

Trends in the Magnitude and Direction of Gender Differences in Learning Outcomes

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ABSTRACT

Using data of the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), gender differences in reading and mathematics in 15 SACMEQ school systems have been analysed.

Results revealed that at the Grade 6 level, reading achievement was mostly in favour of girls while the mathematics achievement was mostly in favour of boys in 2007. While gender equality in Grade 6 participation has improved in many SACMEQ school systems, the size and the direction of gender differences in learning achievement have been very stable from 2000 to 2007, no matter who (boys or girls) performed better. Separate analyses by school location and socioeconomic status (SES) show that in rural schools and among lower SES groups across SACMEQ school systems, gender differences in both reading and mathematics have become slightly larger in 2007 than in 2000. There was a slight improvement in gender equality in achievement in reading and mathematics in urban schools, and a reasonable improvement in higher SES groups.

These findings have led to the hypothesis that previous gender-related interventions have neglected the important quality aspect that may influence learning achievement, especially in rural schools and among lower socio-economic groups.

TABLE OF CONTENTS

Introduction	1
Policy Questions and Specific Research Questions.....	1
Existing Evidence of Trend in Gender Equality in Achievement	2
Reading Achievement.....	2
Mathematics Achievement	3
Gender Equality in the SACMEQ Context	4
Background on the SACMEQ Research Programme	4
Gender-related Policy Frameworks in SACMEQ Countries.....	6
Grade 6 Enrolment in SACMEQ Countries.....	6
Magnitude and Direction of Gender Differences in Achievement in 2007.....	7
What were the differences in achievement (reading, mathematics) between Grade 6 boys and girls in 2007?	8
Were the patterns of gender differences in 2007 the same between: (i) rural and urban areas and (ii) low SES and high SES groups?.....	10
What were the differences in percentages of boys and girls who reached at least SACMEQ competency Level 4 for reading (Reading for Meaning) and mathematics (Beginning Numeracy) in 2007?	14
Changes in the Gender Differences in Achievement between 2000 and 2007.....	17
What were the changes in the direction and magnitude of gender differences in Grade 6 pupil's achievement (reading, mathematics) between 2000 and 2007?	17
Were the patterns of the changes in the direction and magnitude of gender differences the same between: (i) rural and urban areas; and (ii) low SES and high SES groups?.....	21
Were the patterns of the changes between 2000 and 2007 in the percentages of boys and girls the same across SACMEQ competency levels for reading and mathematics?.....	25
Discussion and Conclusion	26
Discussion	26
Conclusion	28
References	30
Appendices	34
Appendix 1: Gender Differences in Reading by School Location and SES Level for 2000 and 2007	35
Appendix 2: Gender Differences in Mathematics by School Location and SES Levels for 2000 and 2007	36
Appendix 3: Gender Differences in Reading by Competency Level for 2000 and 2007	37
Appendix 4: Gender Differences in Mathematics by Competency Level for 2000 and 2007 ..	38

LIST OF TABLES

Table 1:	Summary of Research Results on Gender Differences in Learning Achievement in Selected Assessment Studies.....	4
Table 2:	Special Ministries and Units Dealing with Gender Issues and Focus on Gender-related Policies and Interventions in SACMEQ Countries.....	5
Table 3:	Estimated Grade 6 Pupils by Gender in SACMEQ Countries in 2000 and 2007 ...	7
Table 4:	Gender Differences in the Mean Reading Scores for Grade 6 Pupils in SACMEQ III (2007)	8
Table 5:	Gender Differences in Mean Mathematics Scores for Grade 6 Pupils in SACMEQ III (2007)	9
Table 6:	SACMEQ Competency Levels for Reading	15
Table 7:	SACMEQ Competency Levels for Mathematics	15
Table 8:	Gender Differences in Percentages of Grade 6 Pupils in SACMEQ Countries Reaching at least Level 4 of Reading (2007).....	16
Table 9:	Gender Differences in Percentages of Grade 6 Pupils in SACMEQ Countries Reaching at least Level 4 of Mathematics (2007).....	16

LIST OF FIGURES

Figure 1:	Gender Gap at Country Level, Rural Area, and Urban Area (Reading, 2007)	11
Figure 2:	Gender Gap at Country Level, Rural Area, and Urban Area (Mathematics, 2007)	12
Figure 3:	Gender Gap at Country Level and SES Levels (Reading, 2007).....	13
Figure 4:	Gender Gap at Country Level and SES Levels (Mathematics, 2007).....	14
Figure 5:	Similarity of Gender Gaps between 2000 and 2007 (Reading).....	18
Figure 6:	Similarity of Gender Gaps between 2000 and 2007 (Mathematics).....	18
Figure 7:	Hypothetical Examples to Compare Gender Differences across Time	19
Figure 8:	Scatter Diagram on Gender Differences in 2000 vs. 2007 in Reading.....	20
Figure 9:	Scatter Diagram on Gender Differences in 2000 vs. 2007 in Mathematics.....	20
Figure 10:	Changes in Gender Differences from 2000 to 2007 in Reading (Rural vs. Urban)	22
Figure 11:	Changes in Gender Differences from 2000 to 2007 in Mathematics (Rural vs. Urban)	23
Figure 12:	Changes in Gender Differences from 2000 to 2007 in Reading (Low SES vs. High SES).....	24
Figure 13:	Changes in Gender Differences from 2000 to 2007 in Mathematics (Low SES vs. High SES)	24
Figure 14:	Changes in Gender Differences from 2000 to 2007 for Proportion of Pupils Who Have Reached Various Competency Levels in Reading	25
Figure 15:	Changes in Gender Differences from 2000 to 2007 for Proportion of Pupils Who Have Reached Various Competency Levels in Mathematics	26

Introduction

Education is a fundamental human right which shall be made available equally to everyone (United Nations, 1948). Many governments have attempted to ensure the provision of this basic human right. However, there are still some disadvantaged groups that have fallen behind, including girls and women. Both the Dakar Final Framework for Action in the Education for All (EFA) (UNESCO, 2000) and the Millennium Development Goals (MDGs) (United Nations, 2006) emphasized the importance of gender equality in education within the process of international goal setting as follows:

- **Dakar Final Framework of Action #5:** “Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality”; and
- **Millennium Development Goal #3:** “Promote Gender Equality and Empower Women: Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015”.

While there has been much improvement in gender parity with respect to school participation rates since 1999, the gender equality issue in education needs to go far beyond parity (UNESCO, 2003; USAID, 2008; IIEP, 2011) to include issues such as the need for: (i) a safe and non-discriminatory school environment; (ii) the presence of enough male and female teachers to act as gender role models; (iii) un-biased teacher-based dynamics in the classroom combined with teacher training in gender issues; (iv) un-biased curricula content; (v) the absence of significant gender differences in learning outcomes; and (vi) a reduction in gendered choice of subject areas in tertiary education.

Policy Questions and Specific Research Questions

This working paper deals with important issues on gender equality in learning achievement that have been derived from analyses of information from the SACMEQ data archive, that contains data from three large-scale assessments undertaken in 15 Southern and Eastern school systems. The main aim of this working paper is to investigate whether gender equality has been attained in terms of pupils' performance in the two main school subjects: reading and mathematics. More specifically, the following policy questions have been addressed:

General Policy Question #1: What were the magnitude and direction of gender differences in pupil achievement in 2007?

- **Specific Research Question 1.1** What were the differences in achievement (of reading and mathematics) between Grade 6 boys and girls in 2007 in terms of average standardized scores?
- **Specific Research Question 1.2** Were the patterns of gender differences in 2007 the same between: (i) rural and urban areas; and (ii) low SES and high SES groups?

- **Specific Research Question 1.3** What were the differences in percentages of boys and girls who reached at least SACMEQ competency Level 4 for reading (Reading for Meaning) and mathematics (Beginning Numeracy) in 2007?

General Policy Question #2: What were the changes in magnitude and direction of gender differences in achievement between 2000 and 2007?¹

- **Specific Research Question 2.1** What were the changes in the magnitude and the direction of gender differences in Grade 6 pupils' achievement (of reading and mathematics) between 2000 and 2007?
- **Specific Research Question 2.2** Were the patterns of the changes between 2000 and 2007 in the magnitude and the direction of gender differences the same for: (i) rural and urban areas; and (ii) low SES and high SES groups?
- **Specific Research Question 2.3** Were the patterns of the changes between 2000 and 2007 in the percentages of boys and girls the same across SACMEQ competency levels for reading and mathematics?

It should be noted, however, that the main focus of this working paper was to describe gender differences in learning achievement, and not to investigate factors that may influence gender differences in achievement. Some of the possible explanations for gender differences in learning achievement have been explored by Saito (2011).

Existing Evidence of Trend in Gender Equality in Achievement

This section will provide a review of other international and sub-regional assessment studies. These studies include the Progress in International Reading Literacy Study (PIRLS) and the Trends in Mathematics and Science Studies (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA); Programme for International Student Assessment (PISA) conducted by the Organization for Economic Cooperation and Development (OECD); the *Segundo estudio regional comparativo y explicativo* (SERCE) by the *Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación* (LLECE); and the *Programme d'Analyse des Systèmes Educatifs des Pays de la Conférences des Ministres de l'Education des Pays Francophones* (CONFEMEN-PASEC). A summary of this section has been provided in **Table 1**.

Reading Achievement

Mullis et al. (2007) reported that in all 40 countries that participated in PIRLS in 2006, girls, in both Grade 4 and 8, performed significantly better than boys in terms of mean reading scores as well as the proportion of pupils reaching the top quartile performance level. The

¹ The data collection for SACMEQ II was in 2000 in all countries except for Malawi (2002) and Mauritius (2001).

sizes of these gender differences, however, were greater than were observed in the same study conducted during 2001 (Mullis et al, 2003).

Similarly, research results from OECD's PISA during 2009 with 15-year-old students indicated that girls performed significantly better than boys in all competency areas related to reading: the retrieving information scale, the interpretation scale, and the reflection and evaluation scale (OECD, 2010). It has also been reported that this pattern of research results has been consistent since the start of PISA in 2000 (Reading Association, 2010; EACEA, 2010).

While only limited data on trends over time are available for developing countries, their patterns are somewhat different. For example, in Latin America, the results of the SERCE, which was undertaken by LLECE in 2007, have shown that at the Grade 3 level, girls performed better than boys in all 17 countries that participated in the study. However, at the Grade 6 level, girls significantly performed better than boys only in nine countries (LLECE, 2008).

In Francophone Africa, much work on learning assessment has been carried out by the CONFEMEN through its PASEC study. Results have shown that at Grade 2, gender differences in reading were negligible, while differences at Grade 5 were very large and in favour of boys (CONFEMEN, 2011).

Mathematics Achievement

Unlike reading, results in mathematics have been more mixed. Out of 43 countries that participated in TIMSS in 2007, Grade 4 girls performed significantly better than boys in eight countries, and boys performed significantly better in 16 countries. At the Grade 8 level, these results were reversed, with 16 countries in favour of girls and 10 countries in favour of boys (Mullis et al, 2008). However, in earlier TIMSS studies, the results were totally different. In 1995, although the direction was mixed, in none of the countries was girls' mathematics performance significantly better than boys at both 3rd/4th grades or 7th/8th grades (Beaton et al, 1996; Mullis et al, 1997; Mullis et al, 2005).

The above TIMSS results were consistent with results from the OECD's PISA. The mathematics results in 2006 showed that in all countries boys achieved better than girls, many of them with statistical significance. In 2009, while 35 countries had boys achieving higher performance levels, in five countries the achievement of girls was significantly higher than that of boys (OECD, 2010; EACEA, 2010).

In Latin America, while reading was in favour of girls, mathematics was slightly in favour of boys at the Grade 3 level, with only one country where girls performed significantly better than boys. Boys performed significantly better in seven countries at this level. For the Grade 6 level, the gender differences (where boys were in favour with statistical significance) were larger than that for the Grade 3 level, although the number of countries with statistical significance was the same in Grade 6 as in Grade 3 (LLECE, 2008).

Results in mathematics from the countries participating in the PASEC programme were somewhat similar to that obtained for reading. That is, there were practically no gender differences at a lower grade level; however, at an upper grade level gender differences became larger in favour of boys (CONFEMEN, 2011).

Table 1: Summary of Research Results on Gender Differences in Learning Achievement in Selected Assessment Studies

Assessments	Trends
IEA PIRLS (Reading)	In all grades, girls in favour. Increasing magnitude over time.
IEA TIMSS (Mathematics)	In all grades, mixed results. Changing direction over time.
OECD PISA (Reading)	Girls in favour. Consistent over time.
OECD PISA (Mathematics)	Mixed results. Changing direction over time.
LLECE SERCE (Reading)	Lower grade: Girls significantly better. Upper grade: Mixed results No trend data over time.
LLECE SERCE (Mathematics)	In all grades, mostly boys in favour. No trend data over time.
CONFEMEN PASEC (Reading & Mathematics)	Lower grade: No difference Upper grade: Boys significantly better No trend data over time

Source: Compiled by the author.

Gender Equality in the SACMEQ Context

Background on the SACMEQ Research Programme

Since 1994, 15 Ministries of Education in Southern and Eastern Africa (Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania (Mainland), Tanzania (Zanzibar), Uganda, Zambia, and Zimbabwe) have been working together to undertake a research programme on the conditions of schools and the quality of education. Driven by priority concerns of senior decision makers, SACMEQ's mission is to: (a) expand opportunities for educational planners to gain the technical skills required to monitor and evaluate the quality of their education systems; and (b) generate information that can be used by decision-makers to plan and improve the quality of education. SACMEQ has completed three large-scale, cross-national studies of the quality of education: SACMEQ I (1995-1999, reading) with seven ministries; SACMEQ II (2000-2004, reading and mathematics) with 14 ministries; and SACMEQ III (2006-2010, reading, mathematics, and HIV and AIDS knowledge) with 15 ministries.

Table 2: Special Ministries and Units Dealing with Gender Issues and Focus on Gender-related Policies and Interventions in SACMEQ Countries

School System	Special Ministries and/or Special Units within Ministries of Education	Focus on Gender-related Policies and Interventions
Botswana	<ul style="list-style-type: none"> Department of Women's Affairs in Ministry of Labour and Home Affairs Gender Mainstreaming Committee in Ministry of Education 	<ul style="list-style-type: none"> Guidelines for financial support for women Projects on women and poverty, power, decision-making, health, violence against women and girls, gender-sensitive curriculum
Kenya	<ul style="list-style-type: none"> Ministry of Gender, Children, and Social Development 	<ul style="list-style-type: none"> Establish mechanism to eliminate all gender disparities in education Programmes on inclusiveness, affirmative action, mainstreaming to improve access, completion, transition, retention, and performance of girls
Lesotho	<ul style="list-style-type: none"> Ministry of Gender & Youth, Sports & Recreation 	<ul style="list-style-type: none"> Policy to mainstream gender Monitor through gender parity in primary, secondary, and tertiary education
Malawi	<ul style="list-style-type: none"> Ministry of Gender, Youth & Community Services Gender Coordination Unit and Gender Focal Point in Ministry of Education 	<ul style="list-style-type: none"> Promote gender mainstreaming throughout public sector Reduce repetition, absence, and drop-outs of girls Implement gender-sensitive curriculum Increase enrolment of girls in science and technology Programmes on readmission of mothers, grants for orphans, child-friendly schools
Mauritius	<ul style="list-style-type: none"> Ministry of Women's Rights, Child Development, Family Welfare and Consumer Protection 	<ul style="list-style-type: none"> National Gender Policy Framework to ensure equal opportunities to both sexes Achieve gender equality in learning, gender sensitivity in curriculum, teaching & learning materials
Mozambique	<ul style="list-style-type: none"> Ministry for Women and Social Welfare Special units in Ministry of Education and Provincial Directorates of Education 	<ul style="list-style-type: none"> Gender policy to improve access and participation of girls Guideline on positive discrimination of girls in order to achieve enrolment and retention
Namibia	<ul style="list-style-type: none"> Minister of Gender Equality and Child Welfare 	<ul style="list-style-type: none"> Gender policy on (i) improvement of school completion rates for girls; (ii) increased female access to vocational training and science & technology
Seychelles	<ul style="list-style-type: none"> Gender Secretariat- Ministry of Health and Social Development (Executive) 	<ul style="list-style-type: none"> Plan of Action concerning gender equality Study on gender, school improvement evaluation, child-study project, mainstreaming gender
South Africa	<ul style="list-style-type: none"> Office of the Status of Women, Office of the President Department of Women, Children and Persons with Disability Gender Equity Unit within Department of Basic Education 	<ul style="list-style-type: none"> Commitment to achieve gender parity and empowerment of women Equal opportunities for access, retention, promotion, performance, career advancement Reduce gender bias in curriculum and teaching
Swaziland	<ul style="list-style-type: none"> Ministry of Home Affairs Gender Desk within the Ministry of Education and Training 	<ul style="list-style-type: none"> Programmes to make schools as centres to protect girls Encouraging girls to take up careers previously dominated by males Gender-sensitive curriculum and teaching
Tanzania (Mainland)	<ul style="list-style-type: none"> Ministry of Community Development, Gender and Children Gender Desk within Ministry of Education and Vocational Training 	<ul style="list-style-type: none"> Monitor access and parity in education, girls' retention in school, gender-sensitive curricula, the protection of girls against violence
Uganda	<ul style="list-style-type: none"> Ministry of Gender and Community Development Gender Desk within Ministry of Education and Sports 	<ul style="list-style-type: none"> Projects dealing with equitable access, girls' retention in school, girls' performance in science and mathematics, protection of girls against violence, gender-sensitive curriculum, and gender-responsive teaching methodology.
Zambia	<ul style="list-style-type: none"> Gender in Development in Cabinet Office 	<ul style="list-style-type: none"> Programme for the Advancement of Girls Education for increasing access, retention, and enhancing achievements, especially in mathematics and science for girls. Re-entry policy that allowed girls who fell pregnant to return to school after delivery
Tanzania (Zanzibar)	<ul style="list-style-type: none"> Ministry of Social Welfare, Youth, Children and Women Development Gender Focal Point within Ministry of Education and Vocational Training 	<ul style="list-style-type: none"> Gender equality issues covering equitable access, girls' retention in schools, a gender-sensitive curriculum, a gender-responsive teaching methodology, and the protection of girl students against violence.
Zimbabwe	<ul style="list-style-type: none"> Ministry of Women's Affairs, Gender and Community Development Inspectorate Departments of the Ministry of Education 	<ul style="list-style-type: none"> Gender equality policies focus on issues of discipline and curriculum implementation and fulfillment of the requirements of the MDG.

