

Reaching All:

The Paths to Universal Primary School in Mozambique

By Annababette Wils

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EPDC

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Abstract Challenge

In many countries primary education access is incomplete, many who enter school do not even finish the primary grades, and there are enormous inequalities in schooling. To achieve universal education, it is imperative to understand who is not in school, what is causing their exclusion, and via what pathways a country is advancing towards universal education.

Findings

This study is focused on the trends to universal primary education in Mozambique. Consistent with the EFA goal of reaching universal complete primary, the focus of the paper is largely on grade 5 (lower primary) attainment in Mozambique. The study demonstrates a clear pattern that determines the rate at which Mozambique is approaching EFA and the education inequalities in the country. Taken together, we call these patterns the *education transition*. Enrollment reaches sub-groups in the population along a clear sequence: boys first, then girls; urban areas before rural; and the provinces closer to the capital city earlier than more remote provinces. The lags between groups are on the order of decades; on average female groups reached 50% grade 5 attainment 16-34 years later than males; rural groups lagged 25-33 years behind urban. However, in all sub-groups, the trends are towards universal enrollment - later groups do not appear to be excluded from ultimately attaining universal education and there is no stagnation apparent. Furthermore, the enrollment growth rates of different groups are relatively similar, although female growth is faster than male growth. Our analysis estimates that in Mozambique male groups took an average of 86 years to progress from 10% of an age cohort finishing lower primary school to 90%; while female groups took 70 years.

The study presents some possible drivers of these patterns. A rational utilitarian principle (or a discriminatory principle) might cause schools to be built first in urban and more densely populated areas, for the highest cost/benefit ratio, while a similarly rational choice might drive parents with limited resources to educate boys before girls in anticipation of higher returns. Driving the education transition forward but also constraining its pace, the study suggests, is the tendency for education to beget education – albeit slowly. The internal dynamics proposed are two feedback mechanisms. The first involves parents and children. More educated parents have a higher tendency to send their children to school. As a result, each successive generation is somewhat better educated than the previous one, which in turn, increases the probability that the following generation will be more educated still. The second involves teachers and administrators. A nascent school system has few educated adults to teach; thus, only a small portion of children can go to school (an interim solution may be to hire foreign teachers). That generation of children becomes the next, larger generation of teachers and administrators, which in turn, allows for more children to go to school and so forth.

Although this research confirms what is a frequently observed pattern, having hard data raises the level of certainty and therefore implications for policy making. Ongoing analysis of 13 other developing countries around the world finds the same sequencing

and lags replicated. Countries do appear to differ with regard to the length of the lags between groups. This new study is expected to lead to further insight regarding the drivers of patterns in the education transition and policies to influence them.

Policy Response

The patterns of the education transition in Mozambique and some of the possible drivers behind them – the utilitarian and the discriminatory principles, as well as the long-term education-begets-education feedback mechanism – can enrich and improve the discussion of what policies will most efficiently and effectively lead to a rapid expansion of education, retention, and quality improvement.

The trend to reach certain groups first and others later and the ensuing inequality is pervasive and consistent, suggesting some powerful drivers are at work that may be difficult to remove. It may well be that sequential servicing of different groups is a rational and efficient use of ultimately limited resources. Nonetheless, the patterns pose some interesting policy dilemmas, for example, whether one should work counter to the dominant trend and reach under-served groups first to erase inequality and then proceed forward from there, or to work within the trends. Working within the trends could include devising programs to reduce the lags between groups; accelerating the progression of groups that are behind; developing a differentiated sector-wide education policy that addresses the variety of education levels within the country.

To accelerate the trends has been difficult. If the constraints are the rational use of limited resources, the clear response is to raise resources. In the case of financial constraints this may imply foreign grants and loans. In the case of human resource constraints the policy responses could include: a more efficient use of existing resources (e.g. using local adults to teach in community schools); a direct intervention to increase domestic resources (teachers); or an influx of foreign manpower. If the constraints are discrimination or parental expectations, then a different response is necessary, possibly involving public awareness campaigns or similar mechanisms. If the constraints on expansion lie in feedbacks involving teacher availability and parents' education, one needs to look carefully at the internal dynamics of the system to identify policy levers that can accelerate the feedback. As the range of responses can be large, it is important to continue the discussion on the drivers of the education transition patterns and gain more certainty in this respect.

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FOREWORD

The Education Policy and Data Center's vision is evidence-based education policies and programs leading to improved use of resources and learning outcomes in developing and transitioning countries. The EPDC contributes to this vision by providing better information and policies for education through better access and use of data and policy-oriented program evaluation and applied research. The research program focuses on long-term emerging trends and issues in international education; the efficient, effective and sustainable use of resources for education; and cross-sectoral impacts of education in the near- and long-term. This report is a part of a larger study on international trends and patterns – the identification and analysis of common patterns and phases of growth of education systems, which together can be called the education transition. The findings in this report are a timely contribution to the ongoing evaluation of the Education for All and Millenium Development Goals, whether they are attainable and what can be done to approach to them.

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Reaching All- The Paths to Universal Primary School in Mozambique

1. INTRODUCTION

The question of how school enrollment expands to reach all children is an important one in a world where many children are still excluded from schools and where it is recognized that education can reduce poverty, improve health, and lead to more stable politics (a good summary provided in BEC, 2003). This issue of enrollment expansion was taken up by Wils (2001, 2002, 2003) and called the *education transition*. It was later explored in great historical depth and for almost all countries in the world by Clemens (2004). These papers show that the transition to education for all is a process that historically has taken multiple generations. An immediate question arises: Why does it take so long? Part of the answer, suggested in this paper, is that education does not expand simultaneously in all parts of a country but gradually diffuses from one region and one group to the next, causing a series of lags that slow down the average national education transition.

Another issue is becoming increasingly clear as attention is focused on reaching the remaining children not in school, namely that out-of-school children are not randomly spread around the world. Rather, they are concentrated among the poor, the rural, the girls, in families with less educated parents, in remote areas. So the question arises: Where does the inequality come from? Again, part of the answer, shown below, is the gradual diffusion of education from one region and one group to the next.

A clear understanding of how education expands is important. First, it helps to focus the policy decision on efficient paths, possibly innovative paths, and potential trade-offs. Second, it provides a framework for decision-making, one that suggests realistic bounds for plans and goals, as well as a benchmark for performance. Finally, knowledge of how education can expand helps address practical issues such as where the next schools will be built, where resources should be directed, and what areas or sub-groups require special attention.

This study is focused on Mozambique. It is a country still in the process of expanding its education system, with large inequalities between regions and genders, an MCA and FTI candidate¹, and one for which a rich array of data is available. The study analyzes the historical patterns of enrollment growth by regional and gender sub-groups and uncovers some suggestive general trends and patterns.

¹ MCA is the Millenium Challenge Account, a large US development fund for good performing, poor countries; FTI is the World Bank-led Fast Track Initiative designated to funnel funds for basic education to poor countries that demonstrate a commitment to achieve universal primary education by 2015.

