
Total expenditure on education as a percentage of GDP)	5.0	5.1	6.0	5.3	5.4	4.1	4.4	3.9	4.0	4.0
Domestic spending on education as percentage of GDP	2.4	2.4	3.1	2.6	2.0	1.6	1.9	1.9	2.2	2.3
Exchange rate (meticáis per US dollar)	929	1,435	2,433	3,723	5,918	8,890	11,294	11,546	11,850	12,711

— Not available.
Source: Ministry of Education and World Bank, *1997 Mozambique Population Census*. (Washington, D.C.: World Bank, 1997
a. Figures denote actual expenditures, except for 1999, wich denotes the amount budgeted.

Annex 3
Estimated population, school-age population, and teacher requirements with and without incidence of HIV/AIDS, select years, 1997–2010

Scenario and indicator	1997	2000	2005	2010
Without AIDS				
Total population (millions)	15.3	16.4	18.3	20.5
School-age population (millions)	3.2	3.5	4.0	4.7
Stock of teachers	40,000	43,709	50,671	58,741
Replacement of teachers due to attrition (attrition rate of 4 percent per year)	1,600	1,748	2,027	2,350
Number of new teachers required per year	2,836	3,140	3,641	4,150
With AIDS				
Total population (millions)	15.3	16.0	17.2	18.5
School-age population (millions)	3.2	3.4	3.8	4.2
Stock of teachers	40,000	43,455	49,889	57,276
Replacement of teachers due to attrition (attrition rate of 7 percent per year)	2,800	3,042	3,492	4,009
Number of new teachers required per year	3,951	4,329	4,969	5,609

Note: Total population growth rates: 2.3 percent without AIDS and 1.5 percent with AIDS; school age population growth rates: 3 percent without AIDS, and 2.8 percent with AIDS.
Source: World Bank scenario.

Annex 4
Enrollment and gross enrollment rates, by level and type of education, select years, 1993–99

	1993		1995		1997		1999	
	Number of students	GER (percent)	Number of students	GER (percent)	Number of students	GER (percent)	number. of students	GER (percent)
Primary								
EP1	1,237,063	60.3	1,436,831	68.3	1,780,881	82.7	2,108,790	92.3
EP2	118,909	16.7	136,464	18.7	164,078	22.0	193,523	24.4
Secondary								
ESG1	31,761	3.2	40,588	4.0	51,821	4.9	72,914	6.6
ESG2	1,612	0.3	4,927	0.8	4,253	0.6	9,142	1.3
Technical or vocational								
Elementary	100		158		253		499	
Basic	15,669		16,907		18,529		20,497	
Middle	1,868		3,745		4,337		n.a.y.	
Teacher training[a]								
Basic	3,950		3,598		3,836		4,300	
Middle level	166		240		515		114	
Additional middle level	—		—		658		1269	
Higher education	5,283		6,844		8,650	11,619		
Public								
Eduardo Mondlane University	4,036		5,200		6,200		6,800	
Pedagogical University	1,214		1,489		1,520		1,987	
Research Institute for International Relations	33		155		155		234	
Private								
Higher Institute of Science and Technology[b]					201		644	
Polytechnic University[c]					371		919	
Catholic University[c]					203		1,035	

— Not available.
a. Technical or vocational education run by the Ministry of Education as presented in this table includes both day and evening classes. Includes elementary, basic and middle levels. Enrollment figures for students in the middle level of technical/vocational education in 1999 is not available
b. Opened 1997.
c. Opened 1996.
Source: School survey data, 1993, 1995, 1997, and 1999; census data, 1997.

Annex 5
Distribution of recurrent government spending on education, by level of education, 1996–99
(billions of meticáis)

