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AFRICA DEVELOPMENT FORUM

Facing Forward

Schooling for Learning in Africa

Sajitha Bashir, Marlaine Lockheed,
Elizabeth Ninan, and Jee-Peng Tan

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AGENCE FRANÇAISE DE DÉVELOPPEMENT
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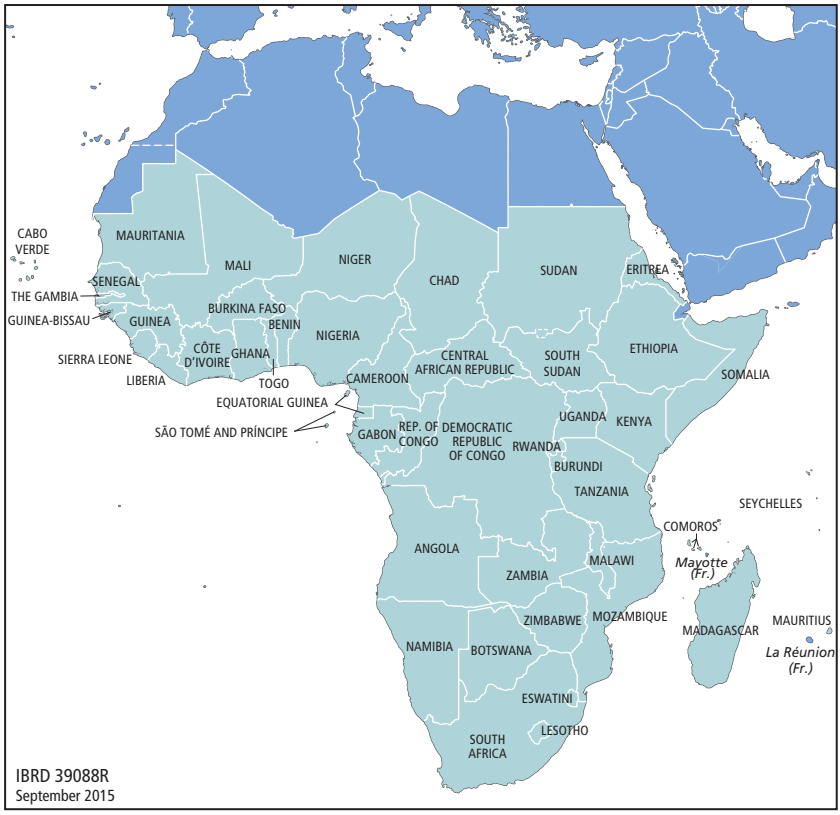

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Contents

Foreword *xxv*
Acknowledgments *xxvii*
About the Authors *xxix*
Executive Summary *xxxi*
Abbreviations *xliii*

1 Facing the Facts: Context and Progress **1**
Knowledge Capital: The Key to Africa's Future Development 1
Study Framework: From Science to Service Delivery 3
Grouping Countries by Educational Performance 8
Grouping Countries by Economic and Social Challenges 20
Mapping Educational Performance and Challenges 35
Organization of the Book 45
Notes 46
References 47

2 A Focus on Learning **53**
Introduction 53
Learning for Development 54
The Knowledge Capital of Sub-Saharan Africa in International Context 58
Equity in the Distribution of Learning in Sub-Saharan Africa 80
Determinants of Learning: Global Evidence 97
Correlates of Learning in Sub-Saharan Africa 110
Effective Interventions in Sub-Saharan Africa 123

Summary: Implementing What Works in Africa 131
Notes 134
References 136

3 The Unfinished Agenda for Reaching Universal Basic Education 145
Introduction 145
Early Grades: Building the Foundations of Learning 146
Improving Access and Progression in Basic Education 171
Expanding Lower-Secondary Education with Quality and Relevance 191
Summary 219
Notes 220
References 223

4 Managing Teachers 231
Introduction 231
Africa's Challenges in Teacher Management 233
Sub-Saharan Africa's Teachers 235
Teacher Deployment and Presence in School and at Work 255
Teaching and Learning in the Classroom 268
Teachers' Workplace Conditions in Sub-Saharan Africa's Primary Schools 303
Strategic Priorities for Improving Teacher Management 317
Notes 325
References 333

5 Deploying the Budget to Improve Quality 341
Introduction 341
Overview of Education Financing and Spending in Sub-Saharan Africa 343
Getting Better Value for Money through Public Financial Management Reform 365
Use of Decentralization to Improve the Planning and Execution of Education Resources 379
Using the Budget: Priority Areas for Improving Quality and Equity 391
Notes 399
References 401

6 From Science to Service Delivery: Closing the Capacity Gap 405
Introduction 405
Generating and Using Data for Better Planning and Monitoring 407
Building Technical Capacity to Improve Education Quality 415
Coordination of Institutions to Align Resources and Inputs 418
Accountability and Incentives to Strengthen Performance and Outcomes 420
Consultation and Negotiation with Stakeholders to Build a Consensus 422
Toward an Approach to Capacity Building in Ministries of Education 425
Notes 432
References 432

7 Conclusions and Recommendations 435
Summary and Conclusions 435
Recommendations 439
Notes 441
References 442

8 Coda: Looking Ahead 443
Introduction 443
Changes in Context: Past and Current Challenges 443
Managing Expansion with Quality 448
Notes 453
References 454

Boxes

1.1 Harmonizing Variations in the Duration of Primary, Lower-Secondary, and Basic Education across Countries in Sub-Saharan Africa 11
1.2 How Can Sub-Saharan African Countries Support Out-of-School Youths? 19
1.3 Jeopardizing Progress: The Impact of Conflict on Human Capital 33
1.4 Kenya: Progress in Both Primary Coverage and Learning, Despite Many Initial Challenges 37
1.5 Togo: Sustained Progress and Expansion in the Wake of Socioeconomic and Political Crisis 39

1.6	Ethiopia: Overcoming Great Odds to Massively Expand Primary Education Coverage	42
1.7	The Central African Republic: Education Struggles amid Perpetual Crisis	44
2.1	Cross-Nationally Comparable Learning Assessments in Sub-Saharan Africa	59
2.2	Solving an Enigma: Why Burundi Outperforms Other Sub-Saharan African Countries on Education Assessments	77
2.3	Examples of Interventions Found Effective in Raising Student Learning in Sub-Saharan Africa	104
2.4	BRIGHT: A "Multilevel" Education Intervention Targeting Girls in Rural Burkina Faso	128
2.5	Examples of Interventions to Boost Student Attendance in Sub-Saharan African Countries	131
3.1	Equality versus Equity in Education	146
3.2	Improving Early-Grade Progression: An Example from South Africa	154
3.3	Countrywide Teaching in Local Languages: Policy and Implementation in Ethiopia	165
3.4	Botswana's Transition to Basic Education: An Impetus for Dramatic Change	189
3.5	Boarding Schools: Effective but Not Cost-Effective	196
3.6	How to Delay the Age at First Marriage Where Early Marriage Remains Widespread: A Model Program in Nigeria	200
3.7	Challenges of Implementing a New Lower-Secondary Curriculum in Uganda	209
4.1	Hiring and Management of Contract Teachers in Cameroon and Madagascar	242
4.2	Collective Bargaining to Standardize Teacher Pay and Benefits in Kenya	254
4.3	Definitions of Minimum Content Knowledge for Teachers	269
4.4	Initial Training of Primary and Secondary Mathematics Teachers in Botswana: Findings from the TEDS-M Survey	278
4.5	Pathways to Initial Teacher Qualification in Ghana	287
4.6	Strengthening Secondary Teachers' Preparation to Teach Mathematics and Science	293

4.7 Promising In-Service Teacher Training Models for Early-Grade Reading in Kenya and Rwanda 300
5.1 Fiscal Imbalances 351
5.2 Intergovernmental Relations and Equality's Effects on Education in Nigeria 362
5.3 Six Dimensions of PFM Evaluation in the 2011 PEFA Framework 366
5.4 Cost-Effectiveness of Interventions to Boost Learning in Sub-Saharan Africa 371
5.5 Improving Procurement of Learning Materials in Mozambique 378
5.6 Where Has Decentralization Worked and Not Worked in Sub-Saharan Africa? 383
5.7 Effects of SBM, Procurement, and PFM Weaknesses on School Infrastructure Project Implementation in Uganda 388
5.8 Randomized Trials of SBM Initiatives in Kenya, The Gambia, Mali, Niger, and Senegal 390
6.1 Institutions Involved in Improving the Quality of Basic Education in Nigeria 417
6.2 Bureaucratized Education Coordination Efforts in Côte d'Ivoire 420
6.3 Effects of Local Stakeholders on Teacher Deployment in Malawi 423
6.4 Capacity Development for the Financial Sector and Disaster Risk Management 428
8.1 Assumptions Used to Calculate Primary and Lower-Secondary Enrollment Projections 451

Maps

B1.1.1 Duration of Education Cycles in Sub-Saharan Africa, by Country 12
3.1 National Selection Examinations, by Education Level, in Sub-Saharan African Countries, 2016 184

Figures

1.1 Study Framework: Science plus Effective Implementation for Improving Educational Quality 7
1.2 Girls' Gross Intake Ratio, Last Grade of Primary Cycle, in Ethiopia, Mozambique, and Togo, 1990 and 2015 9
1.3 Growth in Access to Primary Education in 45 Sub-Saharan African Countries, by Group, 2000–13 10
1.4 Lower-Secondary Gross Enrollment Rates of 34 Sub-Saharan African Countries, 2000 and Most Recent Year 16

1.5	Out-of-School Rates for Children of Primary and Lower-Secondary Age Ranges Combined, 38 Sub-Saharan African Countries, by Group, circa 2013	18
1.6	Real GDP Per Capita and Total Primary-School Enrollment in Sub-Saharan Africa, 1960–2014	21
1.7	Population of Sub-Saharan African Countries, 1995	24
1.8	Average Annual Growth of the Child Population in Sub-Saharan African Countries, 1990–2000	25
1.9	Average Annual GDP Per Capita Growth in Sub-Saharan African Countries, 1990–2000	26
1.10	Gini Index of Economic Inequality for Sub-Saharan African Countries, Earliest Year Available, 1991–2005	28
1.11	Poverty Headcount Ratio in Sub-Saharan African Countries, Earliest Year Available, 1991–2005	29
1.12	Linguistic Diversity Index for Sub-Saharan African Countries, 2015	30
1.13	Violent Conflicts per Million Inhabitants in Sub-Saharan African Countries, 1997–99	32
B1.3.1	Average Years of Education Observed and Estimated in the Absence of Conflict in Côte d'Ivoire, 1990–2010	33
2.1	Knowledge Capital and Long-Term GDP Growth, Selected Countries, 1960–2000	55
2.2	SACMEQ II (2000) Scores and Growth of GDP Per Capita, Sub-Saharan African Countries, 2000–15	57
2.3	Percentage of Test Takers Reaching Minimum Performance on Recent Mathematics, Reading, and Science Assessments in Sub-Saharan Africa, by Country and Group	60
2.4	Reading Proficiency of Adults in Ghana and Kenya Relative to Other Selected Low- and Middle-Income Countries, 2014	61
2.5	Lower-Secondary (Grade Eight) TIMSS Mathematics Scores in Selected Countries, by Region, 2003–15	62
2.6	Percentage of Grade Nine Students in Botswana and South Africa Performing at Mathematics and Science Performance Levels, TIMSS 2011 and 2015	63
2.7	Percentage of Grade Six Students Performing at PASEC 2014 Reading and Mathematics Competency Levels in 10 Sub-Saharan African Countries, by Group	66

2.8 Average SAQMEC Mathematics Scores of Grade Six Students in Participating Southern and East African Countries, by Group, 2000–13 67
2.9 Percentage of Grade Six Students Performing at SACMEQ IV (2013) Reading Performance Levels in 11 Southern and East African Countries, by Group 68
2.10 Percentage of Grade Six Students Performing at SACMEQ IV (2013) Mathematics Performance Levels in 11 Southern and East African Countries, by Group 69
2.11 Average Reading Scores on Grade Four PIRLS and prePIRLS Assessments, Botswana and South Africa Relative to Selected Other Countries, 2011 70
2.12 Average Mathematics and Science Scores on Grade Four TIMSS Assessments, Botswana and South Africa Relative to Selected Other Countries, 2011 and 2015 72
2.13 Average SDI Reading and Mathematics Scores of Grade Four Students in Sub-Saharan African Countries, by Group 73
2.14 Percentage of Grade Four Students with Various SDI Reading Skills in Seven Sub-Saharan African Countries, by Group 74
2.15 Percentage of Grade Four Students with Various SDI Mathematics Skills in Seven Sub-Saharan African Countries, by Group 74
2.16 Percentage of Grade Two Students Performing at PASEC 2014 Reading and Mathematics Competency Levels in 10 Sub-Saharan African Countries, by Group 75
2.17 Percentage of Students in Grades Two and Three Receiving EGRA Reading Comprehension Scores of Zero in Selected Sub-Saharan African Countries, by Testing Language and Country Group 79
2.18 Variance Decomposition of Grade Six Reading and Mathematics Scores into School-Level and Student-Level Shares in 25 Sub-Saharan African Countries 82
2.19 Percentage of Between-School Variance in Grade Six Reading and Mathematics Performance Attributable to Average Socioeconomic Status of Students, Francophone African Countries, 2014 84
2.20 Average Effect Size of Student Characteristics on Grade Six Reading and Mathematics Scores in 25 Sub-Saharan African Countries 85

2.21 Average Gap in Grade Six Reading and Mathematics Scores, Students in the Highest versus Lowest Socioeconomic Quintiles, Francophone African Countries by Group, 2014 87

2.22 Average Gap in Grade Six Reading and Mathematics Scores, Students in Highest versus Lowest Socioeconomic Quartiles, Southern and East African Countries by Group, 2007 88

2.23 Average Gap in Reading and Mathematics Scores between Students Who Always or Sometimes Spoke the Language of Instruction at Home and Those Who Never Did, Francophone African Countries by Group, 2014 90

2.24 Average Gap in Reading and Mathematics Scores between Grade Six Students Who Always or Sometimes Spoke the Language of Instruction at Home and Those Who Never Did, Southern and East African Countries by Group, 2007 91

2.25 Average Mathematics Scores of Students in Grades Eight or Nine in Botswana and South Africa versus International Average, by Frequency of Speaking the Language of the Assessment at Home, 2015 92

2.26 Average Gap in Grade Six Reading and Mathematics Scores between Urban and Rural Students in Francophone African Countries, by Group, PASEC 2014 93

2.27 Average Gap in Grade Six Reading and Mathematics Scores between Urban and Rural Students in Southern and East African Countries, by Group, SACMEQ 2007 94

2.28 Average Gap in Grade Six Reading and Mathematics Scores between Girls and Boys in Francophone African Countries, by Group, PASEC 2014 95

2.29 Average Gap in Grade Six Reading and Mathematics Scores between Girls and Boys in Southern and East African Countries, SACMEQ 2007 96

2.30 Correlations Between School Autonomy over Resources and Curricula with PISA Mathematics Scores of 15-Year-Old Students, by Country Income Level, 2012 99

2.31 Average Effectiveness of Interventions to Boost Learning in Low- and Middle-Income Countries 107

2.32 Average Effectiveness of Interventions to Improve Student Enrollment and Attendance in Low- and Middle-Income Countries 109

2.33	Percentage of Between-School Variance in Grade Six Reading and Mathematics Performance Attributable to School Average Grade Two Reading and Mathematics Scores, Francophone African Countries by Group, 2014	115
2.34	Average Grade Six Mathematics and Reading Scores for Students in Schools in the Lowest Quintile of Socioeconomic Status and Schools in the Highest Quintile, Francophone African Countries, 2014	116
2.35	Resources and Characteristics of High-SES versus Low-SES Schools in Burundi and Cameroon, 2014	117
2.36	Average Effectiveness of Interventions to Boost Learning Outcomes, Sub-Saharan African Countries Compared with All Low- and Middle-Income Countries	126
2.37	Average Effectiveness of Interventions to Boost Student Attendance, Sub-Saharan African Countries Compared with All Low- and Middle-Income Countries	130
3.1	Early-Grade Enrollment Indicators, Selected Sub-Saharan African Countries and Peru, 1990–2010	148
3.2	Early-Grade "Bulge Index" Rankings of Sub-Saharan African Countries	151
3.3	Early-Grade "Bulge" in Mid-2010s and Improvement between 1975 and 2010, Sub-Saharan African and Other Selected Low- and Middle-Income Countries	152
B3.2.1	Trends in Early-Grade Enrollment Indicators, South Africa, 1990–2010	154
3.4	Percentage of Rural Primary-Age Children Living More Than 2 Kilometers or a Half-Hour's Travel Time to the Nearest School, Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s	156
3.5	Average Primary-School Class Size in Malawi, by Grade, 2016	158
3.6	Age Composition of Grade One Enrollment in Selected Sub-Saharan African Countries, by Group, Previous and Latest Years	159
3.7	Repetition Rates in Grade One, by Age Category, in Selected Sub-Saharan African Countries by Group, Latest Available Years	160
3.8	Gross Enrollment Ratios of Primary and Lower-Secondary Education, Rural versus Urban Location, in Sub-Saharan African Countries by Group	173

3.9	Percentage of Rural and Urban Children of Lower-Secondary Age Living More Than 3 Kilometers or a Half Hour's Walk from the Nearest Secondary School in Selected Sub-Saharan African Countries, by Group	175
3.10	Gender Parity Index for Lower-Secondary Education, Selected Sub-Saharan African Countries, by Group	177
3.11	Survival Rates through Grade Nine, Selected Sub-Saharan African Countries	178
3.12	Main Reasons Why Primary-Age Children Drop Out of School, Selected Sub-Saharan African Countries, by Group	179
3.13	Main Reasons Why Boys and Girls of Lower-Secondary Age Drop Out of School, Selected Sub-Saharan African Countries, by Group	182
3.14	Repetition Rates by Grade in Selected Sub-Saharan African Countries, by Group	186
3.15	Transition Rates from Primary and Lower-Secondary Education, by Location Type, Wealth, and Gender, in Selected Sub-Saharan African Countries, by Group	187
B3.4.1	Effects of Education Sector Reforms in Botswana	189
3.16	Projected Lower-Secondary Enrollment in Sub-Saharan Africa, 2015–30	192
3.17	Percentage of Lower-Secondary Schools with Gender-Separate Toilets in Sub-Saharan African Countries, by Group	202
3.18	Percentage of Lower-Secondary Enrollment in Private Schools in Selected Sub-Saharan African Countries, by Group	206
3.19	Percentage of African Population Using Mobile Phones, Broadband, and Internet, 2015	214
3.20	Percentage of Schools with Computer Laboratories, by Education Level, in Selected Sub-Saharan African Countries by Group, 2014 or Latest Available Year	215
3.21	Percentage of Schools with Electricity, by Education Level, in Sub-Saharan African Countries by Group, 2014 or Latest Available Year	216
4.1	Areas of Teacher Management Challenges	234
4.2	Size and Growth of Teacher Cadres in Primary and Secondary Education, Sub-Saharan African Countries, by Group, 2000–13	237
4.3	Percentage of Nonpermanent Teachers in Public Primary Schools, Sub-Saharan African Countries, by Group, Early 2000s versus Latest Available Year	241

4.4	Educational Attainment of Teachers and Other Educated Workers in Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s	246
4.5	Work Hours, Wages, and Second Jobs of Teachers Relative to Other Well-Educated Workers in Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s	247
4.6	Likelihood of Individuals with Tertiary Education to Work as Teachers Instead of in Other White-Collar Jobs in Selected Sub-Saharan African Countries, Early to Mid-2010s	249
4.7	Correlates of Hourly and Annual Pay among Teachers and Other Workers with Tertiary Education in 13 Sub-Saharan African Countries, 2010–16	250
4.8	Correlates of Having a Second Job among Teachers and Other Workers with Tertiary Education in Selected Sub-Saharan African Countries, Early to Mid-2010s	252
4.9	Relation between Numbers of Teachers and Students across Schools in Ghana and Côte d'Ivoire	257
4.10	Degree of Randomness in Teacher Allocation across Primary Schools in Selected Sub-Saharan African Countries, by Group and Baseline Challenge Category, 2006–16	258
4.11	Indexes of Randomness in Teacher Allocation across Secondary Schools in Selected Sub-Saharan African Countries, by Group and Baseline Challenge Category, 2006–16	261
4.12	Relationship of Secondary Teachers' Field of Training to Mathematics and Science Teaching Assignments, by Location Type, in Zimbabwe, 2014	263
4.13	Reasons for Teacher Absence from School and Incidence of "Orphaned" Classrooms in Selected Sub-Saharan African Countries, by Group, Mid-2010s	265
4.14	Percentage of Grade Six Teachers Lacking Minimum Competency in Reading and Mathematics, SACMEQ Countries, Latest Available Data	270
4.15	Average Grade Four Teacher Scores on SDI Assessments in Selected Sub-Saharan African Countries, by Group, 2012–16	271
4.16	Regression Analysis of the Literacy Scores of Teachers and Other Service Sector Workers in Ghana and Kenya, 2013	275
4.17	Relationship between 2008 TEDS-M and 2011 TIMSS Test Scores, Botswana and Other Selected Economies	279

4.18	Average Percentage of Correct Responses from Teachers on Test of Pedagogical Knowledge in SDI Countries, by Group, 2012–16	282
4.19	Quality-Teaching Benchmarks and Practices in Primary Schools, Selected Sub-Saharan African SDI Countries	283
4.20	Percentage of Primary and Secondary Teachers Whose Own Attainment Does Not Exceed Their Teaching Level, Selected Sub-Saharan African Countries, by Group	286
4.21	Stylized Pathways for Teacher Preparation and Development in Sub-Saharan Africa	290
4.22	Percentage of Primary School Students, by Duration of Teachers' Preservice Training, in Selected Sub-Saharan African Countries, by Group	291
4.23	Measures of Continuing Professional Development of Primary Teachers in Selected Sub-Saharan African Countries, by Group	295
4.24	Frequency of Pedagogical Advice to Primary Teachers from School Heads in Selected Sub-Saharan African Countries, by Group	297
4.25	Science and Service Delivery Aspects of Teacher Preparation and Professional Development Programs in Sub-Saharan Africa	301
4.26	Class Sizes and Student-Textbook Ratios in Primary Schools, Sub-Saharan African Countries, by Group, Early to Mid-2010s	305
4.27	Toilets, Potable Water, and Electricity in Primary Schools in Sub-Saharan African Countries, by Group, Early to Mid-2010s	308
4.28	Percentage of Teachers Using Corporal Punishment on Students, Francophone Sub-Saharan African Countries, by Group, 2014	310
4.29	Percentage of School Heads Reporting Teacher Violence against Students, SACMEQ Countries, by Group, Latest Available Year	311
4.30	Availability of Essential Conditions for Effective Teaching in Primary Schools in Sub-Saharan African Countries, by Group	315
5.1	Government Education Expenditures as a Percentage of GDP, World Regions and Sub-Saharan African Countries, by Group, 1999 and 2014	345
5.2	Government Education Expenditures as a Percentage of Total Government Expenditures, World Regions and Sub-Saharan African Countries, by Group, 1999 and 2014	346

5.3 Total Aid to Education, by Region, 2002–03, 2010, 2014 347
5.4 Percentage of Government Education Expenditures, by Level, in Sub-Saharan African Countries by Group, circa 2014 353
5.5 Average Percentage of Government Education Expenditures in Sub-Saharan Africa by Education Level and Country Group, circa 2014 354
5.6 PEFA Ratings of Orderliness and Participation in the Annual Budget Process in Sub-Saharan African Countries, by Group, Early to Mid-2010s 368
5.7 PEFA Ratings of Multiyear Perspective in Fiscal Planning, Expenditure Policy, and Budgeting in Sub-Saharan African Countries, by Group, Early to Mid-2010s 368
5.8 PEFA Ratings of Budget Classification in Sub-Saharan African Countries, by Group, Early to Mid-2010s 370
5.9 PEFA Ratings of Predictability and Control in Budget Execution in Sub-Saharan African Countries, by Group, Early to Mid-2010s 373
5.10 PEFA Ratings of Donor Practices in Sub-Saharan African Countries, by Group, Early to Mid-2010s 380
6.1 Percentage of Sub-Saharan African Countries Not Reporting Data on Essential Student Indicators, 2000–14 409
6.2 Percentage of Sub-Saharan African Countries Not Reporting Data on Basic Teacher Indicators, 2000–14 411
6.3 Percentage of Sub-Saharan African Countries Not Reporting Data on Government Education Expenditure Indicators 412
B6.3.1 Student-Teacher Ratios in Primary Education, by District, in Malawi, 2016 423
8.1 Primary School Enrollment Projections, by Cause, for Sub-Saharan African Region and Four Selected Countries, 2015–30 449
8.2 Lower-Secondary School Enrollment Projections, by Cause, for Sub-Saharan Africa Region and Four Selected Countries, 2015–30 450

Tables

1.1 Definition of Four Levels of Progress in Primary Education across Sub-Saharan African Countries, 2000–13 11
1.2 Social and Economic Challenges to Education Intake and Retention in Sub-Saharan Africa 34

1.3	Sub-Saharan Countries Grouped by Level of Social and Economic Challenges to Education Faced in the Mid-1990s	35
1.4	Progress in Primary Education Coverage and Inclusion Mapped against Baseline Challenges in Sub-Saharan African Countries, by Group, circa 1990s to 2015	36
2.1	Average TIMSS Mathematics Scores of Grade Nine Students and Selected Resources and Practices of Schools in Botswana and South Africa, by School-Average Socioeconomic Status, 2015	122
2.2	Types of Interventions to Boost Learning Evaluated by High-Quality Studies in Low- and Middle-Income Countries, Globally and in Sub-Saharan Africa, 1990–2015	125
2.3	Number of Learning Intervention Studies in Meta-Analysis, Sub-Saharan African Countries	125
B2.4.1	Impacts of BRIGHT on Primary School Enrollment, Test Scores, and Completion Rates in Burkina Faso, 2008–15	129
3.1	Language-of-Instruction Policies and Implementation in Primary Education, Selected Sub-Saharan African Countries, by Group	164
3.2	Average Percentage of Household Expenditures per Child Spent on Education, Selected Sub-Saharan African Countries	181
B3.5.1	Cost per Test Score Unit in Day and Boarding Secondary Schools for Girls, Kericho District, Kenya, 2010	196
3.3	Selected Characteristics of Public and Private Secondary Schools in Côte d'Ivoire and Uganda, 2015	207
3.4	ICT Use in Teaching and Learning in Primary and Secondary Education, Selected Sub-Saharan African Countries, by Group	212
4.1	Size and Growth of Teacher Cadres in Primary and Secondary Education, World and Selected Regions, 1999 and 2014	236
4.2	Percentage of Female Teachers in Primary and Secondary Schools, World and Selected Regions, 1999 and 2014	236
4.3	Incidence of Household and Labor Force Surveys for Comparative Analysis of Teachers and Nonteachers in Sub-Saharan African Countries, by Group and Challenge Category	244
4.4	School Absenteeism Rates among Primary School Teachers in Selected Sub-Saharan African Countries, by Work Venue, Location Type, and Contract Type, Early to Mid-2010s	264
4.5	Percentage Distribution of Teachers by PIAAC Proficiency Levels, Ghana and Kenya	274

4.6	Regression Analysis of Examination Scores of Students Admitted to Teacher Training Courses Relative to Courses in Other Fields, Kenya, 2015	276
4.7	Official Minimum Qualifications for Civil Service Teaching Posts, by Level, in Selected Sub-Saharan African Countries, Early 2010s	285
B4.5.1	Pathways to Initial Teacher Qualifications in Basic Education in Ghana, circa 2013	287
4.8	Defining Minimum Essential Conditions for Teaching and Learning in the Context of Sub-Saharan Africa	313
4.9	Recommendations for Strengthening Initial Teacher Education, by Level, in Sub-Saharan Africa	320
4.10	Strengthening In-Service Teacher Education (Upgrading Programs) in Sub-Saharan Africa	321
4.11	Strengthening Continuous Professional Development (CPD) of Teachers in Sub-Saharan Africa	322
5.1	Government Education Expenditure Trends in Sub-Saharan Africa and Other Selected Regions 1999–2014	344
5.2	Total Donor Aid to Primary Education per Enrolled Child in Sub-Saharan African Countries, by Group, 2014	349
5.3	Household Expenditures as a Percentage of Total Education Expenditures in Selected Sub-Saharan African Countries, by Group, Various Years in 2005–2012	350
5.4	Median Percentage of Government Education Budget, by Level, Selected Regions, circa 2014	352
5.5	Government Expenditures per Student in Primary and Secondary Education, Selected Regions, 2014	354
5.6	Distribution of Direct Aid to Education in Sub-Saharan Africa and South Asia, 2002–03 and 2014	356
5.7	Household Education Spending, by Category, Mid-2000s to Mid-2010s	357
B5 4.1	Cost-Effectiveness of Effective Learning Interventions, by Type, in Sub-Saharan Africa	372
5.8	Education Budget Execution Rates, Budget Item, in Selected Sub-Saharan African Countries, Late 2000s to Early 2010s	375
5.9	Summary of School-Based Management Reforms in Sub-Saharan African Countries	386

5.10	PFM Implications of Delivery of Various Education Inputs	398
8.1	Educational Progress since 1990s against Total Fertility Rates, 2010–15, in Sub-Saharan African Countries, by Group	445
8.2	Educational Progress against Robustness of Economic Performance since the 1990s, Sub-Saharan African Countries, by Group	446

Foreword

Africa's natural wealth is enormous. Growing investments in infrastructure and a better business climate are helping to translate this wealth into productive physical capital. The continent's large and growing youth population could also promote economic growth. However, what slows Africa's social and economic transformation relative to other regions of the world is the lagging stock, composition, quality, and accumulation rate of its knowledge capital.

Bringing children into school and ensuring that they complete at least basic education and acquire the foundations of learning is essential for building this knowledge capital. This book shows that with focused attention on a few key policy areas, tackling this fundamental challenge to Sub-Saharan Africa's future is as feasible as it is promising.

Facing Forward meticulously documents the access and learning levels of many Sub-Saharan African countries. It also demonstrates how countries in the region differ. Over the past twenty-five years, many countries in the region have universalized primary schooling; a few are within reach of universal lower secondary education as well. Other countries, largely in the Sahel region, still struggle to universalize primary education. Many countries have overcome challenges arising from poverty, conflict, and high demographic growth, while others have not. These achievements notwithstanding, some 22 percent of the region's primary school-age children are still not in school today, and far too many of those in school drop out before completing their nine or ten years of basic education.

This book highlights the crisis in learning, reflecting the poor quality of education services. Fewer than half of students in most countries are acquiring minimum competencies in reading and mathematics. The deficiencies in children's learning start in the early grades: Classes are large and overcrowded,

and the lack of consistent policies on language of instruction and their effective implementation impede early learning. Policy makers must focus not just on providing schooling, but also on whether children are learning in school.

Facing Forward presents a wealth of analyses and evidence on what contributes to learning outcomes and shows how to translate this knowledge into effective service delivery. The book argues that for schooling to build learning, action is needed in four priority areas: to focus directly on student progress from the early grades to the end of the lower secondary cycle; to manage and support teachers; to increase the efficiency of resource use; and to build technical and other capacities of the ministries of education.

A fundamental premise of *Facing Forward* is that countries in the region can learn from other countries that have made progress under conditions similar to their own. The challenges of adapting to the local context and ensuring effective implementation are common to all countries. There is no option for Africa other than to invest in its most precious asset, the quality of its human capital, and to ensure the foundations of learning for all its children.

This book makes an essential contribution to our understanding of the performance of education systems in Sub-Saharan Africa. Its recommendations on how countries can move their learning agendas forward deserve urgent attention by policy makers and others concerned about the continent's prospects for economic and social transformation in the coming decades.

Makhtar Diop
Vice President, Africa Region
The World Bank

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Executive Summary

Introduction

Sub-Saharan Africa is becoming more diverse, urbanized, and integrated regionally and globally, bringing the promise of more and better jobs to the continent's sizable and growing youth population. Realizing this potential requires that young Africans have a solid foundation in basic education and opportunities for many of them to continue beyond basic education. These youths—the continent's future workforce—are essential for countries to tap into the world's rich accumulation of scientific and technological knowledge for economic and social transformation. This mechanism is so critical that many, if not all, African leaders have increasingly made the building of knowledge capital a centerpiece of their countries' visions and strategies for development.

For the past 25 years, Sub-Saharan Africa has focused on enrolling students in primary school, the first step in developing human capital. The results have been nothing short of astounding, with some countries already providing all children with a full cycle of 9–10 years of basic schooling. Enrollment alone does not produce knowledge capital, however. It must also equip each child with adequate competencies in literacy, numeracy, and science—and prepare many of them to be educated and trained beyond basic education. By this benchmark, Sub-Saharan Africa's knowledge capital remains thin, even as the frontiers of knowledge push forward at a rapid pace.

How to build Sub-Saharan Africa's knowledge capital by improving learning outcomes in basic education while expanding access and completion is the focus of this book. It draws lessons—*from* the region and *for* the region—about "what works" to boost learning and how to better implement what is known to have worked. It also adds to the literature with its extensive new analyses of multiple datasets from the region, integrating findings about children's learning, access to school, and progress through basic education.

A Severe Learning Crisis—and Four Priorities for Addressing It

This study's analyses of learning bring into sharp focus a severe learning crisis in Sub-Saharan Africa. The study identifies and analyzes four priority areas that will help countries in the region to better align their education systems with the learning agenda:

- *Completing the unfinished agenda of universalizing basic education with quality*. This goal entails addressing major gaps in service delivery that affect children's entry into first grade and subsequent progression through basic education, as well as the wide disparities in learning that greatly increase the risk of dropping out among rural and poor children who are already burdened by economic pressures to do so.
- *Ensuring effective management and support of teachers.* Because teachers are at the center of the teaching and learning process, it is critical for countries to address the serious problems documented in this study relating to teacher recruitment, preparation, deployment, supervision, and support at the school level. Teacher absenteeism is high, and teachers lack adequate knowledge and skills as well as conducive workplaces to be effective in their work.
- *Increasing financing for education and focusing spending and budget processes on quality*. Implementing good ideas to realize Sub-Saharan Africa's agenda for basic education requires more and better-aligned resources. At present, many of the region's countries spend too little per student on basic education, and the little that is spent is often poorly used, as reflected in the haphazard allocation of teachers, the wide disparities across schools in the availability of learning materials and basic conditions, and the consequent gaps in learning.
- *Closing the institutional capacity gap*. Tackling the weaknesses in Sub-Saharan Africa's basic education systems elaborated in this study involves complex activities—among them, planning, coordination, negotiations, operational oversight, follow-up, course correction, evaluation, data collection and analysis, and communication. At present, these functions are highly fragmented and operate with limited technical capacity in most of the region's ministries of education.

Addressing these four priority areas is essential to advancing the region's agenda for basic education. A fundamental premise of this study is that although Sub-Saharan African countries might learn from high-performing and higher-income education systems, they might also look more closely at other low- and middle-income countries, especially within the region, that have made progress

under conditions similar to or more challenging than their own. Such countries offer particularly relevant sources of inspiration. However, learning from them must not bypass the essential work of local adaptation—including careful consideration of local constraints and opportunities.

How Countries Differ: Educational Progress and Contextual Challenges

Since 1990, Sub-Saharan Africa's progress toward universalizing primary education has been nothing short of stupendous. The region's average primary gross enrollment ratio (GER) rose from 68 percent in 1990 to 98 percent in 2015, and enrollments grew from 63 million students to 152 million, with 78 percent of primary-school-age children enrolled.[1] However, countries have followed diverse trajectories of expansion. In this regard, four groups can be distinguished:

- *"Established" countries (Group 1)* demonstrate high primary GERs in the baseline year (2000) and 2013, low shares of children out of school who are of primary school-going age, and primary-school retention rates of close to 100 percent (in the most recent year for which data are available).
- *"Emerged" countries (Group 2)* had high primary GERS in 2000 and 2013 and low rates of out-of-school children, but primary-school retention rates are below 80 percent.
- *"Emerging" countries (Group 3)* made progress in enrollment, having low primary GERs in 2000 that increased to over 90 percent by 2013; however, they still have high rates of out-of-school children and low primary-school retention rates.
- *"Delayed" countries (Group 4)* have made only limited progress on all fronts: they had low primary GERs in 2000 and 2013, and still have high rates of out-of-school children and low primary-school retention rates.

To more accurately assess each country's status and to recommend tailored solutions, the study also considers the widely varying social and economic challenges that the region's countries faced approximately 25 years ago (in the early to mid-1990s). This study identified seven key challenges affecting education system growth in Sub-Saharan Africa: large total population, rapid growth of the school-age population, low or stagnant growth of gross domestic product (GDP) per capita, high income inequality, high poverty levels, high linguistic diversity, and frequent incidence of violent conflict. Based on the number of challenges faced in the 1990s, the study categorizes each country has having faced *few challenges*, *some challenges*, or *many challenges*.

Many of the Group 4 countries have faced multiple contextual challenges that greatly impeded the expansion of their education systems—among them, high population growth, frequent conflict, high linguistic diversity, slow economic growth, and high economic inequality. By comparison, many of the Group 1 countries—comprising most of the region's middle-income countries, where population growth rates are relatively low and other challenges are less severe—are approaching universal lower-secondary education as well. Many Group 1 countries also participate in regional and international assessments, reflecting their growing interest in student learning and in building the knowledge capital required for economic competitiveness.

The State of Knowledge Capital in Sub-Saharan Africa

Knowledge capital defies easy measurement. Average years of schooling, a common indicator of knowledge capital in the past, is neither adequate nor appropriate today, and is being replaced with various direct measures of literacy, numeracy, and other skills. In Sub-Saharan Africa, measures of improved learning—let alone comparisons between countries—are not straightforward because the various tests assess learning differently, measure few skills (typically primary-level mathematics and reading), and generally are not comparable over time. Despite these limitations, this study has gathered enough information to draw certain conclusions, as summarized here.

Many children remain out of school. Despite the salutary progress in the past, an estimated 54.6 million African children of primary- and lower-secondary school age (averaging 24 percent of this age group) remained out of school in 2015, accounting for 45 percent of the global out-of-school population, and many of these children may never attend school.[2] The three most populous Sub-Saharan African countries account for about 40 percent of children who are out of school: 10.5 million in Nigeria, 7.5 million in Ethiopia, and 3.2 million in the Democratic Republic of Congo.

For those who are in school, learning levels are low. Various regional and international assessments of learning show that—except in a few countries that have achieved and maintained universal primary education—less than 50 percent of the students tested reached the absolute minimum level of learning on virtually all assessments. In many countries, less than 25 percent reached that level. For all countries, 75 percent would appear to be a reasonable minimum performance target.

The problem of low learning achievement emerges in the early grades. The teaching of reading, which is crucial to children's progress through school, is highly ineffective in most Sub-Saharan African countries. Early-grade reading assessments in several Sub-Saharan African countries reveal that 50–80 percent

of children in second grade could not answer a single question based on a short passage they had read in the language of instruction. A large proportion could not read even a single word.

Learning levels show signs of improvement. In Southern and East Africa, student test scores in the Southern and Eastern Africa Consortium for Measuring Education Quality (SACMEQ) assessments rose steeply from 2007 to 2013[3]; but in 2013, a third of sixth-grade students were still performing no higher than the "basic reading" and "basic numeracy" levels. Internationally, the scores from the four countries that have participated in recent international assessments[4] were well below those of students from other low- and middle-income countries and several standard deviations below the scores of students in high-income countries.[5] Nevertheless, both Ghana and South Africa have made considerable progress, albeit from a modest base; the share of eighth- or ninth-grade students reaching the low international benchmark in mathematics for eighth-grade students was greater in more recent assessments than in earlier assessments.[6]

Improvement of literacy and numeracy in the early years is a priority. In many Sub-Saharan African countries, enrollments in grades one and two are substantially higher than the size of the relevant age cohorts, by as much as 20–50 percent.[7] These swollen enrollments arise from underage and overage children initially enrolling in grade one and from students repeating grades one and two, often multiple times. The problem has persisted for more than a decade in many countries in the region, worsening learning conditions and straining the budget. This "inefficiency syndrome" is most prominent in countries such as Burundi, Ethiopia, Guinea-Bissau, Madagascar, Rwanda, Sierra Leone, Togo, and Uganda, where access to schooling has grown substantially in the past decade or so. However, the experience of both the "Established" (Group 1) countries and successful Latin American countries shows that it is possible, over a time frame of 10–15 years, to reduce the gridlock in early grades by compiling grade- and age-specific data; establishing age-grade schooling norms and promulgating them to lower-level education officials; and supporting the expansion of preprimary schooling.

In the early grades, children learn best in a language familiar to them. Whether children can reach a level of reading proficiency where they can "read to learn" depends on whether they are taught in a familiar language, usually their mother tongue or other vernacular, which may be a lingua franca used by the community (the home language). Evidence suggests that using the home language as the language of instruction for at least the lower primary cycle (about six years of schooling) is an important way to establish this competency in young children (Ouane and Glanz 2011; Trudell 2016). This is because they need to acquire not only early literacy and numeracy skills but also the skills for studying more complex topics. Many Sub-Saharan African countries lack a

consistent language policy that is being effectively implemented. Only Burundi, Ethiopia, South Africa, and Tanzania have consistently implemented a formal language of instruction policy that incorporates teaching in a language familiar to young children.

Many children drop out of school before completing basic education. Focusing on learning in the early grades also determines whether children complete basic education. In many countries in the region, significant shares of children drop out of school before completing the cycle. According to parents, the reasons for dropping out during primary education include the high cost of schooling, the poor quality of services, and long distances to school; at the secondary level, additional reasons include child marriage and pregnancy.[8] Providing financial incentives to households has proven effective in countering these influences on enrollment and attendance. Additional promising interventions at the lower-secondary education level include adolescent clubs with role models for girls as well as separate, good-quality sanitation facilities for girls. These initiatives have also helped improve the health and welfare of the girls in schools.