The patterns found in Mozambique are: 1) schooling sequentially reaches various sub-groups of the population, boys first then girls, urban regions before rural, 2) there are lags of a few decades between groups, 3) the education growth rates are robust and similar for most sub-groups and 4) intake expands before retention and completion. These patterns together make up what can be called the *education transition* in Mozambique.

Similar patterns may be found elsewhere, as shown in an ongoing analysis of 13 other developing countries from around the world². Sequential growth phases have been observed for other social innovations in many countries so it is not very surprising to see this for schooling. The consistent growth rate of education was also observed in many other countries in a global comparative study (Wils and O'Connor, 2003; Wils, 2003). All of this is evidence that the patterns presented here for Mozambique may be a key to understanding how other countries besides Mozambique can expand education to reach all children.

The paper starts with an overview of education in Mozambique; derives the patterns of expansion by sub-groups in a next section, and concludes by proposing some theoretical grounds for the patterns and discussing policy opportunities and challenges these patterns present to the government of Mozambique, in particular, and the international education community more broadly.

2. EDUCATION IN MOZAMBIQUE

The present education level of adults in Mozambique is extremely low – the result of past failures of the school system. In 2001 according to the recent welfare survey (QUIBB, 2003), only 21 percent of the adult women age 15 and older had completed primary school or higher; 2.6 percent had completed secondary and higher; only 0.1 percent had a university degree. In addition, these national averages mask enormous regional and gender disparity. For example, whereas in the country's capital, male literacy is nearly complete; less than 10 percent of the rural women in the north can read and write. These inequalities are the result of many years of selective school access and a generally weak school system.

Because the school system in Mozambique has expanded over the past century, present enrollment is much higher than the average education levels of adults might suggest. Still, school enrollment in Mozambique remains incomplete and unequal. As Table 1, with 1997 population census data shows, the net attendance rates for boys and girls, by province and urban/rural areas, varies considerably. In 1997, the lowest net primary enrollment rate was 14 for girls in the rural areas of the remote province Manica, compared to around 81 for boys in the capital city, Maputo Cidade.

² Ongoing study at the Education Policy and Data Center, "The Education Transition in 13 Countries". Information available from the principle analyst, Annababette Wils, Countries included in the study are: Bangladesh, Bolivia, Brazil, Colombia, Egypt, Ethiopia, India, Indonesia, Kenya, Mali, Nepal, Nicaragua, Philippines, Uganda, Zambia.

Table 1. Primary net attendance rates in 1997 by sex, province and urban/rural area. Data from 1997 Population Census (INE, 1997).

	Urban		Rural	
	Male	Female	Male	Female
Niassa	51	47	27	20
Cabo Delgado	44	40	27	19
Nampula	45	40	28	19
Zambezia	60	54	34	23
Sofala	58	55	27	21
Tete	61	55	32	23
Manica	63	56	25	14
Inhambane	75	73	56	50
Gaza	73	71	54	52
Maputo	77	75	55	52
Cidade	81	80		

The provinces in the table are arranged from north (at the top) to south, with the southernmost province being the capital city, Maputo Cidade. Thus, moving from the top down the table, the provinces are ever closer to the capital city. The table shows that: 1) there is a general north-south gradient in enrollment rates; 2) within provinces there is a large differential between urban and rural areas; and 3) in all areas girl enrollment is lower than that of boys. Clearly, there is an issue of unequal opportunity here. The huge differences in enrollment also pose considerable challenges for the management of the Mozambican school system. Some provinces require more primary schools to be built, others need a program to get girls into school, some have nearly complete primary enrollment and need to focus on expanding secondary schools, and so forth.

2.1 Sequential enrollment growth phases and consistent growth rates- 1924-1989

The question arises how these inequalities have arisen, and whether there has been progress in eliminating them, especially in recent years. To answer this question, some inquiry into the history of education in Mozambique is illuminating. The most detailed, readily available data source for historical schooling patterns is the 1997 population census data. The census provides adult school achievement by age, region, and sex. But we can use educational achievement by age as a proxy for schooling experience when the cohort was of school-age, and calculating backwards, use the census data to reconstruct school enrollment trends from 1924-1989. Actual enrollment data can be used for more recent trends.

The census provides adult education attainment by various levels, such as “attended any primary” (grade 1 and higher), “completed lower primary” (grade 5 and higher), “completed upper primary” (grade 7 and higher). None of these is an exact approximation of school enrollment rates – “attended any primary” is high because it does not include the effects of dropping out; “completed lower” or “completed upper primary” are low because they include too much drop out. The analyses for this study used both “attended any primary” and “completed lower primary”, and the results are very similar for both indicators. In this report, only the “completed lower primary” results are shown, a decision driven by space considerations and the present focus on complete primary attainment in the Education for All goals.

In Mozambique, lower primary school is usually completed in the age interval 10-15 years, so the lower primary completion of each adult age-cohort approximates fifth grade attendance and completion when that cohort was 10-15 years old. For ease of calculation, we will use a single year of age, 12. Thus, lower primary completion of the group age 20-24 in 1997 indicates fifth grade attendance 8-12 years before, in 1985-89; lower primary completion of the age group 25-29 years old, fifth grade attendance 13-17 years earlier in 1980-84, and so forth up to the age group 85+ in 1924 and earlier.

The census data are disaggregated by age, sex, province and urban/rural residence. Geographically, these distinctions make 21 geographical areas – 10 provinces with urban and rural areas, plus the capital city with only urban. Within each of the 21 areas, the two genders are separated, providing the study with 42 distinct population groups. Within these groups, 5 year age cohorts are separated.

Before the analysis proceeds, a word of caution is required. Many people migrate over the course of their lifetime, so the education level observed in a given age group in a particular area does not necessarily correspond to earlier primary school attendance in that region. In particular, as migrants tend to be more educated than non-migrants, these movements will tend to lower education profiles in sending regions. With regards to the receiving region, immigration could either raise or lower the average education level, depending on how well-educated the receiving area is. The effects of migration may be largest in Maputo Cidade and Maputo, which are important receiving areas, along with neighboring Gaza and Inhambane, which send the most migrants. Within provinces, migration will tend to shift those with more education out of the rural areas to the towns and cities. Unfortunately, it is not possible to correct for these shifts, so the following paragraphs should be considered with these biases in mind. This means, in particular, that actual past enrollment in sending areas – all rural areas and especially for men in Inhambane and Gaza – was higher than the present adult levels suggest. As it turns out, the male primary completion rates in Gaza and Inhambane provinces are lower than one would expect given the overall geographical patterns of education. Also, the differential between rural and urban education rates of men is higher than that of women, which can be explained by a rural-urban migration flow consisting mainly of educated men. Even with this caveat in mind, the general patterns found below remain pronounced.

Figure 1. Lower primary school attendance by birth cohort for males and females, by province and urban/rural residence. Data from 1997 Population Census (INE, 1997).

LEGEND: Solid lines – urban areas; dotted lines – rural areas.