	1996		1997		1998		1999	
Type of spending	**Amount**	**Percent**	**Amount**	**Percent**	**Amount**	**Percent**	**Amount**	**Percent**
Ministry of Education	441,089		583,218		798,039		907,711	
Administration	87,146	16.2	109,862	15.4	172,074	17.9	170,754	15.2
Central	51,654		57,782		88,783		98,702	
Provincial directorates	23,217		38,832		53,859		45,559	
District directorates	12,274		13,248		29,432		26,493	
Lower primary (EP1)	195,569	36.4	261,922	36.6	311,536	32.4	412,408	36.8
Upper primary (EP2)	45,442	8.5	55,865	7.8	72,464	7.5	90,485	8.1
Lower secondary (ESG1)	35,366	6.6	43,467	6.1	65,675	6.8	72,066	6.4
Upper secondary (ESG2)	12,804	2.4	25,187	3.5	25,192	2.6	34,283	3.1
Technical education	24,921	4.6	34,966	4.9	51,831	5.4	46,008	4.1
Technical (elementary)	500		1,145		2,756		2,898	
Technical (basic)	14,258		19,513		29,243		28,870	
Technical (middle)	10,163		14,308		19,833		14,240	
Teacher training	17,620	3.3	15,922	2.2	24,894	2.6	34,325	3.1
Teacher training (basic)	9,463		9,188		13,426		11,800	
Teacher training (middle)	8,157		6,735		11,467		6,119	
Miscellaneous	22,221	4.1	36,027	5.0	74,374	7.7	47,382	4.2
Adult education	2,598		3,582		5,635		1,830	
Teacher housing and student dormitories	13,752		14,616		29,054		20,394	
Student-teacher dormitory	9,831		9,833		15,400		11,601	
Student dormitory	3,921		4,783		13,655		8,793	
Sports department	434		369		404		470	
Short-term training	960		5,041		16,104		—	
Others	4,477		12,419		23,177		24,688	
Higher education (under Ministry of Planning and Finance)	96,000	17.9	132,000	18.4	163,000	17.0	214,000	19.1
Total	537,089	100.0	715,218	100.0	961,039	100.0	1,121,711	100.0

— Not available.
Source: Ministry of Educatiion and Minisry of Planning and Finance.

Annex 6

To understand why unit costs vary with regard to schooling conditions, it is useful to consider the following analytical framework:

B	Budget
SBT	Salary bill of teachers
SBNT	Salary bill of nonteaching staff
PEDOP	Aggregate spending for pedagogical materials and operation
ADM	Aggregate spending on administration
AVT	Average teacher salary
NT	Number of teachers
AVNT	Average salary of nonteaching staff
NNT	Number of nonteaching staff at the school level
RUC	Recurrent unit cost
NSTU	Number of students
PTR	Pupil to teacher ratio
PNTR	Pupil to nonteaching staff ratio
PEDPP	Spending on pedagogical materials per pupil
ADMU	Average spending on administration per pupil

B = SBT + SBNT + PEDOP + ADM
B = AVT * NT + AVNT * NNT + PEDOP + ADM
RUC = B/NSTU = AVT * NT/NSTU + AVNT * NNT/NSTU + PEDOP/NSTU + ADM/NSTU.
This yields the following expression:
RUC = AVT/PTR + AVNT/PNTR + PEDPP + ADMU.

Annex 7
Classroom construction costs in Mozambique, Madagascar, and Senegal, 1998

Country and indicator	Rural primary school[a]	Community school[b]
Mozambique		
Construction cost of one classroom	Mt200,000,000	Mt137,500,000
Annualized value of one classroom[c]	Mt16,600,000	Mt11,500,000
Annual teacher salary, EP1	Mt10,000,000	Mt10,000,000
Cost of construction		
Number of years of annual teacher salary	20.0	13.7
Annualized value as a percentage of recurrent unit cost	133	92
Madagascar		
Construction cost of one classroom	Fmg13,000,000	
Annualized value[a]	Fmg1,100,000	
Annual teacher salary	Fmg3,360,000	
Costs of construction		
Number of years of annual teacher salary	3.9	
Annualized value as a percentage of recurrent unit cost	29	
Senegal		
Construction cost of one classroom	Fcfa4,000,000	
Annualized value[c]	Fcfa325,000	
Annual teacher salary	Fcfa1,800,000	
Costs of construction		
Number of years of annual teacher salary	2.2	
Annualized value as a percentage of recurrent unit cost	16	

a. The cost of one classroom is based on the current Education Sector Strategic Program cost of a classroom, latrine, and provision for supervision, calculated as follows: EPR = 1 classroom.(US$14,000) + 1 latrine (US$1,000) + supervision (US$500) = US$16,000 = Mt200 million.
b. The cost of one classroom is based on Lutheran World Federation (LWF) and PRONES (UNICEF) standards = 1 classroom (US$ 9,500) + 1 latrine (US$1,000) + supervision (US$500) = US$11,000 = Mt137.5 million.
c. Based on an opportunity cost of capital of 5 percent and a lifetime of 20 years.
Source: World Bank (Ministry of Education) Project Appraisal Document, Annex 13; World Bank estimates.