High-stakes examinations are a bottleneck for progression. Many countries in Sub-Saharan Africa continue to have high-stakes selection examinations that filter children for the next level of education. This creates perverse incentives for teachers to "teach to the test" and leads to unnecessary grade repetition. In 28 of the 43 countries for which data are available, high-stakes examinations take place at all education levels: primary, lower-secondary, and upper-secondary (Sayed and Kanjee 2013). Countries that have eliminated examinations between the primary and lower-secondary levels have shown significant increases in lower-secondary enrollments and improvements in basic education completion.[9]

The Need for Better Teacher Management and Support

Sub-Saharan African countries need an overhaul of policies and programs related to teacher recruitment, preparation, deployment, attendance, and professional support from the early grades to lower-secondary education. Among other measures, the requirements of implementing the language-of-instruction policies must be integrated into teacher planning and management. For serving teachers, especially those with low content knowledge and limited pedagogical skills, it is critical that continuous support be provided close to the school or within the school and be related to improving instruction in areas such as reading, academic literacy, mathematics, and science. New entrants into the teaching force need to be trained through revamped preservice teacher education

programs that emphasize mastery of content related to the school curricula, practical teaching strategies, and attitudes for continuous development.

For all teachers, upgrading of professional qualification to provide career pathways requires differentiated training options that integrate preservice preparation and continuing professional development, appropriate eligibility criteria for training, and standards for certification as well as attention to implementation follow-through, including budgeting for projected salary increases. Redeployment to ensure reasonable student-teacher ratios calls for a combination of planning, coordination, negotiations, incentives, and strict accountability. Increasing instructional time through regular teacher attendance and possible use of substitute teachers is required. To be effective, teachers also need at least minimally conducive workplace conditions; in all but the Group 1 countries, less than 10 percent of schools currently have the minimum conditions.[10]

The Case for More, and More Efficient, Education Spending

In 2014, the median government spending per student in Sub-Saharan African countries was just US$208 for primary education and US$412 for secondary education (in constant 2013 purchasing power parity [PPP] US dollars), compared with medians of US$451 and US$665, respectively, for South Asia, the region with the next lowest level of spending per student.[11] The region's spending at both levels of education is also largely absorbed by teacher salaries, which leaves little for inputs essential for effective instruction (World Bank 2017).

Increased education spending in Sub-Saharan African countries will be important to achieve United Nations Sustainable Development Goal (SDG) 4: "Ensure inclusive and equitable quality education." In many of them, the overall resource envelope can expand only through greater domestic resource mobilization—that is, by increasing the flow of taxes and other income into government treasuries.

There is also a need to better prioritize spending within the education sector. Spending could become more efficient, particularly by improving budget planning and execution and by improving teacher deployment.

Improving the budget planning and budget execution processes. Incremental resources should be directed toward nonsalary items that could make a big difference toward improving educational quality, such as learning materials and meeting the minimum essential conditions in schools. Specific aspects of public financial management—such as better controls on payroll and teacher allowances as well as better execution of nonsalary budgets through procurement planning and contract management, including for community school construction—will allow governments to get better value for money.

Improving teacher deployment, teacher attendance, and support for teaching. Teacher salaries account for a significant proportion of education spending, so a good use of teachers is critical for the overall health of the education system. In many Sub-Saharan African countries, some schools have many more teachers deployed to them than other schools with similar enrollments, and the pattern of deployment typically skews in favor of urban schools over those in hard-to-reach areas. And wherever teachers are deployed, too many are absent from school and from their classrooms. Most of the absences from school are for authorized leave, suggesting a problem with the management of leave policy. Moreover, as noted earlier, teachers often lack the training and support to be effective in their work. Improving the management and support of teachers to ensure attendance and effective teaching is crucial for efficient spending in the education sector.

The Need to Close the Capacity Gap

For most ministries of education, especially those still trying to universalize primary education, managing even the basic functions of the system is a challenge. They must plan and manage the training, deployment, accountability, and payment of teachers; oversee the choice of location for new schools as well as the construction processes; supervise the procurement and timely delivery of textbooks and learning materials; and ensure the collection, analysis, and use of data on a regular basis.

Improving student learning demands even more capacity than expanding enrollment at the primary level—and ministries of education in Sub-Saharan Africa face both demands. A steadfast focus on learning requires that they align all policies and institutions to this goal, which in turn requires specialized technical capacity as well as the "soft" capacities to lead, coordinate, and change course as required. Further, the region's education systems have become large and complex: their functions and stakeholders are increasingly numerous and their system management is increasingly decentralized. Building a consensus among this varied group requires special attention. These "soft" capacities are, in fact, the hardest to create.

This study identifies five areas of capacity that are important:

- Generation and use of data
- Technical capacity
- Coordination among institutions
- Accountability and incentives
- Negotiation and consensus building with stakeholders

Looking Ahead

Sub-Saharan African countries have diverged significantly in their educational trajectories over the past 25 years. How will they look 15 years from now? Three challenges will have the greatest effect on their prospects—fertility rates, economic growth, and conflict—and these will differentiate Sub-Saharan African countries in the future.

Group 1 countries, for example, have lower fertility rates, although the populations of such countries as the Republic of Congo, Gabon, Ghana, Kenya, and Zimbabwe will continue to grow for some time. These countries are likely to make more educational progress than countries facing a "demographic disaster" with total fertility rates of five or more.[12] The latter includes both Group 2 countries (such as the Democratic Republic of Congo, Tanzania, and Uganda) and many countries that have made only limited progress thus far or are substantially delayed. Across the region, population growth trends, along with improved student progression through basic education, imply that primary enrollment is likely to grow by 50 percent by 2030. Enrollments in lower-secondary education are also projected to expand rapidly, more than doubling in some countries.

Economic growth has also diverged across the region, with some countries maintaining high rates of growth before and after the financial crisis of 2008 and others decelerating. Much will depend on whether growth rates are sustained. The prospects are uncertain in this regard, particularly in view of the fall in commodity prices. Countries that are diversifying their economies face better prospects. Economic growth will also affect the ability of countries in the region to mobilize more resources for education, which is critical to sustain expansion and promote learning.

One of the challenges to educational progress—conflict—has increased generally across the continent, although it has abated in some countries.[13] Declines in conflict provide windows of opportunity for improving basic education, whereas increases in conflict could threaten the educational achievements of countries in Groups 1 and 2 while jeopardizing prospects for improvement in Groups 3 and 4.

These are sobering prospects. Many Sub-Saharan African countries will find themselves losing ground in the face of rapid population growth and less-than-robust economic growth. The most pressing challenges for these countries will be to reduce and stabilize population growth and to raise domestic resources for education. Nevertheless, there are reasons for optimism: the region's achievements of the past two decades—particularly in improving enrollments and making modest gains in learning—can be sustained and enhanced, especially in countries where population growth is slowing and where economies are becoming more diversified and resilient.

Notes

1. Elaborated using data from the UIS.Stat database, UNESCO Institute for Statistics (accessed October 2, 2017), http://data.uis.unesco.org.
2. Out-of-school rates from analysis of World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) microdata.
3. In principle, the scores from the three rounds of SACMEQ are comparable and can accurately measure improvement over time, although this has been called into question and, as of this writing, no technical reports for SACMEQ IV have been released (Bethell 2016; Spaull 2012).
4. These results include the Trends in International Mathematics and Science Study (TIMSS) mathematics scores of eighth- or ninth-grade students in Botswana, Ghana, and South Africa and the Programme for International Student Assessment (PISA) Plus scores of 15-year-olds in Mauritius.
5. No Sub-Saharan African countries to date have participated in PISA, which assesses the reading, mathematics, and science performance of 15-year-old students. Mauritius participated in the PISA Plus assessment of competencies of 15-year-olds in 2010. PISA Plus refers to an assessment of 10 education systems that had been unable to participate within the PISA 2009 project time frame; they administered the same assessments as their PISA 2009 counterparts, the only difference being that the assessments were administered in 2010.
6. The low international benchmark in TIMSS requires that students have some basic mathematical knowledge, can add and subtract whole numbers, and recognize parallel and perpendicular lines and familiar geometric shapes.
7. Elaborated from the UNESCO Institute for Statistics (UIS.Stat) database (accessed November 19, 2016), http://data.uis.unesco.org/.
8. Reasons for dropping out were gathered from World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data from 12 Sub-Saharan African countries.
9. Analysis of transition rates from the UNESCO Institute for Statistics UIS.Stat database, http://data.uis.unesco.org.
10. Findings are from an analysis of microdata from SACMEQ III (2007) and the 2014 Programme d'Analyse des Systemes Educatifs de la CONFEMEN (PASEC) surveys. The six essential conditions for effective teaching and learning are (a) qualified teachers with content and pedagogical knowledge and skills; (b) ratio of no more than 50 students per teacher; (c) basic services, such as toilets for girls and electricity; (d) access to textbooks for reading and mathematics; (e) regular class attendance by both teachers and students; and (f) a school climate free from abuse and violence.
11. Data from UNESCO 2016 (statistical tables for year ending 2014, long version: table 16. Domestic financial commitment to education: public spending).
12. In seven Sub-Saharan African countries, the total fertility rate is greater than six. "Total fertility rate" is defined as the total number of children who would be born to each woman if she were to live to the end of her childbearing years and give birth to children in alignment with the prevailing age-specific fertility rates.
13. The median number of conflicts per million inhabitants has nearly doubled since the mid-1990s, from 2 events to 3.6 events.

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Abbreviations

ACER	Australia Council for Educational Research
ACLED	Armed Conflict Location and Event Data
ADEA	Association for the Development of Education in Africa
BoM	board of management (Mali)
CBA	collective bargaining agreement
CCT	conditional cash transfer
CGE	Centre for Girls' Education (Nigeria)
COEs	Colleges of Education (Ghana)
CONFEMEN	Conférence des ministres de l'Éducation des États et gouvernements de la Francophonie
CPD	continuing professional development
CRS	Creditor Reporting System (OECD)
CTP	Contract Teacher Program (Cameroon)
DBE	Diploma in Basic Education (Ghana)
DEM	district education manager (Malawi)
DHS	Demographic and Health Survey
ECD	early childhood development
EFA	Education for All (United Nations)
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
ELP	Essential Learning Package
EMIS	education management information system
ETP	Extra Teacher Program (Kenya)
FIRST	Financial Sector Reform and Strengthening Initiative
FY	fiscal year

GDP	gross domestic product
GEEs	government education expenditures
GEM	Global Education Monitoring
GEQIP	General Education Quality Improvement Project (Ethiopia)
GER	gross enrollment rate
GFDRR	Global Facility for Disaster Reduction and Recovery
GIR	gross intake ratio
GMRs	Global Monitoring Reports (Education for All, UNESCO)
GPE	Global Partnership for Education
GPI	Gender Parity Index
HIV/AIDS	human immunodeficiency virus and acquired immune deficiency syndrome
IBE-UNESCO	International Bureau of Education, United Nations Educational, Scientific, and Cultural Organization
ICG	International Crisis Group
ICT	information and communication technology
IEA	International Association for the Evaluation of Educational Achievement
IEG	Independent Evaluation Group (World Bank)
IIEP	UNESCO International Institute for Educational Planning
IMCC	Inter-Ministerial Coordination Committee (Côte d'Ivoire)
IMF	International Monetary Fund
IPTE	Initial Primary Teacher Education (Malawi)
ISCED	International Standard Classification of Education
IT	information technology
ITE	initial teacher education
ITU	International Telecommunication Union
LOI	language of instruction
LSMS	Living Standards Measurement Study (World Bank)
M&E	monitoring and evaluation
MoI	medium of instruction
MS4SSA	Mathematics and Science in Sub-Saharan Africa (World Bank)
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
OER	open educational resources

PASEC	Programme d'analyse des systèmes éducatifs de la CONFEMEN
PCA	principal components analysis
PEFA	Public Expenditure and Financial Accountability survey
PER	Public Expenditure Survey (World Bank)
PFM	public financial management
PIAAC	Programme for the International Assessment of Adult Competencies
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment (OECD)
PPP	purchasing power parity
PTA	parent-teacher association
RCT	randomized controlled trial
SABER	Systems Approach for Better Education Results
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Education Quality
SADC	Southern African Development Community
SBM	school-based management
SDGs	Sustainable Development Goals (United Nations)
SDI	Service Delivery Indicator
SEED	School for Educational Evolution and Development
SES	socioeconomic status
SFCG	Search for Common Ground
SMC	school management committee
SMICT	science, mathematics, and information and communication technology (ICT)
SNNP	Southern Nations, Nationalities, and Peoples (region of Ethiopia)
SSA	Sub-Saharan Africa
STEP	Skills Toward Employment and Productivity
STR	student-teacher ratio (also known as pupil-teacher ratio)
TEDS-M	Teacher Education and Development Study in Mathematics
TFR	total fertility rate
TGEs	total government expenditures
TIMSS	Trends in International Mathematics and Science Study
UCTs	unconditional cash transfer

UIS	UNESCO Institute of Statistics
UN DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFPA	United Nations Population Fund
UNGEI	United Nations Girls' Education Initiative
UNICEF	United Nations Children's Fund
UPPET	Universal Post Primary Education and Training (Uganda)
USAID	US Agency for International Development
WDI	World Development Indicators
WFP	World Food Programme

Chapter 1

Facing the Facts: Context and Progress

Knowledge Capital: The Key to Africa's Future Development

Knowledge capital drives economic growth and enables countries to harness the world's storehouse of information to improve the well-being of their citizens.[1] Sub-Saharan Africa cannot afford to lag behind. The region is entering a new phase of economic development, one marked by increasing economic diversification and urbanization, technological advances, closer economic integration with regional and world markets, and the potential for an increase in higher-productivity jobs. The region's youths, a sizable and growing share of the population, can be a key driver of this transformation—provided they enter the labor market equipped with the knowledge and competencies required to facilitate the acquisition, adaptation, and diffusion of new knowledge and technologies. Better-educated youths would also contribute to reducing income inequality, facilitating social mobility, fostering social cohesion, and jump-starting the region's stalled fertility transition.

Enrolling students in primary school is the first step in building Sub-Saharan Africa's knowledge capital and has been the focus of the region's efforts in the past 25 years. On this, the region has made tremendous progress. However, for knowledge capital to drive socioeconomic transformation, more people need skills and competencies at levels of sophistication that are required for modern economies. The region's knowledge capital remains thin today, even as the frontiers of knowledge push forward at a rapid pace. On tests of knowledge and application of different mathematical concepts, for example, eighth graders in Botswana, Ghana, and South Africa underperform compared with their peers in other regions. Most of these eighth graders will soon enter the labor market and remain in the workforce for five more decades or so. Equipping them with the required knowledge and skills is a priority for the region.

Young people with 9 to 10 years of basic education who have attained adequate competencies in literacy, numeracy, and science provide a solid

foundation for a country's knowledge capital (Fredriksen and Kagia 2013). Universalizing basic education (through the lower-secondary level) is also part of the Sustainable Development Goals (SDGs) for 2030, of which SDG 4 is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UN 2015).[2] How to improve the quality of basic education while expanding access and completion is the focus of this book.

SDG 4 is concerned with providing complete, free, equitable, and quality primary and secondary education leading to relevant and effective learning outcomes, of which at least nine years are compulsory. This development goal is aligned with recommendations from three Regional Seminars on Reforming Secondary Education in Africa (conferences held in Ethiopia in November 2005, Ghana in April 2007, and Rwanda in September 2007).[3] The participating education partners, including development partners and government representatives, reached a consensus that a sectorwide reform of basic education (a minimum of nine years) in African countries was required to ensure the development of relevant skills for a changing labor market (IBE-UNESCO 2007). Although this book focuses on these 9 years, some chapters—those on teachers and budget deployment, for example—pertain to all 12 years of education.

This study builds on past regional comparative analyses of education in Sub-Saharan Africa (Frederiksen and Kagia 2013; Majgaard and Mingat 2012) and expands the analysis to focus on more recent learning assessments, especially those in the early years of education, as well as to document good practices from the region in key areas. Postbasic education and training, as well as adult literacy, are not a focus of this book, given the forthcoming World Bank study on skills in Sub-Saharan Africa (Arias, Santos, and Evans, forthcoming). This book also does not focus on early childhood development because a recent global report published by the World Bank examines this topic (Denboba et al. 2014). It does, however, recognize the importance of improving education in the early grades of primary education. It also does not cover the issue of out-of-school youth in Sub-Saharan Africa because this was the focus of a 2015 regional study (Inoue et al. 2015).

Policy makers in Africa, practitioners, and partners concerned about building the knowledge capital of Sub-Saharan Africa are the primary audience for this book. A fundamental premise of this study is that although Sub-Saharan African countries can learn from high-performing systems, they might also look for inspiration among other low- and middle-income countries, especially within their own region. Successes achieved under similar or more challenging circumstances than their own represent a particularly relevant source of experience. This comparability can help in the design and implementation of promising interventions or policies relevant to a specific

country context. Contextual differences affect "what works" to boost student learning. Interventions that are effective in high-income countries, where classroom conditions are typically quite favorable, may not achieve the same results in low- or middle-income countries, where such conditions often fail to materialize.

Sub-Saharan African countries must create their own repertoire of what works to improve learning, enriching both the science and the experience gained from implementation. In learning from other countries, even from similar low- and middle-income countries, they would do well to avoid borrowing policies and interventions "off the shelf" from other countries. Such borrowings bypass the essential work of local adaptation—including careful consideration of local constraints and opportunities. The region's countries must therefore approach the quest for better learning outcomes through an active engagement in the process of learning by doing. Such a process involves, among other things, scanning for good-practice examples; adapting the most attractive models to the domestic context; and entering a permanent cycle of implementing, evaluating, and reforming for results. Education leaders and professionals in each country must gain mastery over the entire process, at all levels of responsibility—from strategic planners to managers at the school level. If there is one thing to learn from high-performing countries, it is the need to build this kind of capacity to drive sustained gains in learning outcomes.

The rest of this chapter describes our approach to the analysis, starting with a conceptual framework that emphasizes the role of science in identifying effective interventions and the importance of strong implementation practices in delivering educational services and improving learning. We then provide an overview of the countries of Sub-Saharan Africa, presenting a simple typology of countries defined in two dimensions: (a) the progress each country has made in expanding primary education over the past 15 years, and (b) the contextual challenges each country faced in the early to mid-1990s. The final section overlays the challenges and educational progress to provide us with a useful lens for our analysis and help us identify four countries for special attention in the book.

Study Framework: From Science to Service Delivery

Improving the quality of education requires both effective *intervention* practices and effective *implementation* practices. Knowledge about effective interventions comes from science; implementation of this knowledge creates effective service delivery. Much is known about effective interventions that boost children's school participation and learning; less is known about effective

implementation practices. This section provides a framework for the remainder of this study that draws on the evidence regarding "what works" for both interventions and implementation. Subsequent chapters will expand on the themes developed in this section.

Science: Effective Interventions

Successful education systems provide learning opportunities for all and achieve both high levels and equitable distribution of learning across all students, without regard to the immutable characteristics of schools (such as geographic location) or students (such as socioeconomic background, gender, ethnicity, or home language). This is a tall order. How to make education systems more successful has been greatly debated over the past half century, and many cross-country studies have been undertaken to shed light on this question. As Foshay (1962) noted, "If custom and law define what is educationally allowable within a nation, the educational systems beyond one's national boundaries suggest what is educationally possible."

"What is possible" includes variations in systems, finance, schools, classrooms, and teachers across countries. Since the 1950s, international large-scale assessment surveys have explored how these cross-national variations may affect student learning. These surveys provide rich information about how education systems differ and how these differences affect student performance. This research has informed a broad literature on "what works" to boost students' reading, mathematics, and science skills. Countries that have performed less well on these learning assessments have often turned for advice to countries with higher levels of performance.

Increasingly, more low- and middle-income countries have participated in the major international large-scale assessment surveys. For example, the share of low- and middle-income countries has grown from 6 percent of participating education systems in the second Trends in International Mathematics and Science Study (TIMSS) in 1980 to over 25 percent in the sixth TIMSS in 2015, and from no low- and middle-income countries' education systems participating in the Programme for International Student Assessment (PISA) 2000 to over one-third of those countries participating in PISA 2015. New evidence has emerged about differing patterns of "what works" for countries at different levels of economic development. Systemic differences—that is, those features of an education system that vary across countries—that are related to better student performance among high-income countries are not consistently related to better student performance among low- and middle-income countries. For example, in higher-income countries, education systems with greater school autonomy outperform those with less school autonomy; this is not the case among education systems in low- and middle-income countries (Hanushek, Link, and Woessmann 2013).

The disconnect between the context for education in high-income countries and the context for education in lower-income countries is sharp. This has led education leaders in low- and middle-income countries to seek advice from countries sharing conditions similar to their own. As a result, regional large-scale assessment surveys have gained prominence in Latin America and Sub-Saharan Africa; they provide evidence regarding the correlates of student performance relevant to these regions. Two such regional assessment surveys—the Programme d'analyse des systèmes éducatif de la CONFEMEN (PASEC) across 10 francophone countries and the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) across 16 education systems in that region—have provided information on systemic differences and "what works" that is more aligned with the conditions of other countries in Sub-Saharan Africa.

In addition, school and classroom features that are associated with better student performance have been explored within low- and middle-income countries outside the region. These analyses have also shown that features associated with better student performance in high-income countries are often not associated with better student performance in low- and middle-income countries (Lockheed, Prokic-Breuer, and Shadrova 2015).

Finally, knowledge of "what works" to boost school enrollment, attendance, learning, and completion in low- and middle-income countries has been informed by the rise of rigorous impact evaluations of various interventions. A recent review of this research has identified a set of interventions that, when implemented, are consistently effective across multiple implementation sites in low- and middle-income countries (Snilstveit et al. 2015).

Service Delivery: Effective Implementation

Implementation is key. Interventions—policies and practices—known to be effective will result in positive educational outcomes only when they are implemented effectively. Fixsen et al. (2005, 69) refer to this as "moving science to service" to "transform human service systems." The science is provided from the research on effective programs and practices, and the service is provided through implementation. Only when both are effective can improvements in educational outcomes be expected.

In the education sector, the key "service delivery" organization is the school, and the key "service delivery personnel" are teachers and school administrators. For schools and teachers to implement effective interventions requires a well-planned and well-executed implementation strategy. Research suggests that core implementation activities require such actions as careful selection of personnel; preservice training; coaching and consultation; staff performance evaluation; evaluation of the intervention; and facilitative administrative support (Fixsen et al. 2005), as well as incentives and

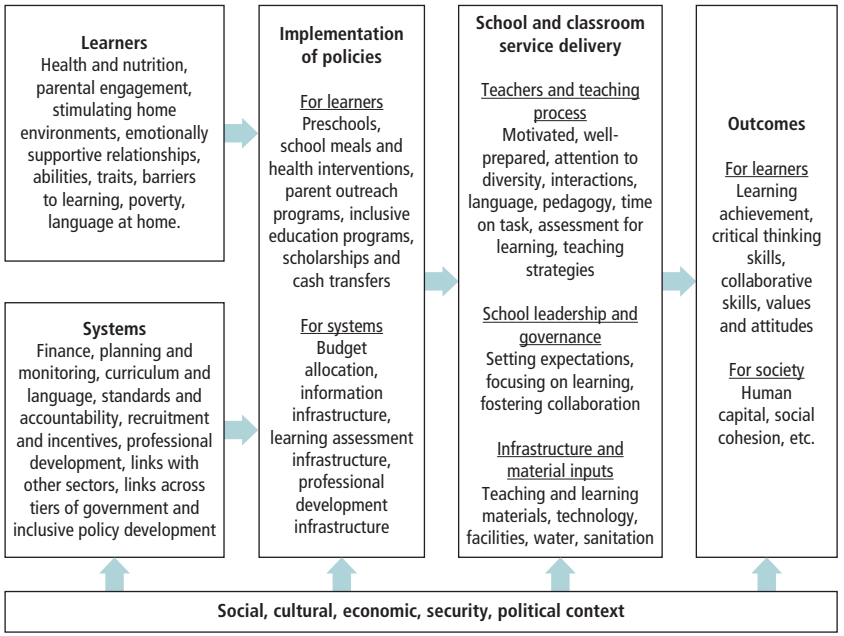
accountability mechanisms. Much of this strategy will be implemented by the education system working at levels above that of the school.

Indicators of poor education service delivery in low- and middle-income countries include teacher absenteeism from schools and classrooms, poor teaching practices, excessively large student-teacher ratios, and small shares of trained teachers in schools (Rogers and Vegas 2009; World Bank 2013). Interventions to improve service delivery in low- and middle-income countries have often focused on reducing teacher absenteeism through teacher incentives and accountability, reducing class size, and increasing the share of trained teachers (Cueto et al. 2008; Glewwe, Ilias, and Kremer 2010; Muralidharan and Sundararaman 2011). Teacher presence in a classroom, smaller classes, and teachers with more qualifications may not be effective interventions for improving student learning unless the quality of teaching is also improved. By comparison, in higher-income countries, interventions to improve service delivery have focused on ensuring a strong knowledge base for teachers and changing pedagogical practices. Coaching and consultation appear to be highly effective implementation strategies for improving teaching performance (Joyce and Showers 2002).

The framework for this study is derived from both (a) learning theory and related evidence about what works, and (b) systems theory and related evidence about what is needed for the successful implementation of what works. It is aligned with standard frameworks for understanding what improves educational quality (Lockheed and Verspoor 1991), as well as the more recent Systems Approach for Better Education Results (SABER) and Service Delivery Indicators (SDI) initiatives of the World Bank.[4] Standard frameworks for learning focus on the learner, the education system, school and classroom settings, and learner outcomes. The SABER framework focuses on education policy, while the SDI framework focuses on the actual delivery of essential inputs to the school and classroom. The framework used in this study places implementation as a key element operating between the policies in the education sector and the actual service delivery processes that ultimately influence student learning (figure 1.1).

This framework acknowledges that the social, cultural, economic, security, and political contexts of education will shape the system. Countries face different challenges affecting their educational development. Conflict, violence, and fragility have particularly strong negative effects on education sustainability. According to the Organisation for Economic Co-operation and Development (OECD), "just one-fifth of fragile states and economies are on track to achieve universal primary schooling, compared to nearly half of non-fragile developing countries" (OECD 2016). Fragile countries also lag in their progress to eliminate gender disparities in education.

Figure 1.1 Study Framework: Science plus Effective Implementation for Improving Educational Quality



Source: Adapted from UNESCO 2015 and websites of the World Bank's Systems Approach for Better Education Results (SABER), http://saber.worldbank.org/index.cfm, and Service Delivery Indicators (SDI), http://www.sdindicators.org/.

The learners' home environments and the characteristics of learners formed through this environment will also affect their education in several overlapping ways: their propensity to attend school, their interest in schooling, and their likelihood of learning. Investments in early childhood care and development can help offset any negative effects of a home environment. These include learner-targeted education system interventions such as preschools, school meals and other health interventions, parental outreach programs, inclusive education programs, scholarships, and cash transfers—all of which can encourage school participation.

Systemic interventions designed to ensure high-quality service delivery include budget allocations and the appropriate institutional infrastructure for system information, curriculum development, learning assessments, and teacher preparation and professional development. Service delivery ensures that

schools have appropriate facilities, adequate teaching and learning materials, effective school leadership, and capable teachers. When all of these operate together, students learn and societies benefit.

The following sections provide an overview of Sub-Saharan African countries by examining their progress in expanding education in the past 25 years and the kinds of challenges they faced at the beginning of that period—in the 1990s.

Grouping Countries by Educational Performance

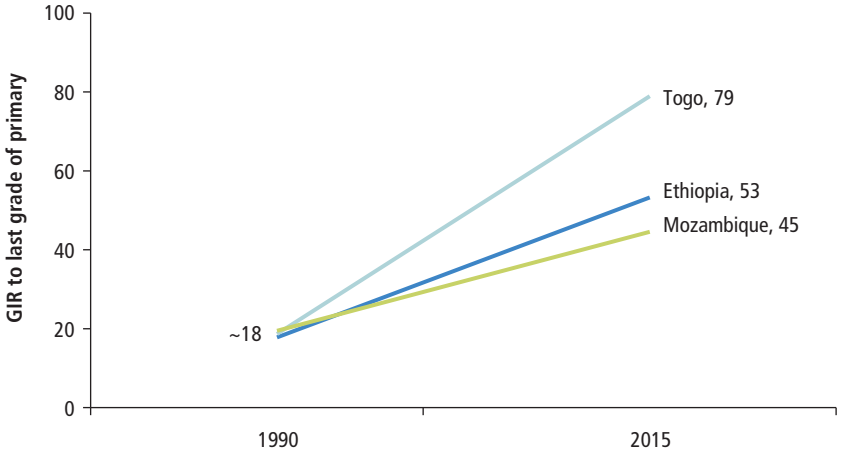
Enrollment Increases in Primary School

Twenty-five years after Jomtien (Education for All)[5] and 15 years after Dakar (Millennium Development Goals),[6] education systems in Sub-Saharan Africa have expanded beyond recognition, enrolling tens of millions of first-generation learners in the primary grades, extending access to secondary education, and employing millions of newly recruited and trained teachers. The region's countries have ridden the globally characteristic, *S*-shaped pathway of educational expansion (Clemens 2004; Meyer, Ramirez, and Soysal 1992; Wils and O'Connor 2003).[7] Enrollments in primary education surged from 63 million students in 1990 to 152 million students in 2013. Net enrollment rates in primary school have risen sharply, from a regional average of 54 percent in 1999 to 78 percent in 2013.[8]

The pace of expansion differed widely across countries, however. In 1990, for example, only one-fifth of the girls in Ethiopia, Mozambique, and Togo who should have been in the last year of primary schooling were enrolled in that grade. By 2015, the share had risen to 53 percent in Ethiopia, 45 percent in Mozambique, and 79 percent in Togo (figure 1.2). These trends exemplify the tremendous advances made by Sub-Saharan African countries in expanding primary school participation as well as differences in their trajectories of expansion.

We take these diverse trajectories into account in distinguishing four groups of countries based on their primary gross enrollment rates (GERs), the percentage of children of primary school age who are out of school, and the retention rates of students between grades one and six. Figure 1.3 presents data for each country's primary GER around the baseline year (2000), its primary GER in 2013, and the share of children out of school in 44 Sub-Saharan African countries. Although the lengths of primary and lower-secondary education cycles differ in these countries (further discussed in box 1.1), data from the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Institute of Statistics (UIS) and household surveys have been analyzed in a standardized way, defining grades one through six as "primary" education and grades seven through nine as "lower-secondary."

Figure 1.2 Girls' Gross Intake Ratio, Last Grade of Primary Cycle, in Ethiopia, Mozambique, and Togo, 1990 and 2015

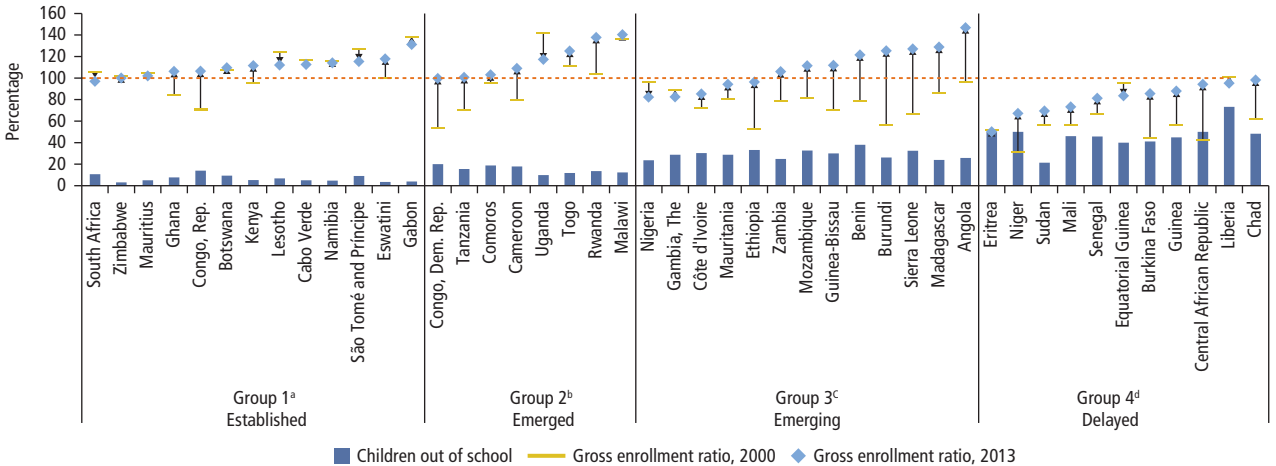


Source: Based on data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS.Stat) (accessed March 30, 2017), http://data.uis.unesco.org.
Note: The gross intake ratio (GIR) to last grade of primary is defined as the total number of new entrants in the last grade of primary education, regardless of age, expressed as a percentage of the population of theoretical entrance age to the last grade of primary education.

The four groups are shown in table 1.1.

- *Established (Group 1)*, where the primary GERs are high in the baseline year (2000) and close to 100 percent circa 2013; the out-of-school rates for children of primary school age are low in the latest year of available data; and primary retention rates are close to 100 percent in 2013
- *Emerged (Group 2)*, where the GERs are high in the baseline year and high by circa 2013; the out-of-school rates for children of primary school age are low in the latest year of available data; and primary retention rates are low in 2013
- *Emerging (Group 3)*, where the GERs are low in the baseline year and high by circa 2013; the out-of-school rates for children of primary school age are high in in the latest year of available data; and primary retention rates are low in 2013
- *Delayed (Group 4),* where the GERs are low in both the baseline year and circa 2013; the out-of-school rates for children of primary school age are high in the latest year of available data; and primary retention rates are low in 2013

Figure 1.3 **Growth in Access to Primary Education in 45 Sub-Saharan African Countries, by Group, 2000–13**



Sources: Gross enrollment rate (GER) and retention rate data from analysis of United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS.Stat) data (accessed July 18, 2016), http://data.uis.unesco.org, and UNESCO International Institute for Educational Planning (IIEP) Pôle de Dakar Indicator Database version 19. Out-of-school rate data from analysis of most recent microdata from Labor Force Survey (South Africa); Multiple Indicator Cluster Surveys (Mauritania, Sudan, Zimbabwe); Demographic and Health Surveys (Benin, Burundi, Cameroon, the Democratic Republic of Congo, Gabon, The Gambia, Kenya, Senegal); Living Standards Measurement Surveys (all other countries with household surveys); and UIS.Stat data (countries without household surveys: Cabo Verde, Central African Republic, Eritrea, Equatorial Guinea, Guinea-Bissau, Mauritius).
Note: Each country is shown in its group organized in ascending order, according to its 2013 GER, indicated by a green diamond. The primary GER around 1995–2000 is designated by an orange line (depending on the latest year of country data); GERs over 100 percent represent students not of primary school age but who are enrolled in primary school. The share of children out of school is represented by a blue bar (for the latest year of country data). For simplicity of presentation, the figure omits the retention rate data included in determining the country groups. Those data are discussed in the chapter text.
a. "Established" countries (Group 1) are characterized by high GERs in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. "Emerged" countries (Group 2) are characterized by high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. "Emerging" countries (Group 3) are characterized by low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. "Delayed" countries (Group 4) are characterized by low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

Table 1.1 Definition of Four Levels of Progress in Primary Education across Sub-Saharan African Countries, 2000–13

Measure	Group 1: Established	Group 2: Emerged	Group 3: Emerging	Group 4: Delayed
Gross enrollment ratio, 2000	High	High	Low	Low
Gross enrollment ratio, 2013	~ 100%	High	High	Low
Out-of-school rate, latest available year	Low	Low	High	High
Primary school retention rate, 2013	~100%	Low	Low	Low

Note: Gross enrollment ratios are "high" if they are 90 percent or higher, and "low" if they are below 90 percent. Out-of-school rates are "high" if they are 20 percent or higher, and "low" if they are below 20 percent. Retention rates are "high" if they are 80 percent or higher, and "low" if they are below 80 percent.

BOX 1.1

Harmonizing Variations in the Duration of Primary, Lower-Secondary, and Basic Education across Countries in Sub-Saharan Africa

In most Sub-Saharan African countries, primary education has a duration of six years, although in three countries its duration is five years, in ten countries its duration is seven years, and in six countries its duration is eight years. The duration of lower-secondary education ranges from two to four years, with most countries reporting three to four years of lower-secondary. The education systems in Kenya, Somalia, South Sudan, and Sudan have only two official levels: primary and secondary. In these countries, primary (or basic) education covers eight years of schooling, and secondary covers four years.

As for the age of entry, all countries in Sub-Saharan Africa expect children to be enrolled in primary school by the age of seven, but 36 countries expect enrollment at age six, and one country (Mauritius) expects it at age five. The official age of entry to primary school, combined with the duration of primary school, affects the official age at which students are expected to enter lower-secondary school.

Given the heterogeneity of education systems across the Sub-Saharan Africa, it is not possible to draw clear conclusions by comparing access by level of education across countries. For this book, an alternative method is used to analyze trends in access: The GER in primary education is calculated using total enrollment by grade for grades one to six, divided by the total population of relevant ages for those grades based on administrative data. This may vary depending on the official age of entry. For the lower-secondary cycle, the approach is similar, whereby the GER is calculated as the sum of enrollment in grades seven to nine, divided by the total population expected to attend those grades, also based on administrative data. This method yields a harmonized GER indicator that accounts for the differences in ages of entry and duration of cycle in every country.

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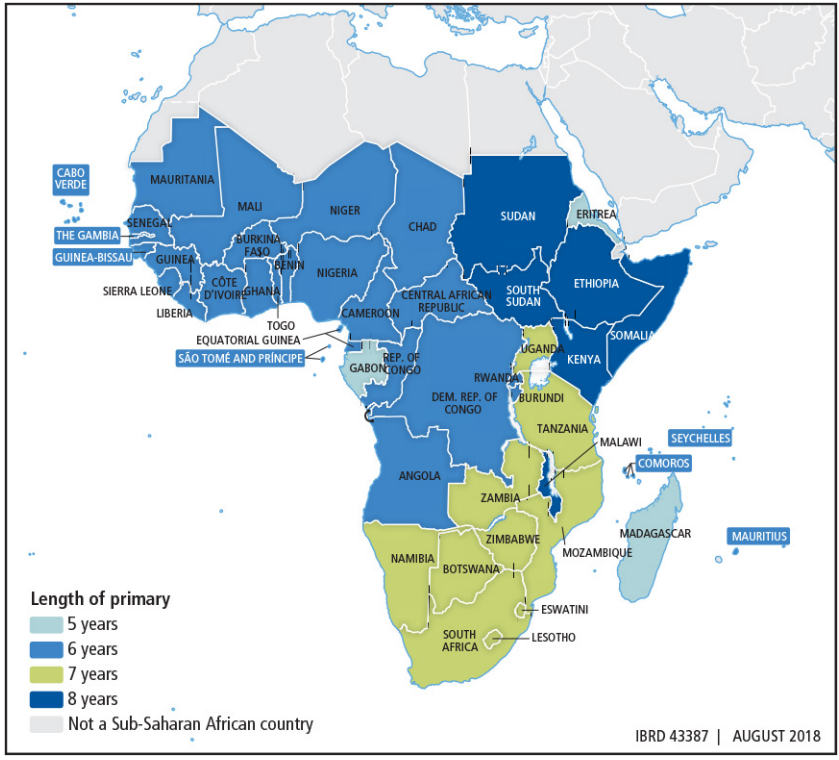
Box 1.1 (continued)

Map B1.1.1 Duration of Education Cycles in Sub-Saharan Africa, by Country

a. Primary education



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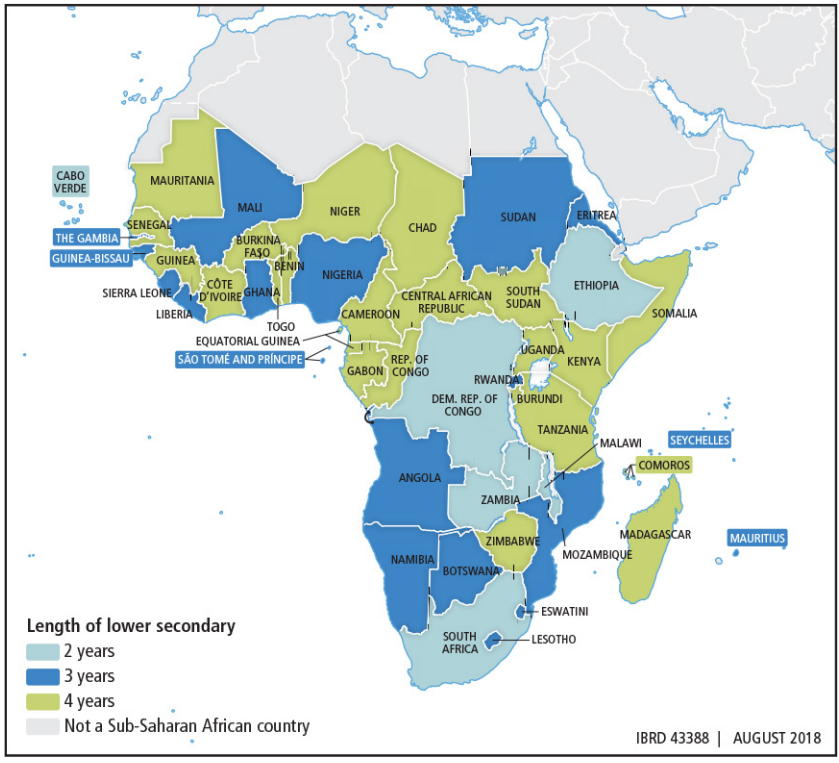
Box 1.1 (continued)

Map B1.1.1 Duration of Education Cycles in Sub-Saharan Africa, by Country (*continued*)

b. Lower-secondary education[a]



Source: Compiled from United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics International Standard Classification of Education (ISCED) mappings (accessed October 17, 2016), http://uis.unesco.org/en/isced-mappings.
Note: Mappings correspond to ISCED 2011 revision except for Kenya, Mauritus, Rwanda, and Zimbabwe, for which only ISCED 1997 was available. Duration of the cycle ("theoretical duration in years") corresponds to the national definition reported by each country. ISCED mapping was not available for Somalia, so duration of cycles was compiled from the country's Education Sector Plan 2012–16 and Pôle de Dakar Indicators database version 19. SSA = Sub-Saharan Africa.
a. The map for duration of lower-secondary education for Kenya, Somalia, South Sudan, and Sudan shows the duration of all postprimary secondary education.