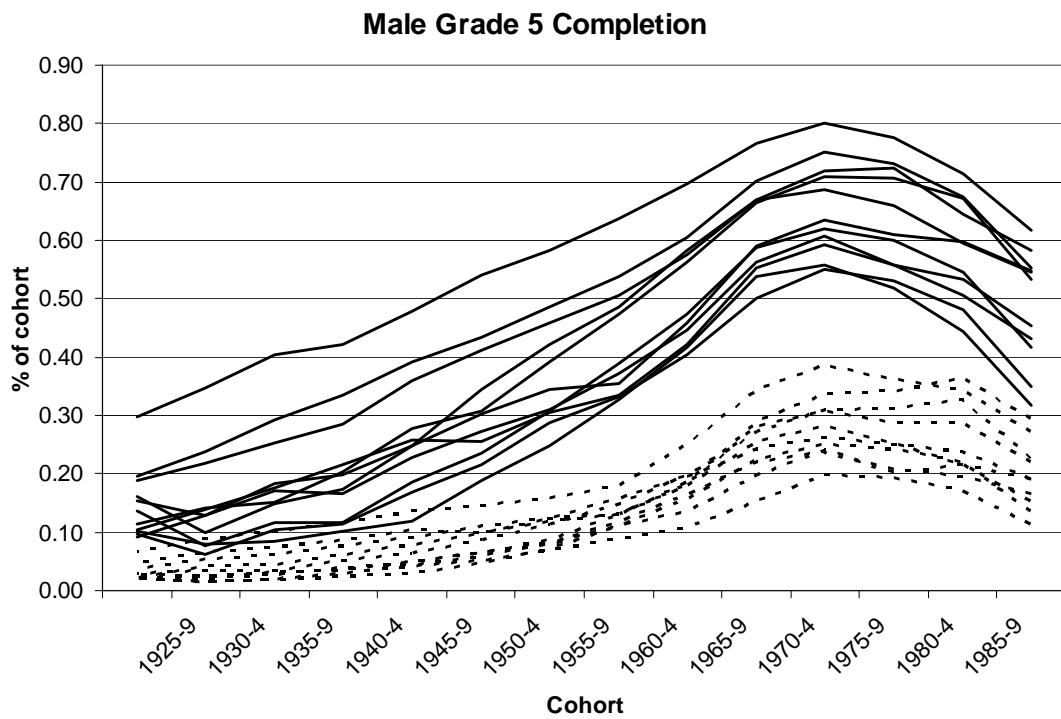
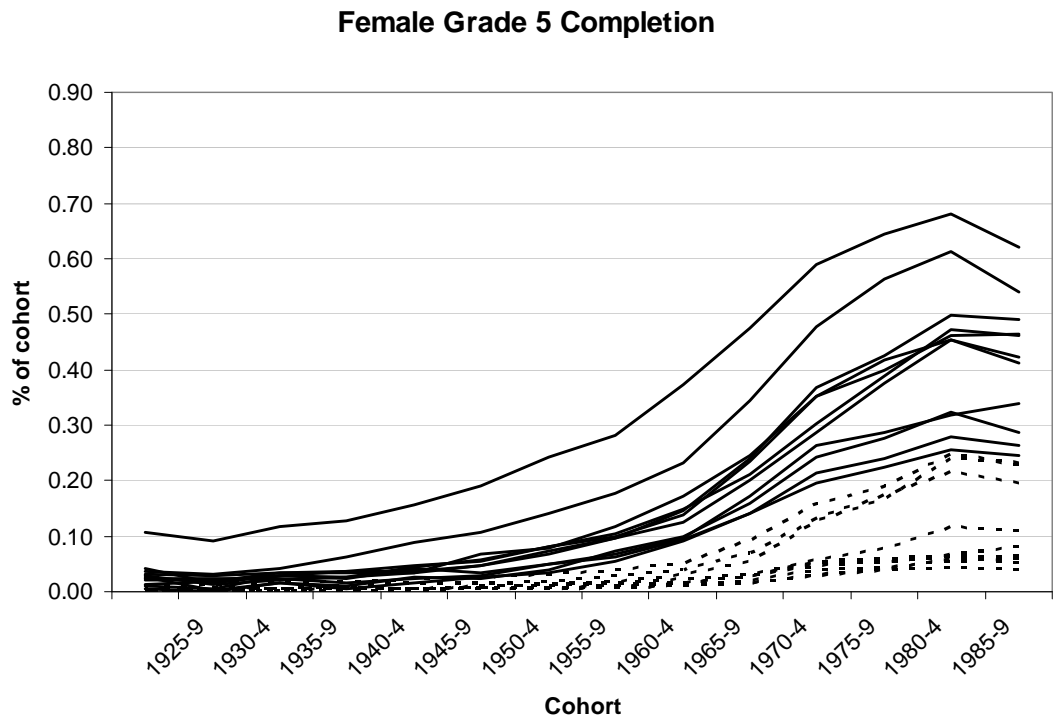


Figure 1 shows the raw data for the analysis, namely the proportion of a group that completed grade 5, by age, sex, and region. The x-axis on the graphs shows the approximate year of schooling using the proxy method explained above³. The numerical data is available in the Appendix. Each graph has 21 lines, making a confusing picture, so it has been simplified by coding the lines only according to the urban region/rural region distinction, and separating the male and female groups into two pictures. A reader can use the data in [Appendix A](#) (to be linked to www.epdc.org) to produce a graph where the provinces could be identified. A careful analysis reveals some clear patterns:

1. The lines show tremendous differentials – with lower primary school completion in 1985-9 ranging from 4-5 percent for young women in rural areas of the remote northern provinces, to a high of about 70 percent in Maputo Cidade for young adults of both sexes in 1985 (note: all the years mentioned here should be taken as approximations).
2. The lines are neatly stacked on top of one another, indicating that each region maintained virtually the same *relative* position throughout the period 1924-89 -- it was rarely possible for those regions that were “behind” in 1924 to overtake more advanced regions. It appears that all regions were progressing along a similar (though not identical) trajectory of enrollment rises, with some being ahead and some lagging behind.

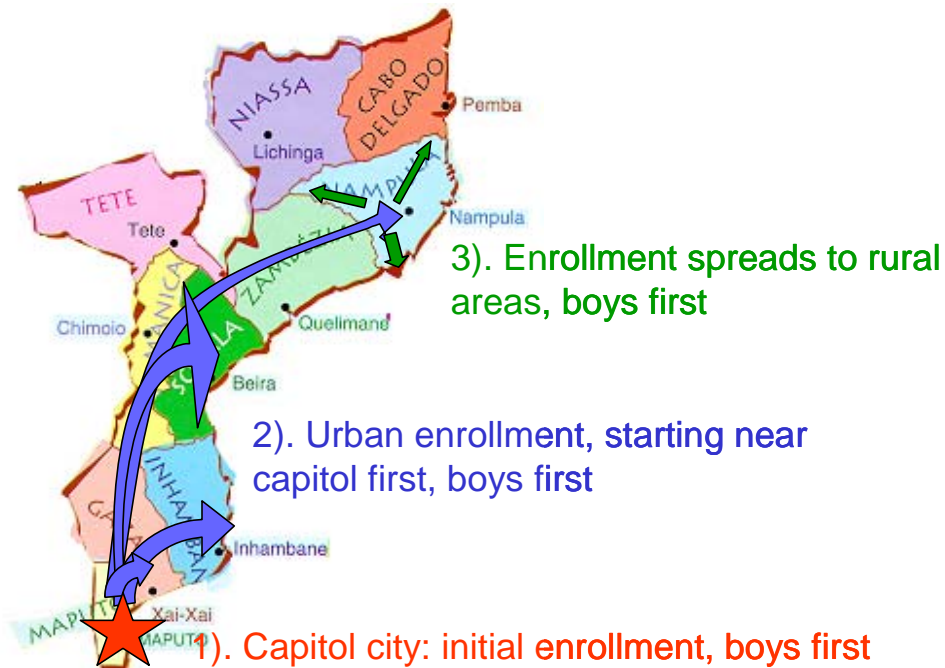
Some additional patterns are not visible from these graphs but evident from the data and a graph with provincial distinctions (not shown):