Annex 8
Relation between the number of teachers and pupils in public EP1 schools, 1998

Province	Number of pupils	Number of teachers	Model 1		Model 2	
			Coefficient	t	Coefficient	t
Number of pupils	n.a.	n.a.	0.016	189	0.0165	175.6
Cabo Delgado	134,112	2,421			Reference	n.a.
Gaza	184,131	2,382			–1.60	11.7
Inhambane	175,071	2,499			–1.18	8.4
Manica	113,176	1,824			–0.51	3.2
Maputo Provincia	141,229	1,807			–2.38	13.9
Nampula	295,988	5,559			0.27	2.3
Niassa	92,108	1,949			0.39	2.9
Sofala	121,393	1,966			–0.48	3.1
Tete	138,970	2,882			0.76	5.5
Zambezia	340,845	4,984			–0.85	7.5
Cidade de Maputo	143,926	2,399			–0.03	0.1
Intercept	n.a.	n.a.	0.04		0.39	
R^2 (percent)	n.a.	n.a.	85.5		87.2	

n.a. Not applicable.
Source: Ministry of Education. Bank calculation.

Annex 9
Relationship between the number of teachers and pupils in EP1 at the school level, by province, 1998

Province	Number of schools	Intercept	Coefficient[a]	R^2 (percent)	N300[b]
Total	6,035	0.04	0.0162	85.5	4.9
Cabo Delgado	555	0.36	0.0166	89.2	5.3
Gaza	534	–0.74	0.0151	82.9	3.8
Inhambane	477	–0.86	0.0166	87.7	4.1
Manica	306	–0.38	0.0171	87.7	4.8
Maputo Province	258	0.97	0.0110	94.6	4.3
Nampula	1,044	–0.65	0.0211	93.0	5.7
Niassa	558	0.27	0.0195	83.1	6.1
Sofala	343	–1.09	0.0193	91.1	4.7
Tete	521	–0.19	0.0215	93.3	6.3
Zambezia	1,344	–1.20	0.0194	80.4	4.6
Maputo City	85	5.75	0.0132	76.4	9.7

a. All coefficients significant at the 0.001 level.
b. N300 is the estimated number of teachers in a 300-pupil school (country average).
Source: Ministry of Education. World Bank calculation.

Annex 10
Basic data for schooling profiles, by gender and rural or urban location, 1998
(percent)

	Gender				Geographical location			
	Boys	Girls	Ratio of boys to girls	Total	Urban	Semiurban	Rural	Ratio of urban to rural
Access to G1	104.0	84.0	1.24	93.7	91.0	110.0	94.0	0.97
Enrollment rate in G5	42.0	27.0	1.56	34.9	59.5	33.0	22.1	2.69
Retention rate, G1-G5	40.4	32.1		37.2	65.3	30.0	23.6	
Transition rate, G5-G6	59.6	63.7		55.9	75.0	52.4	46.6	
Enrollment rate in G6	24.1	17.2	1.40	20.8	44.6	17.3	11.0	4.05
Enrollment rate in G7	16.8	11.6	1.45	14.3	38.9	14.5	8.0	4.86
Retention rate, G6-G7	69.7	67.4		68.8	87.2	83.8	72.7	
Transition rate, G7-G8	43.5	43.4		44.7	—	—	—	
Enrollment rate in G8	7.3	5.4	1.35	6.4	—	—	—	
Enrollment rate in G10	3.9	2.4	1.63	3.1	—	—	—	
Retention rate, G8-G10	53.4	44.4		48.4	—	—	—	
Transition rate, G10-G11	51.2	50.0		51.6	—	—	—	
Enrollment rate in G11	2.0	1.2	1.66	1.6	—	—	—	
Enrollment rate in G12	1.5	0.8	1.88	1.1	—	—	—	
Retention rate, G11-G12	75.0	66.7		71.0	—	—	—	

— Not available.
Source: Ministry of Education, school survey data, 1998.

Annex 11
Structural distribution of public resources, 1998

Level of schooling	1 Enrollment ratio (percent)	2 Terminal level of schooling	3 Per-pupil spending per cycle (millions of meticáis)	4 Cumulative per-pupil spending (millions of meticáis)	5 Aggregate cumulative spending	
					Amount (millions of meticáis)	Percent
No schooling	–	17	0	0	0	0
EP1	83	61	1.2	1.2	73.2	37.1
EP2	22	15.3	1.4	2.6	39.8	20.2
ESG1	6.7	5.2	4.2	6.8	35.4	18.0
ESG2	1.5	0.9	8.1	14.9	13.4	6.8
Higher education	0.6	0.6	44	58.9	35.3	17.9
Total	–	100.0	–	–	197.1	100

— Not available.
Source: Ministry of Education. World Bank calculation.

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