In general, the Group 1 countries had better starting points in terms of access relative to countries in Groups 2 and 3. The Group 1 GERs (shown in figure 1.3 by the yellow lines [2000] and blue diamonds [2013]) were already close to 100 percent in 2000, and these countries managed to maintain high access and retention rates in primary education in 2013. The Group 4 countries (on the right side of figure 1.3), on the other hand, had low access rates for primary education in 2000, but many have made substantial improvement over time, albeit insufficient to close the access gap with Group 1.

The countries in Groups 2 and 3 (middle of figure 1.3) started with lower GERs than did Group 1 in 2000, but all countries in Group 2 and most countries in Group 3 improved primary education access to 100 percent and higher by 2013. Countries such as Ethiopia (Group 3) and the Central African Republic (Group 4) significantly improved their access to primary education despite having two of the lowest GERs in 2000: 53 percent and 43 percent, respectively. Both countries significantly improved access by 2013—to 96 percent and 94 percent, respectively—but the Central African Republic still has a large percentage of children who are out of school, signaling a large repetition rate in primary education, which inflates its 2013 GER. Rwanda's (Group 2) experience stands out because the country was marked by the devastating 1994 genocide but experienced steady and strong improvement in its access rates at the primary level, increasing from 76 percent in 1995 to 104 percent in 2000 and to 138 percent in 2013.

It should be noted that GERs that are significantly over 100 percent (which some countries exhibit), and that have endured at this level for a decade or more or are still rising, are not necessarily a sign of success; very high, enduring, and rising GERs may hide considerable inefficiency in the form of repetition and overage or underage enrollment. Given these discrepancies in GERs, we also consider the out-of-school rates and retention rates for these countries to capture other measures of improving access. Figure 1.3 also shows the out-of-school rates (blue bars) for the latest year of available data. The out-of-school rates in Group 1 are 10 percent or less; in Group 2, 10–20 percent; in Group 3, 21–40 percent; and in Group 4, 40 percent and above.

As for the retention rates in primary education (not shown in figure 1.3), the various groups show the following patterns:

- *Group 1 ("Established"):* Retention rates are generally high (80–100 percent), indicating more established education systems where most children are in school (indicated by high GERs and low out-of-school rates) and stay in school.
- *Group 2 ("Emerged"):* Most children are in school (shown by high GERs and relatively low out-of-school rates), and retention rates are relatively lower than

in Group 1 countries, at around 80 percent. Malawi, Rwanda, and Uganda have much lower retention rates, indicating inefficiencies in these systems, with many children dropping out of school before completing primary education.

- *Group 3 ("Emerging"):* Many children are out of school (shown by relatively high out-of-school rates), with variable retention rates. Countries like Angola, Ethiopia, Guinea-Bissau, Madagascar, and Mozambique retain less than 50 percent of children.
- *Group 4 ("Delayed"):* Many children are out of school, with variable retention rates. Countries like Burkina Faso, Niger, and Sudan have retention rates of 80–85 percent. Fragile and conflict-affected countries such as Chad, Equatorial Guinea, Eritrea, and Liberia have retention rates that are less than 60 percent.

Although all countries in each group do not necessarily meet the thresholds for each variable (primary GER for 2000 and 2013; out-of-school rate for children of primary school age in the latest year of available data; and primary retention rates), overall they meet the general typology of countries from "Established" through "Delayed," with the former group of countries performing the best on access to education.

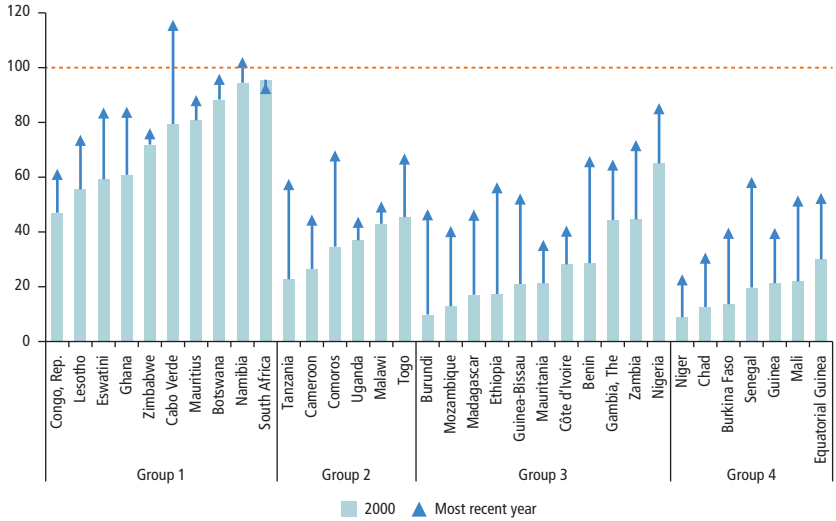
This typology of countries underlines one of the main themes of this study—namely, that Sub-Saharan African countries can learn from each other, as several have, in overcoming great odds to improve coverage and completion in primary education. It also serves as a useful lens to discern patterns and differences in learning outcomes across countries and in the policies and implementation strategies used by countries.

Enrollment Increases in Lower-Secondary School

Progress at the lower-secondary level has been much slower than at the primary level, and enrollment ratios at this level remain low in Sub-Saharan Africa (figure 1.4). Overall, the share of children enrolled in lower-secondary schooling rose from 41 percent in 2000 to 66 percent in 2014. This trend, while salutary, loses its luster compared with South Asia's average rate of 80 percent, which is still low relative to other regions like Latin America and the Caribbean (92 percent) and East Asia and Pacific (91 percent) (UNESCO 2016).

Data on lower-secondary GERs between 2000 and the most recent year of available data (2011–13) are available for only 34 countries. They show that the Group 1 countries are the closest to universal lower-secondary access, while other groups (except for Nigeria in Group 3) are lagging on access to lower-secondary education.

Figure 1.4 **Lower-Secondary Gross Enrollment Rates of 34 Sub-Saharan African Countries, 2000 and Most Recent Year**



Source: Analysis of United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS.Stat) database (http://data.uis.unesco.org) and country administrative data.
Note: Countries include those for which lower-secondary enrollment data for grades seven through nine were available for both 2000 and the most recent year (2011–13). For country group definitions, see table 1.1 and figure 1.3.

A few features are noteworthy, revealing diversity across countries in progressing toward universal coverage in primary and lower-secondary education:

- *Gains in both primary and lower-secondary education:* Countries with these trends include Burundi, Cameroon, Ethiopia, Madagascar, Mozambique, Tanzania, and others in the "emerged" and "emerging" groups. Ethiopia's lower-secondary GER rose from 17 percent in 2000 to 56 percent and Tanzania's, from 20 percent to close to 60 percent. The increase was even more dramatic in Burundi—from less than 10 percent to close to 50 percent.
- *Gains in lower-secondary but not primary education:* This pattern is characteristic of francophone countries. Although many of these countries still struggle to universalize primary education, some were able to expand lower-secondary coverage rather rapidly. In Senegal, for example, the lower-secondary GER rose from 20 percent in 2000 to 58 percent in 2013.

- *Gains in primary but stagnation in lower-secondary education:* Three anglophone countries—Malawi, Uganda, and Zimbabwe—have universalized primary education but have barely increased lower-secondary coverage over a 15-year period.

A Persistent Problem: High Rates of Children Out of School

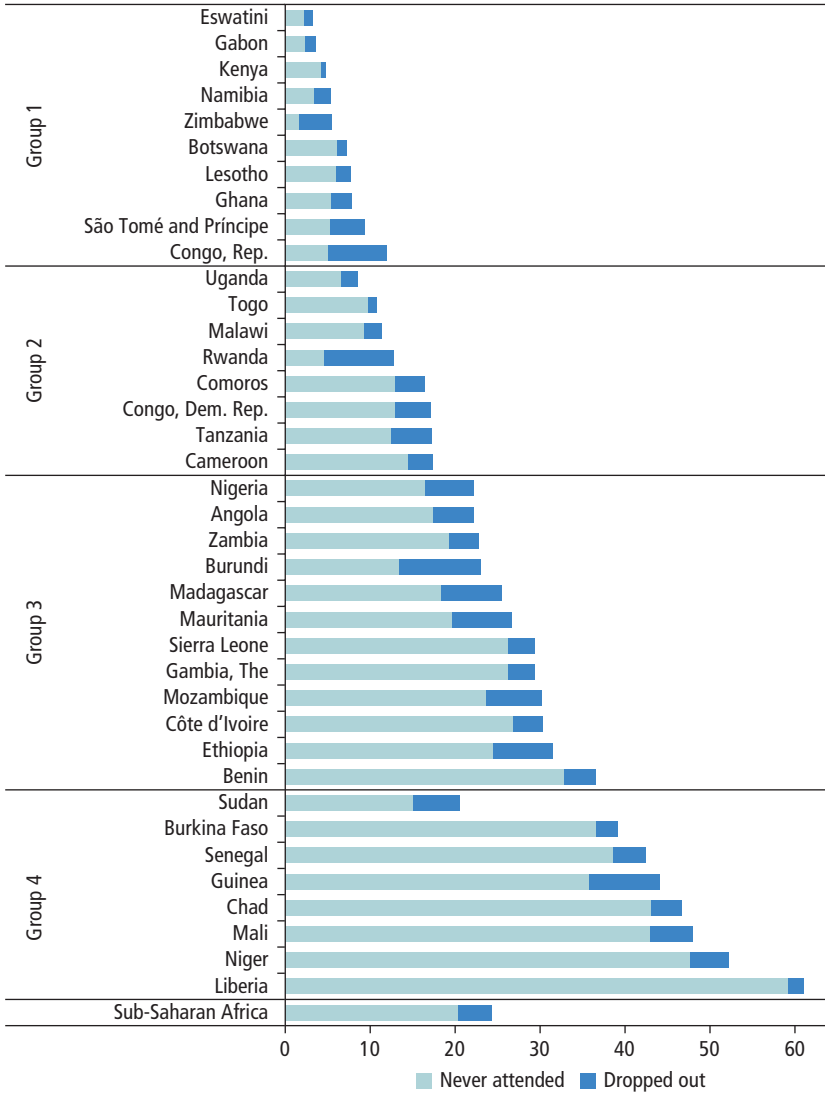
Despite the important achievements in increasing enrollment, especially at the primary level, many children in Sub-Saharan Africa remain out of school. An estimated 52.3 million primary and lower-secondary school-age children (ages 6–14 or 7–15, depending on the country's official entry age) are out of school in Sub-Saharan Africa, accounting for 45 percent of the world's out-of-school child population.[9] This situation creates social and economic challenges because out-of-school children can expect to experience poor economic prospects, hindering countries' efforts to create sustainable long-term economic growth.

Figure 1.5 shows the out-of-school rates for children of both primary and lower-secondary age combined in 38 Sub-Saharan Africa countries, by group. The average Sub-Saharan African out-of-school rate is 24 percent for primary and lower-secondary school-age children combined, with over half the countries having out-of-school rates higher than this average. The countries with the highest incidence of children out of school are in Group 4 (Delayed), with rates well above 40 percent; in this group, Liberia and Niger have the highest out-of-school rates, at 61 percent and 51 percent, respectively. Countries in Group 3 (Emerging) have out-of-school rates of 20–39 percent, and countries in Groups 1 and 2 all have rates below 20 percent.

Countries with large populations (such as the Democratic Republic of Congo, Ethiopia, and Nigeria) have the added challenge of having to provide schools and teachers for especially large numbers of out-of-school children and to provide the necessary public resources needed to help achieve that objective. Together, these countries account for about 40 percent of children who are out of school in Sub-Saharan Africa (Nigeria, with about 10.5 million children out of school; Ethiopia, with 7.5 million; and the Democratic Republic of Congo, with 3.2 million).

Strikingly, most children who are out of school in Sub-Saharan Africa have never attended school, as opposed to having dropped out. Of those who are out of school regionwide, 86 percent of children in the primary school-age cohort and 62 percent of children in the lower-secondary school-age cohort have never attended school. Approximately 50 percent of those who are out of school are girls. Not surprisingly, children who are out of school in the lower-secondary age cohort are more likely than primary-age children to have dropped out. Getting children and youths (ages 15–24) into school is a priority for the region, and some strategies targeting youths are highlighted in box 1.2.

Figure 1.5 **Out-of-School Rates for Children of Primary and Lower-Secondary Age Ranges Combined, 38 Sub-Saharan African Countries, by Group, circa 2013**



Sources: Analysis of microdata from World Bank Living Standards Measurement Study (LSMS) surveys and country Demographic and Health Surveys (DHS).
Note: The age range (6–14 years or 7–15 years) covered in each country depends on the age at which that country enrolls children in first grade (six or seven years old). For country group definitions, see table 1.1 and figure 1.3.

BOX 1.2

How Can Sub-Saharan African Countries Support Out-of-School Youths?

Aside from children of primary and lower-secondary school age, the Sub-Saharan Africa region has a significant number of youths (ages 15–24) who have never attended school, especially in many francophone, low-income, and fragile or conflict-affected countries. Among those who do continue with secondary education, dropout rates are especially high among those who are 15–18, when youths tend to seek work. That said, many youths, especially urban youths, leave school but remain jobless.

Inoue et al. (2015) find that the incidence of out-of-school youth is lower in countries that spend a large share of their gross domestic product (GDP) on education and devote a large share of their public education resources to secondary education. The incidence is also lower in countries with low population growth rates. Inoue et al. (2015) review policies and programs targeting out-of-school youths in the Sub-Saharan Africa region and find three entry points: (a) retention of youths in school, (b) remediation through formal or alternative education programs, and (c) integration into the labor market.

Retention of youths in school. For youths enrolled in school, the most immediate policy intervention is to retain them in school. Identifying and helping at-risk youths is a common theme, not just in Sub-Saharan Africa but across the world, but high dropout rates within this group is a notoriously hard problem to remedy, especially when both labor demand- and supply-side factors lead to the decision to drop out. Some of these policies to improve retention levels are described later in this chapter and more comprehensively by Inoue et al. (2015).

Remediation through alternative education programs. For youths already out of school, the most likely path to complete their education is through alternative education systems such as equivalency programs. Successful alternative education programs are those with multiple entry and exit points and close associations with formal education. But because a lack of adequate formal education is a significant problem in Sub-Saharan Africa, designing effective alternative education programs in the region is especially hard. The two biggest constraints in implementing nationwide alternative education programs are inadequate coordination between national government and subnational entities (regional authorities, communities, local governments, or other stakeholders) and a lack of funding. Myriad small-scale alternative education schemes target out-of-school youths; these are especially successful when they mix academics or cognitive skills with training in life skills as well as mentoring. Finally, little information exists on how successful second-chance programs are as a bridge to formal education.

Integration into the labor market. For youths who are unlikely to return to school, the alternative path is practical training and experience to increase their

(continued next page)

Box 1.2 (continued)

employability. Given that a large share of the economy remains informal in Sub-Saharan Africa, informal apprenticeships are the key mechanism for out-of-school youths to learn skills and find employment. There is no shortage of large-scale regional or national training and workforce development programs across the region, which have varying degrees of success in creating long-term employment for participating youths. Wage subsidies and large public works projects can support large groups of youths, but they rarely produce long-lasting employability, perhaps because of the stigma attached to them. Some countries in Sub-Saharan Africa are now partnering with nongovernmental organizations (NGOs) to run workforce development programs that provide a mixture of training, on-the-job experience, life skills counseling, and mentoring. These programs are sometimes successful in integrating out-of-school youths into labor markets, but their effectiveness is limited by their size and funding.

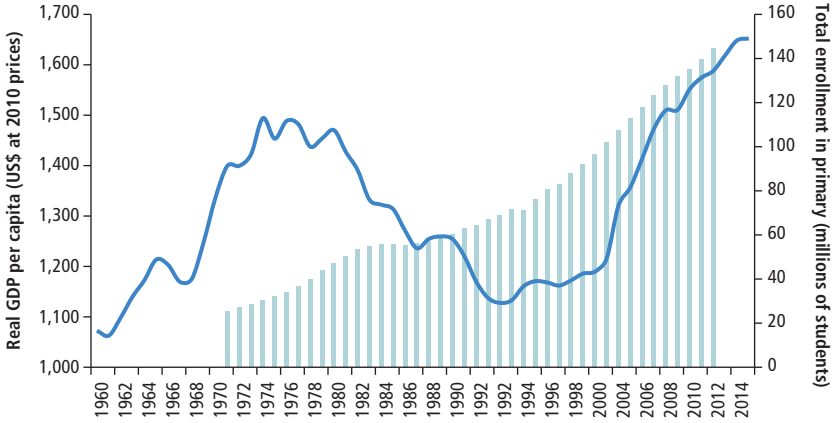
Source: Adapted from Inoue et al. 2015.

Grouping Countries by Economic and Social Challenges

Since gaining their political independence in the late 1950s and early to mid-1960s, countries in Sub-Saharan Africa have experienced more erratic economic growth than countries in other regions. From 1960 through the mid-1970s, the region experienced relatively high growth, which more than exceeded population growth, resulting in rising GDP per capita. GDP per capita peaked at almost US$1,500 (at 2010 prices) around 1974, after which growth declined steeply for the next 20 years (figure 1.6). The main reasons for this decline were external shocks, primarily from higher petroleum prices and droughts, which resulted in severe shortages in countries with price-control regimes.

The downturn continued through the 1980s, with declining terms of trade, increased real rates of interest, continued increases in the price of oil, and pervasive droughts. This was "Africa's lost decade," because the region's GDP per capita at the end of the 1980s had fallen below the level prevailing at the beginning of the decade. Despite a slight recovery in economic growth in the latter half of the 1980s, the early 1990s were dire. Much of this underperformance could be attributed to severe political instability in Angola, Burundi, the Democratic Republic of Congo, Liberia, Rwanda, Sierra Leone, and South Africa, all of which experienced negative GDP growth during this period. Slow economic growth, coupled with a rising population, resulted in an average per capita GDP in 1994 that equaled, in real terms, the region's per capita GDP in 1963.

Figure 1.6 Real GDP Per Capita and Total Primary-School Enrollment in Sub-Saharan Africa, 1960–2014



Sources: Based on data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics (UIS.Stat) (accessed July 18, 2016), http://data.uis.unesco.org; and the World Development Indicators database (July and October 2016), http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.

Not until the mid-1990s did several Sub-Saharan African countries start to experience significant economic growth on the back of high commodity prices for their respective exports, especially oil, coffee, cocoa, gold, and other metals (Olamosu and Wynne 2015). Although the 2008–09 global financial crisis resulted in shrinking fiscal space for all countries, many relatively high-performing countries in the region weathered the storm with the quality of their economic management, as reflected in monetary, fiscal, exchange rate, and debt policies.

These trends in economic growth in Sub-Saharan Africa can be linked with the growth in numbers of children enrolled in primary education in the region (figure 1.6). Enrollment growth had slowed considerably in the early 1980s. Even though it remained slow in the early 1990s—in line with economic growth—1990 was the year of the global "Education for All" commitment in Jomtien, Thailand, which possibly increased attention toward and financing of education by governments and development partners. This boost is reflected in a slight increase in enrollment in the early 1990s, with some tapering off by the time of increased instability in the region around 1994–95. Not until the late 1990s to early 2000s—when per capita GDP started to increase and the United Nations (UN) Millennium Development Goals (MDGs) were agreed upon—did enrollments in primary education shoot up.

While this analysis of per capita GDP is for the Sub-Saharan Africa region, there is considerable heterogeneity among countries in the region. To better

understand this diversity, we analyze seven country characteristics that present specific challenges to education: large population size, rapid child population growth, low or stagnant GDP growth, high inequality, high poverty, high linguistic diversity, and frequent or severe conflict. The next section reviews these characteristics as they appeared before 2000.

Natural disasters can also have devastating effects on the educational attainment of children who are affected by them. Children—particularly those in utero, the very young, and those in poor, rural areas—who live in countries (or regions within countries) that have suffered from droughts, locusts, earthquakes, and flooding have lower levels of educational attainment than children who have not experienced these types of shocks (Baez and Caruso 2017; Caruso 2017; DeVreyer, Guilbert, and Mesple-Somps 2015; Groppo and Kraehnert 2017).

The region is often affected by droughts, particularly in the Sahel region, and by locusts; it is less often hit by large earthquakes. However, a major fault line of about 4,000 kilometers runs through the continent from the Gulf of Guinea up to Sudan, which could cause a future earthquake. Since 1906, 23 earthquakes with magnitudes greater than 6.0 have been recorded in Sub-Saharan Africa (Midzi and Manzunzu 2012). We do not consider these external shocks to be characteristic of countries; that is why they are considered "shocks." For this reason, we do not include exposure to natural disasters as one of the seven social and economic challenges facing countries in the 1990s. (For a description of studies that provide evidence of these consequences, see online appendix A.1; https://openknowledge.worldbank.org/handle/10986/29377).

Seven Key Challenges to Education

Within this economic context, countries in Sub-Saharan Africa differed widely on two general types of challenges they faced in improving educational outcomes: First, they varied in their geographical features, such as vulnerability to weather shocks and desertification, their degree of urbanization, and their past colonial status—all of which may have indirectly influenced how their education systems developed. Second, they faced numerous economic and social challenges in the 1990s and 2000s that more directly influenced the development of their education systems' quality and quantity. These challenges included demographic trends, economic levels and trends, linguistic diversity, and conflict. Not all countries faced all these challenges, and some countries faced few. The countries, therefore, could be roughly grouped into three categories: those with *many* social and economic challenges, those with *some* challenges, and those with *few* challenges.

It would be surprising if the education trajectories among countries in these categories had been the same over the past two decades. Even within the three categories, the challenges differed enormously. In general, however, many

countries with "few" challenges achieved positive schooling trajectories, while only a few countries with "many" challenges were able to do so. Even so, within each category, some countries have made progress. This subsection highlights seven challenges faced by African countries.

Complete baseline data on the indicators of these challenges are available for 38 countries only.[10] Data on population size, population growth rate for children from birth to 14, and conflicts are available for all countries. Data on inequality and poverty are missing from eight countries. The countries are ranked from "high" challenge value to "low" challenge value for each of the seven characteristics, as shown in the figures accompanying the discussion of each characteristic.

Population Size

A country's population size can create both demographic pressures and management challenges. In 1995, the Sub-Saharan African countries ranged in population from under 100,000 to slightly over 100 million (UN DESA 2015), as shown in figure 1.7. The largest countries by population—Nigeria, Ethiopia, the Democratic Republic of Congo, and South Africa—faced significant challenges in managing the schools, teachers, and teacher preparation needed to support their large education systems.

Child Population Growth

The growth in the number of children (aged 0–14 years) places pressure on education systems to expand to keep up with the rising number of new entrants. Overall, the average fertility rate of the region's countries has dropped markedly, despite starting from levels substantially higher than those of other low- or middle-income countries. From 1980 to the late 1990s, the region's total fertility rate declined by 20 percent, dropping from 6.6 births per woman in 1980 (compared with an average of 4.3 births per woman in all low-income countries) to 5.4 births per woman in 1998 (compared with 3.1 births per woman in all low-income countries). In the 1990s, however, the average annual growth in the number of children varied substantially across countries, ranging from under 1 percent in seven countries to over 4 percent in six countries (Chad, the Democratic Republic of Congo, Equatorial Guinea, Guinea, Niger, and Uganda) (figure 1.8).

GDP Growth

A country's GDP per capita growth rate broadly indicates its resource capacity to support education. The average annual growth rate of GDP per capita in the 1990s fell below zero in approximately half of all Sub-Saharan African countries and exceeded 2 percent in only twelve countries (figure 1.9). In only about one-quarter of the countries did the economy grow more rapidly than the school-age population in the 1990s. With GDP per capita growing more slowly than the child population, resources for expanding and improving the region's education systems were generally very limited.

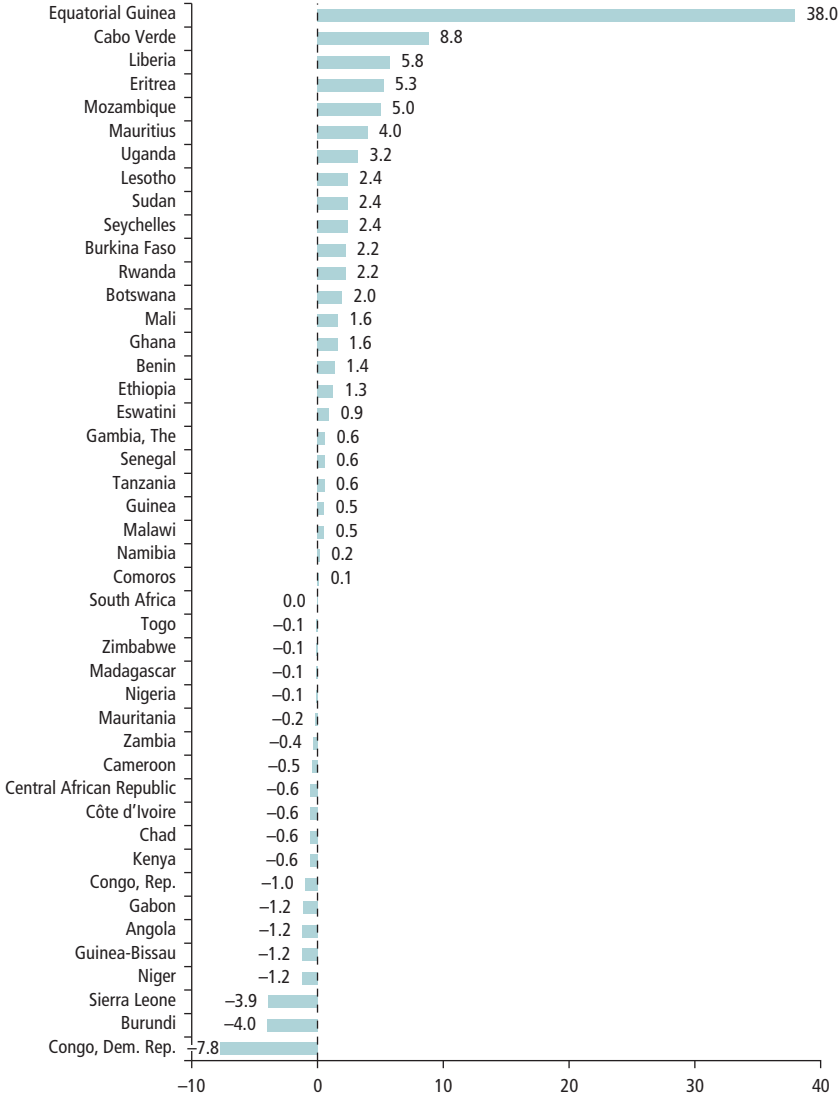
Figure 1.7 Population of Sub-Saharan African Countries, 1995

Sources: Based on data from UN DESA 2015.

Figure 1.8 Average Annual Growth of the Child Population in Sub-Saharan African Countries, 1990–2000

Source: Estimation based on UN DESA 2015.
Note: "Child" includes those of ages 0–14.

Figure 1.9 Average Annual GDP Per Capita Growth in Sub-Saharan African Countries, 1990–2000



Source: Estimation from World Development Indicators database (July and October 2016), http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.
Note: GDP per capita growth estimated in constant 2011 international dollars, using purchasing power parity (PPP) exchange rates.

Economic Inequality

Economic inequality can affect the quantity and quality of education that students from more disadvantaged households receive. Higher economic inequality is correlated with lower educational attainment (Gregorio and Lee 2002). Economic inequality also negatively affects economic growth (Ostry, Berg, and Tsangarides 2014). Countries with high economic inequality might underinvest in public education, and children from disadvantaged households might attend lower-quality schools (Dabla-Norris et al. 2015). In general, inequality is quite high across the countries in Sub-Saharan Africa, with Gini coefficients ranging from 32 to 66 on the 100-point Gini scale, where 0 represents perfect equality in wealth distribution and 100 would indicate that one individual holds all the wealth (figure 1.10).

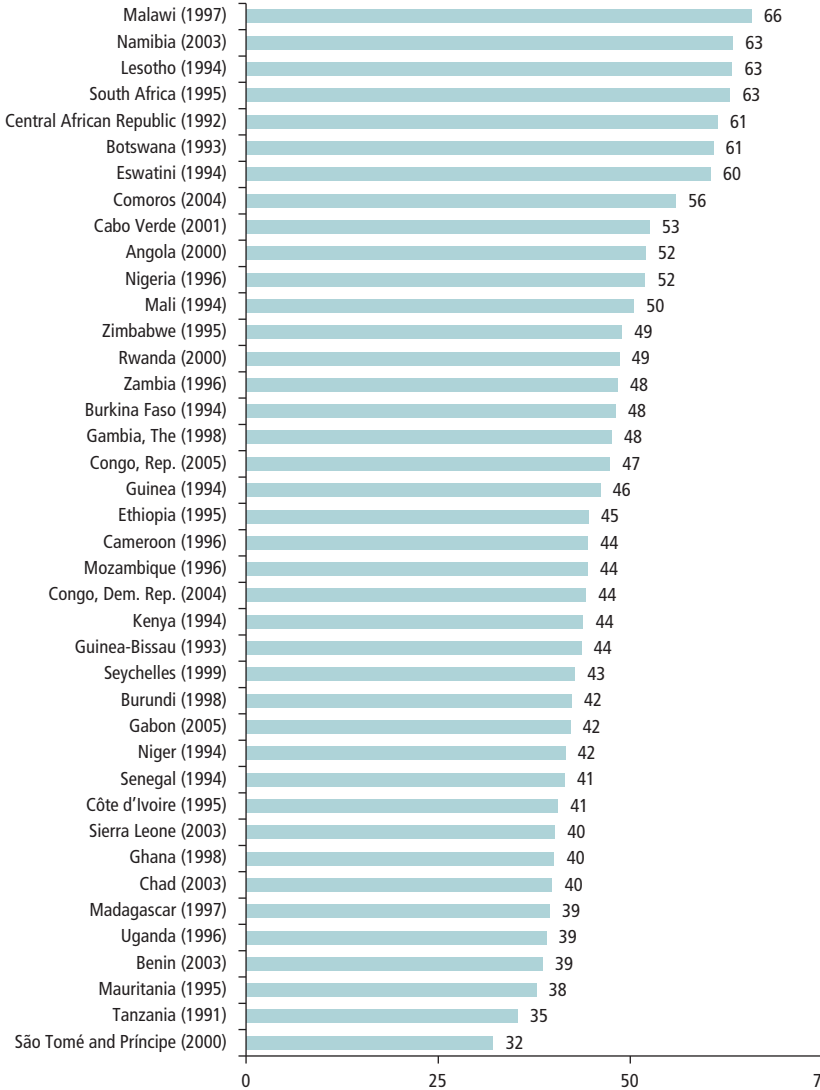
Poverty

Poverty is widespread in Sub-Saharan Africa—the world's only region where the absolute number of poor has increased since 1990 (from 288 million in 1990 to 389 million in 2012). But measures of the countries' baseline poverty headcounts (earliest year available, 1990–2005) show considerable range in the share of the population living below US$1.90 per day: from less than 1 percent in the Seychelles to more than 91 percent in the Democratic Republic of Congo (figure 1.11). Children entering first grade from economically disadvantaged households are typically educationally disadvantaged as well. This means that countries where more than half of children come from economically disadvantaged backgrounds require more extra resources per student to improve their learning than do countries with lower poverty rates.

Linguistic Diversity

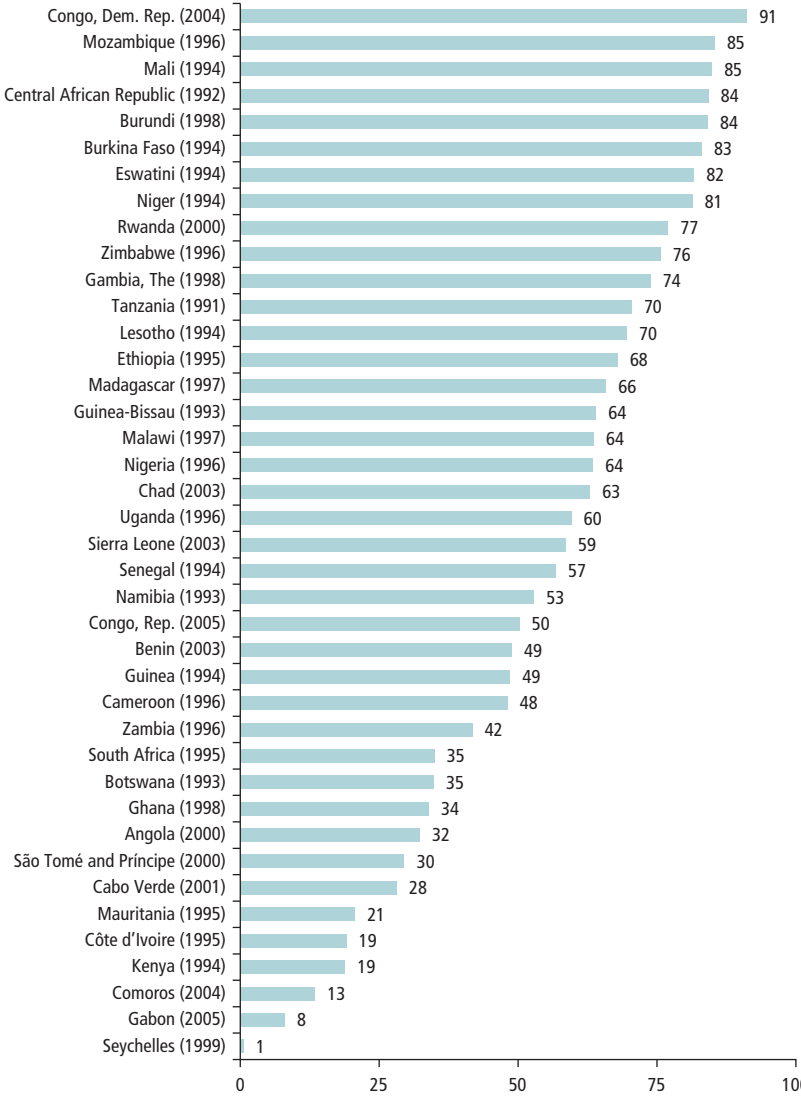
Linguistic diversity affects education in three ways (Alidou 2003): First, children entering school but not speaking the language of instruction must learn a new language before they can learn to read or do simple math, and qualified "bilingual" teachers may be in short supply. Second, even if the official policy is to teach in a "local" language, teachers who are qualified in a local language and textbooks that are published in a local language may not be available in sufficient supply to meet the demand, particularly if the languages are spoken by only a small minority. Third, linguistic diversity may also signal social status, with children speaking minority languages subject to discrimination from others who speak a majority language (Lewis and Lockheed 2006, 2007). Although discrimination may not occur in linguistically homogeneous communities, it may emerge in urban schools and may be a growing challenge because Sub-Saharan African countries are rapidly urbanizing. In Sub-Saharan Africa, linguistic diversity ranges from virtually no diversity to very high diversity (figure 1.12).[11]

Figure 1.10 Gini Index of Economic Inequality for Sub-Saharan African Countries, Earliest Year Available, 1991–2005



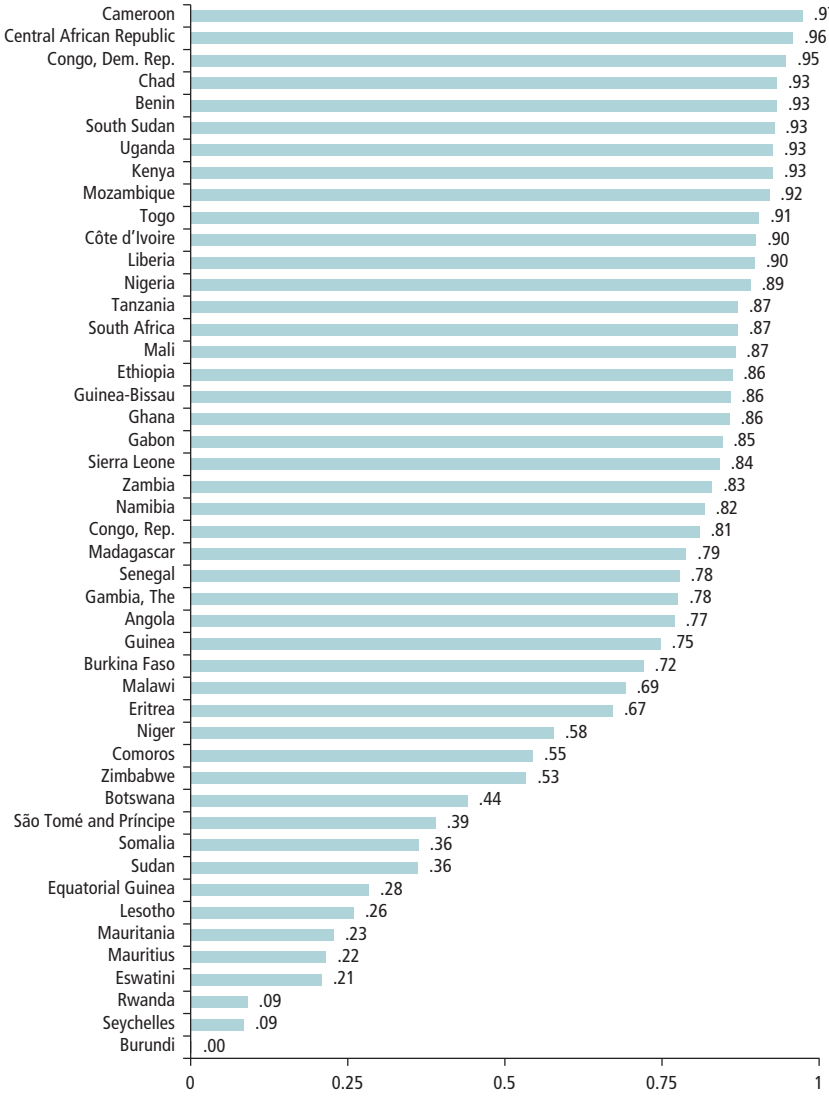
Source: Based on data from World Development Indicators database (July and October 2016), http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.
Note: The Gini coefficient is the most common measure of the inequality of income (or consumption) distribution within a country. A Gini value of 0 indicates full equality, and 1 (or 100 percent) indicates maximum inequality.

Figure 1.11 Poverty Headcount Ratio in Sub-Saharan African Countries, Earliest Year Available, 1991–2005



Source: Based on data from World Development Indicators database (July and October 2016), http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.
Note: Figure shows the percentage of each country's population living on no more than US$1.90 per person per day, at 2011 purchasing power parity (PPP) exchange rates.

Figure 1.12 Linguistic Diversity Index for Sub-Saharan African Countries, 2015



Source: Lewis, Simons, and Fennig 2016.
Note: The linguistic diversity index refers to Greenberg's Diversity Index, a measure of the probability that any two randomly selected people in a country would have different mother tongues. Its values range from 1 (indicating total diversity) to 0 (signaling absence of diversity; that is, the entire population of a given country has the same mother tongue).

Conflict

Conflict lowers educational attainment and exacerbates educational inequalities (Bell and Huebler 2010; Omoeva, Hatch, and Moussa 2016). It affects education because it has often targeted education facilities—destroying schools, murdering teachers, and taking students as hostages. It disrupts populations and creates huge refugee groups, whose children are deprived of education. Children's exposure to conflict lowers their educational attainment, affecting both girls who become victims of sexual violence (Chamarbagwala and Morán 2010) and boys who are recruited as child soldiers (Caruso, Cucagna, and Niu 2017).

A rough index of conflict (based on the number of politically violent events (Raleigh et al. 2010) divided by the country's population) shows considerable differences in the prevalence of conflict in Sub-Saharan Africa, ranging from zero conflicts per million inhabitants to over 300 per million from 1997 to 1999 (figure 1.13). For one example, see box 1.3 on the effect of the Ivorian Civil War (2002–07) on the education of Côte d'Ivoire's children.

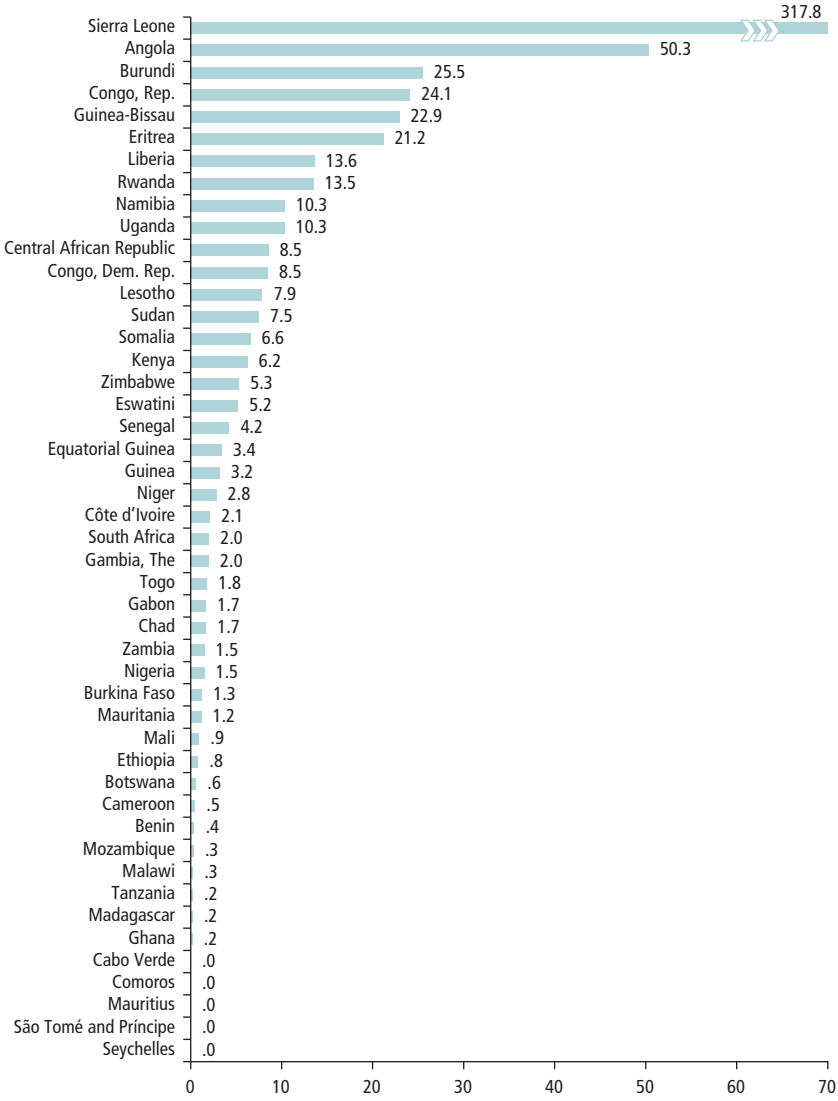
Country Groups by Density of Education Challenges

This subsection groups countries according to the density of the education-related challenges they faced before 2000. For each characteristic, countries in the top quartile (most challenged) and bottom quartile (least challenged) of the countries with relevant data were identified. Table 1.2 lists the challenges and indicates the cutoff points for the top and bottom quartile of each.