3. There is a clear south-north gradient in the lines, or, capital city to remote region, meaning that the highest enrollment rates in any period were in Maputo Cidade, followed by neighboring provinces, and finally the most remote north.
4. In every province, the rural areas trailed the urban, and within rural and urban regions, girls trailed boys.
5. For women, there is a continual increase in primary completion throughout the period in all regions, although the rate of increase is slower from 1974 onwards. For men, there is general improvement from 1924-1974, and then a fall off in primary completion from 1974 onwards. Both the stagnation among women and the decline among men are a clear toll of the civil war. Newer figures, discussed in the next section show a sharp rise for the post war period starting in 1992.

The patterns in these data indicate that growth of enrollment was well underway in Maputo Cidade (then Lourenco Marques) by the 1920s, possibly earlier. It then leap-frogged to other urban areas in the 1930's and 1940's, moving northward in the 1950's and 1960s, until by the 1970s, large proportions of boys in urban areas everywhere were completing lower primary school. After schooling had reached the cities, it moved out to reach boys in the rural areas of the provinces. In all urban and rural groups, girls followed boys. The proposed geographical diffusion pattern is shown in Figure 2.

³ It is not possible to include data from after 1989 in this figure because we do not have completed lower primary for younger age groups or more recent years. Lower primary school completion rises gradually from the age of 10 to 15 and higher, indicating that, due to the high incidence of late school entry, some children are still in lower primary as young teenagers.

Figure 2. Hypothesized geographical diffusion pattern of enrollment and literacy in Mozambique .



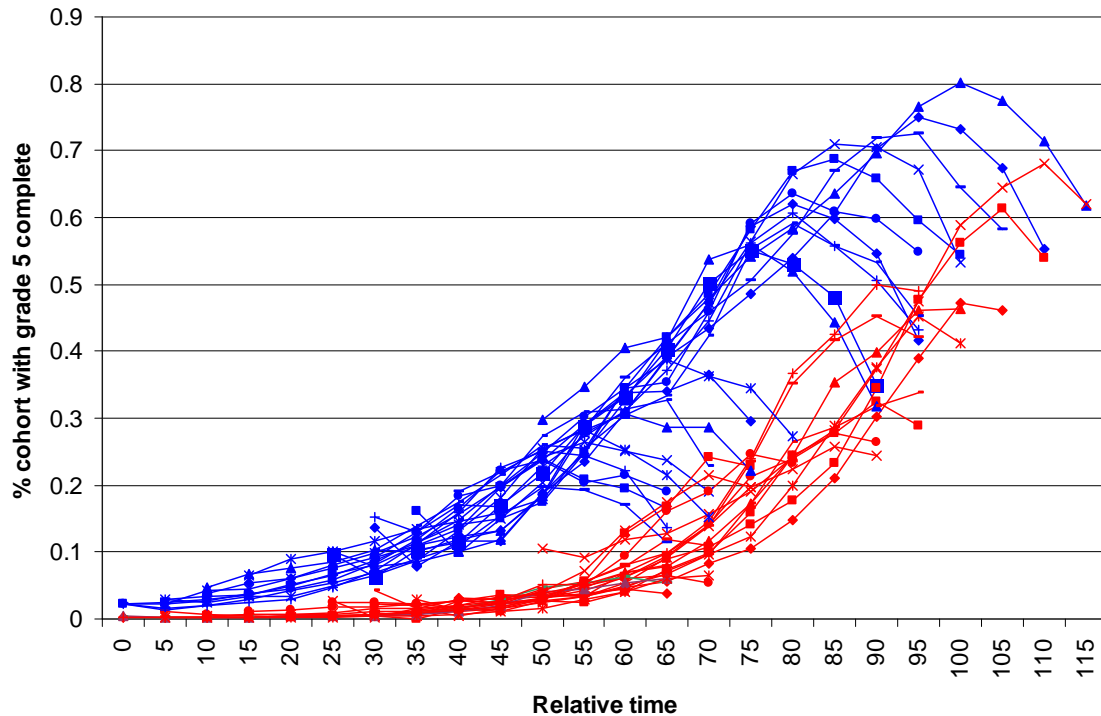
Map: Eduardo Mondlane University Informatics Centre, www.mozambique.mz

Analyzing Figure 1, one notes that at the lower ranges of primary completion, growth is very slow and similar for all sub-groups; in the mid-ranges there is faster growth. One can infer from this that the regional lines all appear to be moving along a similar S-shaped trend. The S-shape is a common pattern for the expansion and diffusion of social and cultural innovations. The following experiment tests whether all of the regions are indeed moving down a similar path, and differ from each other largely in how far they are along that path.

The experiment is to rearrange all the regional literacy rises for each gender to fit along two broad, S-shaped, an earlier one for males and a delayed curve for females. To produce Figure 3, the line segments from Figure 1 are taken and shifted left and right to fall, as much as possible, along two S-shaped curves, one for women, one for men. The shifting is done visually, without statistical aids, as a first approximation. The male and female lines are *shifted together* – so that, as the line for male literacy in region A is shifted left or right, the line for female literacy in region A is shifted with it. The lines for males are shown in black lines, and those for females in grey. Along the x-axis is *relative time*⁴.

⁴(see also Wils (2002, 2003) and Wils and O'Connor (2004) for comparative work on the education transition).

Figure 3. Male and female trends for grade 5 completion in Mozambique as emerging from a rearrangement of provincial, birth-cohort specific grade 5 completion rates for men and women, using 1997 Population Census data.



The figure shows that the trends in the 21 regions can all be placed along a rather narrow envelope consisting of two broad, S-shaped curves, one for males and a second for females, following each other closely, with a lag of approximately 30 years. The ravages of the civil war are evident in the declines for younger men, which have reduced the male-female literacy gap at younger ages. This frayed pattern of declines should be regarded as an aberration in an otherwise clear picture. The war disrupted a clear and consistent trend that is evident in all of the male generations that completed lower primary, or grade 5, prior to about 1975.

It would not be possible to produce such a simple, clear graph if each of the regions and groups were following its own, distinct growth pattern. Thus, the figure indicates all the groups are on one, broad expansion path and differ from each other mainly in how far they have proceeded. Further, the graph implies that before the civil war, females lagged behind males consistently, by about 25-30 years.