Sources: Compiled by the author based on SACMEQ National Policy Briefs from 15 school systems (2011).

Gender-related Policy Frameworks in SACMEQ Countries

Gender equality issues have also been a major concern of senior decision makers in SACMEQ countries (Saito, 1998). As shown in **Table 2**, in many of the SACMEQ school systems, special Ministries have been established in order to deal with the gender issue in general. Analyses of SACMEQ National Policy Briefs from 15 school systems have also revealed that many of the SACMEQ countries had a special unit, such as “Gender Desk” or “Gender Focal Point”, within Ministries of Education. The objectives of gender-related policies, special programmes, and indicators to monitor progress on gender equality varied from one country to another. Most of the countries make reference to gender equality in access and participation. Botswana, Mauritius, South Africa, Swaziland, Uganda, Zanzibar, and Zimbabwe reported on the presence of policy (programmes or projects) to ensure gender-sensitive curricula and teaching practices. Two countries (Botswana, and Uganda) reported a special focus on health and violence issues.

Grade 6 Enrolment in SACMEQ Countries

As shown in research by Hungi (2011), the participation rates of girls at Grade 6 level were very mixed depending on the country. In order to analyze gender differences in learning achievement, it is necessary to take participation rates into consideration throughout time. The estimated population of the Grade 6 pupils at the time of data collection in 2000 and 2007 has been shown in **Table 3** in order to provide a context for the interpretation of the gender differences in learning achievement. These figures were generated using the special pupil weight called the Raising Factor, which is the inverse of the probability of selection into the sample. The Raising Factor carried by one pupil in the sample represents the number of Grade 6 pupils in the population (Ross & Saito, in press).

The proportion of Grade 6 girls out of all Grade 6 pupils for most of the SACMEQ school systems was around the gender-balance level of 50 percent in 2007, except for Lesotho (55 percent), Mozambique (46 percent), Zanzibar (57 percent), and Zimbabwe (56 percent). Within most SACMEQ countries the changes in the proportion of Grade 6 girls between 2000 and 2007 were around ± 1 to 2 percent, except for Mozambique, Uganda, and Zanzibar, where the proportions increased by 5 to 6 percent in this period. In 2000 Mozambique had an extremely low proportion of Grade 6 girls at 40 percent, and by 2007 the proportion increased to 46 percent. In Uganda, the Grade 6 girls’ proportion increased from 45 percent to slightly beyond the gender balance level. In Zanzibar, already in 2000 the proportion of Grade 6 girls was slightly larger than boys (52 percent), and it continued to increase in 2007 to 57 percent. In Zimbabwe, while data were not collected in 2000, Chitiga & Chinoona (2011) indicated that the Grade 6 girls’ proportion in 1995 was 50 percent.

The final two columns of **Table 3** show the growth rates between 2000 and 2007 for boys and girls separately. The growth rates were calculated by taking the values of changes between 2000 and 2007 and dividing by the figures at the starting point of the year 2000. As has been already pointed out in Hungi (2011), the figures in **Table 3** reflected the impact of programmes conducted in association with Education for All (EFA) strategies. For example, in countries such as Mozambique, Tanzania Mainland, and Uganda where Universal Primary Education (UPE) was introduced around the year 2000, there were large increases in the

overall Grade 6 enrolment. In countries such as Botswana, Mauritius, Namibia, Seychelles, and South Africa, where UPE was already in place before 2000, there was very little increase in Grade 6 enrolment. In terms of differences between Grade 6 boys' and girls' enrolment growth rates, in Mozambique (138 percent for boys vs. 196 percent for girls), Uganda (64 percent for boys vs. 111 percent for girls), and Zanzibar (38 percent for boys vs. 73 percent for girls), the growth rates for girls were much larger than those for boys.

Table 3: Estimated Grade 6 Pupils by Gender in SACMEQ Countries in 2000 and 2007

School Systems	Grade 6 enrolment 2000			Grade 6 enrolment 2007			Growth Rate	
	Boys	Girls	% Girls	Boys	Girls	% Girls	Boys	Girls
Botswana	19,244	20,062	51%	20,736	20,928	50%	8%	4%
Kenya	289,230	293,293	50%	378,263	367,444	49%	31%	25%
Lesotho	17,257	21,567	56%	20,484	24,634	55%	19%	14%
Malawi	83,187	76,054	48%	98,387	95,368	49%	18%	25%
Mauritius	13,706	12,714	48%	12,068	11,567	49%	-12%	-9%
Mozambique	73,012	49,326	40%	173,454	145,789	46%	138%	196%
Namibia	23,247	25,133	52%	23,140	25,111	52%	0%	0%
Seychelles	772	774	50%	773	742	49%	0%	-4%
South Africa	428,040	473,632	53%	457,003	471,483	51%	7%	0%
Swaziland	12,135	12,957	52%	14,012	14,042	50%	15%	8%
Tanzania(M)	234,604	256,329	52%	474,301	491,104	51%	102%	92%
Uganda	183,325	147,051	45%	301,474	310,192	51%	64%	111%
Zambia	84,088	79,007	48%	124,029	117,818	49%	47%	49%
Zanzibar	8,349	8,925	52%	11,505	15,435	57%	38%	73%
Zimbabwe	NA	NA	NA	120,251	155,643	56%	NA	NA
SACMEQ	1,470,196	1,476,824	50%	2,230,179	2,267,262	50%	52%	54%

Source: Generated by the author based on SACMEQ Data Archive (2007)

Magnitude and Direction of Gender Differences in Achievement in 2007

In this working paper, the term “magnitude” was used to indicate the size of gender differences for mean scores in reading and mathematics. The term “direction” signified whether boys or girls performed better. For consistency throughout the working paper, the positive direction referred to the situation where girls performed better, and the negative direction referred to the situation where boys performed better.

As described in Ross et al. (in press) and Saito et al. (in press), SACMEQ III reading and mathematics tests had many items in common with the tests used for SACMEQ II. Any item which showed substantial Differential Item Functioning (DIF) across countries was removed for scoring purposes. There were no items that showed a major DIF on gender.

The standardized mean scores in SACMEQ III were based on the item parameters that were established during SACMEQ II. The overall sub-regional mean score for SACMEQ II pupils was set at 500 with a standard deviation of 100 for each subject.

The sampling errors for means were calculated using the IIEPJACK software based on the Jack knife procedure. The sampling errors for the gender differences have been calculated by the following formula:

$$SE_{M_G - M_B} = \sqrt{(SE_G)^2 + (SE_B)^2}$$

Where : SE stands for the Standard Error of Sampling,
 M_G stands for the Mean for Girls, and
 M_B stands for the Mean for Boys

In general, statistical significance is present if the gender difference is larger than twice the size of the sampling error.

What were the differences in achievement (reading, mathematics) between Grade 6 boys and girls in 2007?

Reading

In **Table 4**, the means and sampling errors of reading scores of Grade 6 pupils have been presented separately for boys and girls. The gender differences (girls' mean scores – boys' mean scores) and the sampling errors of the differences have been presented in the final two columns.

Table 4: Gender Differences in the Mean Reading Scores for Grade 6 Pupils in SACMEQ III (2007)

School System	Boys		Girls		Differences		
	M_B	SE_B	M_G	SE_G	$M_G - M_B$	$SE_{M_G - M_B}$	
Botswana	519.7	5.07	549.4	4.54	29.7	6.80	**
Kenya	544.1	4.93	542.1	5.63	-2.0	7.48	
Lesotho	463.5	3.36	471.5	2.95	7.9	4.47	
Malawi	438.4	3.02	428.5	2.73	-9.9	4.07	**
Mauritius	558.8	5.72	588.9	4.93	30.0	7.55	**
Mozambique	478.4	2.86	473.2	3.49	-5.3	4.51	
Namibia	489.6	3.08	503.7	3.20	14.0	4.44	**
Seychelles	544.4	4.56	607.2	4.01	62.8	6.07	**
South Africa	483.5	4.69	506.0	4.78	22.5	6.69	**
Swaziland	545.2	3.19	553.6	3.12	8.4	4.46	
Tanzania (M)	586.1	3.78	569.7	3.79	-16.5	5.35	**
Uganda	481.5	3.73	475.9	3.67	-5.6	5.23	
Zambia	437.1	3.44	431.5	4.08	-5.6	5.34	
Zanzibar	526.2	3.32	539.6	2.93	13.4	4.43	**
Zimbabwe	501.5	6.33	512.5	6.00	11.0	8.72	
SACMEQ III	506.5	4.07	517.0	3.99	10.6	5.70	

** Significant at 95% confidence limit

Source: Generated by the author based on SACMEQ Data Archive (2007)

Compared to the overall SACMEQ II mean of 500, both boys and girls had slightly higher scores (506.5 for boys and 517.0 for girls) during SACMEQ III. Although girls were in favour

by 10.6 score points at the overall SACMEQ level, the difference was not statistically significant.

At the country level, the sizes of gender differences varied from -16.5 score points (boys in favour) in Tanzania Mainland to +62.8 score points (girls in favour) in Seychelles. Girls performed significantly better than boys in six school systems (Botswana, Mauritius, Namibia, Seychelles, South Africa, and Zanzibar). On the other hand, boys performed significantly better than girls in two school systems (Malawi and Tanzania Mainland). In seven other school systems, the gender differences were not statistically significant.

Mathematics

In **Table 5**, the results for mathematics have been presented. As was the case for reading, the scores for boys and girls at the overall SACMEQ level during SACMEQ III were slightly higher compared to the pupil mean score of 500 which was established during SACMEQ II. However, the gender difference in scores at the overall SACMEQ level (-4.3) was not statistically significant.

Table 5: Gender Differences in Mean Mathematics Scores for Grade 6 Pupils in SACMEQ III (2007)

School System	Boys		Girls		Differences		
	M _B	SE _B	M _G	SE _G	M _G -M _B	SE _{MG-MB}	
Botswana	517.5	3.96	523.6	3.52	6.1	5.30	
Kenya	576.3	4.77	550.9	4.78	-25.4	6.75	**
Lesotho	477.1	3.02	476.8	2.81	-0.3	4.13	
Malawi	452.7	3.30	441.1	3.12	-11.6	4.54	**
Mauritius	616.1	6.77	630.7	5.82	14.6	8.92	
Mozambique	488.2	2.36	478.6	3.23	-9.6	4.00	**
Namibia	472.0	2.76	470.1	2.62	-1.9	3.80	
Seychelles	535.2	3.60	566.7	3.36	31.5	4.92	**
South Africa	491.2	4.13	498.4	3.86	7.2	5.65	
Swaziland	545.5	2.60	536.2	2.62	-9.3	3.69	**
Tanzania (M)	568.5	4.06	537.5	3.72	-30.9	5.50	**
Uganda	486.7	3.28	477.2	3.16	-9.5	4.55	**
Zambia	440.8	2.93	429.2	2.86	-11.5	4.10	**
Zanzibar	489.3	2.39	483.9	1.90	-5.4	3.05	
Zimbabwe	520.8	5.82	519.0	5.26	-1.7	7.85	
SACMEQ III	511.8	3.75	507.5	3.55	-4.3	5.16	

** Significant at 95% confidence limit

Source: Generated by the author based on SACMEQ Data Archive (2007)

At the country level, the sizes of gender differences varied from -30.9 score points (boys in favour) in Tanzania Mainland to +31.5 score points (girls in favour) in Seychelles. Unlike the results for reading achievement, only in Seychelles did girls outperform boys in mathematics achievement with statistical significance. In seven school systems (Kenya, Malawi, Mozambique, Swaziland, Tanzania Mainland, Uganda, and Zambia), boys performed significantly better than girls. In seven other school systems, differences were not statistically significant.

Were the patterns of gender differences in 2007 the same between: (i) rural and urban areas and (ii) low SES and high SES groups?

In general, results at the country level could hide some important messages. In order to examine whether the patterns in gender differences are the same throughout different sub-groups, school location and SES have been used in this working paper. These results have been included in Appendices 1 and 2.

School location

In the School Head Questionnaire, there was a question which asked the School Heads about their perception about the location of their schools according to the following categories:

- Isolated
- Rural
- In or near a small town
- In or near a large town or city

These four options were transformed into two categories:

- The “isolated” and “rural” categories were combined to form a “Rural” area; and
- The “in or near a small town” and the “in or near a large town or city” were combined to form an “Urban” area.

It should be noted that this variable dealt with information derived from the perception of School Heads, and this is only relative within each country’s context. For example, a rural area in South Africa could be as developed as an urban area in Swaziland.

Reading

In **Figure 1**, the gender differences at the country level as well as those for rural and urban areas have been presented for reading scores. The statistical significance has been indicated with shaded bars.

The results presented in **Figure 1** illustrate that in all school systems except Kenya, the direction of the gender difference was the same for the country as a whole as well as both the rural and urban areas. In other words, if the difference was negative at the country level (indicating that boys were in favour), the differences were also negative in the rural and urban areas within the same country. Likewise, if the difference was positive at the country level (indicating that girls were in favour), the differences were also positive in rural and urban areas within country.