Among the 38 countries with available data on all seven challenges and the two countries with data on six of the seven challenges, "few challenges" pertains to countries in the least challenged quartile for three or more of the challenges; "many challenges" pertains to countries in the most challenged quartile for three or more challenges; and "some challenges" pertains to all other countries. The exceptions are three countries initially classified as having "some challenges" (Ethiopia, South Africa, and Zimbabwe) and one country initially classified as having "few challenges" (Rwanda), which were reclassified as having "many challenges" on the basis of World Bank staff country knowledge. For five of the eight countries lacking data for two or more challenges (Eritrea, Liberia, Mauritius, Sudan, and Togo), classification was made on the basis of available data and World Bank staff country knowledge. (For more details, see online appendix A.2, table A.2.1.)

Half of all countries confronted some challenges in the 1990s. The remaining countries fell within the most challenged or least challenged quartile for various sets of indicators. However, in general, countries fell into three broad categories: "few challenges," "some challenges," and "many challenges" (table 1.3).

Figure 1.13 Violent Conflicts per Million Inhabitants in Sub-Saharan African Countries, 1997–99



Source: Estimation based on Armed Conflict Location and Event Data (ACLED) version 6, (https://www.acleddata.com/data/) and UN DESA 2015.

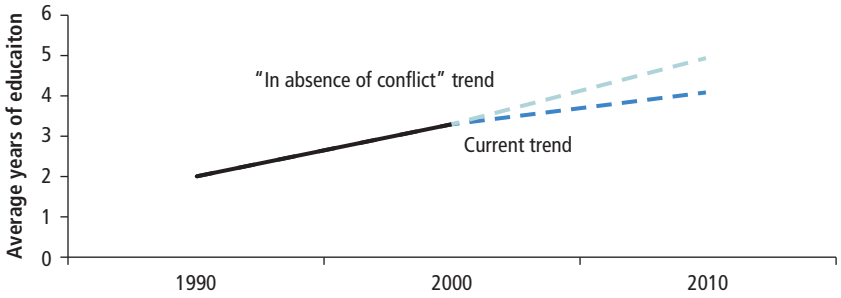
BOX 1.3

Jeopardizing Progress: The Impact of Conflict on Human Capital

The conditions of conflict that prevail in many Sub-Saharan African countries jeopardize their educational progress. Armed conflicts have affected three-fourths of all countries in Sub-Saharan Africa since World War II. Conflicts interrupt human capital formation and destroy critical public infrastructure, such as schools, that is required for the acquisition of human capital. School attendance and completion are also affected by these events. Armed conflicts pose a financial burden on households, often obliging them to cut food and health care expenditures, jeopardizing human capital formation.

Even a few years of conflict can set a country back by a decade. The first Ivorian Civil War raged from 2002 to 2007. A background paper commissioned for this regional study shows that the reduction in years of schooling resulting from the war is equal to the average increase achieved by the country 10 years before the conflict (figure B1.3.1). Children living in regions closer to the conflict completed one less year of education than children in regions that were not war-affected; they also had a lower probability of completing different educational stages (primary, secondary, and tertiary). Older boys in conflict-affected areas, who are more likely to be recruited for war tasks than girls, were less likely to finish secondary schools than boys outside conflict-affected areas. Girls, however, were more affected by the war during primary school (Caruso, Cucagna, and Niu 2017).

Figure B1.3.1 Average Years of Education Observed and Estimated in the Absence of Conflict in Côte d'Ivoire, 1990–2010



Source: Caruso, Cucagna, and Niu 2017.
Note: Figure shows the gap between actual years of education (current trend) and an estimated average number of years (the trend "in absence of conflict") that would have been achieved if not for the first Ivorian Civil War, which lasted from 2002 to 2007.

(continued next page)

Box 1.3 (continued)

Similar studies in other countries of the region found war impacts on other dimensions of human capital formation. Particularly, Akresh et al. (2012) found long-term impacts on human health capital four decades after the Nigerian civil war of 1967–70. Individuals exposed to the war at all ages between birth and adolescence exhibited reduced adult height, and these impacts were found to be greatest when they occurred in adolescence. This reduced adult stature correlates with reduced life expectancy, smaller educational achievements, and lower earnings.

Previous research has also shown a link between health impacts and human capital formation. For instance, Alderman, Hoddinott, and Kinsey (2006) studied the civil war in Zimbabwe to estimate the impact of preschool malnutrition during the war on subsequent human capital formation. They found that an improvement in the height of preschoolers is associated with increased height in young adults and a higher number of grades of schooling completed.

These studies suggest that policies and programs to compensate for the impact of conflict on education should take into account children's gender and developmental stage.

Table 1.2 Social and Economic Challenges to Education Intake and Retention in Sub-Saharan Africa

Challenge	Number of countries	Year	Source of data	Most challenged quartile	Least challenged quartile
Large population (millions)	48	1995	UN DESA 2015	>13.5	<1.7
High annual child population growth, ages 0–14 years (%)	48	1990–2000	UN DESA 2015	>3.2	<1.9
Low GDP growth, per capita (%)	45	1991–2000	WDI 2016 October	<–0.6	>2.2
High inequality (Gini index)[a]	40	1991–2005	WDI 2016 (July)	>51.9	<41.2
High share of population in poverty (%)	40	1991–2005	WDI 2016 (July)	>74.2%	<34.5%
High linguistic diversity index[b]	47	2015	Lewis, Simons & Fennig 2016	>0.90	<0.49
High conflict (events per million population)	42	1997–1999	ACLED version 6	>8.1	<0.5

Note: ACLED = Armed Conflict Location and Event Dataset, https://www.acleddata.com. WDI = World Development Indicators database, World Bank.
a. The Gini index is the most common measure of the inequality of income (or consumption) distribution within a country. On a scale of 0–100, a value of 0 indicates full equality, and 100 indicates maximum inequality.
b. The "linguistic diversity index" measures the probability that any two randomly selected people in a country would have different mother tongues (Lewis, Simons, and Fennig 2016). Its values range from 1 (indicating total diversity) to 0 (signaling an absence of diversity if a country's entire population had the same mother tongue).

Table 1.3 Sub-Saharan Countries Grouped by Level of Social and Economic Challenges to Education Faced in the Mid-1990s

Classification of countries	Few challenges	Some challenges	Many challenges
Countries classified by challenges[a]	Botswana; Cabo Verde; Comoros; Equatorial Guinea; Eswatini; Ghana; Lesotho; Mauritania; Mauritius; São Tomé and Príncipe; Seychelles	Benin Burkina Faso; Cameroon; Congo, Rep.; Côte d'Ivoire; Equatorial Guinea; Gabon; Gambia, The; Guinea; Guinea-Bissau; Madagascar; Malawi; Mali; Namibia; Senegal; Sierra Leone; Tanzania; Togo; Zambia	Angola; Burundi; Central African Republic; Chad; Congo, Dem. Rep.; Eritrea; Ethiopia; Kenya; Liberia; Mozambique; Niger; Nigeria; Rwanda; South Africa; Sudan; Uganda; Zimbabwe
Countries not classified	Somalia; South Sudan (not a country in 1990)		

Note: Among the 38 countries with available data on all seven challenges and the 2 countries with data on six of the seven challenges, "few challenges" pertains to countries in the least challenged quartile for three or more of the challenges; "many challenges" pertains to countries in the most challenged quartile for three or more challenges; and "some challenges" pertains to all other countries. Three countries initially classified as having "some challenges" (Ethiopia, South Africa, and Zimbabwe) and one country initially classified as having "few challenges" (Rwanda) were reclassified as having "many challenges" on the basis of World Bank staff country knowledge. Among the eight countries lacking data for two or more challenges, six countries (Equatorial Guinea, Eritrea, Liberia, Mauritius, Sudan, and Togo) were classified on the basis of available data and World Bank staff country knowledge.
a. The seven challenges are large population, high annual child population growth, low GDP growth per capita, high economic inequality, high poverty headcount rate, high linguistic diversity, and high conflict. For more information about these criteria, see table 1.2 and online appendix A.2.

Countries varied in the combinations of challenges they faced (for example, countries with two or more, but different, challenges, such as population and linguistic diversity or poverty and inequality).

The OECD assessed a different set of political, societal, economic, environmental, and security risks in its *States of Fragility 2016* analysis (OECD 2016). Its classifications yield broadly similar results, but there are differences because our classification focuses on challenges specific to education. Of the 56 countries with the highest levels of fragility according to the OECD, 35 are in Sub-Saharan Africa. Among the 18 Sub-Saharan African countries identified by the OECD as having relatively greater fragility, two-thirds are also in this study's "many challenges" group, and only two are in the "some challenges" group; of the 17 countries with lesser fragility, over two-thirds are classified as having "some challenges," and only two are classified as having "many challenges."

The next section combines both types of country groupings—by educational performance, and by the challenges they faced in the 1990s—to better enable countries facing similar challenges to learn from each other.

Mapping Educational Performance and Challenges

This section overlays the country challenge classifications with the country educational progress groups (Groups 1, 2, 3, and 4) described earlier in the chapter. By creating these groups and comparing them, both within groups and across groups,

it is possible to compare the progress in educational development within each group while partially controlling for the initial conditions facing each country at the beginning of the century. Although the groupings are not perfect—and experts may disagree regarding the categorization of specific countries—they allow us to avoid the problems inherent in comparisons of dissimilar countries.

The purpose of classifying countries according to both their educational progress and challenges faced in the baseline period was to explore how lessons could be learned from the experience of the more successful countries considering their baseline challenges. We find that countries with "many challenges" unsurprisingly are mainly in Group 4 (Delayed) in terms of progress in access to education, and countries with "few challenges" are mainly in Group 1 (Established) on access to education. For example, most countries that were lagging in access to education in 2013 either had "many" or "some" challenges in the late 1990s, and most countries that had "few" challenges in the late 1990s had already achieved universal primary access (table 1.4). There are also countries that faced many challenges that, despite all odds, made progress on education, such as the Democratic Republic of Congo, Rwanda, and Uganda (Group 2 countries) as well as Angola, Burundi, Ethiopia, Mozambique, and Nigeria (Group 3 countries).

Table 1.4 Progress in Primary Education Coverage and Inclusion Mapped against Baseline Challenges in Sub-Saharan African Countries, by Group, circa 1990s to 2015

Number of Challenges in 1990s[a]	Group 1: Established	Group 2: Emerged	Group 3: Emerging	Group 4: Delayed
Few	Botswana; Cabo Verde; Eswatini; Ghana; Lesotho; Mauritius; São Tomé and Príncipe	Comoros	Mauritania	None
Some	Congo, Rep.; Gabon; Namibia	Cameroon; Malawi; Tanzania; Togo	Benin; Côte d'Ivoire; Gambia, The; Guinea-Bissau; Madagascar; Sierra Leone; Zambia	Burkina Faso: Equatorial Guinea; Guinea; Mali; Senegal
Many	Kenya; South Africa; Zimbabwe	Congo, Dem. Rep.; Rwanda; Uganda	Angola; Burundi; Ethiopia; Mozambique; Nigeria	Central African Republic; Chad; Eritrea; Liberia; Niger; Sudan

Note: Among the 38 countries with available data on all seven challenges and the 2 countries with data on six of the seven challenges, "few challenges" pertains to countries in the least challenged quartile for three or more of the challenges; "many challenges" pertains to countries in the most challenged quartile for three or more challenges; and "some challenges" pertains to all other countries. Three countries initially classified as having "some challenges" (Ethiopia, South Africa, and Zimbabwe) and one country initially classified as having "few challenges" (Rwanda) were reclassified as having "many challenges" on the basis of World Bank staff country knowledge. Among the eight countries lacking data for two or more challenges, six countries (Equatorial Guinea, Eritrea, Liberia, Mauritius, Sudan, and Togo) were classified on the basis of available data and World Bank staff country knowledge. Table excludes the Seychelles, Somalia, and South Sudan for lack of data on educational progress.

a. The seven challenge areas are large population, high annual child population growth, low GDP growth per capita, high economic inequality, high poverty headcount rate, high linguistic diversity, and high conflict. For more information about these criteria, see table 1.2 and online appendix A.2 (https://openknowledge.worldbank.org/handle/10986/29377).

Further consideration of this two-dimensional mapping indicates that the Group 1 (Established) countries have sustained high enrollment rates, with low rates of out-of-school children. This group includes 7 of the 10 middle-income countries in Sub-Saharan Africa as of 2000, suggesting that their resource constraints were less acute than those of the countries in other groups. There are lessons to be drawn from these countries to see how they have continued to sustain access and retention through basic education and have begun to improve the quality of learning. (For an example, see box 1.4 about the case of Kenya.) The experience of Group 1 countries is vastly different from that of the other countries in the region because they encountered few challenges in the baseline period and had already achieved universalization of education, with high enrollments and few out-of-school children.

BOX 1.4

Kenya: Progress in Both Primary Coverage and Learning, Despite Many Initial Challenges

Among Group 1 countries, Kenya has made significant progress in primary coverage—for example, it has a current GER of about 100 percent in grade six—despite having faced multiple challenges in the 1990s. Almost all children enroll in school, even if some start late (past age 6 or 7). Even more impressively, as chapter 2 shows, the country is a top performer in regional learning assessments at the primary level compared with other African countries, second only to Mauritius. (It does not, however, participate in global learning assessments.)

Multiple Baseline Challenges

Regarding the seven education challenges described earlier, Kenya was classified as a country with "many challenges" in the mid- to late 1990s. Specifically, it appeared in the top quartile among Sub-Saharan African countries facing three challenges: (a) large population (27 million in 1995); (b) linguistic diversity (index value of 0.93, indicating about a 93 percent probability that two randomly selected inhabitants would have different mother tongues); and (c) low growth of GDP per capita. In addition, conflict was relatively high (6.24 conflicts per million inhabitants during 1997–99).

Effective Policies and Implementation

In 1985, a new structure of school education was adopted—called "8+4+4"—to ensure that children receive at least eight years of primary education. However, coverage did not expand rapidly, partly because of cost sharing with parents. Since the early 2000s, successive Kenyan governments have given a strong priority to education. The policy framework has been clear regarding overall objectives and targets, and implementation has been backed up with high public spending on education, which in 2014 represented about 5.3 percent of GDP and 17.1 percent of the national budget.

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Box 1.4 (continued)

Among the most critical policy actions have been the following:

- *Introduction of free primary education* in 2003, which boosted the enrollment of all primary-age children. The Ministry of Education became responsible for the recurrent expenses of all primary schools through capitation grants. A new curriculum was also introduced that reduced the number of examinable subjects from 7 to 5 in primary education and from 10 to 8 in secondary education.
- *Introduction of free day secondary education* in 2008, considerably expanding the number of secondary schools through additional day schools, which also received capitation grants.
- *Expansion of early childhood education since 2006,* with the adoption of a policy framework and service standard guidelines for early childhood development, covering children from birth through age five. Early childhood education for ages three to five became a county-level responsibility in 2014, and counties are expected to provide free early childhood education, although implementation has varied.
- *Strong legal framework,* developed following the adoption of the new Constitution in 2010. Several new acts were passed that outline the responsibilities of various institutions and the governance structure in school education, aligned with the new Constitution.
- *Consistent teacher training and recruitment policies,* ensuring that all teachers in primary and secondary education are trained. The Teacher Service Commission (TSC), established in 1967, is responsible for recruiting, employing, promoting, and paying teachers. In 2012, a new act aligned the TSC with the new Constitution and mandated the TSC to set standards for those entering the profession, determine the teaching career structure, and monitor teacher performance and conduct.
- *Establishment of key technical support institutions,* such as the Kenya National Examinations Council (established in 1980), which conducts examinations as well as national learning assessments, and the Kenya Institute of Curriculum Development (established in 2013).

Immediate Priorities: Improving Quality and Universalizing Lower-Secondary Education

Despite these successes, Kenya needs to ensure that all children transition to grade nine and complete lower-secondary education. This requires targeting girls and children in poor counties (arid and semiarid lands).

Learning outcomes remain insufficient: Kenya's national assessments show that less than half of third-grade students have sufficient competency in reading. Although Kenya has an official policy to teach in the mother tongue up to grade three, in practice, this is not implemented for lack of appropriate teachers and learning materials. This contributes to learning challenges for significant numbers of children—challenges that are compounded as they move up the system.

Efficient management of the system also requires coordination and alignment of different institutions and negotiations with multiple stakeholders. A lack of reliable data on most critical education indicators has plagued the system for many years. A new education management information system (EMIS) was launched in 2017.

The Group 2 (Emerged) countries, despite some having "many" challenges in the 1990s—particularly the Democratic Republic of Congo, Rwanda, and Uganda—offer many lessons, especially to those countries in Groups 3 and 4 (Emerging and Delayed, respectively) that faced relatively "few" challenges, such as Comoros and Mauritania. There are also lessons to be drawn from countries like Togo that faced "some" challenges in the 1990s but could still increase the financing of education as a percentage of GDP with a focus on improving enrollments in primary education (box 1.5).

BOX 1.5

Togo: Sustained Progress and Expansion in the Wake of Socioeconomic and Political Crisis

In the mid-1990s and for another 15 years, Togo was internationally isolated, and ties with several European countries were severed after failed attempts to democratize the country beyond the ruling of a one-party system. The impact was felt in the country's public financial system: its inability to repay debt and a severe banking crisis. But since 2006, a sustained transition from military rule to democracy has international donors resuming cooperation, funding new projects, and granting debt relief—enabling the country to rehabilitate its social, institutional, and economic infrastructure.

Togo's baseline challenges from the mid-1990s placed it among the Sub-Saharan African countries with "some challenges," although with high linguistic diversity.

Togo's education system follows a "3+6+4+3" structure for the duration (in years) of preprimary, primary, lower-secondary, and upper-secondary schooling, respectively. Basic education comprises the primary and lower-secondary levels, and school attendance is compulsory until the age of 15.

Togo has made important progress in recent years, which places it among the "emerged" (Group 2) countries:

- Between 2000 and 2015, the percentage of children not enrolled in primary school declined from 10 percent to 2.5 percent, and primary enrollments grew rapidly—from fewer than 1 million students in 2000 to 1.5 million in 2015. Lower-secondary enrollment also increased rapidly—from 204,000 students in 2000 to 438,000 in 2015.
- The primary-school gross enrollment rate (GER) grew from 111 percent in 2000 to 125 percent in 2013[a]—with a jump after the free-fee policy was introduced in 2008—and the enrollment gap between boys and girls narrowed. The early-grade enrollment bulge poses a problem (as discussed in chapter 3), although it has eased somewhat in recent years.
- The primary completion rate reached 89 percent in 2015, up from 70 percent in 2007, and the lower-secondary completion rate increased from 33 percent to 41 percent.

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Box 1.5 (continued)

Issues of Quality, Equity, and Capacity

Measures of learning outcomes suggest that some work remains to be done on the quality of education. Togo's results from the 2014 francophone regional learning assessment (PASEC) show that fewer than half of sixth-grade students reached sufficient competency in either reading (38 percent) or mathematics (48 percent).

The following educational disparities still exist:

- *Gender*. Although gender gaps in enrollment have narrowed for the early grades, more girls drop out as they progress to higher grades. Girls who continue in school, however, perform as well as, or even better than, their male counterparts, and the gender gap in learning in Togo is among the lowest for countries participating in PASEC.
- *Rural versus urban*. Location (urban or rural) and regional disparities manifest in the early grades and compound over time. Particularly striking are the regional differences, where outcomes are more favorable for students in or close to the capital (Lomé) than for those living in more distant regions (Savanes).
- *Socioeconomic*. Gaps between the lowest and highest quintiles of household income are large and tend to increase over the education cycle: in 2015, the primary-level GER of 84 percent in the lowest quintile contrasted with 111 percent in the richest quintile. At the lower-secondary level, the gap was even larger: 57 percent against 95 percent. Such gaps are also evident in the PASEC 2014 learning assessment results, with Togo's socioeconomic gaps being the largest among all the participant countries (over 100 points, or more than 1 standard deviation for both reading and mathematics).

Moreover, the condition of school infrastructure is poor. Only 13 percent of primary schools are estimated to meet five or six of the six minimum essential conditions for effective teaching and learning (discussed in chapter 4). Roughly half of the public schools lack textbooks as well as access to basic hygiene facilities such as toilets.

Policy and Strategic Adjustments

The government has been implementing the free-fee education policy established in the 1992 Constitution. In 2000, tuition fees for girls were reduced, to encourage their enrollment, and in 2007–08, all primary-school fees were abolished.

Elimination of school fees led to a 30 percent increase in grade one enrollments the next year, from 180,000 to 240,000 students in 2008–9. At the same time, the teacher cadre did not expand commensurately, growing by only 12 percent. Moreover, the government budget transfers to schools to compensate for lost fees have proven insufficient.

Togo's education strategic plan includes improving child nutrition to enhance student learning and school participation. In 2014, the government implemented a

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Box 1.5 (continued)

program that offered meals to 40,400 students in 182 primary schools; it was supported by international partners, and its sustainability over time remains in question. A broader policy and a national integrated school-feeding program are being designed with the help of the World Food Programme.

Public expenditures for education have been favorable in recent years, growing as a share of GDP from 3.7 percent in 2007 to 5.7 percent in 2015, slightly higher than the regional average. However, education spending as a share of total public expenditure was lower in 2015 (18 percent) than in 1999 (23 percent); more than 80 percent of government spending was for salaries. Despite increased international aid, in 2014, the total annual aid for primary education per child barely exceeded US$1 and remains low in comparison with the regional average of US$8.[b]

Sources: Hoogeveen, Rossi, and Sanson 2014; Republic of Togo 2014; WFP 2016; World Bank 2002.
a. GERs over 100 percent include students who are enrolled in primary school but who are not of primary-school age.
b. Aid to primary education per child estimated from the OECD Creditor Reporting System (CRS) Aid Activity database and enrollment data from UNESCO (2016) and the UIS (UIS.Stat) database (accessed October 12, 2017), http://data.uis.unesco.org. For more details, see chapter 5, table 5.2.

The Group 3 (Emerging) countries with "many" challenges (such as Angola, Burundi, Ethiopia, Mozambique, and Nigeria) have made impressive progress on access to primary education, although they still have a large proportion of children who are out of school (as discussed regarding Ethiopia in box 1.6).

The Group 4 (Delayed) countries that faced "many" baseline challenges—such as the Central African Republic, Chad, Eritrea, Liberia, Niger, and Sudan—are a special group that needs extra support to overcome contextual factors that affect progress in education. Countries like the Central African Republic have had several extended periods of conflict, limiting their ability to make progress on educational outcomes (box 1.7).

Boxes 1.4 to 1.7 illustrate examples of countries from each of the four groups and highlight some of the educational policies and programs pursued by these countries amid the socioeconomic challenges they have faced.

The rest of the book follows the one-dimensional grouping of countries (Groups 1, 2, 3, and 4 based on educational progress: Established, Emerged, Emerging, and Delayed, respectively) rather than the two-dimensional framework that includes the baseline challenges faced by the countries. However, this two-dimensional framework allows countries to compare and benchmark themselves against others and learn about what some countries did differently to move ahead on access to education.

BOX 1.6

Ethiopia: Overcoming Great Odds to Massively Expand Primary Education Coverage

As it was recovering from more than a decade of civil war and severe droughts and famines, Ethiopia in the early 1990s had one of the lowest education participation rates in the world. Its gross enrollment rates (GERs) were exceptionally low, with primary, secondary, and tertiary enrollments at about 30, 13, and 1 percent, respectively. The country also faced many severe contextual challenges: a large population, a rapidly growing child population, high poverty rates, and considerable linguistic diversity. In 2000, it was the still second-poorest country in the world.

Increasing Access to Primary Education: A Policy Priority in the Initial Phase

In 1994, Ethiopia introduced tuition-free basic education, although parents contributed in kind to schools, especially for construction. The ensuing two decades brought substantial progress:

- The total number of primary schools (including Alternative Basic Education centers for pastoralist and nomadic populations) nearly tripled between 1996 and 2013–14, from 11,000 to 32,408.
- Between 1999 and 2014, the primary GER nearly doubled, with enrollments in grades one through four increasing from 5 million to more than 11 million, and those in grades five through eight from about 2 million to 5.5 million.
- The number of teachers more than tripled between 2003 and 2013, and regional teachers' education colleges were established.

Two aspects of the 1994 policy framework were important: (1) adopting local languages for instruction in primary education and (2) clearly dividing responsibilities for education among the federal government, regions, *woredas* (districts), and schools. The federal government determines national education policy and standards. The federal Ministry of Education (MoE) develops the national curriculum framework, textbooks, and standards for teachers, and it also conducts national learning assessments. Staffing levels and allocations are approved by the MoE, but the *woredas* hire and manage teachers and support staff.

Progressive Attention Paid to Quality

The General Education Quality Improvement Project (GEQIP), supported by the World Bank and other donors, was launched in 2008. In its second phase, GEQIP supports the implementation of several new measures to improve education quality:

- *Upgrading the qualifications of primary teachers:* By 2016 more than 100,000 primary teachers had received diplomas from an upgraded training program. The government also established the Teacher Professional Development Program and the Teacher Licensing Scheme.

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Box 1.6 (continued)

- *Producing and distributing textbooks:* All students in grades one to eight receive textbooks in four core subjects. At the national level, a 1-to-1 student-to-textbook ratio has been established.
- *Measuring students' learning achievement:* Since 2004, the Ethiopia National Learning Assessment has tested 4th, 8th, 10th, and 12th graders in English, mathematics, reading comprehension, and science-specific subjects every four years.
- *Monitoring and evaluating schools:* Established in 2012–13, an assessment system monitors the quality and effectiveness of Ethiopia's primary and secondary schools in terms of inputs, processes, and outcomes. School inspections for classifications are conducted by independent bodies and are based on standards and indicators stipulated in the National School Classification Framework.
- *Issuing School Improvement Grants:* These supplement the small, erratic budgets allocated by *woredas* to schools and enable schools to improve the learning environment.

The Elusiveness of Full Coverage and Inclusion

Despite these impressive achievements, Ethiopia is classified among the Group 3 (Emerging) countries in educational progress, because more than 2 million primary-age children are still out of school, and the retention rate, even up to grade six, is comparatively low. Although almost all children appear to enroll in grade one, official and informal repetition rates are very high, especially in grade one. The enrollment rate in grades five through eight has stagnated since 2010.

Ethiopia falls short in these other areas as well:

- *High inequality* persists in enrollment and completion, especially between regions and among children from different socioeconomic groups.
- *Poor quality of teacher training* weakens initial teacher education, teacher upgrading programs, and continuing professional development.
- *Problematic and delayed textbook distribution* to schools—despite massive textbook procurements—contributes to lower student-textbook ratios than the 1-to-1 national policy. Also, teachers do not regularly use the textbooks.

Moreover, foreign aid continues to be extremely important to sustaining the improvements made thus far. Donors have financed all the inputs for the two phases of GEQIP, regarding textbooks, teacher training, and school grants.

Data are scant on Ethiopia's progress in comparative learning outcomes, because the country does not participate in international or regional learning assessments. The country's National Learning Assessment shows improvement in student performance for most grades and on most subjects between 2011–12 and 2015–16, although about two-fifths of fourth graders still have less than basic proficiency in mathematics and reading.

BOX 1.7

The Central African Republic: Education Struggles amid Perpetual Crisis

The Central African Republic, a landlocked country that gained its independence in 1960, fits our classification of a country that faced many challenges in the mid-1990s. In demographic terms, it was on par with other mid-size countries in the region, with a 1995 population of 3.3 million and an average annual child population growth of 2.4 percent. In contrast, its economic profile revealed a harsh context to overcome: a negative annual GDP growth rate (–1.15 percent), widespread inequality (Gini index of 61), and a high poverty rate (84.3 percent).

However, the country's most pressing challenge—one that remains unresolved—is widespread political violence and its profound effect on the viability of the country. Its conflict index for 1997–99 alone places it in the top quartile of Sub-Saharan African countries, with 8.5 violent conflicts per million inhabitants. Several extended periods of violence over the past four decades are worth noting: the 1981–93 tribalization of political life and the state, the 1994–2003 progressive deterioration of the viability of the state, the Bush War of 2004–07, and the Civil War of 2012–16.

Education in Flux, 1980s–2014

As early as 1985–86, the primary-level gross enrollment rate (GER) had reached a notable 78 percent (World Bank 1987). But the state's deteriorating capacity was reflected years later in a declining GER, stuck at about 70 percent, between 1988 and 2001. Events related to the 2003 coup affected that school year's GER, which barely reached 54 percent. Since the peace agreement years (2008–12), some indicators have shown a consistent and promising yearly increase: GER reached 93 percent in 2012, while the primary completion rate was close to 45 percent. But the post-2012 deterioration from the Civil War has been insurmountable.

Some of the problems of the education sector can be traced as far back as the 1980s, when an authoritarian government and resulting intertribal conflict threw the country's infrastructure and public administration into disarray. The education system experienced several *années blanches,* when teachers' absences during a large part of a school year became the norm. Such absences were explained by constant strikes due to unpaid wages and a cascade of mutinies and rebellions. With no teachers, schools were forced to close. Between 1989 and 2003, at least five school years were lost under these circumstances.

In 2013, another *année blanche* was experienced differently across the country. In Bangui, the capital, the entire school year was not lost, but lost classes early in the year caused mandatory exams to be simplified, with less pedagogical content to evaluate. In other regions, where violence and military clashes were common, the lost year was almost inevitable. As the conflict progressed, fewer schools remained open and more were closed, looted, occupied by armed groups, or destroyed. In the 2012–13 school

(continued next page)

Box 1.7 (continued)

year, an estimated 49 percent of the schools were closed, and in 2014 this percentage reached about 65 percent (EC CAR 2013).

Current Educational Challenges

Based on the government's 2015–16 annual statistical report, the Global Partnership for Education compiled the following 2012 education data and challenges for the Central African Republic:[a]

- *Low access to education*, with net enrollment rates of 72 percent in primary education and even lower at the preprimary (3 percent) and secondary (7 percent) levels
- *Overall lack of teachers*, with an average student-teacher ratio of 83-to-1 in primary schools
- *High prevalence of underqualified or rarely trained community teachers* (*maitre-parents*), representing 40–50 percent before the 2013 political crisis
- *Shortage of educational materials*, mainly textbooks
- *Shortage of infrastructure,* including classrooms, schools, and other basic infrastructure, which in most cases has been destroyed amid the conflict

A peaceful presidential election in 2016 resulted in a new president, elected with hopes of regaining control of the country and definitively disarming the belligerent forces. But as of 2017, the country remained mired in an ongoing humanitarian crisis, with about 600,000 people displaced within the country and half a million refugees in neighboring countries;[b] rampant insecurity; government control restricted to the capital; and bouts of violence in cities and villages against civilian populations.

Many schools remained closed, their problems compounded by the recruitment of children for military purposes by nonstate armed groups, with more than 10,000 children affected since 2013 (UNICEF 2017). This situation makes it difficult to predict when the country—and the activities in the education sector—will normalize.

Sources: EC CAR 2013; ICG 2014, 2015; MENET, Central African Republic 2014; UNICEF 2017; World Bank 1987.
a. Statistical data compiled in "Education in Central African Republic," Global Partnership for Education website, https://www.globalpartnership.org/country/central-african-republic#fullpage-7.
b. Data on displaced people and refugees from "Regional Response to the Refugee Crisis in the Central African Republic," Refugee Crisis Portal database, United Nations High Commissioner for Refugees website (accessed October 23, 2017), http://data2.unhcr.org/fr/situations/car.

Organization of the Book

The next chapter, "A Focus on Learning," examines what is being identified as the new challenge to all education systems in Sub-Saharan Africa: a "crisis of learning," referring to the failure of the region's education systems to educate learners. The chapter documents the region's current state of knowledge capital, including, where possible, the progress achieved as well as the equity dimensions. It also presents the evidence on what boosts learning, obtained from the analysis

of the correlates of learning and impact evaluations, both in Sub-Saharan African countries and internationally.

Chapter 3, "The Unfinished Agenda for Reaching Universal Basic Education," focuses on how to ensure progress for all in schooling through lower-secondary education. This chapter deals with how to address the issue of overenrollment in early grades and efficient progression of students through basic education, as well as preparing for a large expansion at the lower-secondary level.

Chapter 4, "Managing Teachers," delves into the topic of teacher recruitment, teacher deployment, and teachers' work in the classroom, concluding with priorities for policy development to improve the management of teachers to enable them to be more effective at the school level.

Chapter 5, "Deploying the Budget to Improve Quality," focuses on how resources can be better used to improve the planning and delivery of educational services.

Chapter 6, "From Science to Service Delivery: Closing the Capacity Gap," describes the new capacities that ministries of education must develop to address the quality agenda.

Chapter 7, "Conclusions and Recommendations," and chapter 8, "Coda: Looking Ahead," summarize the book's findings, policy implications, and recommendations.

Notes

1. A strong association exists between economic growth and cognitive skills as measured by student learning. In cross-country econometric growth models that include both cognitive skills and years of schooling, only the former variable is statistically significant (Hanushek and Woessmann 2015). In addition, more schooling is associated with higher earnings, social cohesion, better health outcomes, and lower rates of fertility (Barouni and Broecke 2014; Peet, Fink, and Fawzi 2015; Riddell 2007).
2. For more about SDG 4 and its specific targets, see the United Nations Sustainable Development Knowledge Platform: https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals.
3. The regional seminars were organized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and its education partners, including, among others, the African Union, the Association for the Development of Education in Africa (ADEA), and the World Bank (IBE-UNESCO 2007).
4. For more information, see the World Bank websites for SABER (http://saber.worldbank.org/index.cfm) and SDI (http://www.sdindicators.org/).
5. The year 1990 marked the beginning of the Education for All (EFA) movement's global commitment to provide high-quality basic education for all children, youth, and adults. The movement was launched at the World Conference on Education for All in 1990 in Jomtien, Thailand, attended by 155 countries and organized by UNESCO, the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), and the World Bank.

6. In April 2000 the global education community gathered at the World Education Forum in Dakar, Senegal, where the participants both reaffirmed the 1990 EFA vision and issued the Dakar Framework for Action, "Education for All: Meeting Our Commitment"—further developing the groundwork for adoption eight months later of the education-related components of the Millennium Development Goals at the United Nations.
7. The "*S*-shaped curve" refers to the typical pace of formal schooling growth: slow initial development of education system coverage (the bottom of the "*S*"), followed by a rapid increase in enrollment, and finally a slow tapering off of enrollments as countries work to include the last, most difficult-to-reach child populations (the top of the "*S*").
8. Primary-school enrollment rate data from the UNESCO Institute for Statistics UIS. Stat database, http://data.uis.unesco.org/.
9. Out-of-school rates from analysis of microdata from World Bank Living Standards Measurement Study (LSMS) surveys and country Demographic and Health Surveys (DHS).
10. Somalia and South Sudan have data on four of the indicators; Equatorial Guinea, Eritrea, Liberia, Mauritius, Sudan, and Togo have data on five of the indicators; Cabo Verde and São Tomé and Príncipe have data on six of the indicators.
11. The linguistic diversity index refers to Greenberg's Diversity Index, a measure of the probability that any two randomly selected people of a country would have different mother tongues. Its values range from 1 (indicating total diversity) to 0 (signaling absence of diversity; that is, all the population of a given country has the same mother tongue). Data from "Summary by Country" of *Ethnologue: Languages of the World*, 19th ed. (accessed April 8, 2016), https://www.ethnologue.com/statistics/country (Lewis, Simons, and Fennig 2016). This indicator is stable over time and adequately reflects the situation in the 1990s.

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Chapter 2

A Focus on Learning

Introduction

Although schooling in Sub-Saharan Africa has surged ahead over the past quarter century, learning has not kept pace. As this chapter shows, the region suffers from a "crisis of learning" that compromises the ability of countries in the region to benefit fully from their human capital. Learning not only enhances the well-being of individuals but also drives the economic and social development of countries. A growing body of evidence demonstrates that improving the quality of schools, teaching conditions, and teaching practices improves learning in low- and middle-income countries, including those in Sub-Saharan Africa. This global evidence underscores the importance of not only choosing policy actions that are effective for boosting learning but also effectively implementing policies at scale.

This chapter reviews the status of learning in Sub-Saharan Africa, places it in international and regional contexts, and reviews the global and regional evidence for those policies and practices that enhance learning. It is structured as follows:

- *"Learning for Development"* discusses how learning (the knowledge capital of nations) drives development, both globally and in Sub-Saharan Africa.
- *The "Knowledge Capital of Sub-Saharan African Countries in International Context"* begins with what is known about the knowledge capital of adults in Sub-Saharan Africa and then traces this back through various levels of schooling. It concludes that remedying the region's weakness in translating schooling into learning must be a priority for the future.
- *"Equity in the Distribution of Learning in Sub-Saharan Africa"* draws attention to gaps in learning related to household disadvantage, home language, rural residence, and gender in Sub-Saharan Africa.

- *"Determinants of Learning: Global Evidence"* looks at the global evidence regarding "what works" to improve learning, drawing on a large literature of correlational studies and a smaller but more rigorous literature of impact evaluations using randomized controlled trials. It concludes that much of what is known to be effective in higher-income countries is less effective in low- and middle-income countries, and that interventions mainly at the classroom level boost learning in low- and middle-income countries.
- *"Correlates of Learning in Sub-Saharan Africa" and "Effective Interventions in Sub-Saharan Africa"* explore the region-specific correlates of learning and the interventions that have been effective.
- *"Summary: Implement What Works in Africa"* synthesizes our findings—highlighting interventions that work to boost student learning and attendance—and describes the implications for policy.

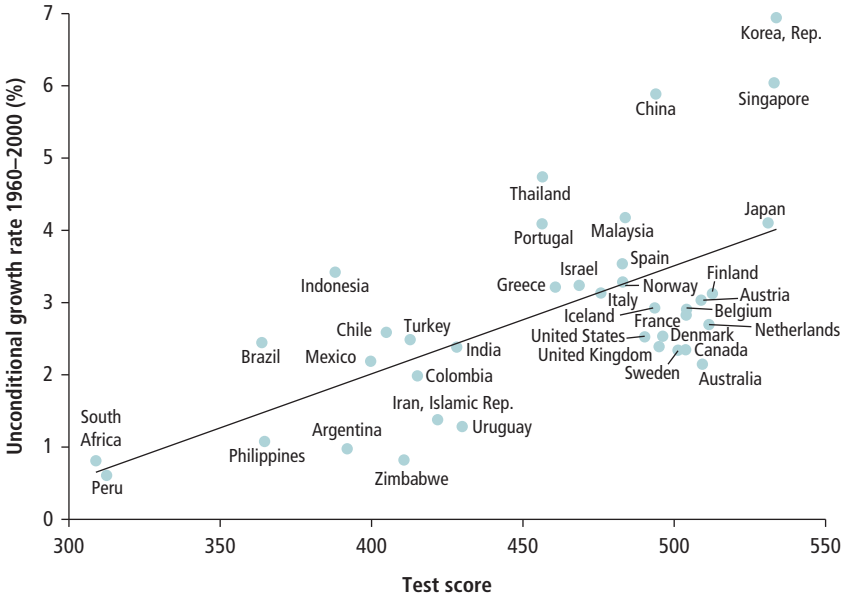
Learning for Development

Learning drives the social and economic development of countries globally, but the link between learning and economic growth appears weak within Sub-Saharan Africa, for two possible reasons: First, the measured level of learning across countries in the region is quite low relative to low- and middle-income countries in other regions. Second, the region's economic growth, which accelerated in the 1990s, has been driven by exportation of natural resource commodities. As opposed to countries in Sub-Saharan Africa, individuals in the region with more schooling and more learning benefit both economically and socially from their education, as discussed in this section.

Knowledge Capital as a Driver of Global Development

Worldwide, countries with a strong human capital base have experienced more rapid economic growth than those with a weaker human capital base (Hanushek and Woessmann 2015). Over the past quarter century, the evidence linking a country's stock of human capital to its economic growth rate has grown substantially (Barro 1991; Barro and Lee 1994; Easterly and Levine 1997; Hanushek and Kimko 2000; Hanushek and Woessmann 2008; Krueger and Lindahl 2001; Mankiw, Romer, and Weil 1992). The indicators of human capital used in these analyses have evolved over time, however. Early studies focused on school enrollment rates (for example, Barro 1991) or the adult population's years of schooling (for example, Barro and Lee 1994), whereas more recent studies have focused on direct measures of cognitive skills, as measured by internationally comparable tests of student learning (for example, Hanushek and Woessmann 2008, 2015).

Figure 2.1 **Knowledge Capital and Long-Term GDP Growth, Selected Countries, 1960–2000**



Source: Analysis based on Hanushek and Woessmann 2015; GDP per capita data from World Development Indicators database (accessed August 17, 2017), https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.
Note: "Knowledge capital" is measured as the average test score in math and science, primary through the end of secondary school, for all years between 1964 and 2003 with available data and scaled to the Programme for International Student Assessment (PISA) scale divided by 100. "Long-term GDP growth" refers to the average annual rate of growth of real GDP per capita between 1960 and 2000.