One of the main implications of Figure 2 is that there is a generalizable growth path that each group is on; that this path strives towards universal primary completion; and that differential attainment is caused by *lags* rather than a structural tendency for permanent education inequality. These findings can be used to conduct a more rigorous, statistical trend analysis of the education growth paths of each group. The analysis extrapolates the education of each sub-group, using available data points, the assumption that the trend is towards ultimate universal primary attainment, and that the path is S-

shaped. SPSS and mathematical trend functions in Excel were used for the calculations. The result is a forward and backward projection of the educational attainment of each sub-group from zero percent attaining complete primary to universal attainment. Only the intervals 10%-90% are discussed however, because the tails of S-shaped curves are much too error-prone. For males, only the data points for the 1924-1974 are used, to exclude the war effects from the fitting estimation; for females all the data points 1924-1989 are used for the extrapolation. An excellent “fit” of the extrapolation to the data points is crucial to our confidence in the extrapolation. As it turns out, the fit is excellent for all 42 groups (indicating the data points are on a clear trend line), and P values⁵ for all but two of the fits were below .01; in all but 5 out of 42 regions the P values were <.0001.

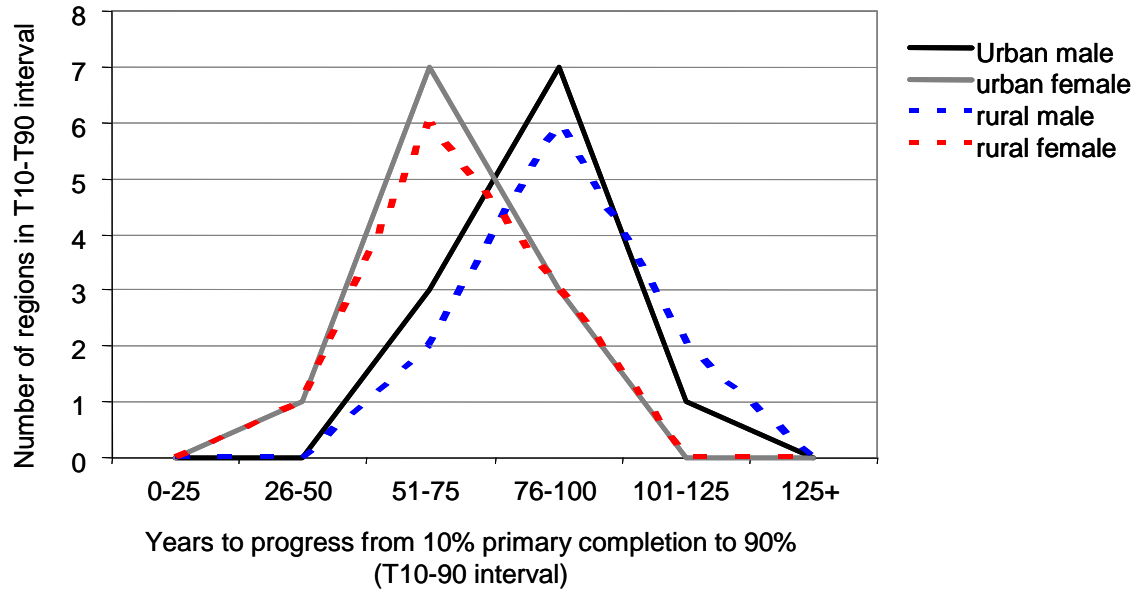
Using the extrapolated curves values, one can then estimate the approximate year in which 10% enrollment to 5th grade occurred, or will occur (T10), as well as 50% enrollment (T50) and 90% (T90). The “speed” of education expansion is measured as the interval between T10 and T90 (T10-90). The approximate timing of the education expansion for each group is taken as the year in which T50 was or will be attained according to the extrapolation. To estimate the lags between various groups’ education expansion, one can then calculate the differentials between T50.

The analysis confirms the similarity of enrollment paths. Enrollment rates increased at similar rates for all males and for all women, but females were, on average faster. 86% of all male T10-90 enrollment increases fall within a fairly narrow 30 year margin of 70-100 years (average 86 years); 86% of all female T10-90 increases fall within a margin of 55-85 years (average 70 years). Outliers are within 20 years of these intervals. The T10-90 for rural regions is equal to that of urban regions. **Error! Reference source not found.** shows the frequency of the T10-90 intervals for the 21 regions by sex, and urban/rural region.

Regional lags are approximated as the difference between the years when groups reach T50. The lag between the first province where urban males reached T50 and the last province are 27 years. Interestingly, the lags *within* provinces between males and females and rural and urban areas were about as long or longer. Within each province, females lagged 16-34 years behind their male counterparts (average 27); rural male groups lagged 25-33 years behind their urban counterparts; and rural females lagged 34-82 years behind urban males (average 61 years).

⁵ P- Value - the probability of observing the extreme range of values currently observed (or more extreme) *assuming that the null hypothesis is true*. The lower the P-value, the more likely that the extreme values seen in your correlation are the result of an effect between the two variables. The P-value should *not* be interpreted as a expression of causal links between two correlated variables.

Figure 4. Frequency of interval from 10% school intake to 90% school intake by province for urban males, urban females, rural males, and rural females. Source: Own calculations



In summary, the above analysis shows that:

1. Enrollment reaches sub-groups in the population along a clear sequence: boys first, then girls; urban areas before rural; and the provinces closer to the capital city earlier than more remote provinces.
2. In all sub-groups, the enrollment trend is towards universal attainment. Education differentials are caused by lags between groups rather than a structural tendency for permanent education differentials.
3. Prior to the civil war, lags between groups are on the order of decades; on average female groups reached 50% grade 5 attainment 16-34 years later than males; rural groups lagged 25-33 years behind urban. During the civil war, the lags between males and females were reduced.
4. All groups appear to be on a similar growth path. The enrollment growth rates between groups are relatively similar and robust, although female growth is faster than male growth. Our analysis estimates that in Mozambique male groups need an average of 86 years to progress from 10% grade 5 attainment to 90% (excluding the effect of the civil war); while female groups need 70 years.

The implications of these findings are both positive and negative. On the negative side, education appears to expand for each sub-group at similar rates; there is no automatic acceleration as policy makers “learn” how to expand the school system. But, a positive observation is that for each group, education tends towards universal achievement, indeed one could almost say automatically (where automatic does *not* imply “without effort”).

The mechanisms underlying the observed patterns are discussed in the last two sections of the report.

2.2 Is Acceleration Possible? The 1990s.

In Mozambique, there was high education growth during the 1990's after the civil war ended in 1992. During these years, education was a government priority and enrollment increased quickly. In 1992, GER was 59; by 2001, it was 101 (QUIBB, 2003). This shows that enrollment can be increased quickly, with concerted effort. To a certain extent, the high growth rates in 1990s should be regarded as a peace-dividend, but one can also ask whether a true change in trends occurred.