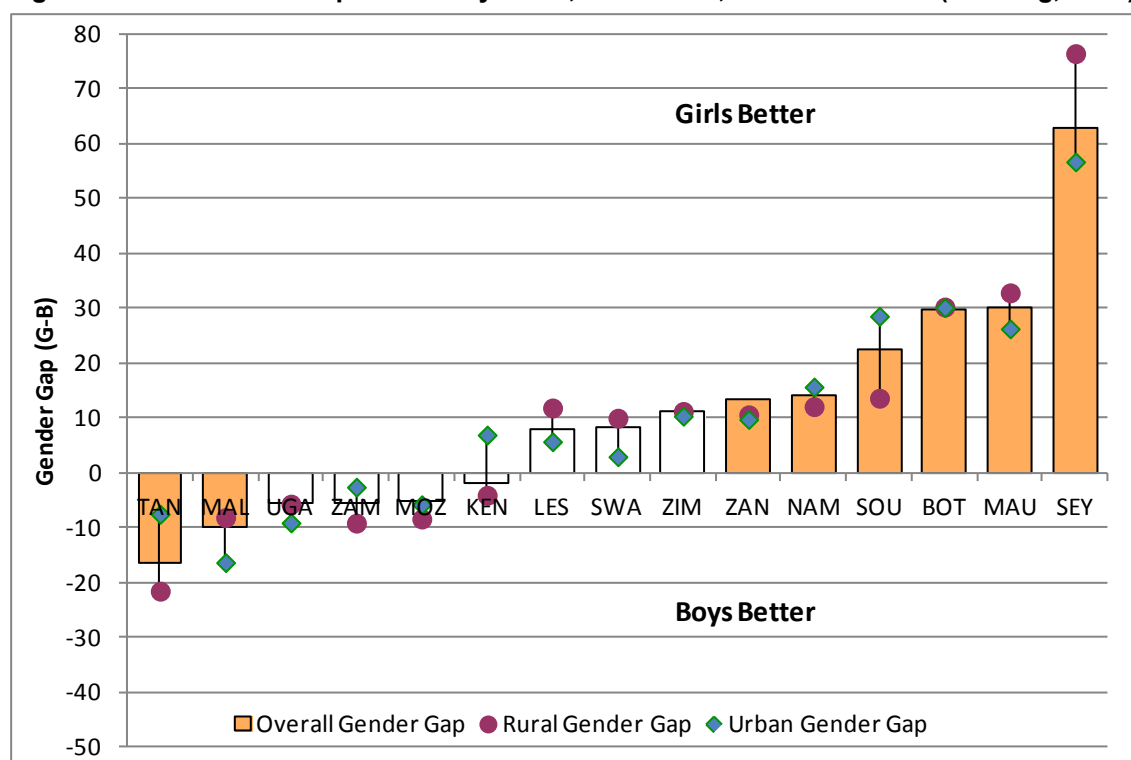
In Kenya, there was no gender difference at the country level, which represented a “cancelling” effect from two different results: (i) boys performed better in rural areas, but (ii) girls performed better in urban areas. However, these differences were not statistically significant.

Girls performed better than boys in reading at the country level, as well as in both rural and urban areas in nine school systems. In Botswana, Zanzibar, and Zimbabwe, the gender

differences were the same in both areas in favour of girls. In Namibia and South Africa, the size of the gap (in favour of girls) was larger in urban areas than in rural areas. In contrast, in Lesotho, Swaziland, Mauritius, and Seychelles, there was more equality in urban areas; i.e., the gender gap was smaller in urban areas than in rural areas.

Boys performed better than girls in reading in both rural and urban areas in five school systems. In Malawi and Uganda, the gender gap was larger in urban areas than in rural areas. In Tanzania Mainland, Zambia, and Mozambique, the gender gap was smaller in urban areas than in rural areas.

Figure 1: Gender Gap at Country Level, Rural Area, and Urban Area (Reading, 2007)



Shaded bars: Statistical significance at 95% confidence level

Source: Generated by the author based on SACMEQ Data Archive (2007)

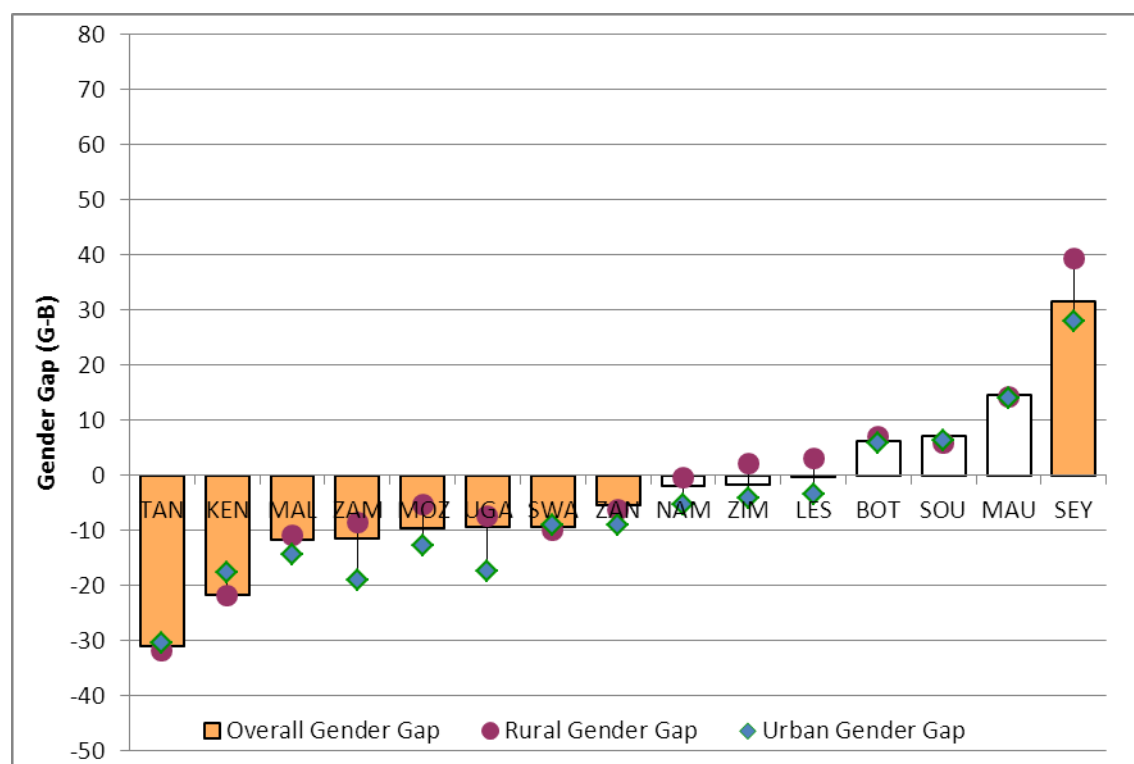
Mathematics

In **Figure 2**, gender differences in mathematics achievement have been presented separately for the country level as well as urban and rural areas. In 12 school systems the direction was the same in both urban and rural areas. The direction was different between rural and urban areas for three school systems. In Lesotho and Zimbabwe, where gender differences at the country level were marginal, girls performed better in rural areas, while boys performed better in urban areas. On the other hand, in Namibia, in rural areas, there was no gender disparity, but in urban areas boys performed better than girls.

Girls performed better than boys in both rural and urban areas in Botswana, South Africa, Mauritius, and Seychelles. The gender gap was larger in rural areas than in urban areas for Seychelles. On the other hand, the size of the gender gap was very similar between the rural and urban areas for Botswana, South Africa, and Mauritius.

Boys performed better than girls in both rural and urban areas in eight school systems. In Swaziland and Tanzania Mainland, the gender gap was the same (in favour of boys) in both areas. The gender gap was larger in urban areas in Malawi, Zambia, Mozambique, Uganda, and Zanzibar. On the other hand, the gender gap was smaller in urban areas in Kenya.

Figure 2: Gender Gap at Country Level, Rural Area, and Urban Area (Mathematics, 2007)



Shaded bars: Statistical significance at 95% confidence level

Source: Generated by the author based on SACMEQ Data Archive (2007)

SES level

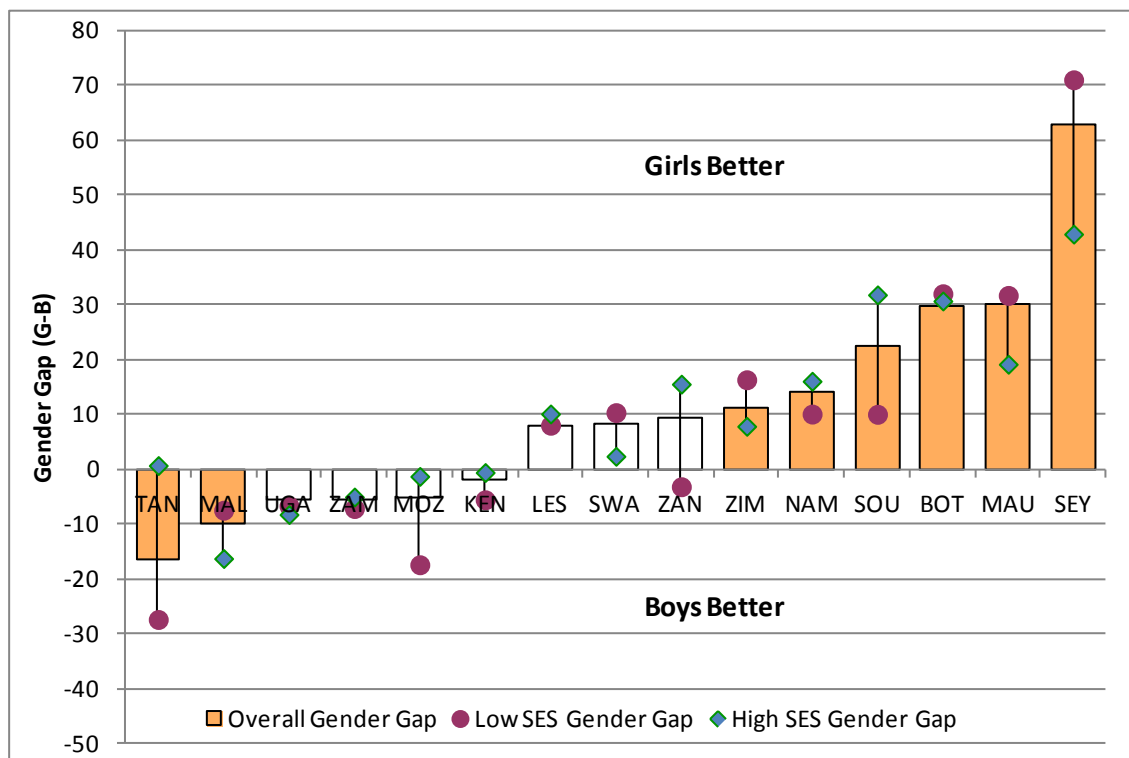
Pupil's SES score was constructed using the Rasch approach based on the SACMEQ II data, using information that described home possessions, parents' education levels, and the materials used to construct the places where pupils lived (Dolata, 2005). The mean SES score of SACMEQ II pupils was set at 500 with a standard deviation of 100. The item parameters were applied to the SACMEQ III data in order to score the SES score of each pupil. For each country, the distribution of SES scores was divided as follows: The low SES group represented pupils below the 25th percentile while the high SES group represented pupils above the 75th percentile within each country. Again, these levels were in reference to the SES within countries.

Reading

As shown in **Figure 3**, in almost all school systems the direction of gender differences in the reading achievement in 2007 was the same between the low and high SES groups. Girls performed better in both low and high SES groups in eight school systems. In Lesotho and Botswana, the size of gender difference was about the same in both the low and high SES groups. The gender disparity (girls performing better) was larger in the high SES group in

Namibia and South Africa. It was smaller in the high SES group in Mauritius, Seychelles, Swaziland, and Zimbabwe.

Figure 3: Gender Gap at Country Level and SES Levels (Reading, 2007)



Shaded bars: Statistical significance at 95% confidence level

Source: Generated by the author based on SACMEQ Data Archive (2007)

For Uganda and Zambia, the sizes of gender differences were about the same in both SES groups. Boys performed better in both low and high SES groups in three school systems. The gender disparity was larger in the high SES group for Malawi, while it was smaller for the high SES group for Kenya, Mozambique, and Tanzania Mainland.

The direction was different between low and high SES groups in Zanzibar, where in the high SES group girls performed better while boys performed better in the low SES group.

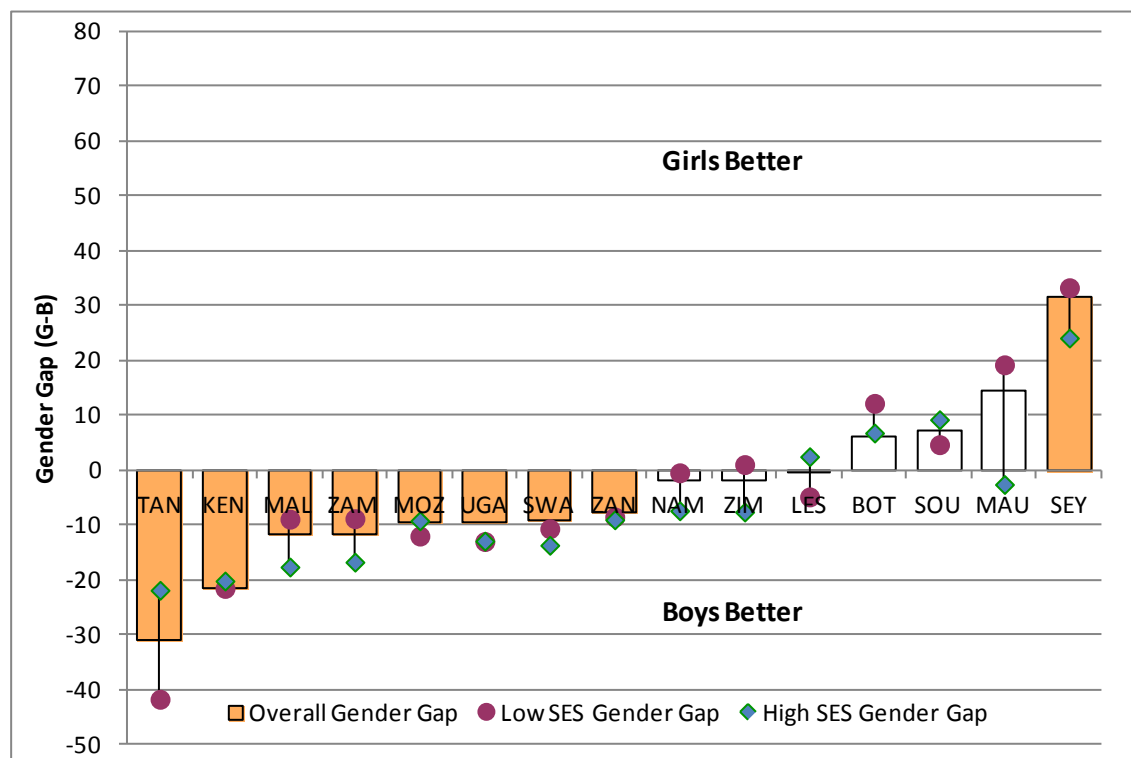
Mathematics

In terms of the mathematics achievement in 2007, in 13 school systems the direction of gender differences was the same between the low and high SES groups (see **Figure 4**). Girls performed better in both low and high SES groups in three school systems. The gender disparity was larger in the high SES group for South Africa, while it was smaller in the high SES group for Botswana and Seychelles.

Boys performed better in both low and high SES groups in 10 school systems. The gender disparity was larger in high SES groups in Malawi, Namibia, Swaziland, Uganda, Zambia, and Zimbabwe. It was smaller in the high SES groups in Kenya, Mozambique, Tanzania Mainland, and Zanzibar.

The direction was different between low and high SES groups in two school systems. In Lesotho, boys performed better in the low SES group, but girls performed better in the high SES group. For Mauritius, girls performed better in the low SES group, while boys performed better in the high SES group.

Figure 4: Gender Gap at Country Level and SES Levels (Mathematics, 2007)



Shaded bars: Statistical significance at 95% confidence level

Source: Generated by the author based on SACMEQ Data Archive (2007)

What were the differences in percentages of boys and girls who reached at least SACMEQ competency Level 4 for reading (Reading for Meaning) and mathematics (Beginning Numeracy) in 2007?

In the SACMEQ studies, in addition to the mean scores, another way to refer to achievement was devised through the establishment of competency levels. These levels were based on a careful examination of all items through a “skills audit” where the skills required for Grade 6 pupils to answer each item correctly were identified. A detailed process of “skills audit” has been shown in Ross et al. (2004). The eight levels of reading and mathematics competency levels have been presented in **Tables 6** and **7** respectively. In Appendices 3 and 4, the proportions of boys and girls who were operating at each level of competency have been presented for 2000 and 2007 respectively.

Table 6: SACMEQ Competency Levels for Reading

Level	Description	Skill/Competency
1	Pre-Reading	Matches words and pictures involving concrete concepts and everyday objects.
2	Emergent Reading	Matches words and pictures involving prepositions and abstract concepts.
3	Basic Reading	Interprets meaning (by matching words and phrases, completing sentences).
4	Reading for Meaning	Reads to link and interpret information located in various parts of the text.
5	Interpretive Reading	Interprets information from various parts of the text in association with external information.
6	Inferential Reading	Reads to combine information from various parts of the text so as to infer the writer's purpose.
7	Analytical Reading	Locates information in longer texts (narrative, document or expository) in order to combine information from various parts of the text so as to infer the writer's personal beliefs (value systems, prejudices and biases).
8	Critical Reading	Reads from various parts of the text so as to infer and evaluate what the writer has assumed about both the topic and the characteristics of the reader

Source: Ross et al (2004).