Cognitive skills (the "knowledge capital" of a country) appear to drive development, net of schooling (figure 2.1). That is, when both cognitive skills and schooling are considered simultaneously in cross-country growth models, only the cognitive skills predict economic growth (Hanushek and Woessmann 2015). This econometric evidence suffers from acknowledged shortcomings, and a recent review of this literature observes that "it is unlikely that precise, credible estimates of the impact of education on economic growth can be obtained from cross-country data" (Glewwe, Maiga, and Zheng 2014, 388). However, the consistency of the association between the quantity and quality of education and the economic growth of a country is persuasive; the role of education quality—as indicated by student learning—is particularly important.

The social and nonmarket benefits of additional schooling are well known. Countries with higher levels of schooling often demonstrate greater social cohesion (including higher societal trust and tolerance), more active citizenship and political participation, lower crime, improved health outcomes, and lower fertility rates (Preston and Green 2003; Riddell 2007). Countries with a higher share

of individuals with secondary education also have more democracy, better human rights, and greater political stability (McMahon 1997, 2000). These relationships have been established for countries in Sub-Saharan Africa (Majgaard and Mingat 2012). The relationship between the knowledge capital of a country and its social and nonmarket outcomes, however, has rarely been studied (Riddell 2007).

Equality of education ensures that the market and nonmarket benefits of schooling are distributed fairly. And the converse, educational inequality, can exacerbate income inequality and reduce social cohesion. Educational inequality arises when education systems fail to ensure that all students are taught by knowledgeable and skilled teachers in schools that provide the necessary conditions for learning.

Knowledge Capital as a Driver of Development in Sub-Saharan Africa

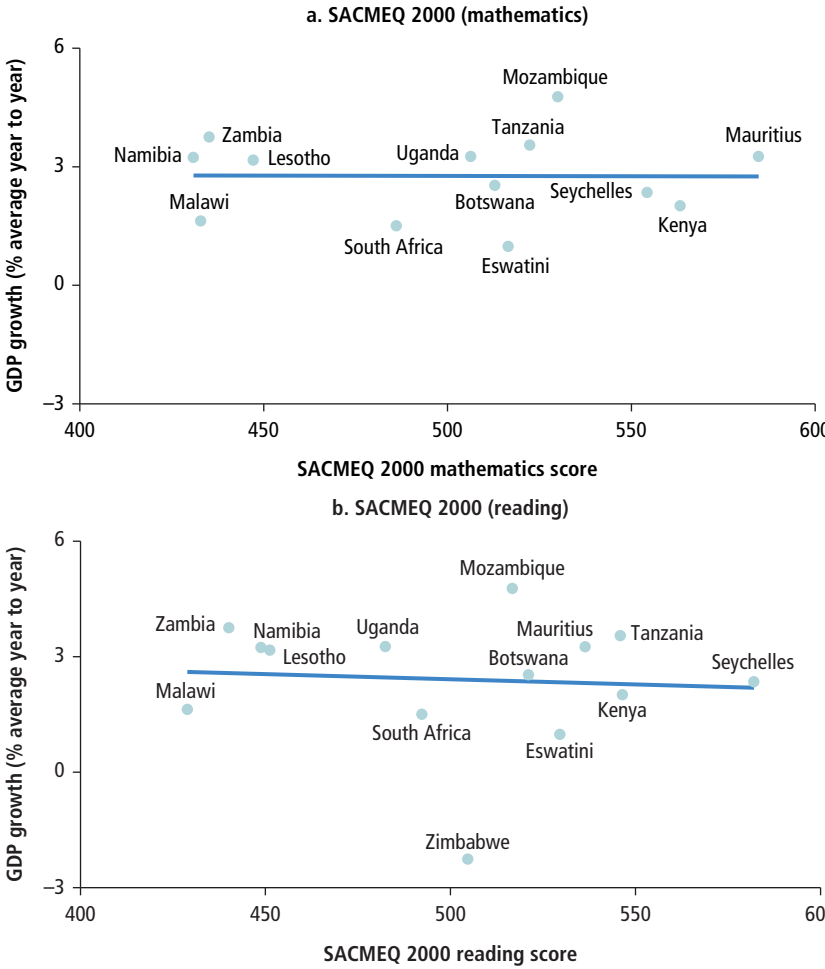
Sub-Saharan African countries reaped fewer returns from their investments in education quantity (schooling) and quality (learning) than did non-African countries before the 1990s, as demonstrated from a reanalysis of data from three studies (Glewwe, Maiga, and Zheng 2014). In the first reanalysis (of Mankiw, Romer, and Weil 1992), the region's significantly lower growth in gross domestic product (GDP) per worker from 1960 to 1985 was entirely explained by its lower investment in schooling. In the second reanalysis (of Barro and Sala-i-Martin 2004), male secondary schooling in Sub-Saharan Africa as of 1960 was unrelated to GDP per capita growth from 1965 to 1995. And in the third reanalysis (of Hanushek and Woessmann 2008), educational quality as measured by test scores entirely explains Africa's lower GDP growth per capita from 1990 to 1996. But the internationally comparable test scores used in that analysis were available for only three Sub-Saharan African countries before 1990.

Since the mid-1990s, the region's countries have expanded their education systems enormously, increasing the average schooling of their labor forces substantially, as shown in chapter 1. In addition, the number of Sub-Saharan African countries that have participated in international and regional large-scale assessments increased from 3 countries in the 1990s to 25 countries during 2010–15, providing cross-nationally comparable test scores indicative of these countries' knowledge capital (Lockheed 2015).[1]

Within Sub-Saharan Africa, however, there is little association between a country's knowledge capital and its subsequent economic growth, although the evidence is limited. Cross-nationally comparable learning data before 2013 are available only for 15 education systems[2] in Southern and East Africa, and not at all for some of the fastest-growing economies. Economic growth in some countries has been affected by external shocks, such as sanctions and conflict; by discoveries of natural resources, such as natural gas, and the growth of extractive industries; and by donor funding.

Average mathematics and reading scores on the 2000 regional comparative learning assessment—Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) II—appear unrelated to economic growth from 2000 to 2015 (figure 2.2).[3] In some extreme cases, countries with similar "knowledge capital" as measured in 2000 differed widely from each other in terms of GDP per capita growth over the ensuing 15 years.

Figure 2.2 SACMEQ II (2000) Scores and Growth of GDP Per Capita, Sub-Saharan African Countries, 2000–15



Sources: Based on SACMEQ II (2000); and World Bank data.
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Educational Quality. Countries shown are those that participated in the SACMEQ II assessments of sixth-grade students in 2000. Tanzania refers to Tanzania's mainland (not shown is the semiautonomous Tanzanian archipelago of Zanzibar, which has a separate education system). Zimbabwe did not report mathematics scores in 2000.

The Knowledge Capital of Sub-Saharan Africa in International Context

One explanation for the weak association between educational quality and economic growth in Sub-Saharan Africa is the low average level of learning observed across the region. All the available evidence indicates that these countries have been successful in expanding their education systems but less successful in building the levels of learning needed to drive growing, vibrant economies, although signs of improvement have been seen, largely from country-specific national assessments.

This section reviews the evidence regarding the knowledge capital in Sub-Saharan Africa, drawing on evidence from learning assessments of adults; for students in lower-secondary, upper-primary, and lower-primary grades; from international and regional large-scale assessments; and from foundational literacy and numeracy assessments (briefly described in box 2.1). The data from the large-scale international and regional assessments typically come from two-stage, stratified cluster samples of schools (typically around 150 schools) and students (typically around 4,500 students) in each country. Where appropriate, the differences between countries in Groups 1–4 (as described in chapter 1 and summarized in figure 2.3) are noted.

Across all countries for which data are available, the evidence shows that many individuals do not reach a minimum level of learning, as defined by the various assessments. Countries in Group 1 typically have higher average performance levels than countries in other groups, and there is modest evidence of some improvement over time.

Figure 2.3 shows the share of individuals assessed in each country whose mathematics, reading, or science performance reached a minimum level, as defined by various assessments.[4] Students in countries where the language of the test and of instruction is a national language—for example, Kirundi in Burundi, Kiswahili in Tanzania, and regional languages in Ethiopia—outperform students in countries where the language of the test is an international language, such as French or English. The next subsections describe the results from these assessments in detail, beginning with adults and ending with the early primary grades; where available, evidence of learning improvements over time is given.

Adult and Young Adult Reading Skills

The adult knowledge capital in a sample of low- and middle-income countries has recently been assessed using the World Bank's Skills Toward Employment and Productivity (STEP) surveys. The STEP reading proficiency tests measure the diversity and complexity of tasks encountered by adults in daily life and assess the cognitive operations required for these tasks (Pierre et al. 2014).

BOX 2.1

Cross-Nationally Comparable Learning Assessments in Sub-Saharan Africa

Internationally Comparable Assessments

- TIMSS (2003, 2007, 2011, 2015)—fourth- and eighth-grade mathematics and science: Botswana, Ghana, South Africa
- TIMSS numeracy (2015)—fourth-grade mathematics: South Africa
- PIRLS (2011)—fourth-grade reading: Botswana, South Africa
- prePIRLS (2011)—fourth-grade reading: Botswana, South Africa
- PISA Plus (2010 only)—15-year-old students, reading and mathematics: Mauritius
- PISA for Development (in progress)—15-year-old students, reading and mathematics: Senegal, Tanzania, Zambia
- STEP (comparable with PIAAC)—adult reading proficiency: Ghana, Kenya

Regionally Comparable Assessments

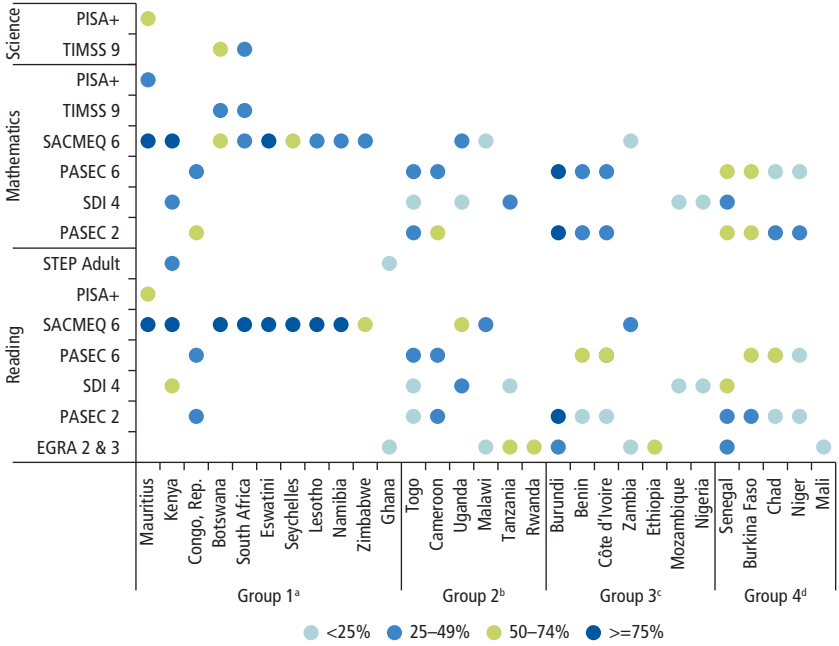
- PASEC (2014 only)—late primary (sixth grade) and early primary (second grade) reading and mathematics: 10 francophone countries
- SACMEQ (2000, 2007, 2013)—sixth-grade reading and mathematics: 15 education systems in Southern and East Africa
- SDI—fourth-grade individually administered literacy and numeracy: 10 countries

Assessments Somewhat Comparable Internationally or Regionally

- EGRA—basic prereading competencies and reading comprehension: 20 countries
- EGMA—basic numeracy
- Uwezo—basic literacy: Kenya, Tanzania, Uganda

Note: EGMA = Early Grade Mathematics Assessment; EGRA = Early Grade Reading Assessment; PASEC = Programme d'analyse des systèmes éducatif de la CONFEMEN; PIAAC = Programme for the International Assessment of Adult Competencies; PIRLS = Progress in International Reading Literacy Study (prePIRLS [now known as PIRLS Literacy] being oriented toward the more basic elements of reading at the end of the primary cycle); PISA = Programme for International Student Assessment; SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality; SDI = Service Delivery Indicators; STEP = Skills Toward Employment and Productivity; TIMSS = Trends in International Mathematics and Science Study.

Figure 2.3 **Percentage of Test Takers Reaching Minimum Performance on Recent Mathematics, Reading, and Science Assessments in Sub-Saharan Africa, by Country and Group**

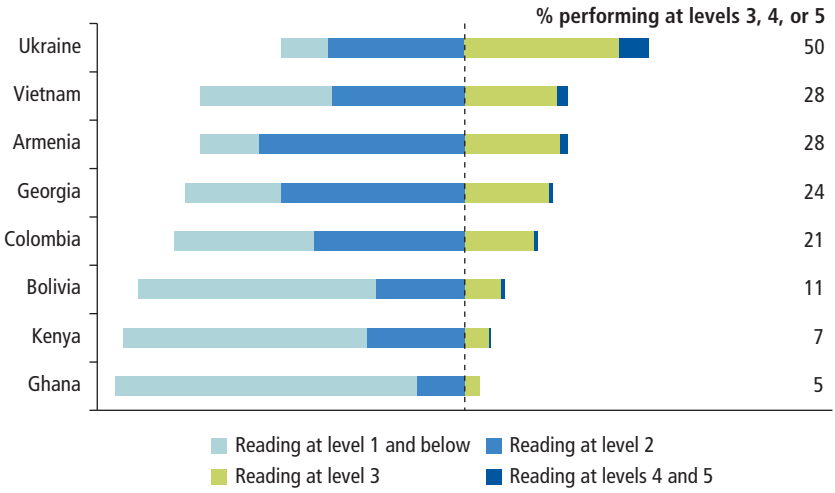


Sources: Compiled from Early Grade Reading Assessment (EGRA) World Bank EdStats database (accessed January 4, 2017), http://datatopics.worldbank.org/education/; Bold et al. 2017; Martin et al. 2016; MOEST 2017; Mullis et al. 2016; PASEC 2015; Valerio et al. 2016; Walker 2011.
Note: The 96 "dots" in this figure summarize the results of seven assessments covering three subjects (reading, mathematics, and science) across several grades and age groups: EGRA in grades two and three for reading; PASEC (Programme d'analyse des systèmes éducatif de la CONFEMEN) in grades two and six for mathematics and reading; SDI (Service Delivery Indicators) in grade four for reading; SACMEQ (Southern and Eastern Africa Consortium for Monitoring Educational Quality) IV in grade six for mathematics and reading; TIMSS (Trends in International Mathematics and Science Study) 2015 in grade nine for mathematics and science; PISA (Programme for International Student Assessment) 2009 Plus for 15-year-old students in mathematics, reading, and science; and STEP (Skills Towards Employability and Productivity) survey of urban adults aged 15–64 years for reading literacy. Countries are presented in descending order within each group, based on the number of assessments each country has participated in. Each dot represents a country's performance (by color) in one assessment: for example, dark blue indicates that at least 75 percent of test takers reached minimum proficiency on that assessment, while light blue indicates that less than 25 percent reached that level.
a. "Established" countries (Group 1) are characterized by high gross enrollment ratios (GERs) in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. "Emerged" countries (Group 2) are characterized by high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. "Emerging" countries (Group 3) are characterized by low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. "Delayed" countries (Group 4) are characterized by low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

The average reading proficiency levels of urban working adults ages 25–64 in the two Sub-Saharan African countries for which STEP results are available (Ghana and Kenya) are lower than those of national samples of same-age working adults in six of the other seven low- and middle-income countries surveyed (Valerio et al. 2016), as shown in figure 2.4. Eighty-two percent of these workers in Ghana and 65 percent of workers in Kenya performed at level 1 or below on the STEP reading proficiency test, indicating very rudimentary reading skills. Across all the low- and middle-income STEP countries, reading proficiency levels averaged more than 1 standard deviation below the reading proficiency levels of countries participating in the Organisation for Economic Co-operation and Development's (OECD) Program for the International Assessment of Adult Competencies (PIAAC), which uses a comparable test. (For the PIAAC/STEP proficiency scale, see on-line appendix B.1, table B.1.1.)

Self-reports of literacy among youths and young adults are generally positive, by comparison. Analyses of household surveys show that, among 25 of the 35 countries for which data are available, 70 percent or more of youths ages 15–19 report that they can read and write (as shown in online appendix B.2). Self-reported literacy rates for youths are generally higher in the Group 1 and 2 countries than in Group 3 and 4 countries, although each group shows considerable variation among countries, and low rates of self-reported literacy are found in all groups.

Figure 2.4 Reading Proficiency of Adults in Ghana and Kenya Relative to Other Selected Low- and Middle-Income Countries, 2014



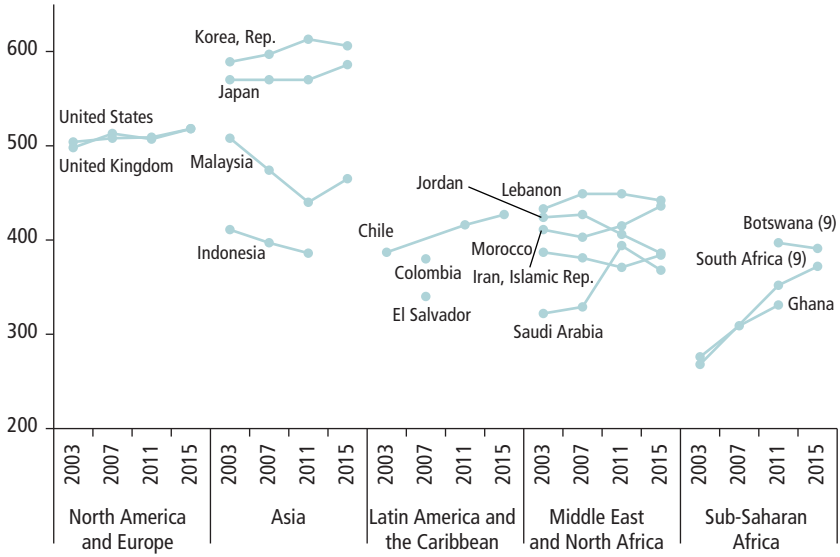
Source: Analysis of microdata from World Bank Skills Toward Employment and Productivity (STEP) household surveys.
Note: STEP 2014 assessed the reading proficiency of urban working adults ages 25–64. Numbers shown to the right of each bar are the percentages of respondents reading at STEP levels 3, 4, or 5.

Lower-Secondary Mathematics and Science Knowledge and Skills

Recent measures of lower-secondary (grades 7–9) learning that are comparable cross-nationally are rare in Sub-Saharan African countries and are available for mathematics and science in three countries only: Botswana, Ghana, and South Africa. Botswana and South Africa participated in the Trends in International Mathematics and Science Study (TIMSS) in 2011 and 2015, and Ghana participated in TIMSS 2011 only. Students in these three countries performed substantially less well than students in other countries and regions. The average TIMSS mathematics and science scores of students in all three participating countries fell 1–2 standard deviations below the international TIMSS scale center points of 500—well below the scores of eighth-grade students in the other low- and middle-income countries and several standard deviations below the scores of students in high-income countries (figure 2.5 for mathematics). This is the case even when students in the Sub-Saharan African countries were tested in grades that were higher than the target grades.[5]

Some score improvements from 2003 to 2015 can be seen for ninth-grade students in South Africa (South Africa did not participate in TIMSS 2007) and from 2003 to 2011 for eighth-grade students in Ghana (Ghana did not participate in TIMSS 2015). Scores in South Africa increased by approximately 20 scale

Figure 2.5 Lower-Secondary (Grade Eight) TIMSS Mathematics Scores in Selected Countries, by Region, 2003–15



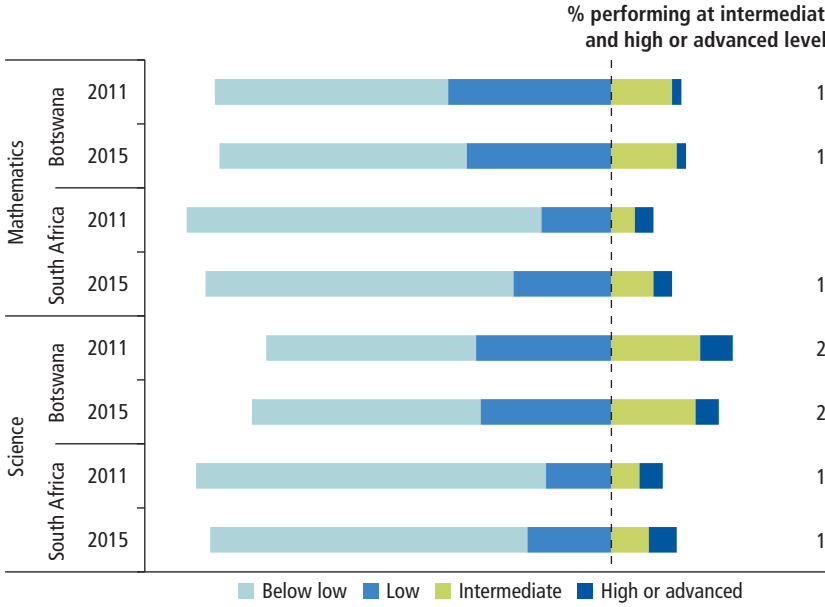
Sources: Constructed from Mullis et al. 2016; Mullis, Martin, and Foy 2008; Mullis, Martin, Foy, and Arora 2012; Mullis, Martin, Gonzalez, and Chrostowski 2004; Reddy 2006; Reddy et al. 2016.
Note: TIMSS = Trends in International Mathematics and Science Study. In Botswana and South Africa, ninth-grade students were assessed, as indicated in parentheses.

points between 2011 and 2015 in both mathematics and science, a statistically significant increase. Scores in Botswana did not change meaningfully over time.

Regarding the TIMSS performance levels, a high share of students scored below the low international performance benchmark for eighth-grade students—that is, students have some basic mathematical knowledge, can add and subtract whole numbers, and recognize parallel and perpendicular lines and familiar geometric shapes (figure 2.6). Few students (about 5 percent) in Botswana or South Africa reached the high or advanced international benchmarks for lower-secondary mathematics or science in 2015, which were basically unchanged from 2011.[6]

In Botswana, the percentage of students performing at low and intermediate international benchmark levels in mathematics remained about the same over time, but the percentage reaching those benchmarks in science declined. In South Africa, however, performance levels improved significantly between 2011 and 2015. Much of the improvement in mathematics and science scores came from improvements at the lower end of the performance distribution. A much higher percentage of ninth-grade students reached the low performance

Figure 2.6 Percentage of Grade Nine Students in Botswana and South Africa Performing at Mathematics and Science Performance Levels, TIMSS 2011 and 2015



Sources: Constructed from Martin et al. 2012, 2016; Mullis et al. 2016; Mullis, Martin, Foy, and Arora 2012.
Note: TIMSS = Trends in International Mathematics and Science Study. Numbers shown to the right of each bar are the percentages of students reaching the TIMSS intermediate, high, or advanced thresholds.

benchmarks in 2015 (34 percent for mathematics and 32 percent in science) than in 2011 (24 percent for mathematics and 25 percent for science). This was accompanied by a sharp drop in the percentage of students whose performance was below the low benchmark: in mathematics, from 76 percent in 2011 to 66 percent in 2015; and in science, from 75 percent in 2011 to 68 percent in 2015 (Martin et al. 2016; Mullis et al. 2016). This positive result suggests that attention has been paid to those at the lower end of the performance ladder. In addition, the share of students reaching high and advanced international benchmarks increased from 9 percent to 13 percent in mathematics and from 11 percent to 13 percent in science.

No Sub-Saharan African countries to date have participated in the Programme for International Student Assessment (PISA), which assesses the reading, mathematics, and science performance of 15-year-old students, although Mauritius participated in the PISA Plus assessment of competencies of 15-year-olds in 2010 (Walker 2011).[7] Average scores of 15-year-olds in Mauritius indicated that over half of the students attained baseline proficiency in reading literacy, mathematical literacy, and scientific literacy; scores were generally equivalent to the lowest-performing OECD countries but were higher than in other low- and middle-income countries participating in PISA Plus. Senegal and Zambia are participating in the pilot PISA for Development project, also for 15-year-olds.[8] Many countries have national assessments at the lower-secondary level, but scores on these assessments are not comparable cross-nationally.

Upper-Primary Reading and Mathematics Knowledge and Skills

Four international assessment programs all show that upper-primary students (grades four to six) in Sub-Saharan Africa remain challenged by foundational literacy and numeracy tasks. These programs include two large-scale international assessments that were designed by and for Sub-Saharan Africa countries: Programme d'analyse des systèmes éducatif de la CONFEMEN (PASEC) and SACMEQ. In addition, 3 Sub-Saharan African countries have participated in the Progress in Reading Literacy Study (PIRLS and prePIRLS), and 10 countries in Sub-Saharan Africa have reported results from a World Bank regional initiative, the Service Delivery Indicators (SDI) survey. All tests are administered in the language of instruction in the participating countries.

Francophone Africa

Ten francophone countries in Sub-Saharan Africa participated in PASEC 2014, the first PASEC assessment to yield fully cross-nationally comparable results. Among the PASEC participating countries, none was in Group 1 ("Established" countries, as defined in chapter 1 and summarized in figure 2.3), two were in Group 2 ("Emerged" countries), four were in Group 3 ("Emerging" countries), and four were in Group 4 ("Delayed" countries). Regarding country classification

by the extent of education challenges faced in the 1990s—a measure to help assess the countries' progress over the past 15 years (also further discussed in chapter 1)—four PASEC countries had faced "many" challenges, six had faced "some" challenges, and only one had faced "few" challenges in the 1990s.

The average sixth-grade PASEC scores on reading and mathematics in the 10 participating countries clustered around the scale mean of 500 points, with lower performance in Niger on both reading and mathematics assessments and higher scores for mathematics in Burundi.

The PASEC literacy and numeracy assessments of grade six students categorize performance in terms of a different set of competency levels (PASEC 2015). The literacy assessment comprises four levels; students whose performance reaches Level 3 are considered to have "sufficient competence" for upper-primary reading.[9] On average, 42 percent of grade six students reach this competence level and can read literary passages, texts, and documents; students below this level "risk facing difficulties in lower-secondary school where reading plays a central role in the learning process" (PASEC 2015, 48).

The mathematics assessment comprises three levels; students whose performance reaches Level 2 are considered to have "sufficient competence" for upper-primary mathematics. On average, 41 percent of grade six students tested in PASEC reached "sufficient competency" in mathematics, and students below this level have difficulty telling time and carrying out arithmetic operations—an exception being Burundi, where 87 percent of students reached "sufficient competency" (figure 2.7). The PASEC assessment indicates that close to 60 percent of students reaching the end of primary school (in other words, those who have not dropped out from primary school) lack the literacy and numeracy skills for a successful transition to lower-secondary school. (For descriptions of the PASEC performance levels, see online appendix B.1, table B.1.2.)

Southern and Eastern Africa

SACMEQ, a consortium of 15 education systems in Southern and East Africa,[10] has surveyed student learning achievement at the primary level (grade six) periodically since 1993. Fourteen education systems participated in SACMEQ II in 2000, 15 participated in SACMEQ III in 2007, and 14 participated in SACMEQ IV in 2013. Among the participating countries or education systems, over half are among the Group 1 countries, four are among Group 2 countries, only two are among the Group 3 countries, and none is a Group 4 country; two participating education systems are not classified (the Seychelles and Zanzibar). The challenges facing these countries in the 1990s differed broadly, but the 15 education systems were evenly split across the three categories of challenges: few, some, or many. Both scale scores and performance levels are reported.

The average SACMEQ mathematics scores for these countries generally increased from 2000 to 2013 (figure 2.8). Average math scores increased steeply,

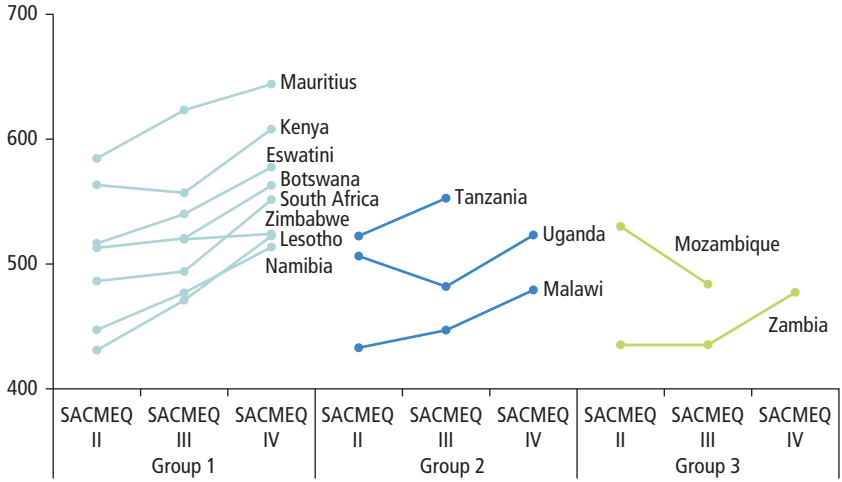
Figure 2.7 **Percentage of Grade Six Students Performing at PASEC 2014 Reading and Mathematics Competency Levels in 10 Sub-Saharan African Countries, by Group**

Source: Constructed from PASEC 2015.
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). For definitions of country groups, see chapter 1 or notes to figure 2.3.

by as much as 0.50 standard deviation in many countries, between 2007 and 2013 (MOEST 2017). (For details, see online appendix B.3.) Countries in all groups showed improvement between 2007 and 2013, although countries in Group 1 achieved higher scores, on average, than countries in Groups 2 and 3.

In principle, the scores from the three rounds of SACMEQ are comparable and can therefore accurately measure improvement over time, although this has

Figure 2.8 **Average SAQMEC Mathematics Scores of Grade Six Students in Participating Southern and East African Countries, by Group, 2000–13**



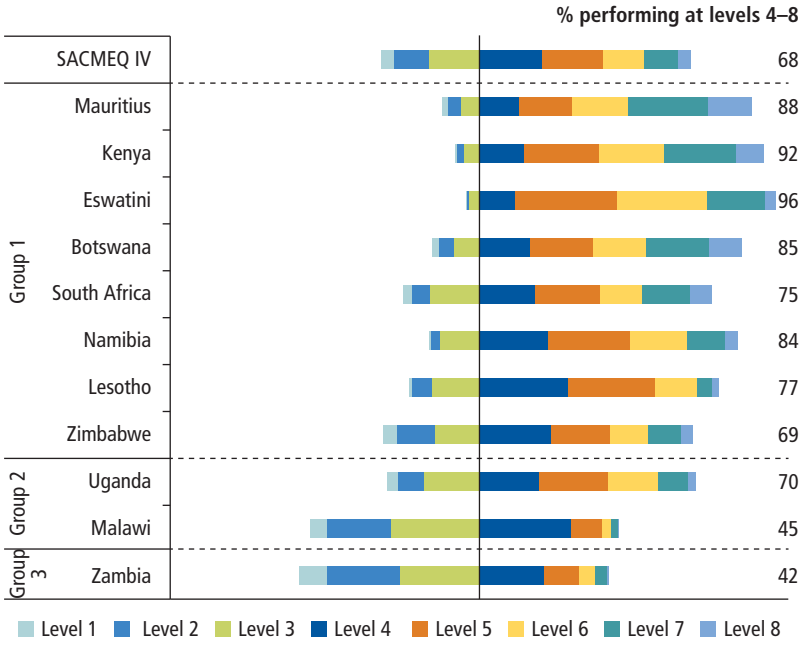
Sources: Constructed from Bethell 2016; MOEST 2017.
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Educational Quality, which measured sixth-grade mathematics proficiency in 2000 (SACMEQ II), 2007 (SACMEQ III), and 2013 (SACMEQ IV). No SACMEQ IV data were reported for Mozambique or Tanzania. For definitions of country groups, see chapter 1 and notes to figure 2.3; no Group 4 countries participated in SACMEQ.

been called into question (Bethell 2016; Spaull 2012). The improvements in sixth-grade SACMEQ mathematics tests are much larger in Botswana than the improvements in eighth- and ninth-grade TIMSS mathematics tests in the same country. In Botswana, average SACMEQ mathematics scale scores increased by more than 50 percent of 1 standard deviation between 2007 and 2014, whereas TIMSS mathematics scores decreased slightly (by less than 10 percent of the scale score standard deviation) between 2011 and 2015. In South Africa, however, improvements in average SACMEQ mathematics scores were about the same (60 percent of a scale score standard deviation) as the TIMSS increase (about 50 percent of the scale score standard deviation). Differences in the grades assessed could account for some of these differences in trends.

The most recent SACMEQ survey, SACMEQ IV of 2013, reports eight levels of performance for both reading and mathematics (for details, see online appendix B.1, table B.1.3). Levels 1–3 are considered "prereading/prenumeracy," "emergent reading/emergent numeracy," and "basic reading/basic numeracy," respectively; Level 4 is "reading for meaning" and "beginning numeracy"; and levels 5–8 reflect correspondingly greater competence in each domain.

On average, across all participating countries, 68 percent of sixth-grade students were reading higher than Level 3. In the Group 1 countries, however,

Figure 2.9 **Percentage of Grade Six Students Performing at SACMEQ IV (2013) Reading Performance Levels in 11 Southern and East African Countries, by Group**



Source: Constructed from KNEC 2017.
Note: Performance levels are based on Southern and Eastern Africa Consortium for Monitoring Education Quality study no. 4 (SACMEQ IV), administered in 2013. Numbers shown to the right of each bar are the percentages of students reading at levels 4, 5, 6, 7, and 8. For definitions of country groups, see chapter 1 or notes to figure 2.3; no Group 4 countries participated in SACMEQ.

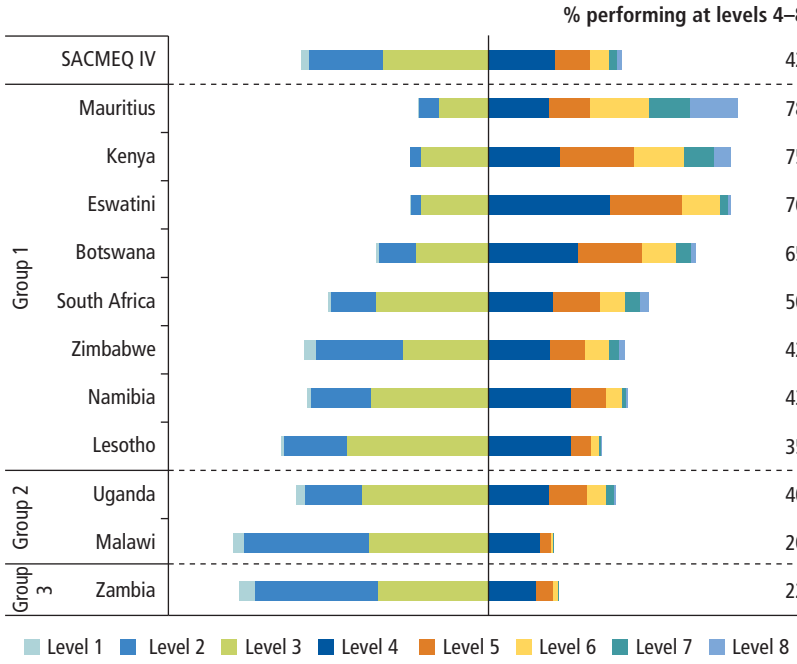
significantly more students were reading at higher levels, and fewer were reading at lower levels (figure 2.9). Across all participating countries, only 28 percent of sixth-grade students were reading at levels 6–8, compared with more than 50 percent of students in the Group 1 countries of Eswatini, Kenya, Mauritius, and the Seychelles.

In mathematics, across all participating countries, 42 percent of sixth-grade students performed mathematics tasks at Levels 4 and above. Among the Group 1 countries, this share was much higher in Eswatini, Kenya, Mauritius, and the Seychelles (figure 2.10). And across all participating countries, less than 10 percent of students performed at Levels 6–8 in mathematics; this share was much higher in several of the Group 1 countries.

The International Context

At the upper-primary level, few Sub-Saharan African countries have participated in international assessments such as TIMSS or the Progress in Reading

Figure 2.10 **Percentage of Grade Six Students Performing at SACMEQ IV (2013) Mathematics Performance Levels in 11 Southern and East African Countries, by Group**



Source: Constructed from KNEC 2017.
Note: Performance levels are based on Southern and Eastern Africa Consortium for Monitoring Education Quality study no. 4 (SACMEQ IV), administered in 2013. Numbers shown to the right of each bar are the percentages of students performing at levels 4, 5, 6, 7, and 8. For definitions of country groups, see chapter 1 or notes to figure 2.3; no Group 4 countries participated in SACMEQ.

Literacy Study (PIRLS, including prePIRLS, which is a less difficult version of the PIRLS assessment). PIRLS assesses fourth-grade reading proficiency, and TIMSS assesses fourth-grade students' performance in various domains of mathematics and science.

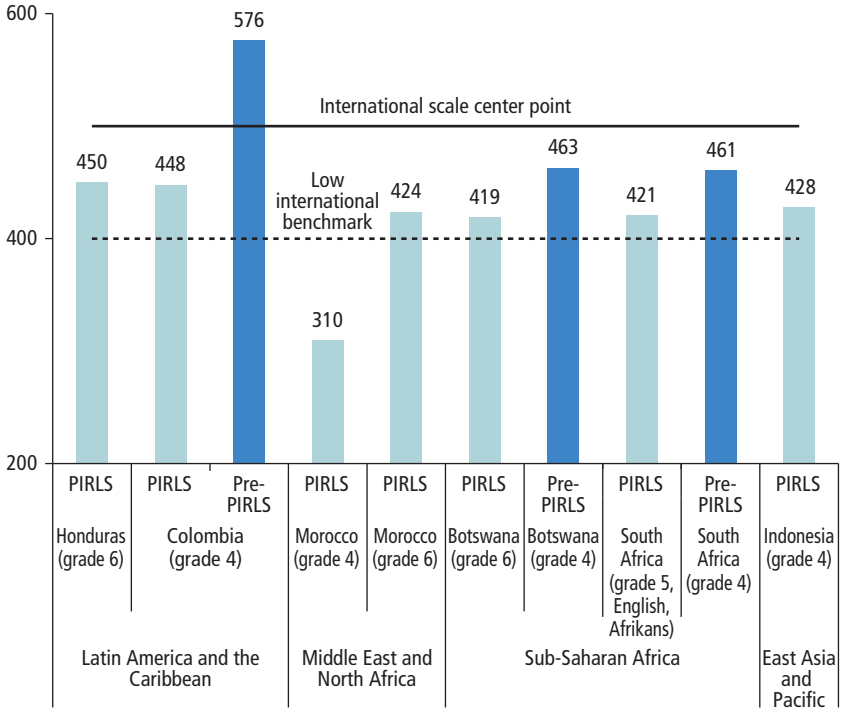
Botswana and South Africa, both Group 1 countries, participated in both recent international assessments for primary grades. Grade five students in South Africa participated in the fourth-grade PIRLS 2011 and TIMSS 2015 mathematics assessments. Grade six students in Botswana participated in the fourth-grade PIRLS 2011 and TIMSS 2011 mathematics and science assessments. In South Africa, the PIRLS sample included only students receiving instruction in English or Afrikaans.[11] In addition, grade four students in Botswana and South Africa participated in prePIRLS 2011.[12]

Students in both countries scored well below the international scale center points of 500 in reading literacy, science, and mathematics.[13] Much of the

dramatic difference between the average performance of these two countries and that of other countries participating in the assessments can be attributed to sharp demographic differences (for example, the shares of rural students or of students with reading materials at home).

For reading, students in the two Sub-Saharan African countries that participated in PIRLS scored below the international scale center point but above the low international benchmark for reading literary and informational texts, indicating that the students could locate and retrieve explicitly stated detail and could locate and reproduce explicitly stated information appearing at the beginning of the text but not further within the text (figure 2.11). Sixth-grade students in Botswana and fifth-grade students in South Africa who took the PIRLS fourth-grade reading assessment performed better than fourth graders in

Figure 2.11 Average Reading Scores on Grade Four PIRLS and prePIRLS Assessments, Botswana and South Africa Relative to Selected Other Countries, 2011



Source: Constructed from Mullis, Martin, Foy, and Drucker 2012.
Note: PIRLS = Progress in International Reading Literacy Study; "prePIRLS" (designated by orange bars) refers to a less-difficult version of PIRLS, first administered in 2011 to enable low- and middle-income countries to better assess student ability at the end of the primary school cycle. Although the two assessments use a scale of 0–1,000, scores on the two assessments should not be directly compared.

Morocco, comparably to sixth graders in Morocco and fourth graders in Indonesia, and less well than sixth graders in Honduras and fourth graders in Colombia. Fourth-grade students in Botswana and South Africa who took the less difficult prePIRLS assessment scored more than 1 standard deviation below the fourth-grade students in Colombia on the same test.

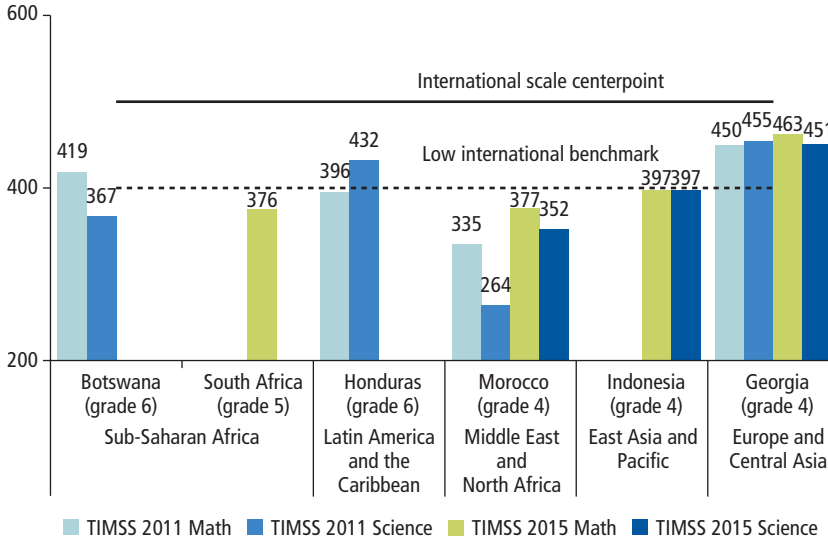
On the fourth-grade TIMSS mathematics and science assessments, fifth-grade students in Botswana (TIMSS 2011) and sixth-grade students in South Africa (TIMSS 2015) scored below the international scale center points for fourth graders. In mathematics, sixth-grade students in Botswana scored much higher than fourth-grade students in Morocco, higher than their counterparts in Honduras, and above the performance of fourth graders in Indonesia (TIMSS 2015), but below fourth graders in Georgia. Fifth grade students in South Africa (TIMSS 2015) scored about the same as fourth graders in Morocco, below the performance of sixth graders in Honduras (TIMSS 2011), and below the performance of fourth graders in Indonesia and Georgia. In science (TIMSS 2011), sixth-grade students in Botswana scored higher than fourth graders in Morocco and lower than sixth graders in Honduras and fourth graders in Indonesia and Georgia. Neither country participated in the fourth-grade TIMSS 2015 science assessment (figure 2.12).