How do the growth rates of the late 1990's compare with those of the pre-war period in the 1970's? Table 2 shows the net enrollment rate by province in 1997, 2000/1 (QUIBB, 2003), and 2002/3 (IAF, 2004) and in the fourth column, the average annual growth rates from 1997 to 2000/1 or 2002/3. One word of caution is warranted regarding the household surveys. These are samples, and therefore there may be errors in the listed enrollment rates by several percentage points. The annual growth rates over the last years of the 1990's and early 2000's ranged from 1-3% in Maputo Cidade to very high rates of 10-19% in the northern provinces. The data from the previous section, show that in the 1960s and 70s, before the disruption of the war, the growth rates in each sub-group ranged from 3-14% annually. While a comparison between the two sets of rates is not exactly apples to apples given the different data sources, and that one is a retrospective reconstruction while the other is taken from actual measures of recent enrollment, they do give at least some indication that the recent growth in enrollment may be higher than during the colonial period. However, even in the 1970's there was already very high growth.

Table 2. Net primary enrollment rates in 1997 and 2001 by province. Source: INE, 1997; QUIBB, 2003; IAF, 2003.

	1997	2001	2002/3	Average annual growth rate
	Census	QUIBB	IAF	
Niassa	29	43	47	10-17
Cabo Delgado	26	40	61	14-19
Nampula	29	38	46	9-14
Zambezia	32	47	60	12-16
Sofala	29	44	52	12-18
Tete	36	45	67	10-14
Manica	37	44	60	10
Inhambane	57	60	74	5
Gaza	57	68	79	7
Maputo	68	77	86	5-6
Cidade	81	83	85	1-3

Inequality has been reduced but remains persistent and consistent with historical patterns. In 1992, GER was 67 for boys and 50 for girls, a 34% advantage; in 2001 GER for boys was 110, compared to 91 for girls, still a 22% advantage (QUIBB, 2003). Low rates for girls were mainly due to the fact that girls in certain rural regions remain mostly out of school: while the overall GER was 92 in 2001, it was 22 for rural girls in the Sofala province. The differences between provinces remained the same in 2000/1 and 2002/3 as they had been in earlier periods, as shown in Table 2 – there are lower enrollment rates, the further the province is from the capital.

3. ENTRY FIRST, THEN RETENTION- EVIDENCE FROM 2000

Another pattern within Mozambique's education transition emerges from an analysis of contemporary enrollment data, albeit more tentatively than the patterns discussed above. It is that intake expands first, followed by ever longer survival to higher grades, or: there is a sequence of *access growth followed by retention growth*. Data for this section are the school enrollment, access and survival figures for 2000⁶. The data are disaggregated by province and gender – the urban/rural distinction was not available from the data source.

In 2000, the national apparent intake rates⁷ were very high, 112 for boys and 97 for girls. At the provincial level, according to the data in Table 3, school intake ranged from 85 to 150 for both boys and girls in the year 2000. Some provinces show apparent intake rates in excess of 100. These can exist because of a *catch-up effect*: as more and more schools open in regions, which were previously un-serviced, older children and teenagers or young adults, who had no chance to go to school before, enter along with young children. The table indicates that school entry is largely complete at least at the provincial level, both for boys and for girls. Boys still have higher entry rates than girls, but the differences are much smaller than those found for grade 5 completion and overall enrollment. That marks a significant achievement for the post-war government.

⁶ Many thanks to Tomas Bernardo of the National Institute for Statistics, INE, for his help in compiling these data, and Buduia and Juvane for their generous sharing of 1999 and 2000 Ministry of Education data.

⁷ The UNESCO (2000) calculates the *apparent intake rate* as an approximation of the proportion of the school age cohort that goes to school. The apparent intake rate is equal to the number of new entrants in first grade divided by the population of the appropriate age for first grade. The advantage of apparent intake rate is that it includes late school entry, which is a reality in Mozambique.

A preferable, but impractical indicator would be the *total intake rate* of a particular year to be calculated in a way similar to the total fertility rate, by summing up the intake rates for different age groups. The total intake rate would be higher than the apparent intake rate, because many people enter school beyond age 6., and, as the age-groups are consecutively smaller in Mozambique, this means the intake rates and older ages would be shifted upwards. However, we can only speculate what these numbers might be.

The table also shows school survival to grade 4 in 1999 using 1999 and 2000 administrative data on enrollment⁸. Basically, the method calculates the proportion of children who reach a certain grade, given prevailing drop-out, repetition and promotion rates. This method cannot correct for migration – out-migration deflates the survival ratios and immigration will inflate them.

Table 3. School intake rates and survival to grade 4 by province and sex, 2000. Data Source: Ministry of Education, 2002.

	Intake		Survival to grade 4	
	Boys	Girls	Boys	Girls
Niassa	115	98	60	46
Cabo Delgado	132	105	58	44
Nampula	101	85	55	39
Zambezia	150	120	47	34
Tete	101	90	55	43
Manica	109	86	73	63
Sofala	113	85	70	62
Inhambane	109	98	81	76
Gaza	116	112	63	62
Maputo	117	120	84	86
Cidade	91	89	104	100

The table shows that survival to grade 4 is far from universal, and large inequalities are apparent along the now familiar ranking of sub-groups. The school survival rates to grade 4 range from 104 for boys in Maputo Cidade (a rate in excess of 100 reflecting the high immigration rates) and 100 for girls in Maputo Cidade, to only 34 percent for girls in the northern province of Zambezia. In each province, the survival rates for boys are higher than those for girls, and in general, the south-north gradient holds.

In 2000, Mozambique had almost attained universal intake, but regarding survival to grade 4, the familiar sequential expansion inequalities were still apparent and survival to grade 4 was far from universal. One can take from this juxtaposition of the two indicators the idea that school intake expands first, followed by longer school survival. In any particular area that is first serviced by schools, entry increases first, erasing regional and gender differences in school access. Only after school entry has become established for some time does retention also rise and ever larger proportions of children reach ever higher grades eventually erasing retention inequalities. One could call this hypothesis that of *sequential access and retention growth* and posit that it is another characteristic of the education transition in Mozambique.

⁸ School survival to each grade can be calculated with the annually collected data on enrollment and repetition using the synthetic cohort method explained on the UNESCO website (2003).

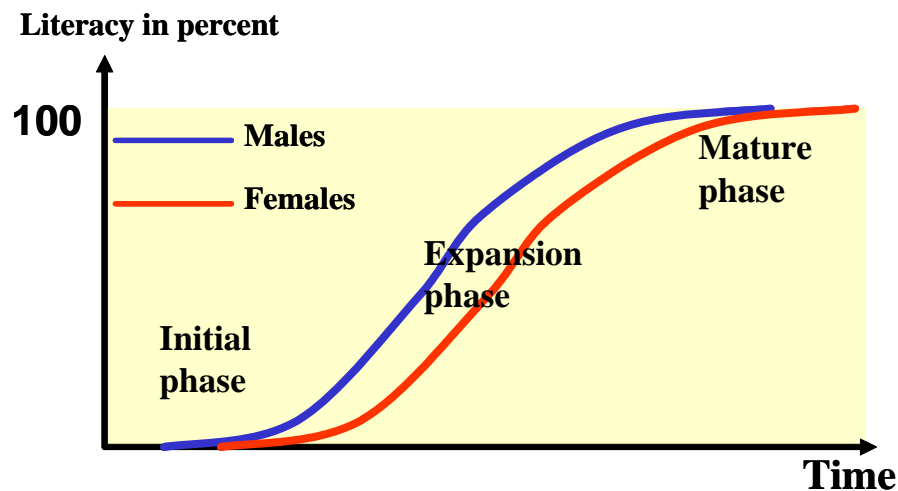
The material for making this hypothesis, as it is presented here, is more tenuous than that for the other hypotheses regarding the patterns of the Mozambican education transition. However, to the extent that the hypothesis is supported by this preliminary evidence and also makes intuitive sense from field experience with expanding school systems, it is worth positing for further exploration.