Table 7: SACMEQ Competency Levels for Mathematics

Level	Description	Skill/Competency
1	Pre- Numeracy	Applies single step addition and subtraction.
2	Emergent Numeracy	Applies a two-step addition and subtraction involving carrying.
3	Basic Numeracy	Translates verbal information into arithmetic operations.
4	Beginning Numeracy	Translates verbal or graphic information into simple arithmetic problems.
5	Competent Numeracy	Translates verbal, graphic, or tabular information into an arithmetic form in order to solve a given problem.
6	Mathematically Skilled	Solves multiple-operation problems (using the correct order) involving fractions, ratios, and decimals.
7	Concrete Problem Solving	Extracts and converts information from tables, charts and other symbolic presentations in order to identify, and then solve multi-step problems
8	Abstract Problem Solving	Identifies the nature of an unstated mathematical problem embedded within verbal or graphical information and then translates this into symbolic, algebraic or equation form in order to solve a problem.

Source: Ross et al (2004).

By examining these competency descriptions, an attempt has been made to divide each subject into two levels: (i) the first level, which has to do with the operations that are uni-structural, covering Levels 1-2-3; and (ii) the second level, which requires more relational and abstract operations, covering Levels 4-5-6-7-8.

In **Table 8**, the percentages of Grade 6 pupils who reached at least the level of “Reading for Meaning” (Level 4) have been shown separately for boys and girls. At the overall SACMEQ level, a slightly higher percentage of girls (65.7 percent) reached at least the “Reading for Meaning” level than boys (61.1 percent). In Botswana, Lesotho, Mauritius, Namibia, Seychelles, South Africa, Swaziland, and Zanzibar, where higher percentages of girls reached Level 4, the differences were statistically significant. Zimbabwe also had girls in favour, but the difference was not statistically significant. Malawi was the only country where statistical significance emerged with more boys reaching Level 4. Unlike the reading mean scores, the gender difference in percentage of pupils reaching Level 4 in Tanzania Mainland was not statistically significant.

Table 8: Gender Differences in Percentages of Grade 6 Pupils in SACMEQ Countries Reaching at least Level 4 of Reading (2007)

School System	Boys		Girls		Differences		
	% _B	SE _B	% _G	SE _G	% _G -% _B	SE _{%G-%B}	
Botswana	68.6	1.66	82.9	1.25	14.3	2.08	**
Kenya	80.4	1.59	79.9	1.94	-0.5	2.51	
Lesotho	43.1	2.26	51.2	1.99	8.1	3.02	**
Malawi	31.3	2.16	22.0	2.01	-9.3	2.95	**
Mauritius	73.5	1.73	84.5	1.26	11.0	2.14	**
Mozambique	58.6	1.66	53.9	2.10	-4.7	2.68	
Namibia	57.4	1.42	64.9	1.55	7.5	2.10	**
Seychelles	68.4	1.69	88.2	1.20	19.8	2.07	**
South Africa	46.7	1.79	56.5	1.72	9.8	2.49	**
Swaziland	91.0	1.11	94.9	0.87	4.0	1.41	**
Tanzania (M)	91.1	1.20	88.7	1.15	-2.4	1.66	
Uganda	54.4	2.09	54.0	2.08	-0.4	2.95	
Zambia	29.5	1.93	25.0	2.15	-4.5	2.89	
Zanzibar	75.5	1.61	80.7	1.32	5.2	2.08	**
Zimbabwe	59.1	2.69	65.7	2.31	6.7	3.54	
SACMEQ III	61.1	1.77	65.7	1.66	4.6	2.44	

** Significant at 95% confidence limit

Source: Generated by the author based on SACMEQ Data Archive (2007)

Table 9: Gender Differences in Percentages of Grade 6 Pupils in SACMEQ Countries Reaching at least Level 4 of Mathematics (2007)

School System	Boys		Girls		Differences		
	% _B	SE _B	% _G	SE _G	% _G -% _B	SE _{%G-%B}	
Botswana	41.2	1.95	45.8	1.77	4.6	2.63	
Kenya	65.9	2.00	57.3	2.52	-8.6	3.22	**
Lesotho	19.0	1.47	18.8	1.52	-0.2	2.11	
Malawi	10.2	1.40	6.4	1.25	-3.8	1.88	**
Mauritius	69.5	1.82	77.1	1.47	7.6	2.34	**
Mozambique	27.4	1.57	24.1	1.70	-3.3	2.31	
Namibia	19.0	1.17	17.7	1.26	-1.3	1.72	
Seychelles	51.5	1.81	64.1	1.78	12.6	2.53	**
South Africa	29.9	1.72	31.8	1.69	1.9	2.42	
Swaziland	58.6	1.82	52.7	1.67	-5.9	2.48	**
Tanzania (M)	64.4	1.80	49.8	2.07	-14.6	2.75	**
Uganda	28.3	1.68	22.1	1.59	-6.2	2.31	**
Zambia	9.4	1.27	7.0	1.02	-2.5	1.63	
Zanzibar	25.9	1.49	23.3	1.30	-2.6	1.98	
Zimbabwe	43.7	2.28	42.0	2.35	-1.7	3.27	
SACMEQ III	36.9	1.68	34.5	1.66	-2.4	2.37	

** Significant at 95% confidence limit

Source: Generated by the author based on SACMEQ Data Archive (2007)

In **Table 9**, the percentages of Grade 6 pupils who reached at least the level of “Beginning Numeracy” (Level 4) have been shown separately for boys and girls.

Unlike reading, the percentages of boys reaching Level 4 were significantly higher than the percentages of girls reaching that level for Kenya, Malawi, Swaziland, and Tanzania Mainland. In Mauritius and Seychelles, the situation was opposite, where the percentages of girls reaching Level 4 were significantly higher than that of boys.

Changes in the Gender Differences in Achievement between 2000 and 2007

What were the changes in the direction and magnitude of gender differences in Grade 6 pupil's achievement (reading, mathematics) between 2000 and 2007?

Several bar graphs and scatter diagrams have been presented in this section in order to examine gender differences in pupil reading and mathematics achievement across the SACMEQ countries.

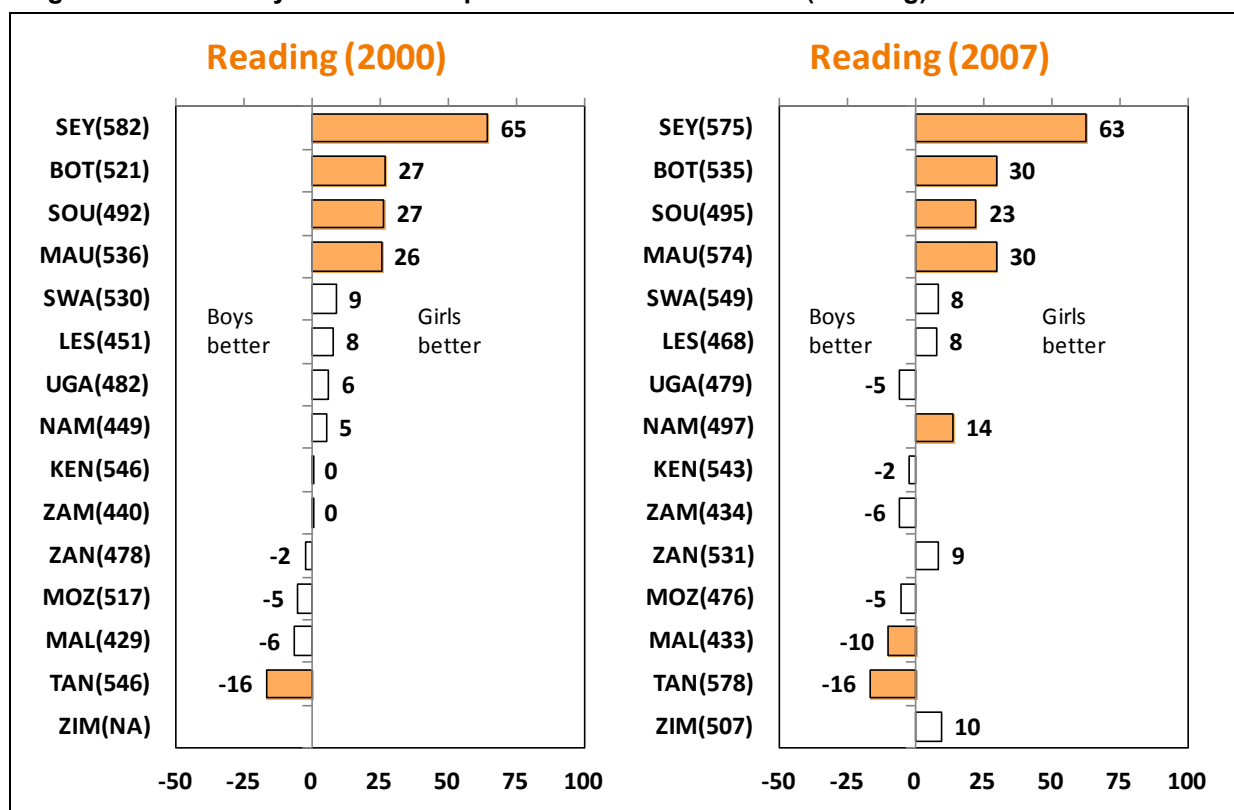
Analysis using Bar Graphs

Two sets of bar graphs have been presented to illustrate: (a) pupil gender differences in reading achievement for 2000 and 2007 (**Figure 5**), and (b) pupil gender differences in mathematics achievement for 2000 and 2007 (**Figure 6**). There were two striking features associated with these graphs:

- The first feature was that the set of countries in which girls performed better than boys in 2000 (for example, Seychelles, Mauritius, Botswana, etc.) were almost exactly the same set of countries where girls performed better than boys in 2007. Similarly, the set of countries where boys performed better than girls in 2000 (for example, Tanzania Mainland, Mozambique, Malawi, etc.) were almost exactly the same set of countries where boys performed better than girls in 2007.
- The second feature was that - not only were the directions in gender differences consistent for countries across 2000 and 2007 - the magnitudes of these differences were also consistent.

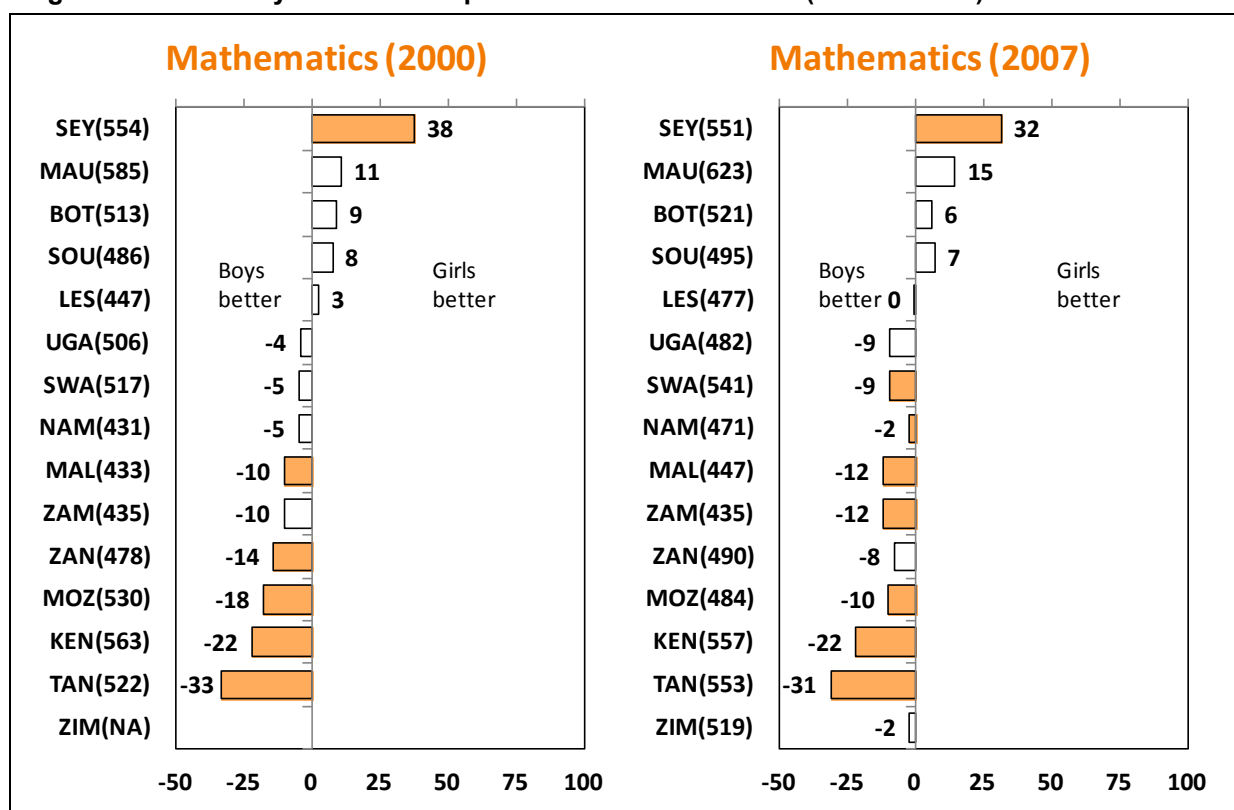
These two features suggested that there was a remarkable stability in reading and mathematics gender differences within SACMEQ countries across the period 2000 to 2007.

Figure 5: Similarity of Gender Gaps between 2000 and 2007 (Reading)



Source: Generated by the author based on SACMEQ Data Archive (2007)

Figure 6: Similarity of Gender Gaps between 2000 and 2007 (Mathematics)

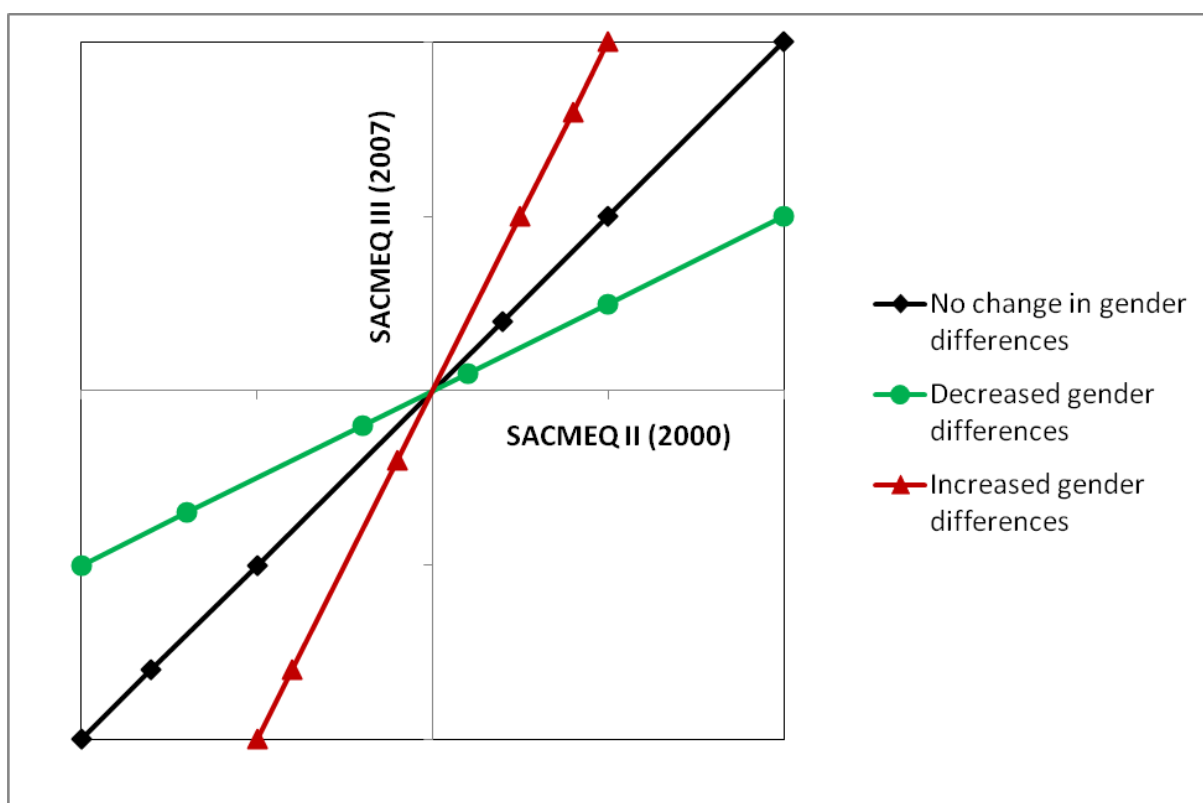


Source: Generated by the author based on SACMEQ Data Archive (2007)

Analysis using Scatter Diagrams

The changes in the pattern of gender differences over time can be examined by using a scatter diagram with trend lines as shown in **Figure 7**. Each data point in **Figure 7** represents gender differences (girls' scores – boys' scores) for the SACMEQ II study (2000) on the horizontal axis and those for the SACMEQ III study (2007) on the vertical axis.