Although TIMSS and PIRLS were developed to reflect the curricula taught in the participating countries, initially most of these countries were high-income and upper-middle-income economies. This might suggest that these international tests may not reflect the content of the curriculum in the participating lower-income countries. However, in nearly all participating countries, educators reviewed the individual test items and identified those that were typically included in the national curriculum. Overall, the test items were closely aligned with the curricula of most countries, including low- and lower-middle-income countries. For example, experts in Botswana and in South Africa found that close to 100 percent of the test items in TIMSS 2011 covered material included in the national curriculum (Martin et al. 2012; Mullis, Martin, Foy, and Arora 2012). Scores that included all test items were compared with scores that included only items covered in the curriculum; in general, no differences were observed (Martin et al. 2016; Mullis et al. 2016).

Foundational Literacy and Numeracy, Grades Two through Four

Globally, children are expected to move from "learning to read" to "reading to learn" by fourth grade. Yet repeatedly, studies show that children with as many as four years of schooling in Sub-Saharan Africa simply lack the foundational literacy and numeracy skills needed to make this transition. In part, poor reading and numeracy skills reflect home environments where "pre-reading" and "pre-numeracy" skills may not be developed. These include such skills as the

Figure 2.12 **Average Mathematics and Science Scores on Grade Four TIMSS Assessments, Botswana and South Africa Relative to Selected Other Countries, 2011 and 2015**



Sources: Constructed from Martin et al. 2012, 2016; Mullis, Martin, Foy, and Arora 2012; Mullis et al. 2016.
Note: TIMSS = Trends in International Mathematics and Science Survey. The "low international benchmark" is a fourth-grade performance measure indicating that students (a) can add and subtract whole numbers; (b) have some recognition of parallel and perpendicular lines, familiar geometric shapes, and coordinate maps; and (c) can read and complete simple bar graphs and tables.

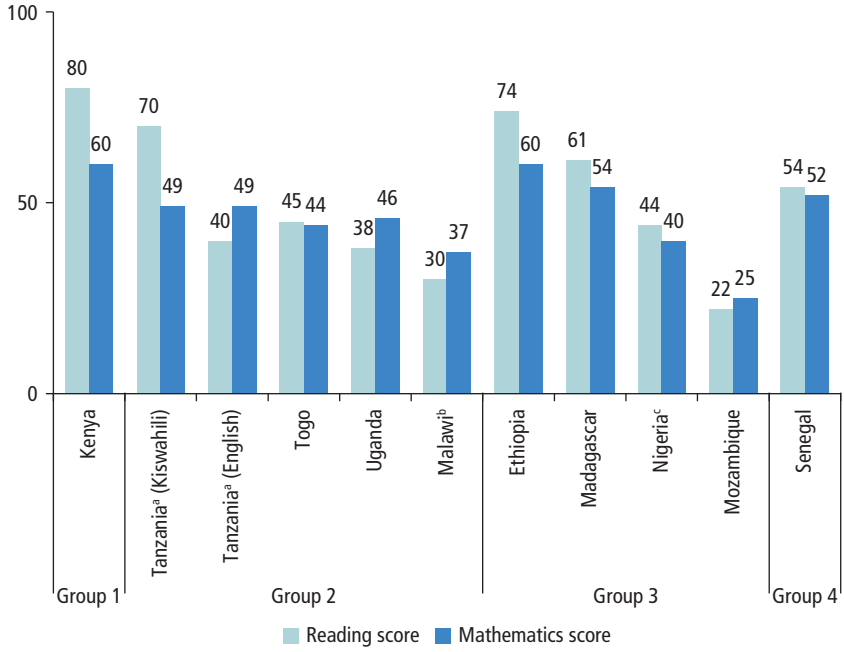
knowledge of writing direction, knowledge of letter names and sounds, and knowledge of numbers.

Pre-reading and pre-numeracy skills are rarely assessed among preschool-age children in Sub-Saharan Africa, and most evidence comes from early-grade reading and numeracy assessments of children in the second and third grades. This section reviews some of this evidence, which shows that a large majority of students in these early grades lack basic literacy and numeracy skills.

Sub-Saharan Africa, Grade Four

By the fourth grade, children in some countries are already far behind in basic reading and mathematics skills, with average test scores below 50 percent in 6 of 10 Sub-Saharan Africa countries participating in recent Service Delivery Indicators (SDI) surveys (figure 2.13).[14] The language tested in Mozambique was Portuguese; in Madagascar, Senegal, and Togo, the language tested was French. In Tanzania, tests were administered in both Kiswahili (average reading

Figure 2.13 Average SDI Reading and Mathematics Scores of Grade Four Students in Sub-Saharan African Countries, by Group



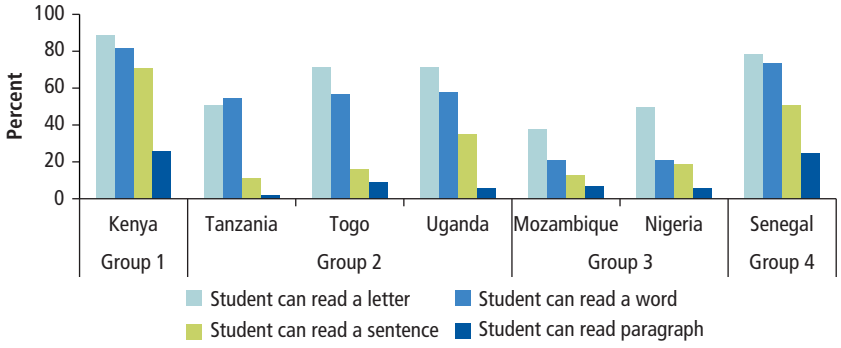
Source: Analysis of microdata from Service Delivery Indicators (SDI) database, http://www.sdindicators.org/.
Note: For descriptions of country groups, see chapter 1 or notes to figure 2.3. Although Niger also participates in the SDI assessment, data for Niger were not available at the time of this analysis.
a. In Tanzania, the reading test was administered in both English and Kiswahili.
b. In Malawi, instructions were read aloud by the enumerators with a written test administered in a class setting; the mathematics test was administered in Chichewa.
c. The SDI survey covered four states in Nigeria.

score: 70 percent correct) and English (average reading score: 40 percent correct). In other countries, the language tested was English. In all countries except Malawi, the test was administered orally, one-on-one.[15]

More detailed analyses for seven of these countries showed serious issues with literacy: nearly 40 percent of fourth-grade students could not read a single letter, 70 percent could not read a sentence, and nearly 90 percent could not read a paragraph (Bold et al. 2017).[16] Considerable variation across countries was observed (figure 2.14).

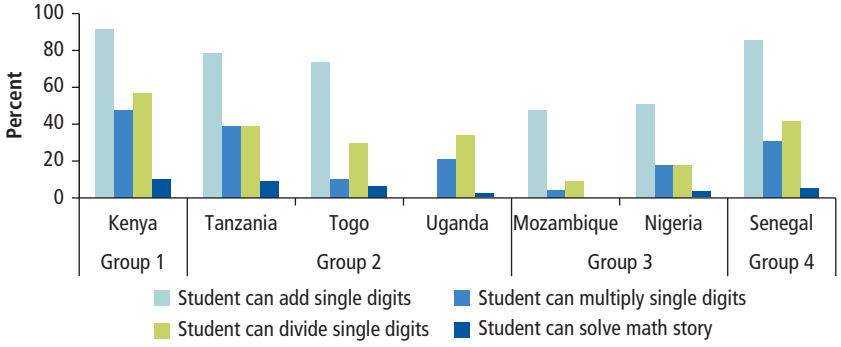
In mathematics, the SDI results were somewhat better, with only about 10 percent of fourth-grade students unable to recognize any numbers and only about one-third unable to perform one-digit addition or subtraction.

Figure 2.14 Percentage of Grade Four Students with Various SDI Reading Skills in Seven Sub-Saharan African Countries, by Group



Source: Constructed from Bold et al. 2017.
Note: SDI = Service Delivery Indicators. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

Figure 2.15 Percentage of Grade Four Students with Various SDI Mathematics Skills in Seven Sub-Saharan African Countries, by Group



Source: Constructed from Bold et al. 2017.
Note: SDI = Service Delivery Indicators. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

However, 95 percent of students could not solve a mathematics word problem, with variation across countries (figure 2.15).

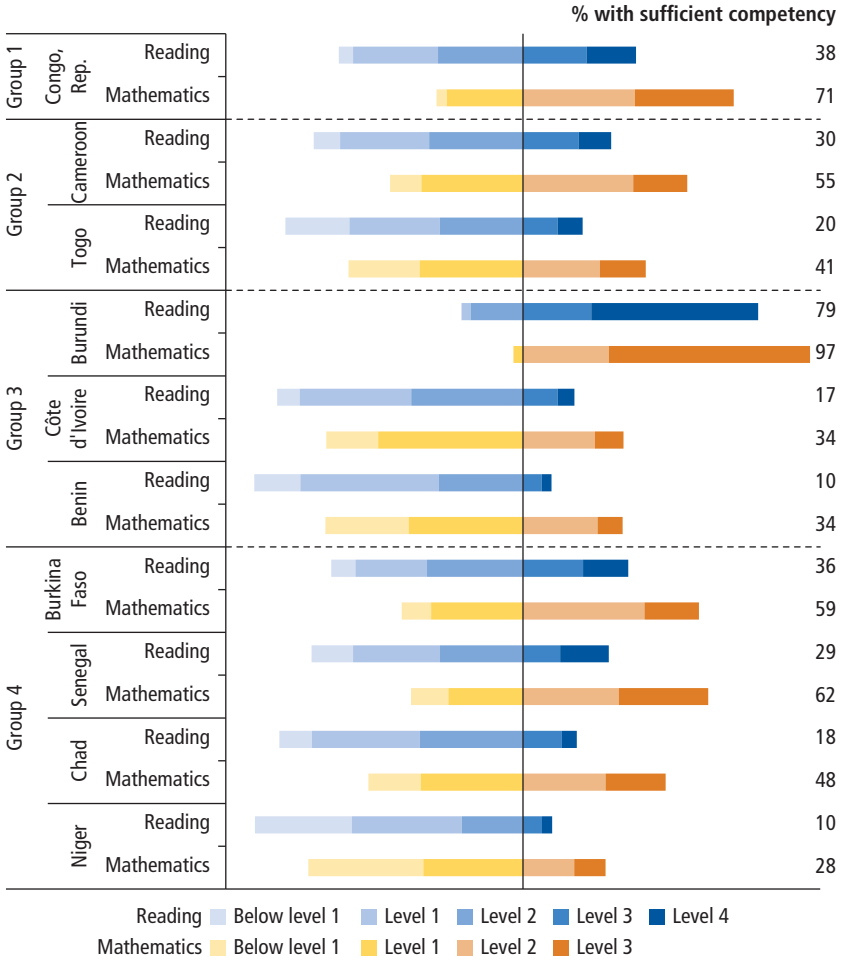
Across the countries participating in SDI, only 11 percent of fourth-grade students could read a paragraph, and only 5 percent could solve a mathematics word problem. Although it is remarkable that students in Senegal (a Group 4 country) appeared to read letters and sentences almost as well as students in Kenya (a Group 1 country), albeit not reading better overall, this is not actually surprising, given Senegal's higher level of out-of-school children and hence greater selectivity.

Francophone Africa, Grade Two

For 10 countries in francophone Africa, the PASEC 2014 grade two assessments demonstrate that literacy and numeracy skills are relatively weak among students in early primary school grades (figure 2.16).

With respect to literacy, many second-grade students lacked basic letter recognition skills and reading comprehension. On average, three-quarters of

Figure 2.16 Percentage of Grade Two Students Performing at PASEC 2014 Reading and Mathematics Competency Levels in 10 Sub-Saharan African Countries, by Group



Source: Constructed from PASEC 2015.
Note: The vertical line designates the level of "sufficient competency" on each assessment. PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). For descriptions of country groups, see chapter 1 or notes to figure 2.3.

second graders had difficulty reading the letters of the alphabet correctly and quickly (that is, more than 20 letters per minute; PASEC 2015). This was not the case in Burundi, where over 60 percent of second-grade students could read more than 20 letters per minute. In some countries, only a small share of students demonstrated this basic literacy skill: Benin (8 percent), Chad (9 percent), and Niger (10 percent). In addition, 26 percent of second-grade students could not read any word, and approximately 40 percent received scores of zero in three countries—Benin (41 percent), Cameroon (40 percent), and Niger (48 percent). In contrast, in Burundi, only 3 percent of second graders received scores of zero. Because of these poor early literacy skills, on average, only about a third of second-grade students reached "sufficient competency" in reading (PASEC 2015).

With respect to numeracy, a similar pattern of performance can be seen. Overall, about half of grade two students reached "sufficient competency" in mathematics, with substantial differences between Burundi and the other countries; in Burundi, 90 percent of second-grade students reached "sufficient competency" in mathematics. One early mathematics skill is oral counting; on average, about one-quarter of students could count beyond 80, whereas in Burundi 63 percent could do so. Another skill is solving a one-digit addition problem; on average, 60 percent of students could do this, but the percentage was higher in Burundi as well as the Republic of Congo: 83 percent.

As these results highlight, Burundi stands out as a notable exception. Box 2.2 describes some of the education policies that have enabled Burundi to achieve these positive learning outcomes.

Literacy in Regional Context, Grades Two and Three

Another initiative, the Early Grade Reading Assessment (EGRA), has tapped basic pre-reading and reading competencies in over 100 languages in 65 countries, including 10 countries in Sub-Saharan Africa (Dubeck and Gove 2015). Because the assessments take place at different times in the participating countries, EGRA is not, strictly speaking, an international assessment, but it confirms the overall conclusions from PASEC.

Recent EGRA assessments show that a high share of second-grade students tested in a national language other than the language spoken at home receive scores of zero on simple literacy assessments; even higher shares receive scores of zero on assessments of reading comprehension (figure 2.17).[17] And many third-grade students also perform at this level.

Students in countries where the language of instruction was a student's "mother tongue," however, performed better, particularly by third grade. In particular, reading comprehension scores of zero were received by only 22 percent of Ethiopian third-grade students tested in Amharic, 27 percent of Burundi third-grade students tested in in Kirundi, and 40 percent of Tanzanian second-grade students tested in Kiswahili.

BOX 2.2

Solving an Enigma: Why Burundi Outperforms Other Sub-Saharan African Countries on Education Assessments

Burundi is among the poorest countries in Sub-Saharan Africa, with high population growth and periodically affected by crises and bouts of violent conflict. Yet it has substantially higher average PASEC scores in reading and mathematics tests in both second and sixth grades—and did relatively better in two rounds of the Early Grade Reading Assessment (EGRA)—than all other Sub-Saharan African countries for which assessment data are available. At grade two, students in Burundi scored over 1 full standard deviation (100 scale points) above the PASEC mean in both reading and mathematics. At grade six, students in Burundi scored one-third of a standard deviation (30 points on the scale) above the PASEC mean in reading, and in mathematics their advantage jumped to a full 1 standard deviation above the sample mean (100 scale points). Girls outperformed boys; rural areas did better than urban areas in mathematics and only marginally worse in reading.

How has Burundi become such a regional exception? This seeming enigma has several explanations. First, Burundi differs from most other countries on one challenge dimension: linguistic diversity. It is among the most linguistically homogeneous countries, with 98 percent of the population speaking a single language, Kirundi. Kirundi is phonetically coded using the Latin script and has stronger written traditions than many African languages. *Notably, since 1973, Kirundi has been the language of instruction from first through fourth grades.*

In addition, a fairly consistent education policy that has favored a "structured pedagogy" approach and has been implemented in practice seems to explain the relatively higher performance of Burundi children. This approach has been supported by the following:

- *Teaching-learning aids produced in Kirundi:* As children master reading and mathematics concepts, they are better able to transfer their skills to French, which is introduced in grade one primarily as an oral language and becomes the language of instruction in grade five. Early-grade instruction in a national language helps both reading and mathematics performance in later grades.
- *High community participation*: School infrastructure has been built with shared government-community contributions in public schools or by religious organizations. The government has concentrated on financing teachers and teaching-learning materials, including in schools that are run by religious organizations.
- *Trained teachers, even in rural areas*: Despite the huge influx of students, resulting from the introduction of free primary education in 2005, the government was able to train and recruit teachers in large numbers. Over 90 percent of primary teachers have undergone two years of teacher training.

(continued next page)

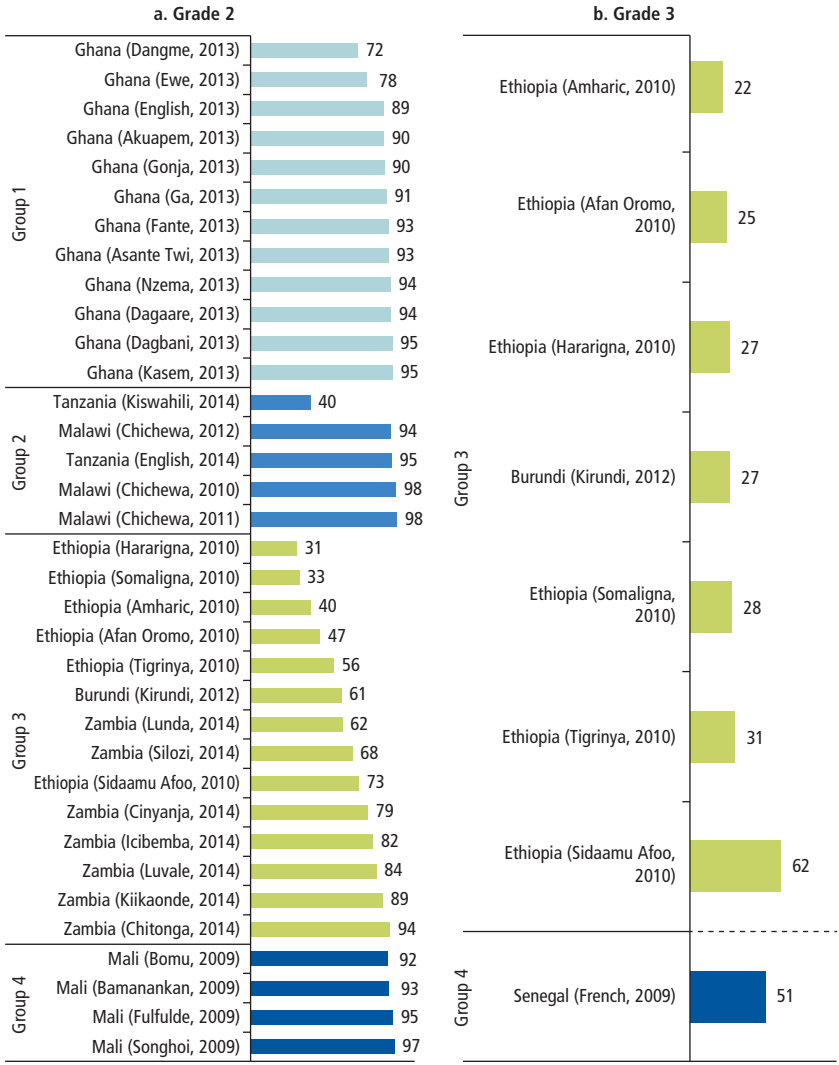
Box 2.2 (continued)

- *Teachers' use of appropriate pedagogical practices and resources in the classroom*: A participative approach is used to teach reading and writing in first and second grades. A whole-word method and pedagogical supports such as posters are used. Reading and writing are done at the same time, in an active manner, using play.
- *Ongoing pedagogical support for teachers*: Coaching from district supervisors and from radio programs or through distance-learning interventions supports teachers. Substitute teachers can be mobilized when teachers are absent.
- *High proportion of women teachers*: In contrast with other Sub-Saharan African countries, over 80 percent of teachers are women, who also make up a large share of school directors.
- *Reduction of class sizes*: Two types of double-shifting are used to reduce class sizes, even though they continue to be large: (a) double-shift use of classrooms with different teachers, and (b) using the same teacher to teach two classes, one after the other, with slightly reduced instructional time.
- *High female literacy*: Close to 75 percent of women ages 15–24 are literate and are keen to educate their children, including girls.

There are still several challenges:

- *High repetition rates:* Some children are held back in grades one and two, and others attend irregularly and enroll in grade one more than once, creating unofficial "hidden repetition."
- *Poor performance of many students:* Ten percent of children in grade two do not master mathematics skills, and 20 percent do not master language skills; 60 percent of grade two students received scores of zero on EGRA reading comprehension tests.
- *Inadequate infrastructure:* Community construction of schools, without improvements in quality, affects the learning environment.
- *Challenging transition to French:* Inadequacies in the teaching of French as a second language lead to inequalities as children progress through the education system.
- *Introduction of a four-language policy:* Kirundi, English, and French are official languages, and Kiswahili is widely spoken. Multiple languages of instruction at the primary level, intended to enable greater integration with the East African community, can destabilize Burundi's achievements.

Figure 2.17 Percentage of Students in Grades Two and Three Receiving EGRA Reading Comprehension Scores of Zero in Selected Sub-Saharan African Countries, by Testing Language and Country Group



Source: Early Grade Reading Assessment (EGRA) World Bank EdStats database (accessed January 4, 2017), http://datatopics.worldbank.org/education/.
Note: After each country name, the language and year in which the test was administered appears within parentheses. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

Summary: Focus on Improving Learning

Knowledge capital—as measured by tests of mathematics, reading, and science—appears to be weaker across the countries of Sub-Saharan Africa than in other regions of the world. However, the TIMSS and SACMEQ assessments provide some evidence that learning in the region has improved over time, particularly from 2007 to 2013. Comparisons between older cohorts of individuals and younger cohorts also suggest improvements in learning. Moreover, countries in Group 1 typically have higher average performance than countries in other groups, but there are exceptions.

This section also shows a consistent pattern of weak performance, beginning in lower-primary grades and continuing through the upper-primary and lower-secondary grades. Weak performance in early-grade literacy and numeracy could explain subsequent weak performance in higher grades—an association explored further in the "Correlates of Learning in Sub-Saharan Africa" section below. The consequences of the region's failure to develop its knowledge capital may be seen in weak overall economic growth.

Equity in the Distribution of Learning in Sub-Saharan Africa

In virtually all contexts, the education of students takes place in classrooms and schools, and the data used to study education are explicitly "multilevel." Variation in student learning—and hence equity in learning—can be examined at each level: among schools, among classrooms in schools, and among students within classrooms within schools (Raudenbush and Willms 1991). In practice, few studies of low- or middle-income countries gather data at all three levels; most gather data about schools and about students "nested" within schools. Teacher data may also be gathered, but it is rarely separable from school-level data. Exceptions include a recent study in Kenya (Ejakait et al. 2016). This section examines equity and inequality at two levels: among schools and among students.

Equity among Schools

An important source of inequality comes from differences among schools, particularly between those serving more advantaged students and those serving less advantaged students. School-level variance in learning as a share of the total variance in learning within a given country is often used as an indicator of school equality, with lower shares indicating greater equality across schools and higher shares indicating greater inequality across schools.

Internationally, the share of school-level variance in fourth-grade learning averaged 22 percent for reading, 26 percent for mathematics, and 25 percent for

science across 32 countries participating in PIRLS 2011 and TIMSS 2011 (Martin et al. 2013). The share of school-level variance is higher at the secondary level. For example, the share of school-level variance in mathematics averaged 37 percent across the 34 OECD countries participating in PISA 2012 (OECD 2014).

Globally, low- and middle-income countries exhibit greater between-school inequality—"academic segregation"—than do high-income countries. This is demonstrated by the share of total variance in student performance that is attributable to school-level variance as opposed to student-level variance. Among the 18 middle-income countries participating in PISA 2012, the share of between-school variance in over half of the countries was more than 10 percentage points higher than among the OECD countries, and in four countries, it was more than 15 percentage points higher (Lockheed, Prokic-Breuer, and Shadrova 2015).

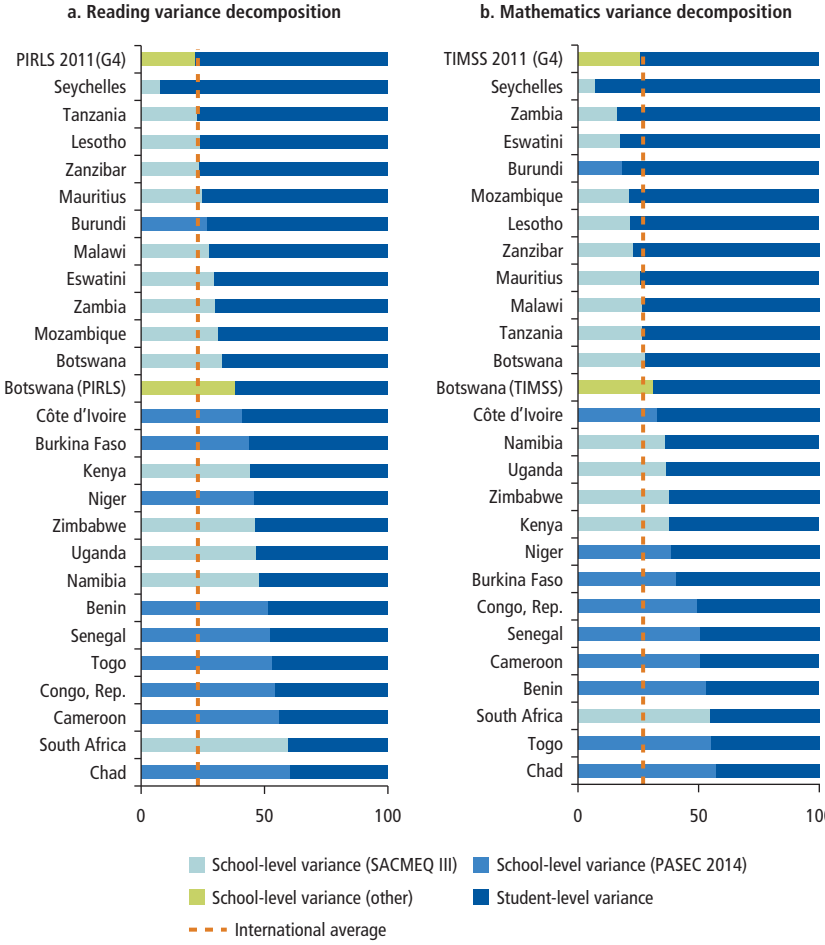
A study of the share of variance attributable to schools across countries participating in TIMSS and PIRLS from 1995 to 2007 also showed that academic segregation was higher among middle-income countries than among high-income countries. It was also higher among eighth-grade students (averaging 31 percent in mathematics) than among fourth-grade students (averaging 27 percent in mathematics and 23 percent in reading for the most recent years) (Zopluoglu 2012).

To what extent are these between-school differences in student performance observable in Sub-Saharan Africa? To answer this question, this section partitions the total variance in student performance into the shares of variance attributable to students versus schools in those countries that participated in either SACMEQ III (2007) or PASEC 2014 in the upper-primary grades (typically fifth or sixth grade). These partitions come from the country-specific "null" models in a multilevel regression. Although these assessments used different tests for reading and mathematics, it is possible to compare the share of total variance due to students and schools, across countries.

Figure 2.18 shows the share of total variance that is attributable to schools compared with the share attributable to students within schools in 25 countries. School-level variance is designated by light blue for countries in Southern and East Africa (for SACMEQ III) and by medium blue for countries in francophone Africa (for PASEC 2014). In addition, the international averages of variance attributable to schools and to students within schools are also shown in the figure, for comparison (from TIMSS 2011 and PIRLS 2011).

Two observations can be made. First, in all but one of the 25 countries (the Seychelles), the share of variance in student reading performance attributable to variation between schools exceeds the international average. In some cases, the between-school share of variance is over 50 percent, or nearly double the international average. For mathematics performance, in about two-thirds of the

Figure 2.18 Variance Decomposition of Grade Six Reading and Mathematics Scores into School-Level and Student-Level Shares in 25 Sub-Saharan African Countries



Sources: Analysis of microdata from PASEC 2014 and TIMSS 2015 (Botswana and South Africa); Hungi 2011.
Note: PASEC = Programme d'analyse des systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ III = Southern and Eastern Africa Consortium for Monitoring Education Quality, third survey (2007); TIMSS = Trends in International Mathematics and Science Study; PIRLS = Progress for International Reading Literacy Study; G4 = grade four. "Other" refers to sixth-grade test results for Botswana participation in 2011 PIRLS (reading) and 2011 TIMSS (mathematics). Figures show the percentage of variance attributable to schools versus students in "empty" multilevel models of mathematics and reading. Empty models do not include any independent variables at either the school or student level. International benchmarks for student-level versus school-level variance in reading (from PIRLS) and in mathematics (from TIMSS) are indicated by orange vertical lines.

countries, the share of between-school variance also exceeds the international average (26 percent). A similar finding came from an analysis of SDI data for five Sub-Saharan Africa countries: Kenya, Mozambique, Nigeria, Togo, and Uganda (Filmer, Molina, and Stacy 2016). Over one-third of the observed variation in fourth-grade students' reading and mathematics test scores was due to variation between schools (one classroom was sampled for each school).

Second, the share of variance attributable to differences between schools is much higher in most francophone African countries than in Southern and East Africa. In half of the 10 francophone countries, the between-school variance exceeds 50 percent of the total variance. In only one francophone country—Burundi—is the between-school variance lower than the international average. By comparison, in many of the Southern and East African countries, the share of the variance between schools is much lower, and in a few cases, it is comparable to international averages. In only one of the Southern and East African countries—South Africa—is more than 50 percent of the variance explained by differences between schools (60 percent in reading and 55 percent in mathematics), possibly owing to the country's legacy of apartheid.

Large between-school variance typically signals inequality in learning environments and opportunities.

Many differences among schools could explain the between-school variance, one of the most important being a single school-level characteristic: the average socioeconomic status (SES) of the students who were assessed in the school. In original analyses carried out for this study, the average SES of students in each primary school explained more than one-third of the between-school variance in the reading or mathematics performance of sixth-grade students, as assessed through PASEC 2014 in 10 countries (figure 2.19).

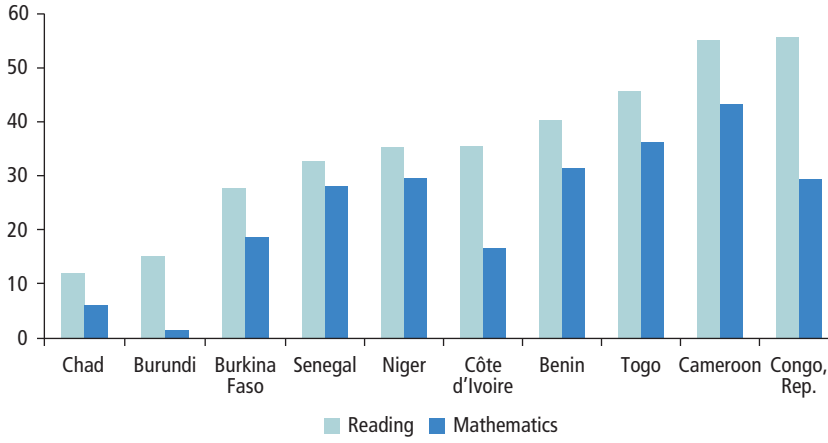
At the lower-secondary level, the share of between-school variance was much higher. In Botswana and South Africa, 71 percent and 59 percent, respectively, of the between-school variance in TIMSS 2015 mathematics scores was explained by the school's average SES.[18]

The implications—at the primary level—are that schools serving disadvantaged students are also low-performing schools, and that the education systems may not be providing either good-quality services to disadvantaged students or additional services designed to compensate for disadvantage. At the secondary level, some student placement policies, based on students' past performance, may account for the large between-school differences.

Equity among Students

One explanation for the lower student performance in Sub-Saharan Africa than in other regions is the broad difference in the population demographics, particularly household income and students' home language. More students in Sub-Saharan African countries come from homes with few resources for

Figure 2.19 Percentage of Between-School Variance in Grade Six Reading and Mathematics Performance Attributable to Average Socioeconomic Status of Students, Francophone African Countries, 2014



Source: Analysis of microdata from PASEC 2014.
Note: PASEC = Programme d'analyse des systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries).

learning and live in very small communities, both of which are correlated with lower levels of learning in all countries. Students from disadvantaged households perform less well than those from more advantaged households. And students living in very small towns or communities perform less well than those living in larger towns or cities.

Internationally, students who do not speak the language of assessment at home perform less well on tests than do students who are tested in their home language. In Sub-Saharan Africa, high shares of children come to school not familiar with the language of instruction and therefore perform less well on all types of assessments than those who speak the language of instruction at home.

As for gender, few performance differences between girls and boys are observed internationally at the primary and lower-secondary levels. In Sub-Saharan Africa, girls often outperform boys, but gender differences vary by region (Southern and East Africa versus francophone Africa) and assessment. In Southern and East Africa, girls outperformed boys in reading, and gender differences in mathematics were minimal. In francophone Africa, gender differences in reading were small, but boys outperformed girls in mathematics.

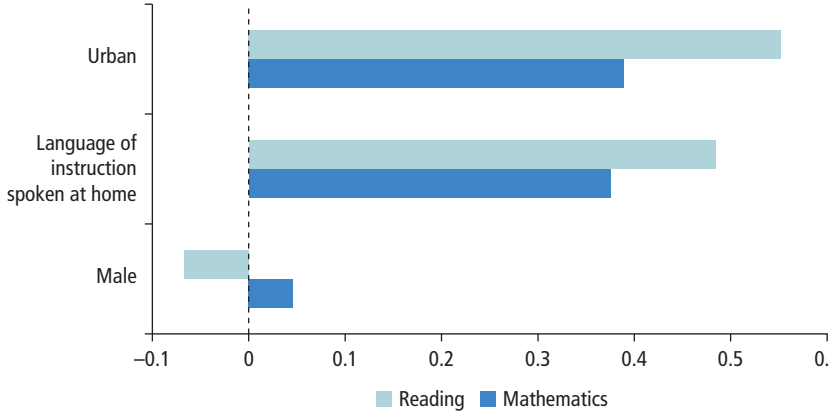
The next subsections describe these differences in detail, drawing on the various assessments that provide comparative evidence. For all the regional and international assessments discussed below, scale scores have

means of 500 and standard deviations of 100. This permits robust comparison of two learning gaps across countries: (a) between boys and girls, and (b) between students who speak and those who do not speak the language of instruction at home. In addition, a partial comparison can be made between urban and rural students, although the exact definitions vary between assessments.

These performance differences can be expressed in terms of units of standard deviation, or "effect sizes" (figure 2.20). On average, across 25 countries for which data are available, urban students and students who speak the language of instruction at home outperform rural students and those who do not speak the language of instruction at home by 40–50 percent of 1 standard deviation, which is considered a "very large" effect; by comparison, gender differences in learning are negligible.

For another key indicator, household SES, the measures vary so widely across the various assessments that the learning gaps cannot be expressed in comparable terms. Moreover, because the scales of the various assessments measure different types of skills, actual scale scores are not comparable across assessments.

Figure 2.20 Average Effect Size of Student Characteristics on Grade Six Reading and Mathematics Scores in 25 Sub-Saharan African Countries



Source: Analysis of microdata from SACMEQ III and PASEC 2014.
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality; PASEC = Programme d'analyse des systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). "Effect size" refers to the performance difference (in units of standard deviation) between urban and rural students; between students who speak the language of instruction at home and those who do not; and between male and female students. A score difference of 100 points equates to 1 standard deviation.

Household Disadvantage

Household disadvantage strongly affects students' reading, mathematics, and science performance at the primary level in all countries. The effects are very large, amounting to more than a full standard deviation in scores in some countries. Measures of household disadvantage vary across assessments.

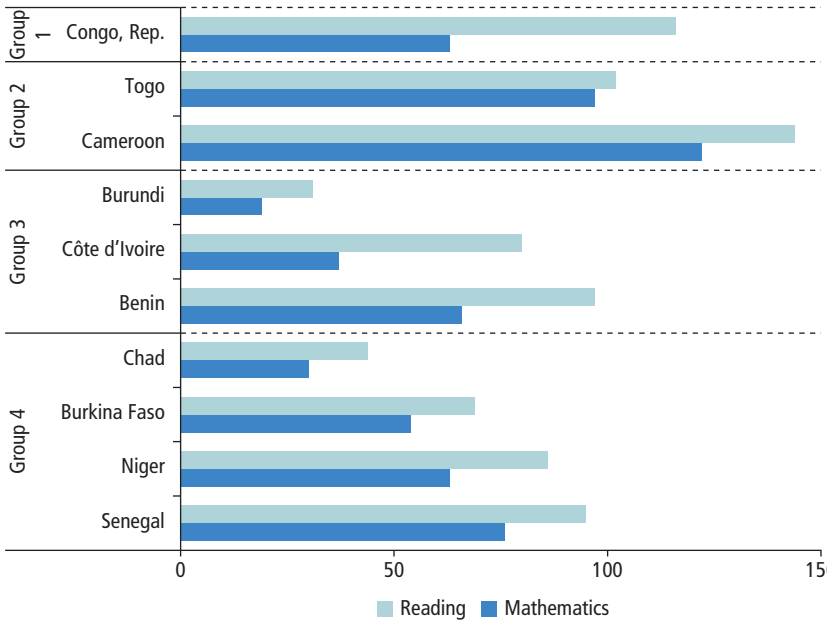
For PIRLS and TIMSS at the primary level, parents reported on the availability of key home resources, including parental education, parental occupation, number of books in the home, and study supports such as an internet connection. Lower-secondary students completed questionnaires asking for the same types of information. From these responses, a three-category scale was constructed, as follows for TIMSS 2015 (Mullis et al. 2016):

- *"Many resources":* Parent completed university education; parent worked as a professional; home has more than 100 books, including more than 25 children's books; student has own room; and home has internet connection.
- *"Some resources":* Parent finished postsecondary education; parent works in clerical position or is a small business owner; home has 26–100 books, including 11–25 children's books; and student has own room or home has an internet connection.
- *"Few resources":* Parent completed upper-secondary education or less; parent works as general laborer or semiprofessional; home has fewer than 26 books; and student has neither own room or an internet connection.

Few primary or lower-secondary students in Botswana, Ghana, or South Africa—the three Sub-Saharan African countries participating in recent international assessments—came from homes with "many resources" (about 1–3 percent compared with the international averages of 12–20 percent, depending on the assessment). In addition, many students came from homes with "few resources" (from 30–60 percent, compared with the international averages of 9–21 percent, depending on the assessment). In Botswana and South Africa, students with "some resources" at home outperformed those with "few resources" at home by large margins, ranging from 0.5 to nearly 1 full standard deviation of the scale scores (40–80 points) across the various assessments; in Ghana, the differences were smaller (see online appendix B.4, tables B.4.1 and B.4.2, for details).

The PASEC 2014 regional assessment of grade six students in francophone African countries included a measure of family background comprising items in the home, such as number of books, equipment ownership (e.g. TV, computer), durable goods (e.g. table), means of transportation (e.g. car, bicycle), type of dwelling, water source, electricity and latrines. On this measure, grade six students in the highest socioeconomic status (SES) quintile significantly

Figure 2.21 Average Gap in Grade Six Reading and Mathematics Scores, Students in the Highest versus Lowest Socioeconomic Quintiles, Francophone African Countries by Group, 2014



Source: PASEC 2015.
Note: PASEC = Programme d'analyse des systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). The socio-economic index is based on student reports regarding material goods availability in the household and dwelling characteristics: number of books at home, equipment ownership (TV, computer, radio, DVD player, stereo, mobile phone, freezer or refrigerator, air conditioner, fan stove), durable goods and transportation means ownership (table, sewing machine, iron, car or truck, tractor, motorcycle or scooter, bicycle, boat or canoe, cart), materials used for the construction of the dwelling, availability of latrines with or without running water, availability of electricity at home, availability of a well or tap of running water at home. A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

outperformed those in the lowest SES quintile. In both reading and mathematics, the score gap exceeded 50 points (0.5 standard deviation) in eight of the ten participating countries: Benin, Burkina Faso, Cameroon, Côte d'Ivoire (reading only), the Republic of Congo, Senegal, Niger, and Togo. On average, the gaps were greater for reading than for mathematics (figure 2.21).