4. THEORETICAL UNDERPINNING FOR THE EDUCATION TRANSITION

4.1 Summary of the education transition patterns

The historical analysis of the Mozambican education system presents us with some clear, long-term patterns and trends that can together be called parts of an *education transition*. The characteristic trend pattern in the education transition is that of an S-shaped growth curve, with an initial phase dominated by low schooling rates, a second, expansion phase, to a third, final phase dominated by universal schooling at that level. Within a given region, the rise in male schooling precedes that of females; although the female pattern is towards universal attainment, just as the male is. A very simple visual characterization of the three phases is provided in Figure 5. The above growth pattern is repeated in all provinces of Mozambique, and in urban as well as rural areas of those provinces. Similarly, the study posits that there may be two similar curves for intake and retention, where school intake rises first, followed by growing rates of retention to a certain grade level.

Figure 5. Schematic representation of the education transition, with separate paths for males and females, separated into three phases.



In a summarized list, the characteristics of the Mozambican education transition found in this study are:

1. Enrollment reaches sub-groups in the population along a clear sequence: boys first, then girls; urban areas before rural; and the provinces closer to the capital city earlier than more remote provinces.
2. In all sub-groups, the trend for enrollment is towards universal attainment. Education differentials are caused by lags between groups rather than a structural tendency for permanent education differentials.
3. The lags between groups are on the order of decades; before the civil war, on average female groups were on a path to reach 50% grade 5 attainment one to two generations later than males; rural groups lagged at least a generation behind urban. The urban-rural lag persists today; the male-female lag has been reduced. The education levels of rural women in remote provinces are still behind the levels attained by urban males of the capital city in the 1920s, and are not projected to reach the level of that group of urban males until the middle of the 21st century, indicating that within one country, there can be more than a century of lag between the education levels of the most vanguard group and the most disadvantaged group.
4. Growth rates appear to be very robust and similar across sub-groups, although female growth is somewhat faster than male growth. Our analysis estimates that in Mozambique male groups take an average of 4 to 5 generations to progress from 10% grade 5 attainment to 90%; while female groups take 3 to 4 generations. However, it is possible that in the last decade, there has been some acceleration.
5. There is some indication that school intake expands first followed by ever longer school survival.

These patterns give a proximate explanation of the large enrollment disparities between groups. One group starts first and maintains that lead; other groups start later in the sequence described above, so at any given point in time, each group is at a different stage. If the delays between the initiation of education expansion in one group and the next are long – as they appear to be in Mozambique – the inequalities can be very large, with some sub-groups in the population enjoying universal education, while others have barely any access at all. Unless the growth rates of later groups are much faster than earlier groups, inequalities can disappear only when all of the last sub-group has completed its transition. With regards to gender inequality, it does appear that once females start to enter school, the expansion is faster than for males.

So much for a proximate explanation; the next question is whether one can propose a theoretical framework on the driving forces behind these trends. Below, a number of possible driving forces are proposed, as a first step in what may be a longer discussion towards fully understanding the drivers of the education transition.

4.2 Drivers of the education transition

The drivers and policy response proposed in this section and the next are the result of discussions and correspondence with colleagues on the patterns observed in the report. As the observation of these patterns is new, an understanding of the drivers is still

emerging. What is presented here should be considered the first discussion and collection of possible explanations and policy responses, which will be developed further over time.

Regional differences in enrollment – provinces, and urban vs. rural regions – are likely to be at least substantially caused by differences in the supply of schools. It is also possible that gender differentials are partially caused by a lag in the supply of girl-friendly schools (separate toilet facilities, female teachers, safe walk to school). If the enrollment differentials are caused by supply, an increased supply of schools (or appropriate schools) would result in rising enrollment. Then the question becomes why schools are built in particular regions, or for particular groups (e.g. boys) before they are in others. Two driving mechanisms are proposed.

First, a rational utilitarian principle might be guiding policy makers with limited annual budgets for system expansion, namely, to reach the most children possible with each additional school, or the population with the most political and/or economic pay-back. Such a principle would automatically lead to schools being built first in the most densely populated and most developed areas, with school construction moving down the “utility” curve to finally reach the most remote areas, where, in addition, teacher recruitment might be most difficult. This principle would explain the expansion from urban to rural areas, and from the core provinces to the more remote ones.

Political preference, expedience, as well as discrimination may also drive sequential provision of schooling; schools are built first for those with the most political clout and/or from whom the most political support is desired (the reigning clan, ethnic group, urbanites). The building of schools may be deliberately postponed or eliminated for groups for whom education is not desired – perhaps to keep them in their place as an under-class. In addition, a curriculum might be offered only with a particular cultural context, which intentionally or unintentionally excludes certain groups in the population (with a different language, religion, sex). With the rise of schooling, these discriminations may gradually erode, or be shifted to ever higher levels of schooling.

If supply of education constrains growth, and rational or discriminating policy makers have a limited budget each year with which to expand the school system, then the decades long phase of education expansion would follow from whatever annual expansion was possible within that fixed budget. If this were so, acceleration would be a matter of increasing the budget. While this idea is attractive, it does not explain why, all over the world, in different cultures, which expend varying portions of their national income on education, with varying requisites for schools and teachers, schooling increases gradually and along similar paths (as observed in the studies mentioned in the course of this manuscript).

Another possible constraint to expansion is human and logistic resources. Policy makers may only have the capacity to oversee the expansion of schooling in particular areas of the country, or, choose to focus what capacity they have on particular regions in sequence rather than spread evenly around the country.

Another driver for sequential education attainment lies in demand for schooling. Families, with limited budgets for sending children to school, send only those for whom the perceived benefits exceed the costs. The highest perceived benefits are initially attributed to boys, who can later compete for jobs in a male-dominated economy, and

who, in many societies, will be responsible to care for the parents in old age. As the benefits of education become more obvious, after a generation or so, the barriers to sending a child to school are lowered, and girls enter also.

Urban/rural differences in enrollment could also be caused by differential demand – in urban areas, the benefits of schooling are more obvious because there are more job opportunities for those who are educated. At the same time, the costs of schooling, in the form of lost child labor or long walking distances, are probably lower in urban areas compared to rural.

As the economy modernizes even in rural areas, job opportunities for girls increase, as parents become more accepting of the benefits of education for their children there is a gradual increase in demand – in rural areas and for girls.