Figure 7: Hypothetical Examples to Compare Gender Differences across Time



Source: SACMEQ (2009).

If the sizes of the gender differences were exactly the same between SACMEQ II and SACMEQ III studies, then their trend line should be exactly the 45 degree line which goes through the origin of 0, as shown by the black line in **Figure 7**. If the sizes of the gender differences were smaller in SACMEQ III than SACMEQ II, then the trend line should become “flatter” than the 45 degree line, as shown by the green line. On the other hand, if the sizes of gender differences were larger in SACMEQ III than in SACMEQ II, then the trend line should become “steeper” than the 45 degree line, as shown by the red line in the graph.

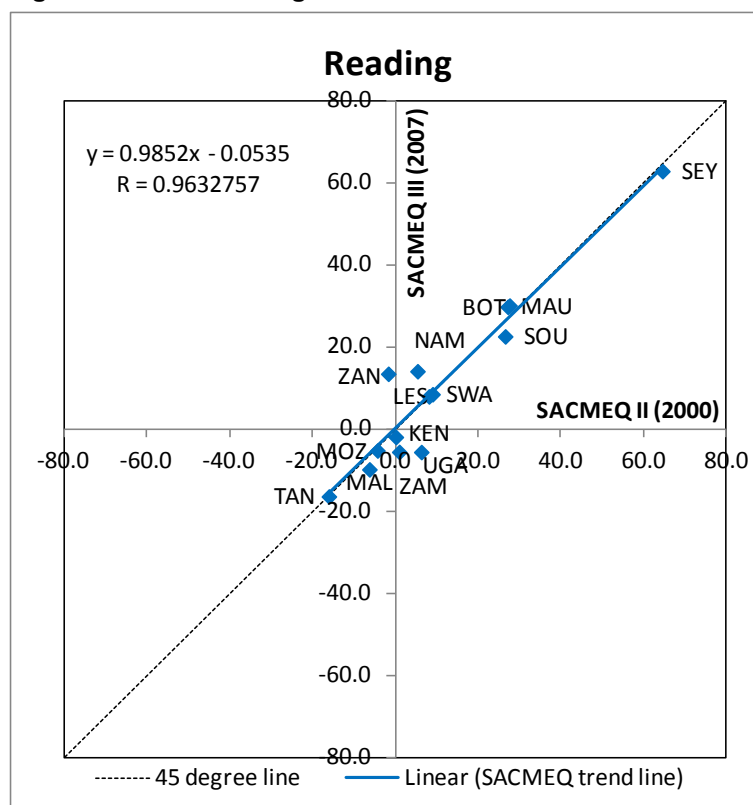
Following the above process, **Figures 8** and **9** have been generated to present the changes in gender differences in reading and mathematics achievements respectively for 14 school systems² that participated in both SACMEQ II and SACMEQ III studies.

The SACMEQ trend line in the scatter diagram based on 14 data points for the reading achievement in **Figure 8** was almost perfectly on the 45 degree line. This illustrated that the

² There is no plot for Zimbabwe since it did not take part in SACMEQ II.

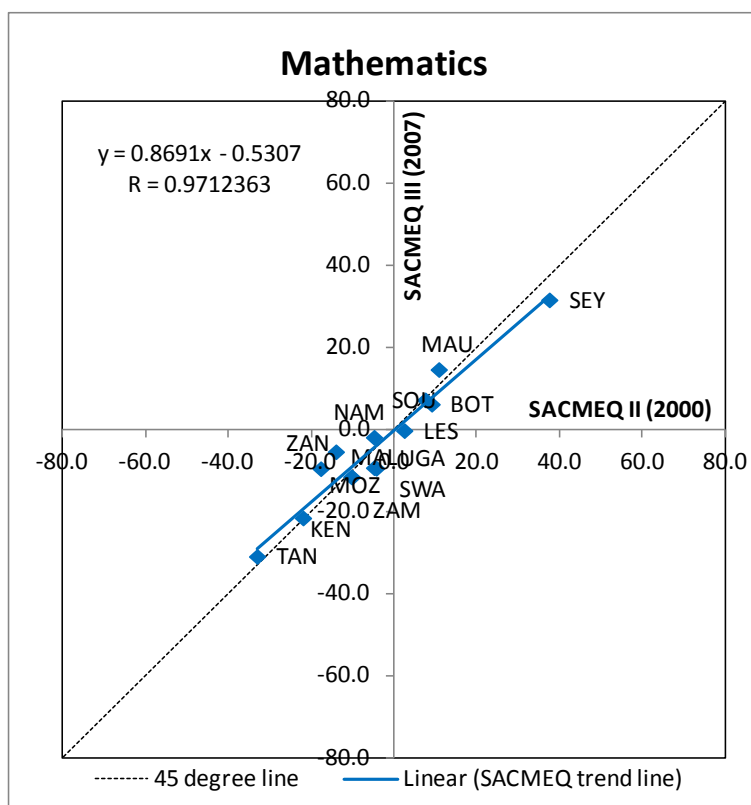
overall size and the direction of the gender differences in SACMEQ countries have largely remained the same between SACMEQ II and SACMEQ III. For example, in Seychelles girls performed 64 score points better than boys during SACMEQ II and 59 score points better during SACMEQ III. In Mauritius, girls performed 11 score points better than boys in SACMEQ II and 14 score points during SACMEQ III. In Tanzania Mainland, boys performed 16 score points better than girls in both SACMEQ II and III.

Figure 8: Scatter Diagram on Gender Differences in 2000 vs. 2007 in Reading



Source: Generated by the author based on SACMEQ Data Archive (2007)

Figure 9: Scatter Diagram on Gender Differences in 2000 vs. 2007 in Mathematics



Source: Generated by the author based on SACMEQ Data Archive (2007)

On the other hand, the SACMEQ trend line in the scatter diagram based on 14 data points for the mathematics achievement in **Figure 9** was slightly flatter than the 45 degree line. This illustrated that, while the direction is the same, the overall magnitude of gender differences has slightly decreased in SACMEQ III compared to SACMEQ II. Concretely, in Seychelles, girls performed 38 score points better than boys during SACMEQ II and 29 score points better during SACMEQ III. In Mozambique, boys performed 18 score points better than girls during SACMEQ III and 9 score points better during SACMEQ III. In Tanzania Mainland, boys performed 32 score points better than girls during SACMEQ II and 28 score points better during SACMEQ III.

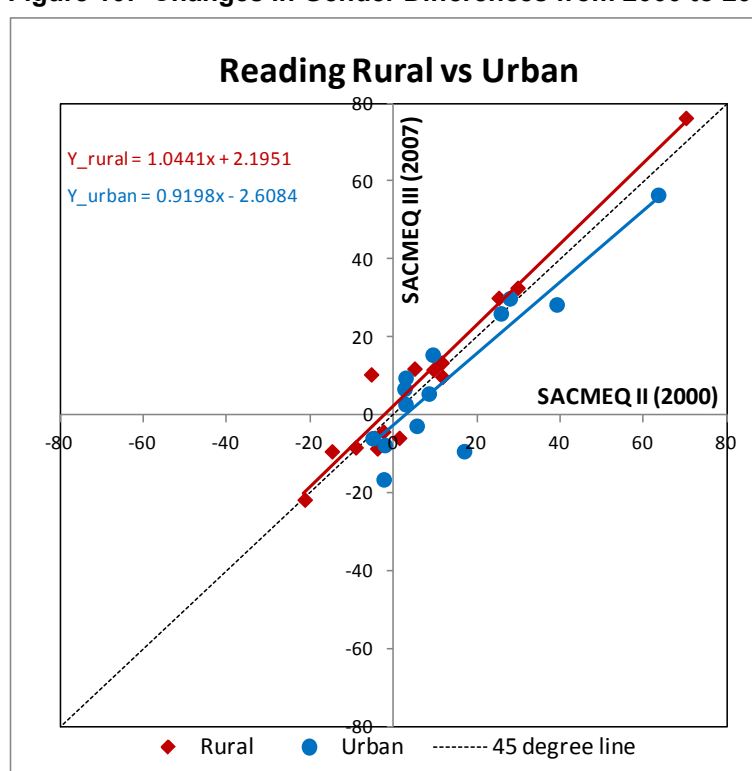
Were the patterns of the changes in the direction and magnitude of gender differences the same between: (i) rural and urban areas; and (ii) low SES and high SES groups?

When the unit of data point is at an aggregated level such as a country, much information is often concealed. It could be possible that the relationship between the SACMEQ II gender differences and SACMEQ III gender differences that was observed at the country level may not be seen in different sub-groups of people, such as those in different school locations and socio-economic groups. For example, in **Figures 10** and **11**, the magnitude and the direction of the changes in the reading and mathematics achievement respectively have been shown in different colours in the same scatter diagram for the rural area (red line) and the urban area (blue line).

In terms of reading, the slopes of the trend lines were very similar between the rural area and the urban area, and they were both close to the 45 degree line, with a slightly flatter trend line for the urban area. This indicates that whatever the areas, there has not been much change in terms of the direction and the magnitude of gender differences, although a marginal improvement was only seen in the urban area.

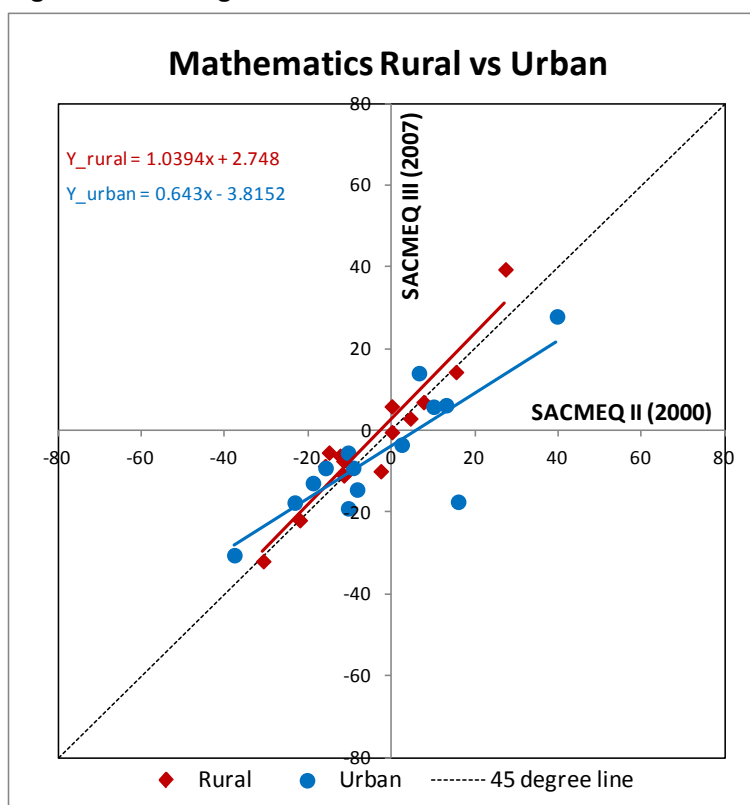
The scatter diagram for mathematics (see **Figure 11**) shows that, there has not been much change in the size or the direction of the gender differences in the rural area (red line) which has a very similar slope as the 45 degree line. However, in the urban area (blue line), the trend line is very much flatter than the 45 degree line, indicating that there was an improvement in the gender equality between boys and girls in 2007 compared to 2000.

Figure 10: Changes in Gender Differences from 2000 to 2007 in Reading (Rural vs. Urban)



Source: Generated by the author based on SACMEQ Data Archive (2007)

Figure 11: Changes in Gender Differences from 2000 to 2007 in Mathematics (Rural vs. Urban)

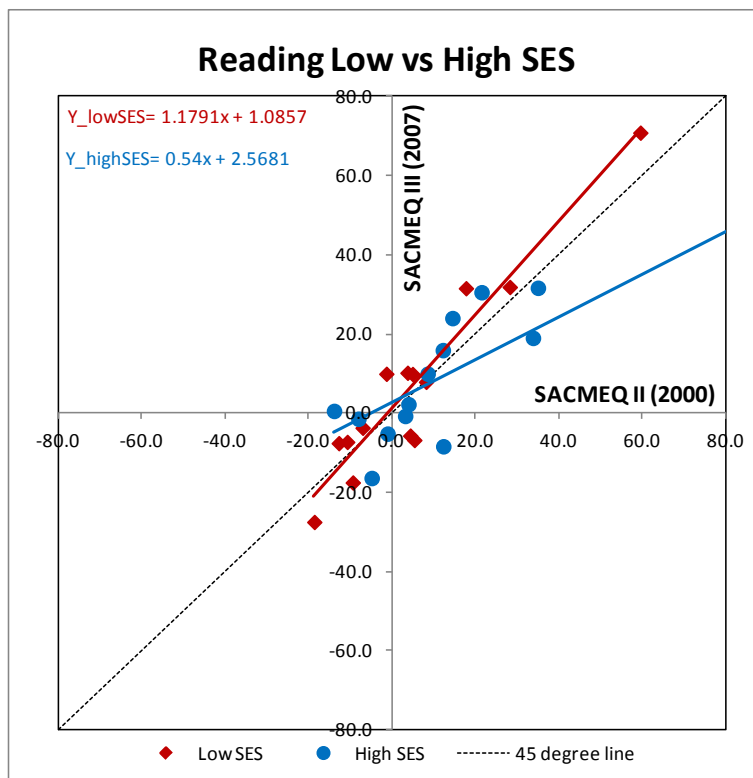


Source: Generated by the author based on SACMEQ Data Archive (2007)

Another set of examples is shown in **Figures 12 and 13**, reading and mathematics respectively, in order to compare the trend lines for high and low SES groups. Within the low SES groups (red line), it seems that the slope of the trend line was very similar to the 45 degree line, indicating that there was practically no change in the gender differences between 2000 and 2007 for reading. On the other hand, within the high SES groups (blue line), the slope has become much flatter than the 45 degree line, demonstrating that the overall gender differences have become smaller in 2007 compared to 2000. That is, there has been an improvement in gender equality. The pattern was very similar in mathematics where obvious improvement was only seen among the high SES groups.