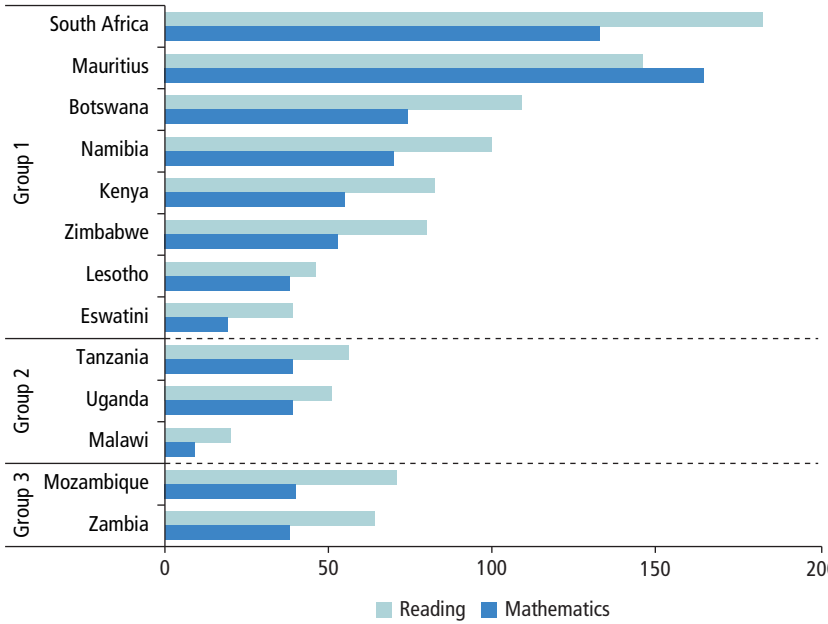
The SACMEQ III (2007) regional assessment of students in Southern and East Africa also showed that household disadvantage strongly affected both reading and mathematics scores. It measured family SES with a series of questions regarding household possessions (Spaull 2012).[19] Across all countries and for both reading and mathematics, students in the highest quartile of

socioeconomic background outperformed students in the lowest quartile, with the score gap exceeding 100 points in several countries: Botswana, Mauritius, the Seychelles, and South Africa in reading; and the Seychelles and South Africa in mathematics (figure 2.22). Overall, countries with higher average SACMEQ III scores and countries in Group 1 also showed the largest achievement gaps between low- and high-SES students. Although the scores for lower-performing countries indicate a more *equitable* education system, they also show that education systems in those countries (such as Malawi and Zambia) are of lower *quality*, with weak student performance across the board.

The Home Language

Sub-Saharan Africa is the most linguistically diverse region globally, with more than 1,500 languages spoken. Most countries have policies that introduce a

Figure 2.22 Average Gap in Grade Six Reading and Mathematics Scores, Students in Highest versus Lowest Socioeconomic Quartiles, Southern and East African Countries by Group, 2007



Source: Analysis of microdata from SACMEQ III (http://www.sacmeq.org/sacmeq-projects/sacmeq-iii/reports).
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. SACMEQ III measured student socioeconomic status based on questions about household possessions. A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

national or international language of instruction (LOI) at some point during primary school (a topic discussed at length in chapter 3). Students who are familiar with the LOI and speak it at home outperform students who never speak the LOI at home.

In francophone countries—the only set of countries with cross-nationally comparable information on both lower-primary and upper-primary performance—the impact of home language on reading and mathematics learning outcomes is substantially larger for second-grade students than for sixth-grade students (figure 2.23). In Chad, for example, the difference between students who speak the LOI at home and those who do not amounts to more than 40 points in reading and 60 points in mathematics (0.40 and 0.60 standard deviation, respectively) in the second grade, but it amounts to only around 10 points (0.10 standard deviation) on the sixth-grade scales. Similar reductions in the effect of home language on learning outcomes are observed in the other countries as well; this may be a consequence of a high dropout rate among underperforming students.

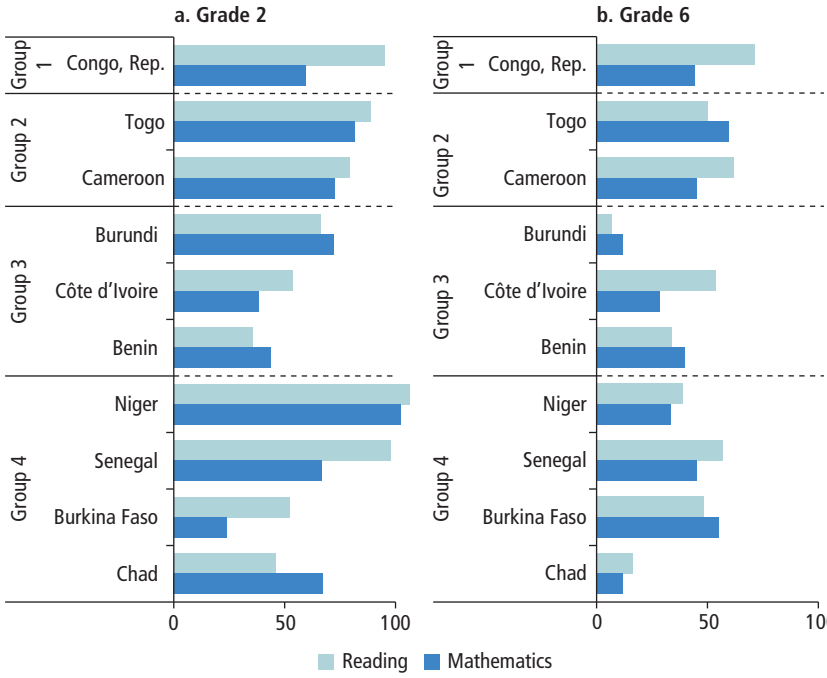
In the countries of Southern and East Africa, the largest differences between students who speak the LOI at home and those who do not appear in the Group 1 countries, with generally stronger effects for reading than for mathematics (figure 2.24).

The impact of the home language persists in lower-secondary student performance. The frequency of speaking the language of the assessment at home strongly affects student performance in all countries as well as in Sub-Saharan African countries (Mullis et al. 2016). Although the overall gaps in performance remain quite large between international averages and Botswana and South Africa, they are much smaller for students who regularly speak the language of the test at home. Figure 2.25 shows these gaps for the most recent international mathematics assessment, TIMSS 2015, in which these two countries participated.

Rural versus Urban Location

Globally, primary students in city schools outperform those in schools in smaller towns, with an average gap of around 25 points (0.25 standard deviation) on both the TIMSS 2011 mathematics assessment and the PIRLS 2011 reading assessment (Mullis, Martin, Foy, and Arora 2012; Mullis, Martin, Foy, and Drucker 2012). In Sub-Saharan Africa, where most students attend schools in small towns or villages and relatively few live in cities, the urban/rural gaps are much larger. In Botswana and South Africa, the scores of primary students attending city schools were higher than those of students in rural schools, with performance gaps greater than 50 points (0.50 standard deviation) on both PIRLS reading and TIMSS mathematics assessments. (For details, see online appendix B.4.)

Figure 2.23 Average Gap in Reading and Mathematics Scores between Students Who Always or Sometimes Spoke the Language of Instruction at Home and Those Who Never Did, Francophone African Countries by Group, 2014

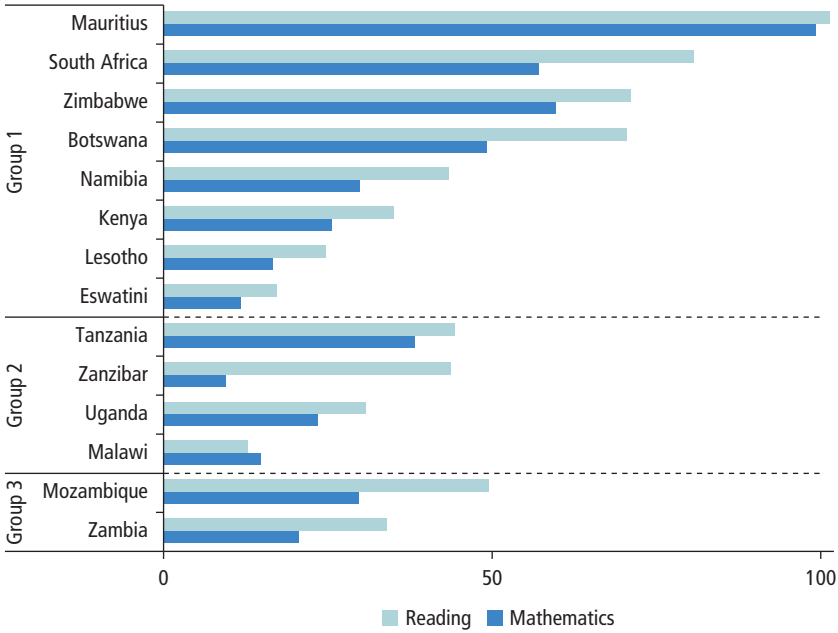


Source: Analysis of microdata from PASEC 2014.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

These global rural/urban performance gaps have also been found in regional assessments at the primary level: on both PASEC 2014 and SACMEQ III (2007), students in urban schools outperform those in rural schools. In francophone countries, with one exception (mathematics performance in Burundi), students in urban schools outperformed those in rural schools in both reading and mathematics (figure 2.26). The reading performance gaps exceeded 50 points in eight countries: Benin, Burkina Faso, Cameroon, the Republic of Congo, Côte d'Ivoire, Niger, Senegal, and Togo. The mathematics performance gaps exceeded 50 points in five of the same countries: Benin, Cameroon, Niger, Senegal, and Togo. The urban/rural performance gap was more pronounced in the countries of Groups 1 and 2.

In Southern and East Africa, students in urban schools also outperformed those in rural schools (figure 2.27). In all countries participating in SACMEQ III

Figure 2.24 Average Gap in Reading and Mathematics Scores between Grade Six Students Who Always or Sometimes Spoke the Language of Instruction at Home and Those Who Never Did, Southern and East African Countries by Group, 2007



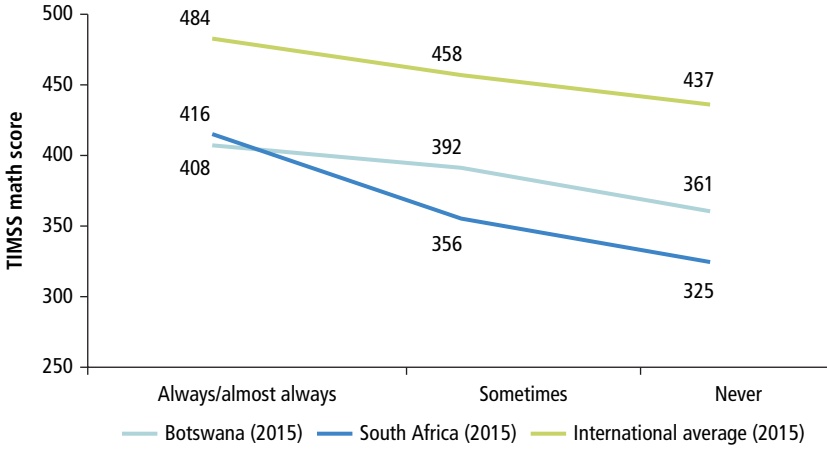
Source: Analysis of microdata from SACMEQ III (http://www.sacmeq.org/sacmeq-projects/sacmeq-iii/reports).
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

(2007), students in urban schools outperformed students in rural schools in both reading and mathematics achievement, with gaps exceeding 30 points (0.30 standard deviation) in nine countries for reading and in seven countries for mathematics. The urban/rural divide was smaller among these countries than among the francophone countries—with the exception of South Africa, possibly because of residual apartheid effects.

Gender

Internationally, few gender differences in achievement are observed at the primary level, but where they do exist they favor girls, particularly in reading. Girls outperformed boys in reading in the PIRLS 2011 international assessment (Mullis, Martin, Foy, and Drucker 2012). In the two Sub-Saharan African countries participating in prePIRLS and PIRLS—Botswana and South Africa—girls outperformed boys on the reading assessments by over 25 percent of 1 standard

Figure 2.25 Average Mathematics Scores of Students in Grades Eight or Nine in Botswana and South Africa versus International Average, by Frequency of Speaking the Language of the Assessment at Home, 2015

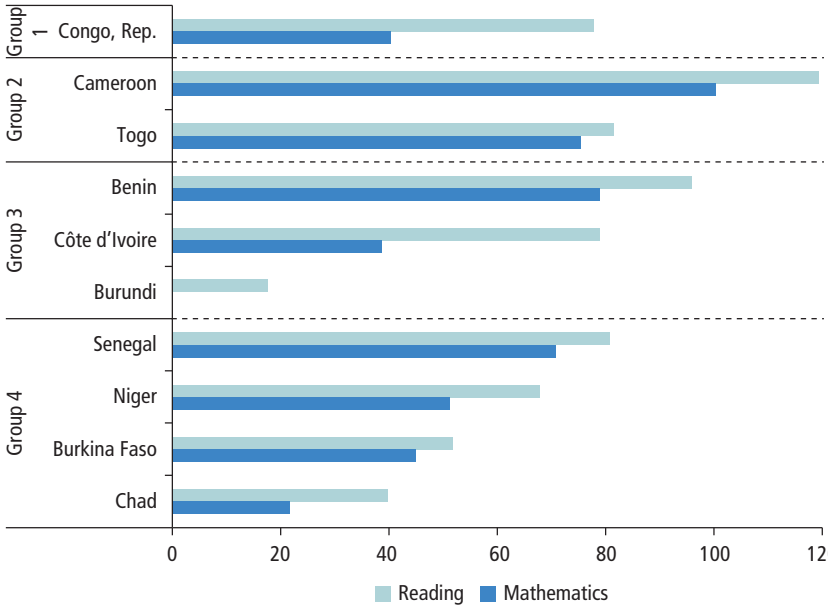


Source: Analysis of microdata from TIMSS 2015.
Note: TIMSS = Trends in International Mathematics and Science Study.

deviation (for details, see online appendix B.4, table B.4.3). Girls' average reading scores were also higher than boys' average reading scores in 5 of the 10 francophone countries participating in PASEC 2014, although the averages exceeded 10 percent of 1 standard deviation only in Burundi and Cameroon, and boys outperformed girls in Chad by 18 percent of 1 standard deviation (figure 2.28). In Southern and East Africa, girls' average SACMEQ III reading scores were higher than boys' average reading scores in seven of the eight Group 1 countries, exceeding 20 percent of 1 standard deviation in three countries; gender differences favoring boys in countries in Groups 2 and 3 were generally not statistically significant (figure 2.29). The results confirmed prior findings and trends from international assessments that show persistent gender achievement gaps favoring girls in reading.

By comparison internationally, no gender differences were observed in either mathematics or science across all countries participating in TIMSS 2011 or TIMSS 2015 at the primary level (Martin et al. 2012; Martin et al. 2016; Mullis, Martin, Foy, and Arora 2012; Mullis et al. 2016). As for the two Sub-Saharan African countries participating in either assessment—Botswana and South Africa—sixth-grade girls in Botswana outperformed boys in both mathematics and science in 2011, and fifth-grade girls in South Africa outperformed boys in mathematics in 2015 (for details, see online appendix B.4, table B.4.4). Among the francophone countries participating in the PASEC

Figure 2.26 Average Gap in Grade Six Reading and Mathematics Scores between Urban and Rural Students in Francophone African Countries, by Group, PASEC 2014



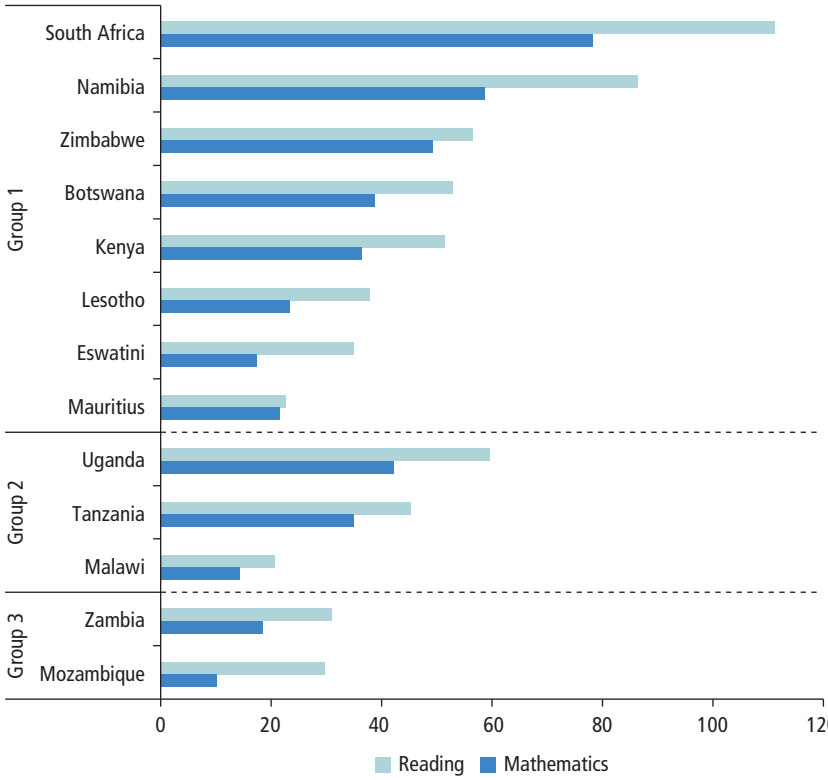
Source: PASEC 2015.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

2014 mathematics assessment, however, sixth-grade boys outperformed sixth-grade girls in seven countries, with the average difference exceeding 10 percent of 1 standard deviation in five countries; girls outperformed boys in mathematics only in Burundi, but that difference was very large: 33 percent of 1 standard deviation (figure 2.28).

In Southern and East Africa, sixth-grade girls' average SACMEQ III (2007) mathematics scores were higher than those of boys in three countries, but the differences did not exceed 20 percent of 1 standard deviation; boys' scores were 20 percent of 1 standard deviation higher in two countries: Kenya and Tanzania (figure 2.29). Gender gaps in mathematics were smaller in Group 1 countries and larger in countries of Groups 2 and 3.

At the lower-secondary level, the global assessments also found few gender differences in mathematics or science scores. In mathematics, eighth-grade girls and boys performed similarly on both TIMSS 2011 and TIMSS 2015, while in science, girls significantly outperformed boys on TIMSS 2015, an improvement over TIMSS 2011. In the three Sub-Saharan Africa countries

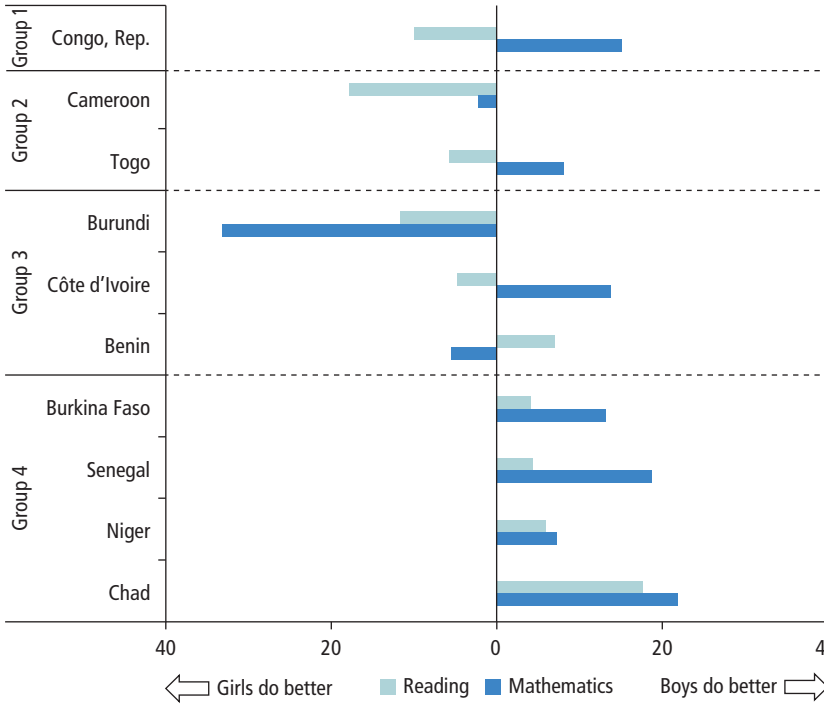
Figure 2.27 Average Gap in Grade Six Reading and Mathematics Scores between Urban and Rural Students in Southern and East African Countries, by Group, SACMEQ 2007



Source: Analysis of microdata from SACMEQ III (2007) (http://www.sacmeq.org/sacmeq-projects/sacmeq-iii/reports).
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

with lower-secondary TIMSS results for 2011 or 2015, gender differences varied by country (for details, see online appendix B.4, tables B.4.5 and B.4.6). For both mathematics and science in 2011, ninth-grade girls outperformed ninth-grade boys in Botswana, eighth-grade boys outperformed eighth-grade girls in Ghana, and gender differences favoring ninth-grade girls in South Africa were slight. In 2015, girls continued to outperform boys in Botswana and South Africa. In all cases, the performance of both boys and girls in these three Sub-Saharan African countries was substantially lower than the international averages for these assessments.

Figure 2.28 Average Gap in Grade Six Reading and Mathematics Scores between Girls and Boys in Francophone African Countries, by Group, PASEC 2014



Source: PASEC 2015.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

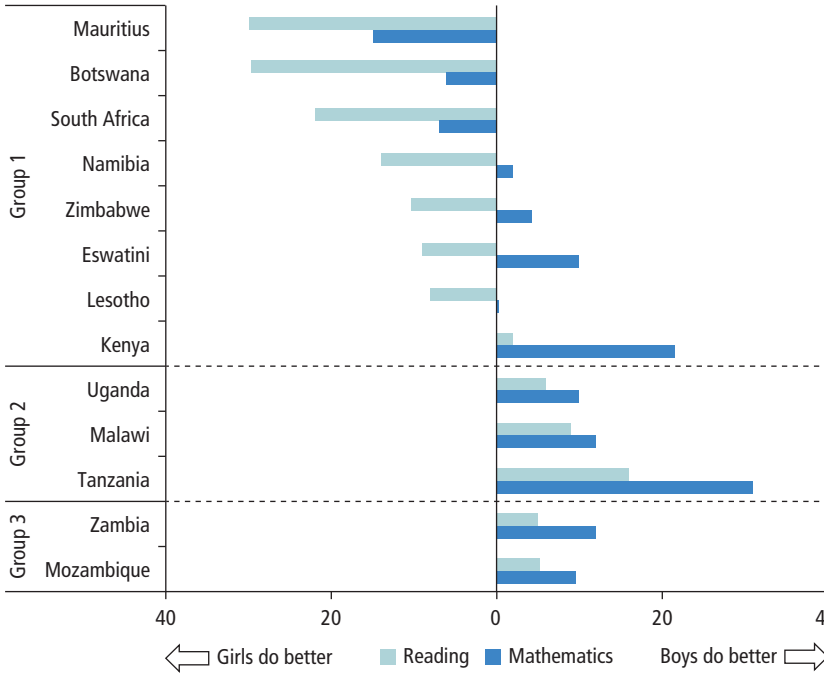
Summary: Closing the Learning Gap

Equity in learning remains a serious problem in Sub-Saharan Africa that affects students in all countries. The largest learning gaps found at the primary level arise from household disadvantage and students' lack of familiarity with the language of instruction. Little information is available for learning at the lower-secondary level.

In summary, this analysis finds the following effects on learning equity:

- *Household disadvantage has large effects* at the primary level in virtually all countries across the region. The measure of household disadvantage is typically based on student reports about items in the home. In all countries, students from the 20-25% most advantaged households far outperformed

Figure 2.29 Average Gap in Grade Six Reading and Mathematics Scores between Girls and Boys in Southern and East African Countries, SACMEQ 2007



Source: Analysis of microdata from SACMEQ III (http://www.sacmeq.org/sacmeq-projects/sacmeq-iii/reports).
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. A score difference of 100 points equates to 1 standard deviation. For descriptions of country groups, see chapter 1 or notes to figure 2.3.

students from the 20–25% least advantaged households, with larger differences for reading than for mathematics.

- *Home use of the language of instruction is particularly salient* for younger primary students—with larger learning gaps between those who sometimes or always spoke the language of instruction at home and those who never did—in comparison with older primary students. Students who sometimes or always spoke French at home (or Kirundi in Burundi) outperformed those who never spoke French (or Kirundi) at home in all francophone countries on reading assessments and in seven countries on mathematics assessments. Students who sometimes or always spoke English at home (Swahili in Tanzania or Portuguese in Mozambique) outperformed those who never did.
- *Students in rural schools are also disadvantaged* compared with those in urban schools in most countries, but the size of the effect varies across countries.

- *Gender differences in performance are smaller* than those associated with home language, and they differ by reading and mathematics. In reading, girls outperform boys in Group 1 countries, but boys outperform girls in countries of Groups 3 and 4. In mathematics, boys outperformed girls in all countries at the primary level but not at the lower-secondary level.

Determinants of Learning: Global Evidence

Drawing on the framework described in chapter 1, this section examines the global evidence for what boosts learning. It reviews four potential areas for improving student learning outcomes: the education system, the school, classroom conditions, and teaching quality. It distinguishes evidence derived from the large body of cross-sectional studies from that derived from the smaller body of rigorous impact evaluations.

Two major streams of research shed light on the determinants of learning globally and in low- and middle-income countries: correlational analyses of survey data and randomized controlled trials (RCTs) within experimental designs. The first research stream is large and provides guideposts for further investigation, often through RCTs. The second research stream is much smaller but is growing, particularly in low- and middle-income countries.

This section has two main subsections: The first one summarizes the systemic, school, and classroom correlates of learning in low- and middle-income countries, drawing comparisons with the correlates in high-income countries. The second subsection summarizes various interventions and their impacts on learning and school enrollment and attendance in low- and middle-income countries.

Correlates of Learning in Cross-Sectional Studies

Effective Education Systems: One Size Does Not Fit All

Systemic variations among high-income countries, which are correlated with better student performance, often do not have the same effect among low- and middle-income countries. This subsection reviews nine such differences among education systems. Five are institutional features that have been studied extensively: school accountability measures, school autonomy, school competition, school tracking and ability grouping, and the preprimary education system (Hanushek and Woessmann 2014). These features create variations in incentives that are positively correlated with learning outcomes in high-income economies but appear less so in low- and middle-income countries (OECD 2013). In addition to these institutional differences, education systems exhibit four other differences: education resource allocation, education system structure,

official curriculum, and teacher qualifications. Most of the evidence regarding systemic variations has come from the OECD (2013) analysis of PISA 2012 results.

School accountability measures In high-income countries, school accountability in the form of curriculum-based exit exams and regular standardized testing improves learning by providing incentives for student effort and encouraging stakeholders to monitor learning (Woessmann 2003, 2016). Accountability systems using high-stakes examinations have been associated with slightly higher student performance in high-income economies (Figlio and Loeb 2011; Fuchs and Woessmann 2010).

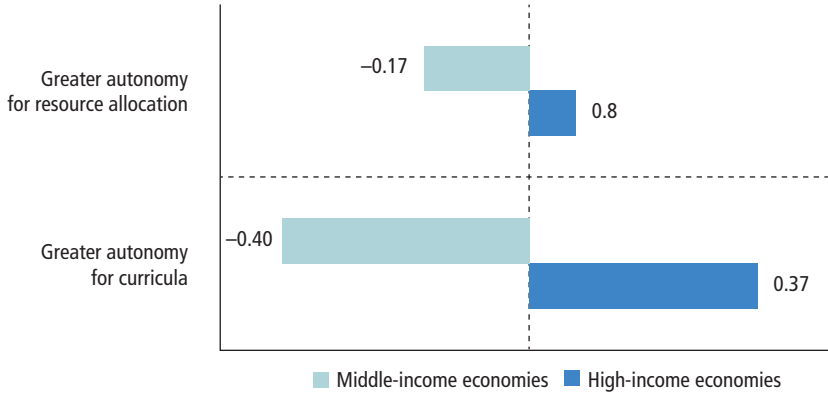
This is not the case for middle-income countries. School accountability was associated with higher student PISA scores in only 4 of 18 middle-income countries (Bulgaria, Colombia, Thailand, and Vietnam) and was negatively associated with achievement in Mexico (OECD 2013). One reason for this may be that high-stakes exit examinations—which in many low- and middle-income countries are gatekeepers to future educational opportunities—create distortions such as cheating and bribery (Campbell and Lyons 1975).

School autonomy School autonomy boosts student learning when decentralized decision makers, who have better access to information on best practices, align their decisions with student learning objectives (Fuchs and Woessmann 2010; Woessmann 2003). The impact of school autonomy on student achievement is highly heterogeneous and varies across countries and education systems (Hanushek, Link, and Woessmann 2013). Among OECD countries, education systems with greater school autonomy have higher PISA mathematics scores than those with less autonomy (OECD 2013).

However, school autonomy does not improve student learning outcomes in middle-income countries (figure 2.30). At lower levels of economic development, increased school autonomy—particularly in the decision-making areas related to instructional content but also in the areas of personnel and budgeting—is associated with lower student outcomes (OECD 2013). The reasons for this are the weak overall institutional structures with poor accountability systems and the weak links between centralized structures and schools in low- and middle-income countries. If overall institutional structures are weak, the danger of school autonomy lies in the possibility that individual schools pursue goals that are not related to improving student learning. This also contributes to increasing inequity (Galiani, Gertler, and Schargrodsky 2008).

School competition School competition, mostly in the form of competition between private and public schools, could improve the performance of both public and private schools under certain conditions (Hoxby 2003; Rouse and Barrow 2009). However, cross-country systemic differences in competition appear unrelated to student learning outcomes. For example, the percentage of students

Figure 2.30 Correlations Between School Autonomy over Resources and Curricula with PISA Mathematics Scores of 15-Year-Old Students, by Country Income Level, 2012



Source: Constructed from OECD 2013.
Note: PISA = Programme for International Student Assessment. "Autonomy for resource allocation" is an index derived from six questions to school principals regarding their responsibility for teachers' employment and school budget. "Autonomy for curricula" is an index derived from four questions regarding responsibilities for assessment, textbooks, and courses. Positive values on both indexes indicate greater autonomy (OECD 2013). Figure shows the average correlation coefficient of each index for countries in each income group.

in schools that compete with other schools in the area—as reported by school principals—was unrelated to a country's performance on PISA 2012 for all OECD countries and only weakly related to performance across all participating countries (OECD 2013).

Among middle-income countries, competition was associated with higher mathematics scores in Mexico and Vietnam and with lower scores in Colombia and Indonesia. Moreover, the share of students enrolled in private schools in a country was unrelated to its average PISA mathematics scores (OECD 2013).

Tracking and ability grouping Tracking is a way of placing students in schools (tracking) or classes (ability grouping) according to their past or anticipated performance, and it has been found to increase inequality (Ammermueller 2013; Hanushek and Woessmann 2006; Schütz, Ursprung, and Woessmann 2008). More homogenous schools or classes may or may not contribute to creation of the optimal learning situation, depending on the nature of the peer dynamics. Although tailor-made curricula will optimize learning, tracking will, if implemented early on, disadvantage the weaker groups of students and increase the inequality of student achievement. Across all countries, the number of school types or education programs (tracks) available to 15-year-olds was unrelated to a country's average PISA mathematics performance. Countries that

practiced ability grouping, however, had significantly lower mathematics performance (OECD 2013). Within middle-income countries, ability grouping was unrelated to achievement in 15 countries, negatively related to achievement in two countries (Bulgaria and Turkey), and positively related to achievement in none (OECD 2013).

Preprimary education system Preprimary education enhances early learning and potentially can mitigate the effect of family background on disadvantaged children. Systemic access to preprimary education is positively related to both performance and greater equality of education systems (Schütz, Ursprung, and Woessmann 2008). In six middle-income countries (Bulgaria, Malaysia, Mexico, Romania, Thailand, and Vietnam), schools with a higher share of students who had attended preschool achieved higher PISA mathematics scores (OECD 2013).

Resource allocation Education systems differ in the amount and type of resources allocated to students at different levels: preprimary, primary, lower-secondary, upper-secondary, and tertiary. Early research, using data primarily from high-income countries or economies, concluded that cross-national differences in education expenditures, teacher quality, and instructional time were either unrelated to cross-national differences in performance (Baker et al. 2004; Hanushek 1997) or were related but with small effects (Hanushek and Woessmann 2014). More recent research shows that the benefit of increased education spending has decreasing returns in high-income countries (OECD 2013).

Across low- or middle-income countries, however, the education expenditure per student is strongly correlated with educational performance. Among countries with per-student expenditures below US$8,000, each additional US$1,000 of spending per student is associated with an improvement in student learning outcomes of 14 points (14 percent of 1 standard deviation) (Vegas and Coffin 2015).

Education system structure Systems differ in how they organize learning. These differences include such education policies as the age when children are expected to enter school, how schools are defined by grades and ages, the duration of the school day and academic year, and the presence of high-stakes selection examinations at various grades (discussed under "school accountability measures" above). The association between these types of structural variations and student educational outcomes has rarely been examined across countries globally. One review of the association between systemic differences in official instructional time and student performance found little evidence of an effect (Baker et al. 2004).

Official curriculum Curriculum includes the cognitive and noncognitive skills that are taught and at which grades or ages. Cross-national studies have shown

a remarkable consistency in the distribution of curriculum content and skills that schools are expected to develop in students (Benavot and Amadio 2004). This lack of variation means that systemic differences are not observed.

Teacher qualifications formal education and certification The evidence regarding systemic differences in teacher qualifications, as measured by certification or degree, is mixed. One study found a positive relationship with student mathematics achievement across 37 high-income countries (Akiba, LeTendre, and Scribner 2007), but another study found no relationship to student learning in 18 middle-income countries (OECD 2013). Luschei and Chudgar (2011) found little evidence that cross-national differences in teacher certification or degree were associated with cross-national differences in student performance.

In short, this subsection demonstrates that many of the country-level systemic differences that are correlated with higher student learning among high-income economies do not appear related to higher student learning among low- and middle-income countries. And some differences that are *not* correlated with higher learning in high-income countries *are* correlated with higher learning in some low- and middle-income countries.

Effective Schools: One Size Still Does Not Fit All

Schools within countries vary in terms of their physical infrastructure and their forms of governance, among other characteristics. Recent reviews of the large body of research find substantial variation in the impact of these characteristics on student learning, after student intake characteristics have been taken into account. In some cases, international, large-scale assessments designed for high-income countries fail to capture school and classroom characteristics that are important in low- and middle-income countries (Willms and Tramonte 2015). Factors that drive improvements in learning in high-income countries often are not the same as those related to improvements in low- and middle-income economies.

Physical infrastructure Some research has explored how perceived deficiencies in basic school inputs (such as textbooks, desks, and chairs) and infrastructure (such as buildings, electricity, clean water, and sanitary facilities) affect student learning. In some cases, a positive association is found (Glewwe et al. 2013), but the availability of such inputs is also strongly associated with the SES of the students in the schools. For example, schools serving more socially advantaged students had more and higher-quality educational resources in 15 of the 18 middle-income countries that participated in PISA 2012 (OECD 2013).

Private versus public schools Since the early 1990s, studies have shown that, within countries, students in private schools outperform those in public schools, but the advantage is largely due to differences between the intake characteristics of students in the two types of schools (see, for example, Jimenez and Lockheed 1991). A recent review of 59 empirical studies of private schools in low- and

middle-income countries concluded that most claims about the positive impact of private education were not supported by strong evidence (Day Ashley et al. 2014). The one exception was that private schools had higher-quality teaching than public schools.[20]

Reanalysis of microdata from 18 middle-income countries that participated in PISA 2012 found that PISA mathematics scores were higher in private schools in 10 countries, lower in 3 countries, and no different from public schools in 5 countries. Decomposition of achievement differences between public and private schools in these countries, however, showed that most of the difference could be attributed to differences in the intake characteristics of the students (Lockheed, Prokic-Breuer, and Shadrova 2015).

Effective Teachers and Teaching: Global Similarities

Unlike the correlates of systemic and school-level effects on student learning, which vary between high-income and lower-income countries, the correlates of classroom and teacher characteristics are similar across countries. Three important characteristics of classrooms and teachers are broadly associated with higher student learning after the intake characteristics of students have been taken into account: teacher knowledge, teaching practices, and instructional time. These are summarized below but are discussed in detail in chapter 4.

Teacher knowledge Teacher subject-matter knowledge, when measured, has been found to be positively related to student learning in both high-income countries (Hill, Rowan, and Ball 2005) and low- or middle-income countries (Filmer, Molina, and Stacy 2016; Glewwe et al. 2013; Harbison and Hanushek 1992; Kremer, Brannen, and Glennerster 2013; McEwan 2015; Ganimian and Murnane 2016; Metzler and Woessmann 2012; Mullens, Murnane, and Willett 1996). Thus, mathematics teachers with better knowledge of mathematics content improve their students' learning of mathematics.

Teaching practices Specific teaching practices improve student learning outcomes. The meta-analysis literature on "what works" in high-income countrie has consistently identified specific teaching practices as having the highest associations with student learning, with effect sizes over 0.40 standard deviation (Hattie 2003, 2009; Walberg 1984). These include teachers providing feedback to students, the quality of instruction, direct instruction, speeding up instruction, assigning homework, and questioning.

Teaching practices are consistently related to student learning in low- and middle-income countries (Ganimian and Murnane 2016). For example, strong associations between a teacher's knowledge of pedagogical practices and student achievement were found in Cambodia and Laos (Benveniste, Marshall, and Araújo 2008; Benveniste, Marshall, and Santibañez 2007). Teaching practices are further discussed in chapter 4.

Instructional time Official instructional time for basic education (primary and lower-secondary) is often similar across countries (Benavot and Amadio 2004), but *actual* instructional time varies enormously. More actual instructional time was related to student learning in some countries (Ammermueller 2013; Glewwe et al. 2013; Lavy 2015; Long 2014). A recent review of the effects of extending the duration of the school day found generally positive effects on learning in Latin America (Alfaro, Evans, and Holland 2015). Instructional time was positively correlated with mathematics performance in 8 of 18 middle-income countries (Lockheed, Prokic-Breuer, and Shadrova 2015). Extending the school day in schools that changed from double shifts to a 30-percent-longer single shift significantly increased student reading performance compared with students in schools not making this change (Orkin 2013; Valenzuela 2005). Teacher absenteeism reduces instructional time and contributes to lower student achievement (Miller, Murnane, and Willett 2008).

Effective Interventions for Low- and Middle-Income Countries

The previous section examined correlates of student learning; this section examines the impact of specific interventions designed to improve learning in low- and middle-income countries. Impact evaluations have the capacity to isolate the effects of interventions and provide strong evidence for "what works" in improving educational outcomes. One benefit of impact evaluations is that they provide detailed information on which specific change was implemented, under what conditions, and with what degree of fidelity. This provides needed information for determining how a successful intervention could be scaled up. A new body of meta-analyses of RCTs and impact evaluations of interventions in low- and middle-income countries has exploded in the past decade, largely focusing on primary education.

Evans and Popova (2015) synthesized the findings and conclusions of six major meta-analyses of RCTs and impact evaluations covering studies published from 1980 to 2013: Conn (2014); Ganimian and Murnane (2016); Glewwe et al. (2013); Kremer, Brannen, and Glennerster (2013); Krishnaratne, White, and Carpenter (2013); and McEwan (2015). These six reviews covered a total of 301 studies across the developing world, 227 of which reported learning outcomes. The Conn (2014) review included studies in the Sub-Saharan African region only, while the other five studies covered low- and middle-income countries internationally, including countries in Sub-Saharan Africa. Overall, Sub-Saharan Africa was the most-covered region (Evans and Popova 2015).

More recently, the International Initiative for Impact Evaluation (3ie) synthesized high-quality impact evaluations (Snilstveit et al. 2015). It reviewed education interventions that were designed to increase access or improve learning outcomes in primary and secondary education in low- and middle-income countries (covering 420 research reports related to 52 low- and middle-income

countries, including 21 countries in Sub-Saharan Africa, from 1990 to July 2015).[21] The review collected and synthesized quantitative evidence from impact evaluations of more than 200 unique interventions that used experimental and quasi-experimental study designs to allow for causal inference; it examined interventions targeted at six levels: child, household, school, teacher, system, and "multilevel" interventions. Within each level, the studies were categorized by intervention types. In terms of study design, 122 (52 percent) of the reviewed studies were cluster-randomized controlled trials; 19 (8 percent) were RCTs; 17 (7 percent) were natural experiments; 25 (11 percent) were regression-discontinuity designs; and 54 (23 percent) used a controlled before-and-after study design, with estimation strategies such as difference-in-differences estimation or propensity score matching to control for potential selection bias.

Three important conclusions come from this meta-analysis. The first is that some interventions are highly effective in increasing children's participation in school or highly effective in improving their learning outcomes, but rarely both. The most widely studied intervention—cash transfers to households—boosts both school enrollment and student attendance but does not have an impact on student learning. Providing vouchers for eligible students, particularly girls, to attend private schools has been found to improve enrollment, but in most cases this intervention has not raised learning achievement. The most-studied intervention to improve learning—structured pedagogy (see box 2.3)—boosts students' reading and mathematics scores but does not affect their attendance.

BOX 2.3

Examples of Interventions Found Effective in Raising Student Learning in Sub-Saharan Africa

School Feeding Programs

The Kenya Child Nutrition Project provided a mid-morning meal—either meat-githeri, milk-githeri, or energy-githeri (a Kenyan traditional meal of maize [corn] and any type of beans mixed and boiled together)—to first-grade students averaging seven years of age in rural schools (Omwami et al. 2011). The meal provided 240 kilocalories (kcal) in the first school year and 313 kcal for the remainder of study period. Children receiving the mid-morning meal scored 13 percent of 1 standard deviation higher on a mathematics test, 20 percent of 1 standard deviation higher on a language arts test, and 35 percent of 1 standard deviation higher on a "composite score" than children not receiving the meal.

The World Food Programme (WFP) school canteen program in Senegal provided hot lunches through school canteens to second- and fourth-grade children in rural

(continued next page)

Box 2.3 (continued)

schools (Kazianga, De Walque, and Alderman 2012). The food basket included the appropriate caloric composition made up of maize, three legumes, vegetable oil, and iodized salt, as recommended by the WFP; the United Nations Educational, Scientific, and Cultural Organization (UNESCO); and the World Health Organization (WHO). The WFP provided the food supplies each term. Parents were required to contribute CFAF 200 a month per student for other products needed for the functioning of the school meal program but that were not included in the WFP food basket. Children receiving hot lunches scored 11 percent of 1 standard deviation higher on a mathematics test, 7 percent of 1 standard deviation higher on a language arts test, and 17 percent of 1 standard deviation higher on a "composite score" than children not receiving the meal.

Structured Pedagogy

Structured pedagogy is defined as a package of teacher training; ongoing teacher support, resources, or materials for teachers; and classroom learning materials for students.