All of the proposed drivers are likely factors to explain sequencing; however, they do little to explain why education trends are towards universal achievement, nor why growth paths for diverse groups are so consistent. A more dynamic theory for consistent, gradual expansion addresses these issues. This theory can be summarized thus:

schooling begets schooling, but only slowly.

First, to expand a school system there must be a sufficient number of teachers to stand in front of thousands of classrooms. Teachers are almost always adults with at least some secondary schooling and most often certification from a teaching college or similar institution. These teachers grow out of the enrollment rates of an earlier generation of school children. Thus, the school-system builds on itself, it generates its own resources for further growth, but, there are generation-long delays between schooling and the expansion of the teaching supply. These lags cause real constraints on the expansion of the school system, as shown in a recent EPDC paper by Wils and O'Connor (2004). There may also be a similar, long feedback from education to national income generation to fund further education increases.

On the demand side, a similar, long feedback exists. It is well-established that more educated parents are more likely to send their children to school. But those parents themselves are the offspring of an earlier generation of (often less-educated) parents. If the aspirations of parents are generally to provide more education for their children than they themselves received (and perhaps the economic resources of successive parent generations grow), then the result would be a gradual, but very persistent growth in education demand over generations.

This dynamic theory would explain the relative consistency of education growth rates within regions and across countries, despite enormous differences of culture, public education commitment, fee structures, school quality, and population density.

5. POLICY IMPLICATIONS

The patterns of the education transition in Mozambique and some of the possible drivers behind them – the utilitarian and the discriminatory principles, as well as the dynamic education-begets-education theory – can enrich and improve the discussion of

what policies will most efficiently and effectively lead to a rapid expansion of education, retention, and quality improvement. Policy responses suggested here are ideas and items for thought at this point, more than concrete proposals.

Accelerating Trends

One characteristic of the Mozambique education transition is that regions and groups all appear to experience similar, generations-long growth paths towards universal attainment. This suggests it is very difficult to accelerate paths for each region or population group, but at the same time, it also suggests that education tends to become universal within each group. If this consistency is caused by the feedback mechanisms proposed above, policy interventions to accelerate the trends would investigate where possible leverage points are within those mechanisms. At the same time, if the persistence to universal attainment within groups already exists, the objective should be mainly to accelerate enrollment growth or to improve school quality.

One possible intervention point is the production of teachers. Particularly in initial phases of education growth, there can be a shortage of adults who are sufficiently educated to be able to teach (assuming that the teacher needs to have a higher level of education than the pupils he or she is teaching). How can the number of teachers be most rapidly expanded (first for primary school, then for secondary)? One interim solution is to hire uncertified adults to teach, possibly in community or alternative schools, and to provide these local teachers with basic training and ongoing support in a small school. Another interim solution is to hire teachers from abroad, from countries with a compatible curriculum or culture and language. A medium-term solution is to accelerate the production of certified teachers. Education projections with a model developed at the EPDC, (Lutz, Goujon and Wils, 2004) suggest that the fastest path to increase teachers in countries with high drop-out or repetition rates is to focus attention on pupils presently in school, improving their promotion and retention rates so they can get to a level where they can start pedagogical training, rather than focusing on increased school entry (as is the present policy with the Education for All and Millenium Development Goal initiatives). Once the larger teaching cadre begins to roll out of the teaching academies, then school entry can be increased quickly. The advantage of the approach to focus on retention first and then access is that of those who are already in school benefit more and *earlier*.

Another possible intervention point is parents. If aspirations of parents for higher education for their children are only modest and those expectations limit children's education opportunities, awareness campaigns can raise those expectations and the perceived benefits of school. Other possibilities are programs that reduce the costs of schooling, such as fee elimination, school meals, and schools in close vicinity. Finally, if expansion is constrained by financial resources, and policy makers are funding in order of priority, given their annual budget, then a boost to the budget will speed up the spread of schooling.

Reducing Inequality

The trend to reach certain groups first and others later and the ensuing inequality is pervasive and consistent, suggesting some powerful drivers are at work that may be difficult to remove. It may well be that sequential servicing of different groups is a

rational and efficient use of ultimately limited resources. Nonetheless, the patterns pose some interesting policy dilemmas, for example, whether one should work counter to the dominant trend to reach under-served groups first to erase inequality and then proceed forward from there, or to work within the trends.

Working within trends can include a focus on all groups, ensuring that school access and retention reaches the under-served rural, female groups as well as the privileged urban groups. It can mean developing a differentiated sector-wide education policy that addresses the variety of enrollment levels within the country. However, it can also entail a focus on disadvantaged sub-groups. For example, programs can work to ensure that the lags between boy and girls enrollment are short; or that the urban-rural differential is reduced through faster education growth in the rural areas. Another way to work within trends but still improve the performance of the school system would be to develop disaggregated or regionalized policy. By focusing on aspects of school enrollment that a region is most “ready” for, efficiency of resource use should increase, both because resources are concentrated on those issues that are appropriate for the context, and because policy makers can focus on a smaller number of tasks, improving performance. Part of the regionalized approach could include mechanisms to transfer experience and learning from one region to another one that is coming up behind it.

An additional benefit of the regionalized approach, besides probable efficiencies, is that it allows the country to achieve more balanced growth of education overall. In Mozambique, a regionalized education policy would allow the country to increase secondary school access in Maputo Cidade and a number of other regions, while at the same time, working to reach primary education for all in the more remote areas.

Any policy should be cognizant of consistent overarching trends and patterns. The sequential phases of growth that have characterized and will characterize each region are similar throughout the country. That observation implies that it may be possible to develop a sector-wide education strategy that encompasses all the phases of growth starting with primary access for boys in the capital city, and ending (perhaps) with secondary school completion for boys and girls in all rural areas, but with allowances for different progression by region. The sector-wide strategy would allow regions to anticipate the next phase of growth, thus reducing the lags from one phase to the next.

Does this policy discussion apply elsewhere?

The focus thus far has been on Mozambique. Do these findings also apply to other countries? It appears from other, international comparative analyses that education rises along long, S-shaped curve and reaches males earlier than females in many countries (Wils and Goujon 1998; Wils, 2001, 2003; Wils and O’Connor, 2003, Clemens, 2004). Ongoing research at the EPDC, extending this Mozambique case study to 13 other countries, suggests that the patterns found here are pervasive, with few exceptions. The incomplete 13-country study results indicate that in the countries studied, growth is slow but persistent; females lag behind males; rural areas lag behind urban areas. However, the countries differ from each other in the length of lags between the sub-groups. In Nepal, Kenya, Uganda and Indonesia for example, the urban-rural lags are much shorter than in Ethiopia, Mali, and India. Meanwhile, in three of the four Latin American countries included - Brazil, Columbia and Nicaragua - as well as in one

African country, Kenya, male-female lags have been small to non-existent. In Bangladesh, the education growth rates of males have been low while those of females have risen quickly, removing what was once a large gender gap. But as a whole, the combined body of analysis suggests that much of what is described here for Mozambique applies elsewhere, with regional variations.

It is encouraging that in some countries the lags between groups are shorter than in Mozambique – these countries could be studied to accelerate education access and reduce inequality around the world.

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