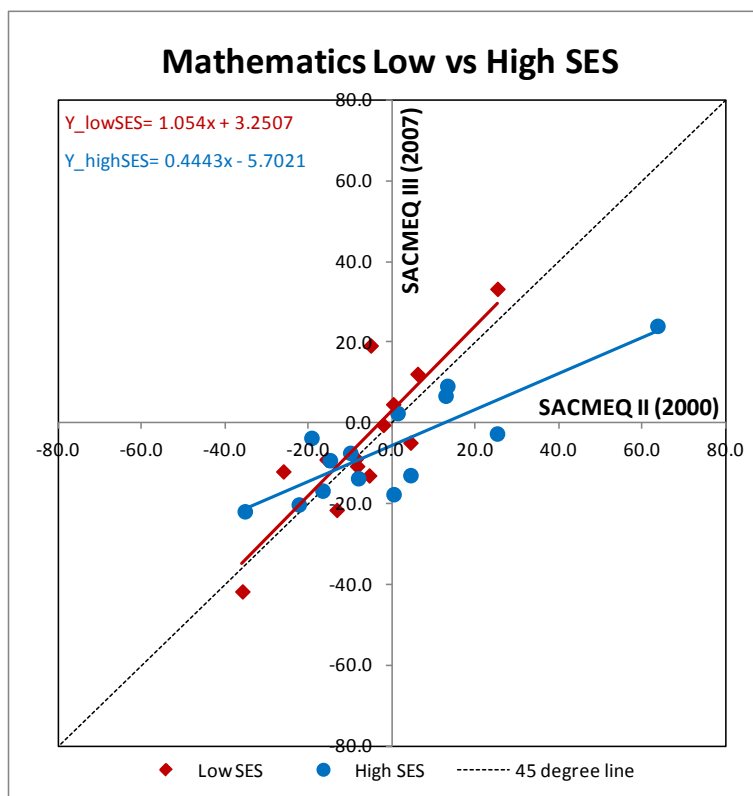
The fact that the gender equality in both subjects has improved among pupils in wealthier areas is quite intriguing. In order to find out why, it would be worth reflecting on potentially different priority setting between high and low SES groups in terms of how important the gender equality in learning achievement is considered as opposed to that in participation within the overall education policy. For example, in low SES groups, where historically girls' participation has been limited, it would seem reasonable to assume that the gender equality issue would first focus on gender parity in participation. On the other hand, in high SES groups, where gender parity has been met, the policy focus has possibly been shifted more on the learning achievement issue.

Figure 12: Changes in Gender Differences from 2000 to 2007 in Reading (Low SES vs. High SES)



Source: Generated by the author based on SACMEQ Data Archive (2007)

Figure 13: Changes in Gender Differences from 2000 to 2007 in Mathematics (Low SES vs. High SES)

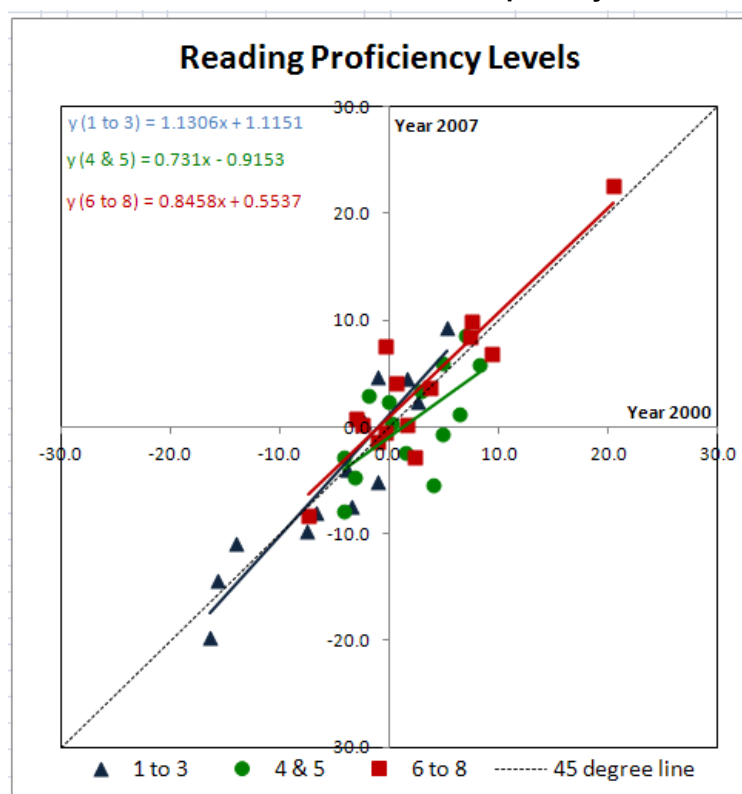


Source: Generated by the author based on SACMEQ Data Archive (2007)

Were the patterns of the changes between 2000 and 2007 in the percentages of boys and girls the same across SACMEQ competency levels for reading and mathematics?

Based on the proportions of pupils who were at different competency levels (see Appendices 3 and 4), the changes in the proportions of those who reached at different levels were examined for boys and girls separately. **Figures 14** and **15** illustrate the changes in these percentages for reading and mathematics respectively. In order to examine whether the patterns in changes in gender equality were different among different levels, in each graph three separate trend lines have been shown (Levels 1 to 3, Levels 4 and 5, and Levels 6 to 8).

Figure 14: Changes in Gender Differences from 2000 to 2007 for Percentage of Pupils Who Have Reached Various Competency Levels in Reading

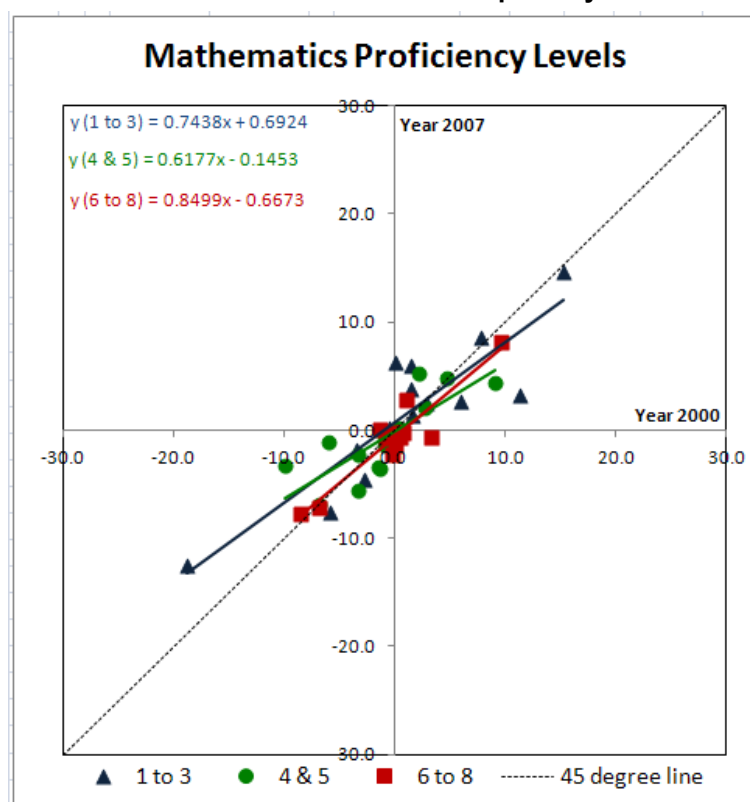


Source: Generated by the author based on SACMEQ Data Archive (2007)

From Appendix 3, it is possible to observe that for the entire SACMEQ region, both boys and girls had a slight improvement in reading higher competencies maintaining a similar gender difference in favour of girls. As can be seen in **Figure 14**, the trend lines for the changes in the percentages in Levels 1 to 3 and Levels 6 to 8 were very similar to the 45 degree line, indicating that the gender differences for the proportions for these levels did not change very much over time. For the Levels 4 and 5, the trend line has become flatter than the 45 degree line, demonstrating an improvement in gender equality for proportions at these levels.

For the mathematics competencies (see Appendix 4), the overall percentages of the entire SACMEQ region in higher levels improved slightly for both boys and girls, resulting in a similar, slight gender difference in SACMEQ III as in SACMEQ II in favour of boys. When comparing the different proficiency levels (see **Figure 15**), it was the group with Levels 4 and 5 that had the flattest slope, with the more improvement in gender equality.

Figure 15: Changes in Gender Differences from 2000 to 2007 for Percentage of Pupils Who Have Reached Various Competency Levels in Mathematics



Source: Generated by the author based on SACMEQ Data Archive (2007)

Discussion and Conclusion

Discussion

In this working paper, analyses were made to investigate whether gender equality has been attained in terms of pupils' learning achievement in reading and mathematics. For each research question raised in this working paper, a summary has been provided below.

- **What were the differences in achievement (of reading and mathematics) between Grade 6 boys and girls in 2007 in terms of average standardized scores?** For reading, in six school systems girls performed significantly better. For mathematics, in seven school systems boys performed significantly better. For both subjects, Seychelles had the largest gender difference in favour of girls, and Tanzania Mainland had the largest gender difference in favour of boys.

- **Were the patterns of gender differences in 2007 the same between: (i) rural and urban areas; and (ii) low SES and high SES groups?** In most of the SACMEQ countries, the direction of the gender gap was consistent between rural and urban areas as well as between low and high SES groups for both subjects, although the size of gender gap was different depending on the school locations and SES groups. Results were mixed in terms of which groups had larger gender gaps.
- **What were the differences in percentages of boys and girls who reached at least SACMEQ competency Level 4 for reading (Reading for Meaning) and mathematics (Beginning Numeracy) in 2007?** For reading, eight school systems had a higher percentage of girls reaching Level 4. The gender difference in percentage varied from +20 percentage points in Seychelles (girls in favour) to -9 percentage points in Malawi (boys in favour). For mathematics, five school systems had a higher percentage of boys reaching Level 4. The gender difference in percentage varied from +13 percentage points in Seychelles (girls in favour) to -15 percentage points in Tanzania Mainland (boys in favour).
- **What were the changes in the magnitude and the direction of gender differences in Grade 6 pupils' achievement (of reading and mathematics) between 2000 and 2007?** In both reading and mathematics, there was not very much change in the magnitude and the direction of gender differences in achievement between 2000 and 2007. However, the size of gender differences in mathematics has reduced very slightly.
- **Were the patterns of the changes between 2000 and 2007 in the magnitude and the direction of gender differences the same for: (i) rural and urban areas; and (ii) low SES and high SES groups?** Between rural and urban areas, the patterns of change in gender differences in reading were similar, while for mathematics, improvement in gender equality was only seen in urban areas. Between low and high SES groups, only high SES groups had improvement in gender equality for both subjects.
- **Were the patterns of the changes between 2000 and 2007 in the percentages of boys and girls the same across SACMEQ competency levels for reading and mathematics?** For reading, gender equality has improved slightly more in Levels 4 and above. For mathematics, gender equality has improved in all Levels, with the best improvement in Levels 4-5.

The above results can be further reflected upon together with the concerns raised by Saito (2004a; 2004b) on the gender differences in achievement during SACMEQ II.

First of all, in Mozambique in 2000, the lower primary education ended at Grade 5, and fewer girls than boys were enrolled in upper primary education including Grade 6. Based on the structural change of its primary education system during the early 2000s, the number of Grade

6 pupils almost tripled between 2000 and 2007, and the difference in the proportion of enrolment by Grade 6 boys and girls has become much smaller, as seen in the section on the SACMEQ context of the current working paper. In fact, in Mozambique, the overall learning achievement (boys and girls together) has significantly declined in both subjects during SACMEQ III, and the gender differences remained the same between SACMEQ II and SACMEQ III. Despite the large gender difference (boys in favour) in mathematics in 2000, the only policy suggestion that is related to the gender issue in the SACMEQ II National Report (Passos et al., 2005) was the girls' access and participation. This was consistent with the description in **Table 2**, where Mozambique's gender policy also seemed to concentrate on access and retention. While the priority concern of the Ministry of Education in Mozambique could be the overall decline in achievement, it may be worthwhile to reconsider the nature of gender-related policy and interventions in relation to the persisting gender differences in achievement.

In Tanzania Mainland, boys continued to outperform girls in both subjects in SACMEQ III. Preliminary analyses have also shown that girls seemed to be involved in many more tasks at home. Especially those tasks that were traditionally considered as 'female tasks' such as cooking, cleaning, sweeping, and fetching water seem to burden girls much more than boys. Further investigations into the relationship between the workload at home and the gender differences in achievement may be valuable in Tanzania Mainland, taking into consideration the important role of traditional view and values in this context. This may require a more in-depth qualitative study of pupils, teachers, and parents.

In Seychelles, as was the case during SACMEQ II, girls continued to outperform boys in both subjects. During SACMEQ II, the concern was on the practice of 'streaming' which favoured girls at an earlier age (Leste et al, 2005). Despite the fact that SACMEQ II gender differences have triggered the Minister of Education in Seychelles to take on a 'de-streaming' project (Leste, 2005), SACMEQ III results still indicated that the proportion of girls in more able classes was still considerably higher than that of boys. Continuous evaluation and monitoring of classroom practices at each school seems very important in order to track the progress and results of the de-streaming project.

Conclusion

In this working paper, changes of gender differences in learning achievement for reading and mathematics between 2000 and 2007 were investigated. International trends from other assessment were reviewed in order to examine if the trend in SACMEQ was similar. Policy framework and the changes in the Grade 6 enrolment between 2000 and 2007 were also reviewed in order to understand better the results in learning achievement.

In 2007, while Mozambique was the only country with significantly lower proportion of Grade 6 girls, the gender imbalance with significantly lower proportion of Grade 6 boys was seen in Lesotho, Zanzibar, and Zimbabwe. Although the focus of this working paper was gender equality in learning achievement, the change in the school participation of boys and

girls is also an area that needs to be monitored continuously since it seems to have reasonable connection with the quality of learning.

While gender balance in Grade 6 participation has improved in most of the SACMEQ countries, reducing gender disparity in achievement is an area which shows very limited progress. First of all, unlike in industrialized countries, the direction and the magnitude of gender differences in SACMEQ school systems did not change much between 2000 and 2007. In most countries where boys performed better in 2000, they did so in 2007, and where girls performed better in 2000, their performance was also better during 2007. Exceptions were Uganda, Zambia, and Zanzibar, where the direction changed between 2000 and 2007 for reading. However, the magnitude of gender differences in these countries was very small, and did not influence the overall trend. Secondly, the more disaggregated analyses illustrated that the gender equality improved only in urban schools and high SES groups for both subjects.

The above results have particular significance for those international organizations and donors that have invested enormous resources and efforts on a wide spectrum of educational programmes that have aimed to reduce gender differences in education. These results seem to suggest that there is a need to move the focus of the gender-related interventions beyond ‘access’ and ‘participation’ and concentrate more on ‘achievement’, especially in less advantaged settings. As can be seen in the National Policy Briefs on Gender Equality in 15 SACMEQ school systems, most of the interventions and the indicators that were used to monitor the progress on gender equality were related to access and participation. Ministries of Education might wish to undertake more detailed audits of past gender-related interventions in order to analyse the proportion of the budget allocated to quality-oriented aspects in these interventions to work towards gender equality.

Reasons for absence and/or presence of gender disparity in achievement for each country need to be further examined taking into account traditional contexts, which may influence pupil attitudes towards subjects, school practices, and family support. Ministries of Education in SACMEQ countries are facing many challenges in this area.

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Appendices

Appendix 1: Gender Differences in Reading by School Location and SES Level for 2000 and 2007

2000	Boys		Girls		Rural				Urban				Low SES				High SES			
					Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Botswana	507.2	3.93	534.4	3.60	489.9	4.08	515.0	4.05	524.7	6.69	552.4	5.67	476.0	5.34	504.1	4.59	562.7	8.96	584.1	8.92
Kenya	546.4	5.41	546.6	5.43	532.1	6.30	529.5	5.91	577.6	9.62	580.1	10.32	512.0	5.79	516.3	7.45	595.8	8.45	598.8	7.66
Lesotho	446.7	3.15	454.8	3.19	435.9	3.80	445.4	3.49	465.1	4.81	473.4	5.48	434.5	4.11	442.6	3.92	463.2	6.50	471.6	5.63
Malawi	431.9	2.78	425.6	2.60	427.8	3.16	418.5	2.78	441.2	6.05	438.7	5.00	424.3	5.06	411.4	3.30	454.6	5.52	449.6	4.23
Mauritius	523.1	5.97	550.7	5.66	517.1	7.28	546.7	6.90	528.8	9.50	554.4	9.05	463.0	6.17	480.6	6.25	593.0	9.33	626.7	9.12
Mozambique	518.4	2.63	514.1	2.67	503.5	5.90	499.5	8.15	523.1	3.15	517.9	2.84	505.6	3.55	496.1	4.60	541.2	4.82	533.0	3.99
Namibia	446.0	3.51	451.3	3.24	415.0	2.02	419.9	2.25	498.3	8.26	507.5	8.01	416.6	2.31	415.2	3.20	516.4	9.20	528.5	8.38
Seychelles	549.7	4.43	614.2	4.22	542.8	10.34	612.8	10.46	551.1	4.90	614.5	4.61	505.4	8.44	564.9	6.64	596.1	11.35	686.0	9.26
South Africa	478.3	8.03	504.8	10.28	420.6	5.05	432.0	5.87	524.7	12.98	563.7	14.12	421.9	6.00	426.7	5.56	598.0	16.44	632.9	12.88
Swaziland	525.0	4.16	533.9	3.80	511.8	3.27	523.4	3.65	556.5	10.11	559.2	8.38	508.9	3.19	512.5	3.71	562.1	10.73	565.9	7.90
Tanzania	554.3	5.74	538.2	8.34	536.3	5.49	514.8	4.79	599.1	9.07	596.8	6.02	509.7	8.65	491.0	7.74	596.9	7.64	582.9	5.83
Uganda	479.6	5.74	485.9	8.34	474.5	6.10	475.7	9.87	502.9	16.70	519.7	13.61	466.1	5.57	471.4	10.09	516.9	12.34	529.1	17.16
Zambia	439.8	4.90	440.7	4.72	417.3	4.13	402.4	3.45	464.7	7.58	470.1	6.51	404.2	5.14	393.4	4.86	487.2	9.55	486.1	9.39
Zanzibar	479.1	2.34	477.4	2.22	471.1	2.54	465.6	2.49	490.8	4.42	493.6	3.95	468.2	4.08	461.0	4.23	495.3	5.87	509.7	4.74
Zimbabwe	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SACMEQ II	495.0	4.48	505.1	4.88	475.9	4.96	479.1	5.29	519.1	8.13	536.9	7.40	466.2	5.24	469.8	5.44	542.6	9.05	553.4	8.22

2007	Boys		Girls		Rural				Urban				Low SES				High SES			
					Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Botswana	519.7	5.07	549.4	4.54	492.8	5.93	523.1	4.82	544.5	7.51	574.6	7.20	466.3	4.70	498.3	4.89	596.7	8.04	627.4	7.55
Kenya	544.1	4.93	542.1	5.63	527.7	6.11	523.6	7.41	572.4	9.86	579.3	9.16	519.6	5.12	514.1	7.49	608.6	9.42	608.1	8.22
Lesotho	463.5	3.36	471.5	2.95	448.8	3.34	460.7	2.87	489.4	5.90	495.1	6.17	443.6	3.70	451.7	3.08	493.9	6.49	504.0	6.77
Malawi	438.4	3.02	428.5	2.73	432.6	3.46	424.5	3.16	457.3	4.39	441.0	4.80	432.4	6.05	425.0	7.19	456.2	4.18	440.0	3.77
Mauritius	558.8	5.72	588.9	4.93	546.9	7.52	579.7	6.95	572.1	8.89	598.4	7.13	496.8	6.08	528.5	5.78	647.0	9.11	666.2	6.39
Mozambique	478.4	2.86	473.2	3.49	461.2	4.05	452.9	4.71	489.4	3.83	483.7	4.91	456.5	4.84	439.1	5.30	521.7	5.25	520.5	6.23
Namibia	489.6	3.08	503.7	3.20	458.1	2.53	470.2	2.90	539.3	6.11	555.0	5.70	452.8	3.28	462.9	3.41	562.7	6.49	578.8	6.07
Seychelles	544.4	4.56	607.2	4.01	534.2	8.18	610.6	7.07	548.9	5.50	605.6	4.86	495.2	7.78	566.2	7.38	597.0	7.95	639.9	6.22
South Africa	483.5	4.69	506.0	4.78	433.9	4.71	447.6	4.86	534.5	7.42	563.1	7.26	423.5	3.35	433.6	3.72	593.3	7.29	625.1	5.88
Swaziland	545.2	3.19	553.6	3.12	534.3	3.39	544.3	3.40	571.1	5.75	574.1	5.69	527.1	4.23	537.5	3.86	574.9	5.06	577.3	5.13
Tanzania	586.1	3.78	569.7	3.79	574.8	4.34	553.3	4.26	611.5	6.30	604.0	6.46	568.1	7.49	540.8	6.65	612.6	5.00	613.4	5.07
Uganda	481.5	3.73	475.9	3.67	465.7	3.57	460.0	3.56	525.6	8.09	516.5	7.75	462.3	4.34	455.7	3.88	521.3	7.16	513.1	5.97
Zambia	437.1	3.44	431.5	4.08	427.9	3.40	418.8	4.48	455.6	7.20	453.0	7.38	422.4	4.50	415.3	4.42	477.5	8.33	472.5	9.07
Zanzibar	526.2	3.32	539.6	2.93	512.3	3.83	522.9	3.59	554.7	6.35	564.4	5.16	503.3	5.67	499.8	4.96	565.8	5.99	590.0	4.86
Zimbabwe	501.5	6.33	512.5	6.00	467.9	5.28	479.1	4.90	589.7	9.12	600.1	9.85	460.7	6.63	477.0	5.89	598.4	10.82	606.3	8.47
SACMEQ III	506.5	4.07	517.0	3.99	486.7	4.64	493.6	4.60	536.3	6.81	551.6	6.63	477.0	5.18	484.2	5.19	559.2	7.10	571.6	6.38

Source: Generated by the author based on SACMEQ Data Archive (2007)

Appendix 2: Gender Differences in Mathematics by School Location and SES Levels for 2000 and 2007

2000	Boys		Girls		Rural				Urban				Low SES				High SES			
					Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Botswana	508.2	3.30	517.4	3.51	496.7	3.78	504.2	4.50	519.7	5.41	529.6	5.24	486.5	5.57	492.6	5.07	543.3	7.52	556.1	8.67
Kenya	574.2	5.50	552.4	4.81	563.5	6.72	541.3	5.67	597.3	9.21	573.9	8.65	546.9	6.35	533.6	7.66	613.2	10.04	590.7	8.13
Lesotho	445.7	3.55	448.3	3.44	434.3	3.75	438.7	2.98	465.1	6.19	467.4	7.35	438.7	4.19	443.0	4.75	454.6	5.57	455.8	4.86
Malawi	437.7	2.85	427.7	2.35	434.5	3.65	422.9	2.88	445.0	4.59	436.6	3.95	432.1	5.96	416.3	4.60	448.4	4.57	448.7	3.43
Mauritius	579.3	6.79	590.2	6.79	570.3	7.15	585.6	8.57	588.2	11.56	594.6	10.57	514.6	7.32	509.4	7.50	652.3	11.63	677.4	11.68
Mozambique	537.0	2.09	519.5	2.80	528.7	5.34	513.6	10.75	539.9	2.32	521.0	2.59	532.1	3.37	505.9	4.55	545.3	3.61	530.3	4.71
Namibia	433.3	3.46	428.6	2.93	404.7	2.27	404.7	1.98	481.9	8.24	471.3	7.54	405.1	3.21	402.9	2.38	499.3	9.12	489.2	8.32
Seychelles	535.5	3.75	573.1	3.85	536.3	9.37	563.5	9.88	535.3	4.10	574.9	4.18	498.1	7.53	523.3	6.88	577.9	10.14	641.5	8.72
South Africa	482.1	6.74	489.8	8.03	436.6	4.72	436.5	4.58	517.9	11.17	530.8	11.88	439.2	4.94	439.4	4.59	577.0	15.20	590.2	13.18
Swaziland	518.9	3.31	514.3	3.97	512.3	3.00	509.6	4.39	534.7	8.29	525.4	8.32	511.4	3.28	503.0	4.00	541.3	8.75	533.1	8.46
Tanzania	539.6	7.62	506.7	11.46	524.8	5.28	493.9	4.03	576.5	10.82	538.6	6.63	507.1	7.18	471.1	5.44	570.3	9.02	534.9	6.41
Uganda	508.1	7.62	504.0	11.46	503.5	8.76	491.8	10.82	529.0	15.03	544.9	33.41	490.7	11.65	485.1	13.67	535.5	11.64	539.9	26.54
Zambia	440.2	4.21	430.0	3.49	425.4	3.50	409.3	3.19	455.9	6.67	445.3	5.10	415.9	4.79	407.2	5.13	470.4	8.20	453.6	7.60
Zanzibar	485.3	2.04	471.4	1.86	483.7	2.30	471.2	2.40	487.6	3.76	471.6	2.93	484.3	3.71	468.5	3.88	496.1	5.00	476.7	3.82
Zimbabwe	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SACMEQ II	502.7	4.49	497.3	5.05	487.9	4.97	478.6	5.47	521.3	7.67	519.9	8.45	480.7	5.65	469.8	5.72	539.1	8.57	533.5	8.89

2007	Boys		Girls		Rural				Urban				Low SES				High SES			
					Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Botswana	517.5	3.96	523.6	3.52	497.5	3.92	504.5	3.62	535.9	6.34	541.7	5.67	478.4	4.11	490.6	4.04	569.8	7.63	576.6	7.02
Kenya	567.6	4.28	546.0	4.36	555.6	5.18	533.7	5.45	588.2	8.56	570.7	8.26	551.2	5.08	529.7	5.56	611.9	9.45	591.7	8.39
Lesotho	477.1	3.02	476.8	2.81	467.6	3.81	470.6	3.21	493.7	4.48	490.3	5.40	463.2	4.34	458.4	3.50	499.2	4.82	501.7	5.01
Malawi	452.7	3.30	441.1	3.12	449.1	3.81	438.1	3.80	464.8	6.12	450.5	4.59	449.0	6.63	440.1	8.02	461.9	4.83	444.3	3.61
Mauritius	616.1	6.77	630.7	5.82	606.3	8.79	620.6	7.91	627.1	10.66	641.2	8.76	545.7	7.49	564.9	5.79	720.6	10.80	718.0	8.66
Mozambique	488.2	2.36	478.6	3.23	479.8	4.24	474.5	6.78	493.5	2.88	480.8	3.79	473.5	5.00	461.5	7.21	514.3	3.78	505.1	4.52
Namibia	472.0	2.76	470.1	2.62	448.6	2.57	448.3	2.41	508.9	5.14	503.5	4.81	444.4	3.06	443.9	3.39	528.8	6.12	521.5	5.40
Seychelles	535.2	3.59	566.7	3.36	530.9	6.40	570.3	6.29	537.2	4.35	565.1	3.97	496.2	5.75	529.4	5.67	574.7	6.76	598.8	5.57
South Africa	491.2	4.13	498.4	3.86	453.7	4.42	459.7	4.07	529.9	6.45	536.2	5.87	447.1	4.45	451.8	3.50	577.1	6.68	586.3	6.00
Swaziland	545.5	2.60	536.2	2.62	540.4	3.03	530.5	3.17	557.6	4.70	548.5	4.08	537.7	3.96	527.1	3.85	562.1	4.00	548.5	4.07
Tanzania	568.5	4.06	537.5	3.72	558.1	4.36	526.2	3.81	591.5	7.84	561.1	8.60	557.5	6.75	515.8	5.10	589.8	6.60	568.0	7.11
Uganda	486.7	3.28	477.2	3.16	474.5	3.50	467.1	3.60	520.6	6.27	503.2	5.82	473.2	4.37	460.3	3.99	514.1	6.19	501.2	4.61
Zambia	440.8	2.93	429.2	2.86	432.6	3.20	424.0	3.41	457.0	5.33	438.0	5.02	428.9	4.76	420.1	4.33	468.2	6.82	451.5	6.14
Zanzibar	489.3	2.39	483.9	1.90	481.2	2.93	475.0	2.29	506.2	4.50	497.1	3.51	476.1	4.74	467.1	3.22	516.8	4.09	513.2	3.60
Zimbabwe	520.8	5.82	519.0	5.26	491.8	5.34	493.9	4.28	591.9	9.96	587.8	8.77	487.2	7.12	488.3	6.23	600.3	10.36	592.7	7.64
SACMEQ III	511.6	3.68	507.4	3.48	496.5	4.37	491.6	4.27	534.4	6.24	530.8	5.79	490.0	5.17	484.5	4.89	549.6	6.60	544.8	5.82

Source: Generated by the author based on SACMEQ Data Archive (2007)

Appendix 3: Gender Differences in Reading by Competency Level for 2000 and 2007

2000	Level 1				Level 2				Level 3				Level 4				Level 5				Level 6				Level 7				Level 8			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se
Botswana	4.5	0.53	1.2	0.30	10.6	0.90	4.8	0.58	19.0	1.12	12.5	1.01	22.5	1.19	23.5	1.22	20.4	1.17	27.7	1.08	11.7	1.04	16.3	0.99	8.1	0.81	10.8	0.88	3.1	0.76	3.2	0.83
Kenya	1.2	0.33	0.9	0.31	4.8	0.77	4.4	0.83	11.7	1.26	9.9	1.24	20.1	1.49	20.8	1.46	23.2	1.31	27.4	1.49	19.3	1.35	19.1	1.50	14.8	1.52	12.4	1.23	5.0	0.89	5.1	0.90
Lesotho	6.1	0.90	5.1	0.79	27.0	1.65	21.2	1.77	33.7	1.40	33.9	1.54	23.0	1.71	25.1	1.59	6.0	0.82	10.8	1.14	2.6	0.52	2.4	0.46	1.4	0.37	1.2	0.35	0.2	0.15	0.3	0.17
Malawi	11.4	1.27	11.2	1.25	31.1	1.84	35.4	1.97	33.1	1.48	34.2	1.80	17.3	1.73	15.0	1.74	5.3	0.78	3.4	0.69	1.6	0.38	0.7	0.30	0.3	0.17	0.1	0.06	0.0	0.00	0.0	0.00
Mauritius	7.7	0.85	5.4	0.72	15.0	1.19	9.0	1.00	16.5	1.11	10.7	1.04	12.8	0.94	16.4	1.11	13.3	1.11	16.1	1.18	11.1	0.93	13.2	1.07	13.9	1.06	18.3	1.36	9.7	1.20	10.9	1.21
Mozambique	2.4	0.36	2.0	0.52	3.6	0.53	4.4	0.67	11.8	0.94	10.5	0.92	27.6	1.31	30.6	1.57	32.3	1.53	33.3	2.18	16.4	1.28	15.7	1.69	5.8	0.85	3.7	0.74	0.2	0.13	0.0	0.00
Namibia	13.3	0.94	12.4	0.94	31.8	1.21	29.5	1.27	26.7	1.13	26.4	1.06	13.3	0.92	15.3	0.93	5.5	0.54	6.4	0.65	3.4	0.37	3.7	0.39	3.9	0.59	3.9	0.53	2.0	0.45	2.4	0.49
Seychelles	4.6	0.76	1.3	0.42	10.5	1.12	4.2	0.74	12.2	1.20	5.4	0.83	15.9	1.34	9.7	1.09	13.6	1.26	15.6	1.33	14.9	1.31	15.1	1.31	16.8	1.37	26.7	1.63	11.4	1.15	22.0	1.48
South Africa	13.6	1.49	10.9	1.36	20.2	1.41	17.6	1.56	20.3	1.59	18.1	1.56	17.3	1.71	14.8	1.33	9.1	1.17	9.7	1.15	6.0	1.02	7.9	0.93	8.5	1.68	13.1	3.13	5.1	1.23	7.9	1.33
Swaziland	0.5	0.23	0.1	0.09	2.0	0.53	1.4	0.36	12.4	1.08	9.6	1.07	31.8	1.52	31.6	2.26	31.2	1.45	31.5	1.82	14.4	1.22	16.2	1.41	6.0	0.99	7.7	1.02	1.8	0.79	1.9	0.61
Tanzania	2.1	0.55	3.4	0.63	5.4	0.92	5.6	0.78	8.8	1.11	9.9	1.14	17.6	1.32	20.0	1.45	20.1	1.19	22.6	1.40	20.7	1.30	20.5	1.45	21.9	1.82	16.0	1.87	3.4	0.65	2.1	0.52
Uganda	7.0	1.05	7.5	1.00	17.9	1.73	18.7	1.95	23.4	1.57	19.8	1.86	22.2	1.60	20.6	1.76	14.1	1.37	15.7	1.80	7.8	1.26	8.5	1.72	5.7	1.09	4.9	1.12	1.8	0.64	4.3	1.61
Zambia	19.4	1.41	20.3	1.96	27.1	1.80	28.5	1.61	21.2	1.20	20.6	1.15	16.1	1.16	12.2	1.23	7.5	0.96	8.3	1.14	4.8	0.70	6.4	1.26	3.2	0.79	2.6	0.73	0.6	0.33	1.2	0.41
Zanzibar	5.6	0.72	6.5	0.75	14.9	1.27	12.7	1.09	21.3	1.43	21.6	1.40	25.0	1.47	28.8	1.50	21.7	1.42	19.4	1.39	8.9	0.99	9.8	0.99	2.6	0.60	1.3	0.36	0.0	0.00	0.0	0.00
Zimbabwe	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SACMEQ II	7.2	0.81	6.5	0.79	16.1	1.21	14.7	1.16	19.6	1.26	18.0	1.26	20.2	1.39	20.6	1.45	16.1	1.15	17.5	1.32	10.1	0.98	10.8	1.10	7.7	0.98	8.2	1.07	2.9	0.60	3.8	0.68

2007	Level 1				Level 2				Level 3				Level 4				Level 5				Level 6				Level 7				Level 8			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se
Botswana	4.4	0.57	1.5	0.29	11.1	0.88	4.3	0.53	15.9	0.97	11.3	0.91	19.9	1.10	18.4	1.11	17.0	0.89	24.3	1.12	14.1	0.94	18.7	1.10	12.4	1.12	15.0	1.22	5.1	0.87	6.4	1.05
Kenya	2.3	0.41	2.3	0.63	6.3	0.70	5.2	0.94	11.0	0.91	12.5	1.08	19.9	1.17	19.3	1.28	21.8	1.06	21.8	1.17	17.5	1.19	19.8	1.35	14.0	1.19	13.4	1.26	7.1	1.12	5.6	0.89
Lesotho	5.2	0.66	3.6	0.47	18.7	1.32	15.3	1.09	32.9	1.52	29.9	1.51	22.9	1.28	27.7	1.20	9.8	1.03	13.5	1.08	6.5	0.82	6.2	0.72	3.7	0.60	3.4	0.46	0.3	0.14	0.5	0.23
Malawi	10.3	1.20	9.1	0.96	23.4	1.63	30.6	1.60	35.1	1.47	38.3	1.47	22.7	1.46	16.9	1.42	5.8	0.85	3.7	0.80	2.0	0.58	0.8	0.40	0.8	0.29	0.5	0.35	0.0	0.00	0.1	0.07
Mauritius	4.7	0.53	2.7	0.42	10.0	1.00	4.8	0.63	11.8	1.00	8.1	0.77	12.8	0.88	11.3	0.88	12.1	0.94	14.8	0.94	14.5	0.91	16.9	1.09	20.1	1.20	24.5	1.32	13.9	1.29	16.9	1.40
Mozambique	5.8	0.72	7.8	0.81	14.7	1.06	14.9	1.04	20.9	1.19	23.4	1.35	25.8	1.21	24.0	1.35	19.6	1.15	15.8	1.12	10.5	1.05	10.9	1.08	2.5	0.45	2.9	0.73	0.3	0.17	0.3	0.12
Namibia	3.7	0.38	2.1	0.32	12.8	0.84	8.9	0.67	26.1	0.95	24.1	1.13	25.7	0.98	25.3	0.98	14.0	0.79	17.8	0.92	8.9	0.67	11.9	0.84	6.2	0.61	7.4	0.66	2.6	0.53	2.5	0.45
Seychelles	6.9	0.92	1.8	0.49	11.2	1.15	3.3	0.66	13.5	1.24	6.7	0.93	12.6	1.20	8.0	1.00	11.2	1.15	12.9	1.25	15.7	1.32	20.4	1.49	16.7	1.36	26.6	1.64	12.2	1.15	20.2	1.48
South Africa	11.2	0.75	8.7	0.63	19.9	0.96	14.8	0.85	22.1	0.97	20.0	0.99	14.3	0.75	15.1	0.71	9.6	0.60	11.7	0.69	8.5	0.65	10.6	0.64	8.9	0.92	11.4	0.94	5.4	0.64	7.7	0.81
Swaziland	0.2	0.19	0.2	0.12	1.8	0.40	0.7	0.24	7.0	0.78	4.2	0.63	21.3	1.32	20.2	1.25	33.8	1.26	35.3	1.28	24.4	1.27	27.1	1.35	9.7	1.03	10.5	1.06	1.7	0.35	1.9	0.41
Tanzania	1.2	0.31	1.6	0.44	2.0	0.58	2.2	0.36	5.6	0.77	7.5	0.77	9.8	0.88	14.1	1.14	16.1	1.04	17.7	1.05	28.7	1.13	27.3	1.17	29.2	1.31	24.6	1.33	7.4	0.79	5.0	0.64
Uganda	5.3	0.60	6.3	0.67	13.9	1.09	15.2	1.09	26.4	1.36	24.5	1.23	21.8	1.02	25.4	1.20	16.7	1.06	15.5	1.01	11.0	1.06	8.8	0.96	4.2	0.70	3.8	0.76	0.6	0.19	0.5	0.20
Zambia	15.8	1.06	15.7	1.16	26.0	1.38	30.8	1.68	28.7	1.41	28.4	1.56	16.4	1.10	13.4	1.08	6.8	0.86	5.0	0.74	3.3	0.59	4.2	0.75	2.4	0.63	1.9	0.62	0.6	0.25	0.5	0.29
Zanzibar	3.0	0.50	3.2	0.49	8.0	1.00	4.7	0.56	13.5	1.16	11.4	0.95	16.9	1.26	16.4	1.13	22.7	1.44	20.9	1.30	19.3	1.33	22.6	1.28	14.5	1.22	18.4	1.27	2.0	0.43	2.4	0.50
Zimbabwe	7.5	1.14	4.8	0.75	14.9	1.39	10.7	1.28	18.5	1.41	18.8	1.37	19.1	1.41	21.9	1.45	13.7	1.17	15.9	1.20	10.4	0.96	11.4	1.11	11.2	1.31	12.1	1.33	4.6	0.85	4.5	0.72
SACMEQ III	5.9	0.66	4.8	0.58	13.2	1.03	11.0	0.88	19.8	1.14	18.5	1.11	19.0	1.13	19.3	1.15	15.3	1.02	16.7	1.04	12.7	0.96	14.1	1.02	10.0	0.93	11.1	1.00	4.1	0.58	4.5	0.62

Source: Generated by the author based on SACMEQ Data Archive (2007). Figures have been rounded to the one decimal point.

Appendix 4: Gender Differences in Mathematics by Competency Level for 2000 and 2007

2000	Level 1				Level 2				Level 3				Level 4				Level 5				Level 6				Level 7				Level 8			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se
Botswana	3.6	0.57	3.1	0.49	28.8	1.40	22.9	1.30	33.9	1.28	37.7	1.28	19.2	1.03	20.0	1.16	9.5	0.86	10.8	0.80	3.8	0.59	3.8	0.58	1.1	0.45	1.4	0.41	0.1	0.08	0.4	0.21
Kenya	0.1	0.10	1.0	0.32	8.4	0.91	11.8	1.23	28.9	1.92	32.3	1.92	24.6	1.36	26.9	1.54	19.6	1.27	16.4	1.26	12.7	1.33	8.1	1.10	3.9	0.73	2.7	0.49	1.8	0.52	0.7	0.34
Lesotho	9.1	1.22	8.1	1.02	56.6	1.97	57.9	2.04	27.1	1.78	26.5	1.44	5.8	1.50	6.0	1.37	0.9	0.30	1.1	0.38	0.4	0.18	0.3	0.14	0.1	0.06	0.2	0.14	0.0	0.00	0.0	0.00
Malawi	11.2	1.37	13.7	1.44	58.6	1.63	65.4	1.67	27.3	1.76	19.5	1.51	2.8	0.65	1.3	0.39	0.2	0.14	0.2	0.15	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Mauritius	2.7	0.49	2.1	0.44	20.3	1.30	15.9	1.36	22.2	1.25	21.4	1.25	16.4	1.04	17.0	1.07	10.2	0.98	14.4	1.17	10.9	0.99	11.6	0.96	9.9	1.03	11.0	1.02	7.3	1.08	6.7	1.03
Mozambique	0.4	0.14	0.5	0.18	10.5	0.82	15.7	1.44	39.3	1.59	45.3	1.91	33.3	1.64	30.4	1.69	14.3	1.09	7.1	1.17	2.2	0.41	0.9	0.65	0.1	0.05	0.1	0.05	0.0	0.00	0.0	0.00
Namibia	19.5	1.05	19.9	1.07	55.8	1.36	58.1	1.31	15.3	0.98	14.4	0.87	3.6	0.42	3.5	0.46	2.4	0.44	1.7	0.32	2.5	0.56	1.7	0.39	0.8	0.28	0.7	0.23	0.1	0.06	0.2	0.09
Seychelles	3.0	0.62	2.2	0.54	25.3	1.59	14.7	1.30	27.8	1.65	20.5	1.47	18.4	1.42	21.0	1.49	10.5	1.13	17.0	1.38	9.9	1.09	16.7	1.35	3.8	0.69	6.3	0.89	1.4	0.42	1.6	0.46
South Africa	8.2	0.96	7.6	0.97	44.7	2.22	44.1	2.87	25.0	1.69	22.7	1.64	8.5	0.97	9.0	1.31	4.9	1.24	7.1	1.78	5.6	1.21	5.9	1.20	2.0	0.48	2.1	0.55	1.1	0.43	1.5	0.60
Swaziland	0.7	0.35	0.9	0.36	18.1	1.37	24.2	2.03	46.8	1.73	42.0	1.60	22.4	1.31	21.2	1.40	8.6	1.07	8.5	0.86	2.4	0.51	2.3	0.41	0.7	0.32	0.6	0.28	0.2	0.18	0.3	0.26
Tanzania	2.2	0.48	3.4	0.58	18.2	1.54	26.8	1.73	32.0	1.71	37.7	1.72	22.9	1.55	20.1	1.36	12.0	1.15	8.0	1.11	8.8	1.26	3.8	0.84	3.1	0.75	0.3	0.16	0.7	0.25	0.1	0.07
Uganda	4.5	0.82	6.6	1.03	31.8	2.27	35.3	2.93	34.1	2.07	28.6	2.40	13.2	1.34	11.1	1.49	6.6	1.06	5.4	1.08	4.6	0.93	6.5	1.56	4.3	1.31	6.2	2.58	0.8	0.32	0.3	0.21
Zambia	15.9	1.12	17.7	1.71	51.6	2.14	57.3	2.08	23.7	1.86	19.2	1.36	5.8	0.83	4.1	0.89	2.6	0.71	1.0	0.46	0.3	0.15	0.6	0.35	0.1	0.09	0.0	0.00	0.0	0.00	0.1	0.10
Zanzibar	2.2	0.47	3.8	0.63	38.1	1.69	43.8	1.67	41.8	1.72	40.5	1.67	12.0	1.18	8.1	0.88	4.8	0.72	2.7	0.45	0.9	0.28	1.1	0.25	0.2	0.13	0.0	0.04	0.0	0.04	0.0	0.00
Zimbabwe	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SACMEQ II	6.4	0.70	7.1	0.77	33.4	1.59	36.6	1.78	30.0	1.64	28.8	1.58	15.0	1.16	13.8	1.18	7.7	0.87	6.9	0.88	4.5	0.68	4.0	0.70	2.1	0.45	2.0	0.49	0.9	0.24	0.8	0.24

2007	Level 1				Level 2				Level 3				Level 4				Level 5				Level 6				Level 7				Level 8			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se	%	se
Botswana	1.6	0.27	1.5	0.30	23.4	1.35	18.6	1.16	33.8	1.22	34.1	1.24	25.3	1.25	29.0	1.07	8.4	0.80	10.0	0.91	6.0	0.89	5.9	0.95	0.9	0.38	0.8	0.24	0.5	0.26	0.2	0.14
Kenya	0.4	0.15	0.8	0.22	9.7	1.02	11.6	1.41	24.1	1.49	30.3	1.69	30.6	1.12	33.5	1.54	17.7	1.13	13.4	1.08	12.4	0.99	7.7	0.86	3.2	0.49	1.8	0.49	2.0	0.47	0.9	0.29
Lesotho	3.2	0.55	3.8	0.52	39.1	1.74	37.7	1.61	38.8	1.40	39.8	1.25	13.4	1.20	13.8	1.16	3.5	0.58	3.3	0.63	1.9	0.56	1.7	0.39	0.1	0.05	0.0	0.06	0.1	0.09	0.0	0.00
Malawi	8.7	0.90	8.5	0.94	46.8	1.73	55.9	2.06	34.3	1.53	29.1	1.73	8.0	1.04	5.1	0.84	1.6	0.48	1.0	0.74	0.6	0.28	0.3	0.14	0.1	0.09	0.0	0.00	0.0	0.00	0.0	0.00
Mauritius	1.6	0.35	0.6	0.20	12.0	1.09	8.1	0.87	16.9	1.07	14.1	1.08	16.8	1.02	19.0	1.23	11.5	0.79	14.1	0.88	18.2	1.01	21.2	1.20	10.1	0.87	11.2	0.90	12.9	1.32	11.6	1.25
Mozambique	4.3	0.60	6.0	0.78	25.3	1.39	30.5	1.45	43.0	1.37	39.4	1.29	22.3	1.28	19.3	1.34	4.0	0.55	3.8	0.75	0.9	0.35	0.6	0.24	0.1	0.10	0.5	0.46	0.0	0.00	0.0	0.00
Namibia	6.0	0.58	4.7	0.46	41.6	1.38	43.0	1.34	33.4	1.17	34.6	1.12	12.3	0.68	12.1	0.82	3.7	0.44	3.2	0.40	2.4	0.44	2.0	0.39	0.6	0.19	0.4	0.17	0.1	0.05	0.1	0.03
Seychelles	3.2	0.64	0.6	0.28	20.1	1.46	11.6	1.19	25.2	1.58	23.8	1.57	26.1	1.60	26.8	1.65	12.6	1.21	16.3	1.38	9.3	1.06	17.3	1.40	2.4	0.55	2.3	0.57	1.2	0.40	1.4	0.44
South Africa	6.5	0.62	4.6	0.44	36.0	1.30	33.3	1.25	27.6	1.00	30.3	1.09	14.7	0.81	16.1	0.77	6.7	0.64	7.5	0.73	6.0	0.68	5.8	0.65	2.0	0.45	1.7	0.44	0.5	0.15	0.7	0.16
Swaziland	0.0	0.00	0.4	0.27	7.3	0.92	9.5	0.99	34.1	1.44	37.4	1.23	38.1	1.29	35.8	1.15	13.6	0.89	12.3	0.90	6.6	0.72	4.3	0.59	0.3	0.14	0.3	0.12	0.0	0.00	0.0	0.00
Tanzania	0.7	0.22	0.6	0.18	9.7	0.99	15.4	1.41	25.2	1.26	34.2	1.40	25.2	1.16	25.8	1.24	23.1	1.10	15.6	1.14	10.8	0.88	6.7	0.79	3.6	0.66	1.4	0.36	1.7	0.45	0.3	0.19
Uganda	4.7	0.54	5.2	0.55	31.8	1.48	35.7	1.56	35.2	1.12	37.1	1.18	20.1	1.16	16.0	1.03	5.8	0.69	4.4	0.69	2.0	0.46	1.6	0.47	0.3	0.13	0.1	0.07	0.1	0.06	0.0	0.02
Zambia	11.7	0.93	15.9	1.23	52.2	1.48	55.0	1.56	26.7	1.33	22.1	1.34	6.9	1.00	6.1	0.81	2.2	0.48	0.9	0.36	0.2	0.11	0.1	0.07	0.1	0.08	0.0	0.00	0.0	0.00	0.0	0.00
Zanzibar	2.4	0.51	3.1	0.54	30.1	1.56	31.0	1.38	41.6	1.59	42.5	1.50	19.8	1.34	19.8	1.25	4.5	0.65	3.3	0.55	1.6	0.39	0.2	0.06	0.1	0.04	0.1	0.03	0.0	0.00	0.0	0.00
Zimbabwe	3.6	0.63	3.6	0.69	24.6	2.18	21.7	1.59	28.0	1.61	32.8	1.67	22.1	1.35	23.0	1.32	10.9	1.07	8.9	0.98	6.5	0.94	7.1	1.05	2.9	0.84	2.2	0.52	1.3	0.43	0.8	0.28
SACMEQ III	4.0	0.50	3.9	0.51	28.0	1.41	28.9	1.39	31.0	1.35	32.7	1.36	19.7	1.15	19.6	1.15	8.5	0.77	7.5	0.81	5.7	0.65	5.0	0.62	1.8	0.34	1.4	0.29	1.3	0.25	0.9	0.19

Source: Generated by the author based on SACMEQ Data Archive (2007). Figures have been rounded to the one decimal point.

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