The Early Grade Reading Assessment (EGRA) Plus in Liberia for children in second and third grades continually assessed student reading levels (Piper and Korda 2011). In addition, teachers were trained, continually assessed, and supported by coaches; schools were provided with resource materials and books; and parents and communities were informed of student performance. In the second year, outreach to communities via radio shows and reading competitions were introduced. Student performance and progress were also discussed with parents. There was semiannual refresher training and materials were revised. Children in the EGRA Plus program scored 72 percent of 1 standard deviation higher on reading outcomes than children not in the program.

The Read-Learn-Lead (RLL) in Mali offered first- and second-grade students and their teachers structured and systematic lessons, activities, and accompanying materials for instruction and practice on critical early reading skills in the local language (Spratt, King, and Bulat 2013). RLL provided teachers with preservice and in-service professional development as well as support and monitoring visits. It also involved ongoing assessment of children's reading performance. Materials included flash cards, books in a national language, and related posters. Children in the RLL program scored 24 percent of 1 standard deviation higher on reading outcomes than children not in the program.

The English and Operacy program (EOP) in South Africa (KwaZulu-Natal province) for fifth-grade students was based on "suggestopedic" methodology, which is a communicative approach emphasizing massive language input, attention to affect, and pair and group work (Mouton 1995). Teachers were given three weeks of training in the methodology as well as English language and thinking skills. Some new instructional materials were provided. Half the teachers received visits to provide support and to motivate them. Monitoring occurred though interviews with teachers and principals as well as classroom observation. Children in the EOP scored 40 percent of 1 standard deviation higher on mathematics test than children not in the program.

The second conclusion is that some conventional inputs and other popular interventions are not effective for increasing participation or improving learning. Three interventions that have been widely promoted—school-based management, reducing school fees, and teacher incentives—do not systematically boost student enrollment or improve attendance, although in one case (in Senegal), a school grants program was found to reduce student and teacher absenteeism (Carneiro et al. 2015). Nor do school-based management, providing materials, or teacher incentives improve student learning. (These interventions have effect sizes that are negative or less than 0.09 standard deviation.)

The third conclusion is that the characterization of some interventions varies widely in the literature. For example, "school-based management" can mean "management of a small grant to a school committee" or "hiring a contract teacher," but rarely does it mean the full decentralized control of all decisions at the school level. This is discussed further in chapter 5.

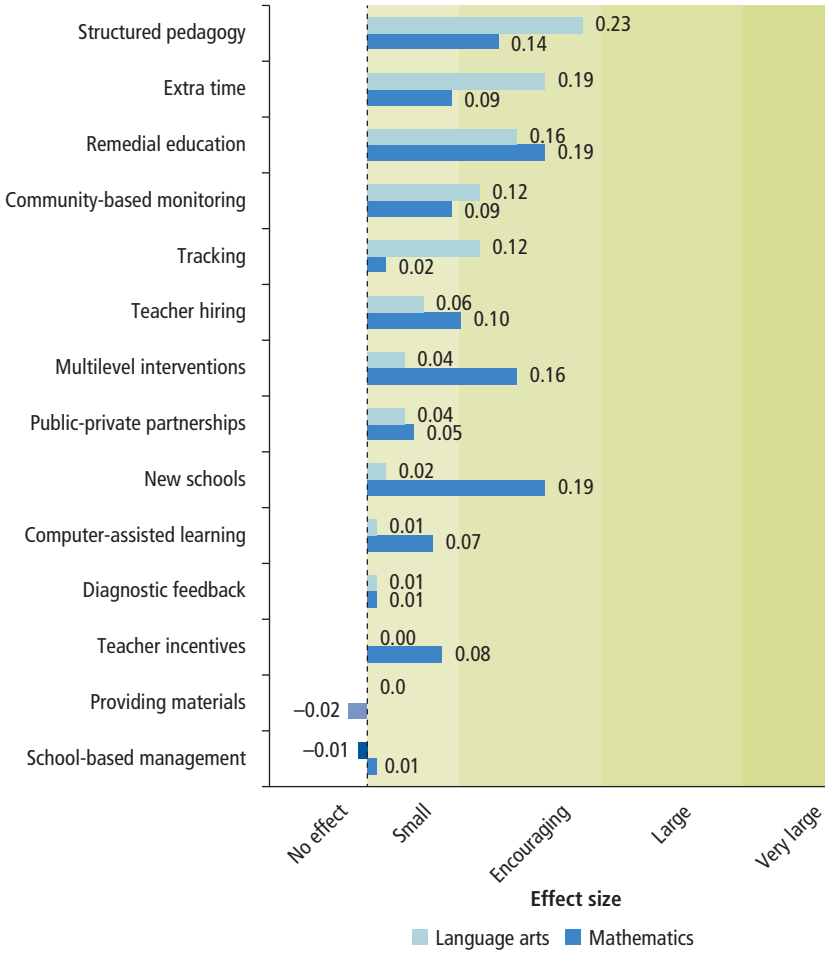
Interventions That Boost Learning

Figure 2.31 summarizes the effectiveness of various interventions for improving learning in low- and middle-income countries, as measured generally by tests of reading and mathematics. Highly effective interventions for improving learning occur in the classroom. The figure shows conventional cutoff points for determining the degree to which an intervention makes a difference: effect sizes of less than 0.1 standard deviation are considered "small," from 0.1 to 0.25 are considered "encouraging," and over 0.25 are "large."

Structured pedagogy (defined as a package of teacher training; ongoing teacher support, resources, or materials; and classroom learning materials for students), additional learning time, and remediation significantly boost learning (having effect sizes greater than 0.15 for math or language arts) and fall into the "encouraging" category. Some interventions (extra time, providing materials, remedial education, tracking, and diagnostic feedback) have been evaluated in fewer than five impact evaluations, however, so results should be interpreted with caution, although ineffective implementation may explain some of the unexpected results.

For example, few educators would agree that instructional materials such as textbooks are irrelevant to learning. Yet one interesting conclusion from the above review is that providing materials had little impact on learning outcomes. Poor implementation may be the explanation. Of the four impact evaluations, three distributed textbooks and one distributed flip charts (Das et al. 2013; Glewwe, Kremer, and Moulin 2009; Glewwe et al. 2004; Sabarwal, Evans, and Marshak 2014). Although the flip chart intervention appeared to be well implemented, implementation of the textbook interventions was ineffective. In both India and Sierra Leone, many treatment schools did not receive textbooks, and in Sierra Leone textbooks were kept in storage and not distributed to students. In Kenya, only two-thirds of the students reported they had access to textbooks, students in

Figure 2.31 Average Effectiveness of Interventions to Boost Learning in Low- and Middle-Income Countries



Source: Constructed from Snilstveit et al. 2015.
Note: "Extra time" refers to added learning time through an extended school day or year. "Multilevel" refers to interventions that target all levels: students, teachers, schools, and parents. "Structured pedagogy" is a package of teacher training, ongoing pedagogical support, and instructional materials. "Effect size" refers to effectiveness of a given intervention, shown as a unit of 1 standard deviation: effect sizes of less than 0.1 are "small," of 0.1–0.25 are "encouraging," and of more than 0.25 are "large."

grades three through five were not allowed to take textbooks home, and students in grades six through eight had to share textbooks for home use.

Another example comes from the unexpected conclusion that school-based management does not improve student performance. The overall effect was quite low, but its effectiveness varied widely across countries. The impact of

school-based management, as measured by effect sizes, ranged from –0.42 to 0.20 in language arts in Senegal and Indonesia, respectively, and from –0.11 to 0.14 in mathematics in Senegal and the Philippines, respectively (Carneiro et al. 2015; Khattri, Ling, and Jha 2012; Pradhan et al. 2014; Yamauchi 2014). These differences in effectiveness were attributed to variations in implementation fidelity, which appeared related to baseline human and social capital at the school. Uneven implementation of school grants in Mexico (Santibañez, Abreu-Lastra, and O'Donoghue 2014; Skoufias and Shapiro 2006) and Niger (Blimpo, Evans, and Lahire 2015) and diversion of grants to school construction rather than learning materials in Mexico (Bando 2010; Beasley and Huillery 2017; Skoufias and Shapiro 2006) may have explained the lack of impact.

Interventions That Increase School Participation

A different set of interventions improve students' school participation. Figure 2.32 summarizes the effectiveness of various interventions for improving student enrollment and attendance—in all low- and middle-income countries.

Enrollments are improved by building new schools (with "large" effects on enrollment) or hygiene infrastructure, establishing mechanisms for community-based monitoring, introducing school feeding programs, creating public-private partnerships, and providing cash transfers to disadvantaged households. All five of these interventions increase enrollments by 10 percent or more of 1 standard deviation. *Attendance* has also been significantly improved by "multilevel" interventions, such as hygiene infrastructure along with cash transfers.

Other interventions that boost enrollment or attendance appear to have larger effects, but they have been studied in many fewer instances. For example, one study of a public-private partnership program in Uganda that provided grants to private schools for enrolling eligible disadvantaged students found that enrollment increased (Barrera-Osorio et al. 2016), but this was not found in other countries.

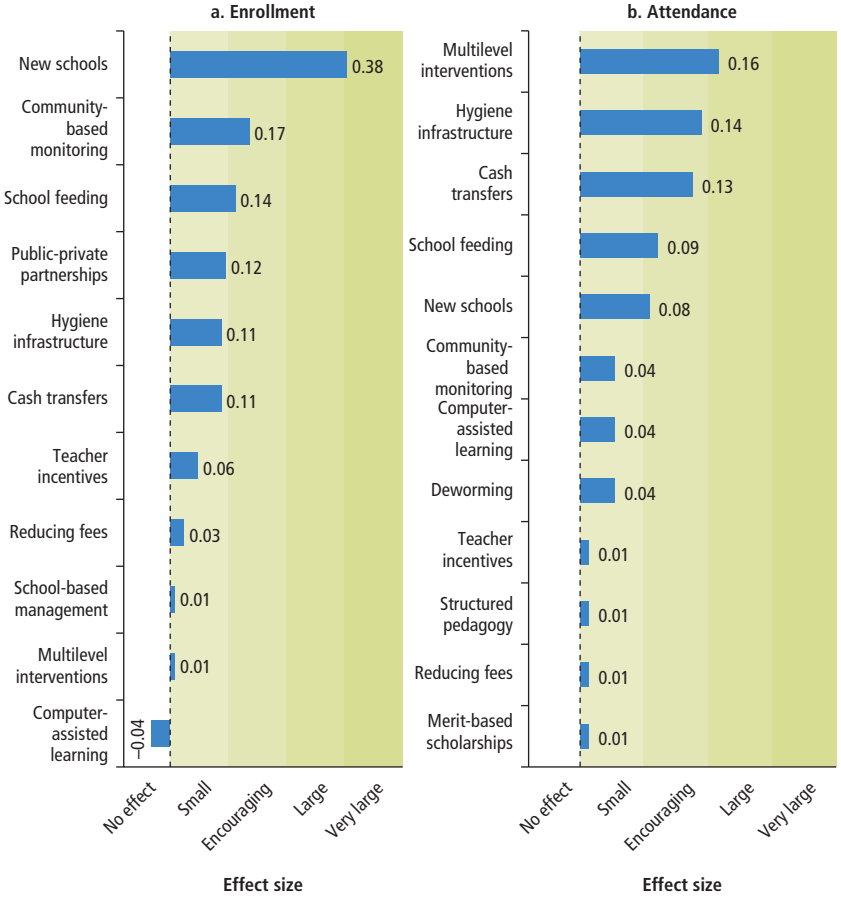
Summary: "What Works" to Improve Learning

The global evidence for what works to improve learning points to three conclusions:

- What works in high-income countries often does not work in low- and middle-income countries.
- Improving classroom instruction has the greatest impact on improving learning.
- Interventions that improve learning do not necessarily increase enrollment and attendance.

The global review also reveals that effective implementation is essential; differences in the effectiveness of approaches may stem from differences in implementation.

Figure 2.32 Average Effectiveness of Interventions to Improve Student Enrollment and Attendance in Low- and Middle-Income Countries



Source: Constructed from Snilstveit et al. 2015.
Note: "Multilevel" refers to interventions that target all levels: students, teachers, schools, and parents. "Effect size" refers to the effectiveness of a given intervention, shown as a unit of 1 standard deviation: effect sizes of less than 0.1 are "small," of 0.1–0.25 are "encouraging," and of more than 0.25 are "large."

Policy prescriptions need to be implemented at the service-delivery level: the school and the classroom. When implementation falters, learning outcomes may not improve. In short, interventions that are known to be effective in one context may fail in another simply because the capacity to implement them is lacking. This can be a systemic shortcoming, which is discussed further in chapters 5 and 6.

Correlates of Learning in Sub-Saharan Africa

Are these findings from global research, especially those related to low- and middle-income countries, corroborated in Sub-Saharan African countries? We now turn to the research evidence specific to the region. The two major, rigorous streams of research that have investigated what influences learning in Sub-Saharan Africa are (a) correlational studies based on high-quality regional and international surveys of learning (including original analyses conducted for this study), and (b) well-designed RCTs of specific interventions. This section focuses on the school and classroom correlates of primary and lower-secondary learning in Sub-Saharan Africa; the next section reviews the findings from RCTs conducted in Sub-Saharan Africa of interventions designed to increase learning or school attendance.

This section first presents original multilevel regression analyses of the correlates of learning for lower- and upper-primary students in francophone countries. Second, it summarizes earlier analyses of SACMEQ III (2007) and presents the results from new, original analyses of data from SACMEQ IV (2013) in Kenya and Malawi to explore patterns of strong correlates of learning in Southern and East Africa. Third, it places learning outcomes in Sub-Saharan Africa in an international context, through original analyses of the 2015 TIMSS study in Botswana and South Africa.

As noted earlier, the average PIRLS and TIMSS performance of students in the Sub-Saharan African countries falls well below the performance of students in other low- and middle-income economies (Majgaard and Mingat 2012; Sandefur 2016). The average performance of students in many countries also falls below standards established within the region, as reflected in PASEC and SACMEQ scores. The reasons for this weaker performance can be attributed to differences in student characteristics (discussed earlier), teacher and school quality, and broad education policies.

Correlates of Learning in Francophone Africa

This section presents the results from multilevel regression analyses of learning in the 10 PASEC-participating countries. Unlike SACMEQ, PASEC includes tests of reading and mathematics for both lower-primary learners (grade two) and upper-primary learners (grade six). For a subset of schools sampled for PASEC, the school's average lower-primary performance can be linked with upper-primary performance and shows the importance of early-grade learning for subsequent learning.

Lower-Primary Learning

At the lower-primary level, students' background—gender, age, home language, and having books in the home—were all strongly correlated

with achievement. In addition, while controlling for student background, a few classroom and school characteristics were also associated with achievement, but much more modestly and not in all countries. Full models are presented in online appendix B.5, tables B.5.1 and B.5.2. The following discussion is related to marginal effects, controlling for all other student and school or classroom characteristics.

Student characteristics Student background characteristics as measured in PASEC were correlated with grade two student mathematics and reading performance, as discussed earlier and summarized as follows:

- *Household disadvantage.* Students with books in the home (one of only two SES indicators for grade two students; the other indicator is maternal literacy) outperformed those without books in most countries, with differences as large as 0.5 standard deviation in both reading and mathematics.
- *Home language.* Children who spoke French (Kirundi in Burundi) at home substantially outperformed those who never spoke French (or Kirundi) at home, in all countries.
- *Gender.* Girls and boys performed equally well on the PASEC reading tests in eight countries, while boys outperformed girls in Chad. In mathematics, boys outperformed girls in five countries, and gender differences were not significant in the other five countries.
- *Age.* Controlling for repetition, older students outperformed younger students, but the differences were small.
- *Repetition.* Controlling for age, students who had ever repeated a grade performed less well on reading and mathematics than those who had not repeated, in Burkina Faso only; repeaters outperformed nonrepeaters on mathematics in Burundi.

Classroom characteristics Some classroom conditions were correlated with higher reading or mathematics performance, but the specific conditions vary across countries. This underscores the need for country-specific policies based on country-specific analysis. Three classroom conditions are more consistently associated with scores:

- *Textbooks.* The share of students who could take French textbooks home was positively correlated with reading scores in Burundi, Cameroon, Côte d'Ivoire, and Niger but the share of students who could take a mathematics textbook home was positively correlated with mathematics scores only in Côte d'Ivoire (and associated with lower scores in Chad).
- *Class size.* Large class sizes (more than 50 students) were associated with much lower reading scores in Benin, the Republic of Congo, Côte d'Ivoire, and Niger, and with lower mathematics scores in Niger.

- *Crowding.* An indicator of crowding—the number of students per actual seat in class—was associated with lower reading scores in Cameroon and Côte d'Ivoire but with higher reading scores in Chad and the Republic of Congo.

School characteristics Some school conditions were also correlated with higher reading or mathematics performance—but, again, these conditions vary across countries. Only two school characteristics were generally associated with student performance:

- *Private school.* Lower-primary students in private schools outperform those in public schools in all countries, with statistically significant differences in seven countries for reading and in three countries for mathematics.
- *Free canteen.* Lower-primary students in schools that offer free meals to students score lower than students in schools without a free canteen in all countries, with statistically significant differences for reading in Benin, the Republic of Congo, Côte d'Ivoire, and Senegal, and with statistically significant differences for mathematics in Chad, the Republic of Congo, Côte d'Ivoire, and Senegal. This may be because of reverse causality, however, with free meals provided in disadvantaged schools.

The knowledge and skills that children bring with them to school from their homes seem to be the most important correlate of early primary learning. The policy implication of this is that countries need to take steps to compensate for home disadvantage, through more learning materials that children can take home and smaller classes in the early grades.

Upper-Primary Learning

At the upper-primary level, students' home language, and gender continue to be correlated with learning, but age and repetition emerge as significant characteristics. As with lower-primary students, a few classroom and school characteristics were also associated with achievement. The following discussion summarizes marginal effects from the full multilevel models summarized in online appendix B.5, tables B.5.3 and B.5.4.

Student characteristics Several student background characteristics, as measured in PASEC, were correlated with grade six student mathematics and reading performance:

- *Home language.* Children who spoke French at home outperformed those who never spoke French at home in seven countries on reading and in six countries on mathematics.
- *Gender.* Girls and boys performed equally well on the PASEC reading tests in six countries, while boys outperformed girls in three countries and girls outperformed boys in only one country. In mathematics, boys outperformed

girls in eight countries, while girls outperformed boys in two countries (Benin and Burundi). Differences ranged from 0.33 standard deviation higher for girls (Burundi) to 0.25 standard deviation higher for boys (the Republic of Congo).

- *Age.* Controlling for repetition, younger students outperformed older students in eight countries on reading and in seven countries on mathematics. The differences were small. No differences by age were observed for reading in Chad and Niger and for mathematics in Burkina Faso, Chad, and Niger.
- *Repetition.* Controlling for age, students who had ever repeated a grade generally performed less well than those who had not repeated in five countries on reading and in six countries on mathematics.

Classroom and school characteristics Only one classroom condition was associated with upper-primary learning in four or more countries, and only for mathematics: availability of textbooks. The share of students who could take a mathematics textbook home was correlated with higher mathematics scores in Burkina Faso, Côte d'Ivoire, and Senegal, but with lower scores in Chad.

A few school conditions were correlated with upper-primary learning in three or more countries:

- *School pedagogical resources.* A measure of school pedagogical resources—textbooks per student; textbooks, guides, and programs for teachers; teaching resources in class, such as maps and blackboards; and availability of furniture in the classroom—was positively associated with student learning in four countries (Benin, Cameroon, Chad, and Togo) for reading and in three countries (Benin, Cameroon, and Togo) for mathematics.
- *Community involvement.* Greater community involvement was associated with higher reading scores in Burkina Faso but with lower reading scores in Burundi, the Republic of Congo, and Togo.
- *Private schools.* Students enrolled in private schools outperformed those in public schools in three countries (the Republic of Congo, Niger, and Senegal) for reading and in three countries (the Republic of Congo, Senegal, and Togo) for mathematics. The differences were very large, in some cases more than 1 standard deviation in the scale score.
- *Large schools.* Students enrolled in larger schools outperformed those in smaller schools in Burkina Faso, Senegal, and Togo for reading and in Burkina Faso, Cameroon, and Senegal for mathematics. In Benin, however, students in larger schools scored below those in smaller schools.
- *Free canteen.* Students in schools that offer free meals (a free canteen) scored higher for reading in Burundi, Chad, and Togo but lower for reading in Burkina Faso and Cameroon than students in schools without a free canteen.

With respect to mathematics, free canteens were associated with higher scores in Burundi but with lower scores in Benin, Burkina Faso, and Cameroon. The association with lower scores may reflect programs targeting free meals to disadvantaged schools.

- *School SES.* The average SES of grade six students in the school was correlated with higher reading and mathematics scores in Cameroon and Côte d'Ivoire and with higher mathematics scores in Chad.

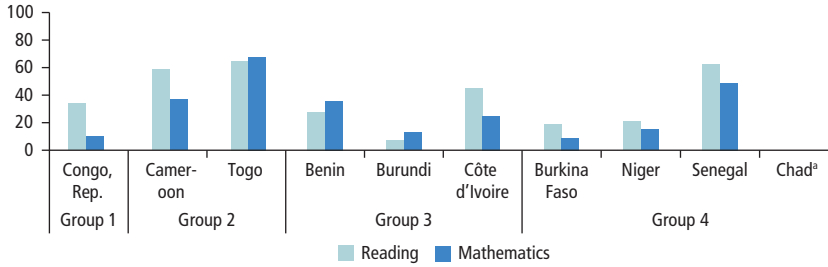
In summary, at the upper-primary level, student-level factors continue to affect learning. Household disadvantage affected student learning but principally through the differences in the quality of schools serving advantaged and disadvantaged students. Home language was strongly correlated with learning, although the effect was smaller than at the lower-primary level. The effects of gender were greater in upper-primary school, particularly affecting mathematics learning, with boys outperforming girls in most countries. Older students and those who had repeated grades performed less well than younger students and those who were nonrepeaters. School characteristics also were more correlated with learning in the upper-primary grades. But, again, variations across countries regarding which teaching and learning conditions influence learning (as measured in the PASEC assessment) suggest that interventions based on country-level analyses are desirable.

How Lower-Primary Learning Affects Upper-Primary Learning

In approximately half of schools in all countries that participated in PASEC 2014, the performance of both lower-primary and upper-primary students was assessed. In a few of these countries, a large share of the variance between schools in upper-primary learning could be explained by lower-primary learning (figure 2.33). For example, more than 50 percent of the variance between schools in reading in Cameroon, Senegal, and Togo was explained by lower-primary school average scores in reading. This suggests that improving upper-primary learning begins with improving learning at the lower-primary level.

Controlling for individual student background and school average lower-primary reading and mathematics scores, the correlates of classroom and school learning conditions vary dramatically across countries and between reading and mathematics (for details, see online appendix B.5, tables B.5.5 and B.5.6). For example, in the highest-performing country (Burundi), both higher reading and higher mathematics scores were associated with several factors: lower teacher absenteeism, free school canteen, and free learning supplies for children. In addition, the higher mathematics scores were associated with more female teachers, electricity in the class, more crowded classes, and the presence of school latrines or toilets, while lower scores were associated with private schools. By comparison, in another high-performing country (Senegal), *higher*

Figure 2.33 Percentage of Between-School Variance in Grade Six Reading and Mathematics Performance Attributable to School Average Grade Two Reading and Mathematics Scores, Francophone African Countries by Group, 2014



Source: Analysis of microdata from PASEC 2014.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries). For descriptions of country groups, see chapter 1 or notes to figure 2.3.
a. In Chad, the share was zero for both reading and mathematics. The variance between schools in upper-primary learning could not be explained by lower-primary learning.

reading scores were associated with regional planning, free supplies for children, and more teachers per classroom, and *lower* scores were associated with electricity in the classroom. Higher mathematics scores were associated with more community involvement, private schools, free supplies for children, and more teachers per classroom.

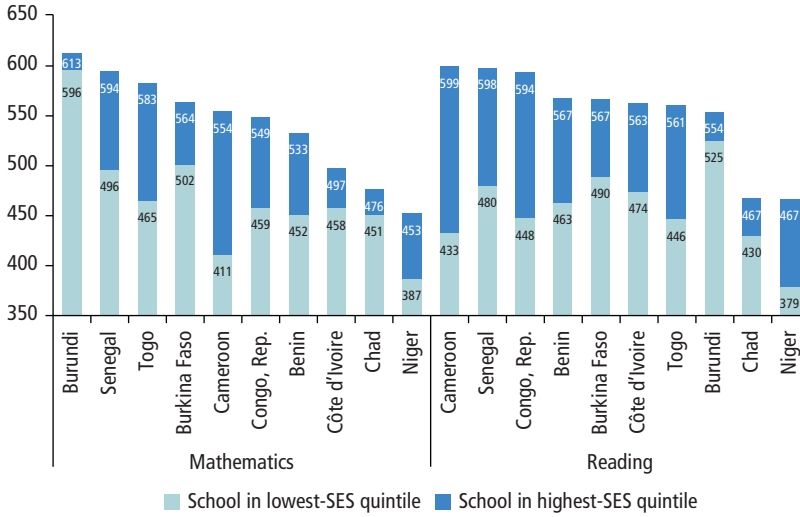
School Socioeconomic Status and Learning Resources

The association between a student's family background and reading and mathematics scores suggests that the average SES of a school's students may affect the learning of all the school's students. The school average SES (as measured for upper-primary students) was associated with lower-primary (grade two) reading and mathematics scores in Burkina Faso, Burundi, and Senegal but was unrelated to upper-primary scores in the other seven countries. However, there were sharp differences between the performance of students attending schools in the highest quintile of school SES and that of students attending schools in the lowest quintile of school SES—except in Burundi (figure 2.34).

In 9 of the 10 PASEC-participating countries, the reading and mathematics scores of students attending schools in the highest-SES quintile exceeded those of students attending schools in the lowest-SES quintile by an average of 72 points for reading and 55 points for mathematics. In Burundi, the difference was less than 20 points for reading and 30 points for mathematics.

Interestingly, the average mathematics score of students attending schools in Burundi's lowest-SES quintile (596) was higher than the average scores of

Figure 2.34 **Average Grade Six Mathematics and Reading Scores for Students in Schools in the Lowest Quintile of Socioeconomic Status and Schools in the Highest Quintile, Francophone African Countries, 2014**



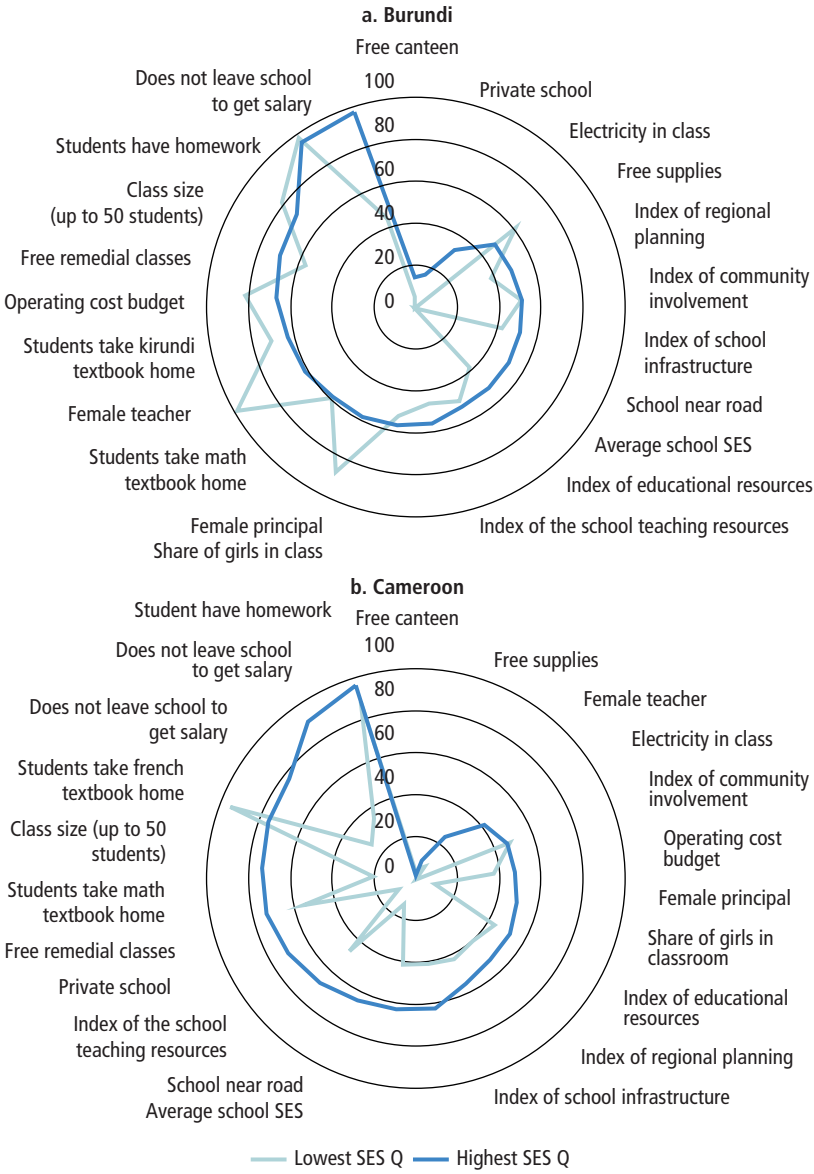
Source: Analysis of microdata from PASEC 2014.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SES = socioeconomic status.

students in the highest-SES-quintile schools in all other countries (ranging from 453 to 594). The reading scores of students attending schools in Burundi's lowest-SES quintile were also higher than comparable schools in the other countries—and higher than those of students attending schools in the highest-SES quintile in Chad and Niger.

In countries other than Burundi, students who attended schools in the lowest-SES quintile also attended highly disadvantaged schools with respect to teaching and learning conditions. In Burundi, students in low-SES schools (the light blue lines in figure 2.35, panel a) generally had access to the same types of learning conditions as those in high-SES schools (the dark blue lines in figure 2.35, panel a), sometimes with even more resources. But in most other countries (for example, Cameroon), students attending high-SES schools had access to many more learning resources than those in low-SES schools (figure 2.35, panel b).

What accounts for the greater equity in the distribution of resources in Burundi compared with other countries in the region? And does this distribution account for Burundi's relatively better performance? The education policies described earlier in this chapter (box 2.2) provide some answers.

Figure 2.35 Resources and Characteristics of High-SES versus Low-SES Schools in Burundi and Cameroon, 2014



Source: Analysis of microdata from PASEC 2014.
Note: PASEC = Programme d'analyse des systèmes éducatifs de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); Q = quintile; SES = socioeconomic status.

Correlates of Learning in Southern and Eastern Africa

SACMEQ III (2007)

Three analyses of the SACMEQ III data shed light on the correlates of learning across the countries and education systems in the region. Analyses of school, classroom, and teacher correlates of higher learning outcomes across the 15 East and Southern African countries that participated in SACMEQ III (2007) show that, after the intake characteristics of students have been taken into account: (a) countries differ as to which school, classroom, and teacher characteristics are correlated with higher student reading and mathematics scores; and (b) a few school, classroom, and teacher characteristics are consistently associated with higher student learning in the region's countries (Altinok 2013; Bietenbeck, Piopiunik, and Wiederhold 2017; Hungi 2011). These include greater student resources, more instructional time, and greater teacher knowledge, as further described below.

Unlike Hungi (2011) and Altinok (2013), Bietenbeck, Piopiunik, and Wiederhold (2017) combined data from SACMEQ II (2000) and SACMEQ III (2007) in their analysis. Some differences among the results from these three analyses of SACMEQ III are observed.

Student characteristics Characteristics consistently related to student learning were age (younger students scoring higher), gender (with different effects across countries), having repeated a grade (nonrepeaters scoring higher), socioeconomic status (higher-SES students scoring higher), speaking the language of the assessment at home (linked to higher reading scores), and absence from school (students with fewer days absent scored higher).

School resources Certain resources were strongly associated with higher student reading and mathematics scores in 10 countries (Hungi 2011). For example, the scores of students who lacked any textbook for mathematics or for reading fell substantially below the scores of students who had either sole access or shared access to textbooks in Botswana, Mauritius, Mozambique (mathematics only), Namibia, and the Seychelles (Hungi 2011). In addition, larger classes were associated with lower scores (Bietenbeck, Piopiunik, and Wiederhold 2017).

Instructional time Teacher absenteeism was related to lower student performance overall (Bietenbeck Piopiunik, and Wiederhold 2017) and to lower mathematics performance in Botswana, Malawi, Mozambique, and Uganda (Hungi 2011).

Teacher knowledge A strong association exists between higher teacher subject-matter knowledge and higher student scores overall (Bietenbeck, Piopiunik, and Wiederhold 2017). Stronger effects were observed for certain countries, with slight differences between analyses. Hungi (2011) found that students taught by teachers with higher reading and or mathematics scores performed better on

tests of reading and or mathematics in Botswana, Eswatini, Kenya, Namibia, South Africa, and Tanzania. Altinok (2013) found similar results for Botswana, Mozambique, Namibia, South Africa, and Tanzania only, however. Bietenbeck, Piopiunik, and Wiederhold (2017) estimate the effects of increasing teacher subject-matter knowledge in 12 SACMEQ countries to the same level as countries with the highest measured subject-matter knowledge: Kenya for mathematics and the Seychelles for reading. This would require increasing teacher scores by more than 100 SACMEQ points in mathematics in nine education systems (Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zanzibar) and by more than 100 SACMEQ points in reading in four education systems (Malawi, Mozambique, Tanzania, and Zanzibar). The overall estimated effect on student performance ranged from 0.03 to 0.08 standard deviation in mathematics and from 0.01 to 0.08 standard deviation in reading.

The correlation between teacher knowledge and student learning varies across student subgroups, countries, and analyses. For example, in some countries, teacher knowledge was more important for poor-performing students: Altinok (2013) found that weaker students learned better when taught by high-scoring teachers in Botswana, Eswatini, South Africa, and Uganda. In some countries, teacher knowledge was more important for students from high-SES backgrounds, while in other countries it was more important for middle-class students: Shepherd (2015) and Zakharov, Tsheko, and Carnoy (2016) found that, in South Africa, teacher subject knowledge and student learning were positively correlated only among high-SES students—a finding that may be linked to the country's unique history of apartheid. In Eswatini, by comparison, a positive correlation between teacher knowledge and student performance was found only among middle-SES students (Zakharov, Tsheko, and Carnoy 2016).

Finally, gender effects were observed. Across all countries, Bietenbeck, Piopiunik, and Wiederhold (2017) found heterogeneity of teacher knowledge effects by student and teacher gender. In three countries, Altinok (2013) found that female teachers exerted a positive and statistically significant impact on female students' learning outcomes.

SACMEQ IV (2013)

Microdata from two countries participating in the most recent SACMEQ IV study—Kenya and Malawi—were made available for regression analyses for this book. Preliminary results confirm much of the above for both countries. In Kenya, a high share of the variance in reading (44 percent) and mathematics (41 percent) learning was attributable to differences between schools. This was not the case in Malawi, however, where only 13 percent of the variance came from between-school differences. (Full multilevel regression analyses are included in online appendix B.6, tables B.6.1 and B.6.2.) These results point to

the importance of student and household characteristics, school resources, and instructional time.

Student and household characteristics In Malawi, several student characteristics were related to student learning: gender (boys scoring higher than girls); having repeated a grade (nonrepeaters scoring higher); socioeconomic status (higher-SES students scoring higher); speaking the language of the assessment at home (higher reading scores); absence from school (students with fewer absences scored higher); and maternal education (students with better-educated mothers scored higher). In Kenya, in addition to these characteristics, children who had attended preschool scored higher than those who had not.

School resources In Malawi, the only two school features correlated with student learning were having a female principal (higher scores) and having more permanent classrooms (higher scores). In Kenya, scores were higher in schools with a female principal and with more school facilities and lower in schools with a higher share of students from a low-SES background.

Instructional time In Malawi, the scores of students in schools where teachers had to leave school to retrieve their salaries—thus being unavailable to teach—were lower than those of students in schools where this was not the case.

Correlates of Lower-Secondary Learning in an International Context

Two countries in Sub-Saharan Africa—Botswana and South Africa—participated in the most recent (2015) cycle of the Trends in International Mathematics and Science Study (TIMSS), in which 56 countries and education systems participated globally. A stratified random sample of 159 schools and 5,964 students in Botswana and 292 schools and 12,514 students in South Africa participated. In both countries, ninth-grade students participated in the eighth-grade survey. The average performance of students in both countries, as reported earlier, fell well below the scale midpoint and well below the average for the other countries participating in the study.

The share of total variance in student performance that was due to differences between schools was large and consistent with the earlier results from SACMEQ III (2007): 25 percent in mathematics and 29 percent in science for Botswana, and 57 percent in both subjects for South Africa. More than 90 percent of the between-school variance in Botswana and 80 percent of the between-school variance in South Africa could be explained by student, teacher, and school-level factors. This section examines the correlates of lower-secondary student performance in mathematics and science. (For full multilevel regression analyses, see online appendix B.7, tables B.7.1 and B.7.2.)

Student characteristics Both mathematics and science scores were associated with student characteristics, including socioeconomic background, gender, age,

language spoken at home, and hours spent in homework. In both countries, students from higher socioeconomic backgrounds outperformed students from lower socioeconomic backgrounds. The effects of gender differed between the two countries: in both mathematics and science, girls outperformed boys in Botswana, whereas boys outperformed girls in South Africa. Older students performed less well than younger students. Regularly speaking the language of instruction at home boosted scores in South Africa but had no effect on scores in Botswana. Spending more time on academic homework was associated with lower science scores in Botswana but with higher mathematics scores in South Africa.

Teacher and classroom characteristics As measured in TIMSS, teacher and classroom characteristics were unrelated to students' test scores, with a few exceptions. Longer teaching experience was positively associated with student science scores in Botswana but was unrelated to student performance in South Africa. The teacher's gender (female) was related to higher math performance in South Africa but was unrelated to science performance in that country, and teacher gender was unrelated to student performance in either subject in Botswana. Students in larger classes performed less well than those in smaller classes in South Africa, but class size was unrelated to student performance in Botswana. Teaching that was engaging, as reported by students, was associated with lower student performance in South Africa but was unrelated to performance in Botswana.

School characteristics Student scores in mathematics and science were associated with a few school-level characteristics, the most important of which was the average SES of students in the school. The higher the SES of students in the school, the higher the mathematics and science scores in both countries. Of the many school-level characteristics that could be correlated with student learning, only a few remained statistically significant after the effect of average school-level SES was taken into account. In Botswana, schools in small towns, villages, or remote rural areas had lower student scores than schools in cities. And in South Africa, the mathematics and science scores of students in schools where less than 25 percent of students were tested in their home language were significantly lower than the scores of students in schools where a higher share of students spoke the language of the test at home.

Several school characteristics were unrelated to student performance in either country after the effects of student characteristics, teacher characteristics, and school average SES were taken into account: resource shortages (as reported by the school principal), a school emphasis on academic success, school discipline problems, teacher tardiness and absenteeism, school tracking, and incentives for mathematics and science teachers.

More advantaged schools with more advantaged students In both countries, schools with a higher share of socioeconomically advantaged students also benefited from resources and could be considered "advantaged" schools. In both countries, the average score difference between students in high-SES schools versus those in low-SES schools was about 0.5 standard deviation on the TIMSS scale (table 2.1). In both countries, low-SES schools reported having fewer resources for learning; in Botswana, schools reported that mathematics and science instruction was affected by shortages of instructional materials for these subjects.

Science and mathematics teachers in low-SES schools reported more severe problems with physical infrastructure issues such as building repair (for example, reported as a "serious problem" by 40 percent of math teachers in low-SES schools in Botswana compared with 23 percent of teachers in high-SES schools)

Table 2.1 Average TIMSS Mathematics Scores of Grade Nine Students and Selected Resources and Practices of Schools in Botswana and South Africa, by School-Average Socioeconomic Status, 2015

	Botswana		South Africa	
Measurement	**Low-SES schools**	**High-SES schools**	**Low-SES schools**	**High-SES schools**
School characteristics				
Math score (TIMSS grade 9)	376	427*	333	388*
School SES	8.13	9.41*	8.29	9.71*
Less than 25% of students speak language of test at home (%)	92	84	80	71*
School is in small town, village, or remote rural area (%)	86	49*	87	61*
Reported by math or science teacher				
School is less than safe and orderly (%)	28	31	19	14
School has moderate to severe problems in conditions and resources (%)	76	66	74	42*
School has less than high emphasis on academic success (%)	86	70*	54	53
Reported by school principal				
School has less than high emphasis on academic success (%)	93	67*	67	71
Instruction affected by math or science resource shortages (%)	100	93*	98	89*
School has moderate to severe discipline problems (%)	25	13*	36	30
School uses incentives for math or science teachers (%)	21	38	6	8

Source: Analysis of microdata from TIMSS 2015.
Note: SES = socioeconomic status; TIMSS = Trends in International Mathematics and Science Study. "High-SES" schools were those above the country-specific median for school average SES; "low-SES" schools were those below the country-specific median for school average SES.
*$p < .01$ for difference between high-SES and low-SES schools.

and maintenance (for example, reported as "not a problem" by 8 percent of science teachers in low-SES schools in South Africa compared with 28 percent of teachers in high-SES schools). Teachers in low-SES schools also reported problems with the availability of instructional materials, information and communication technology (ICT) resources, and support for ICT.

This analysis underscores the sharp differences between the quality of schools serving less advantaged students and those serving more advantaged students. Teachers and principals in most schools reported that academic and other resource shortages affected their schools, but the disadvantages in schools serving low-SES students were greater than those serving higher-SES students. These issues are examined further in chapter 3.

Summary of Correlational Studies: One Size Does Not Fit All

These analyses of the correlates of learning in Sub-Saharan Africa clearly show that students' home backgrounds affect their learning outcomes and that early learning affects later learning; these results are consistent with global evidence. Moreover, these analyses also demonstrate that children from disadvantaged households often attend schools that are disadvantaged in terms of learning conditions. The share of between-school variance in the Sub-Saharan Africa countries is generally larger than in countries in other regions, which suggests that equity may be a larger issue for African countries.

The detailed analyses also demonstrate that the school and classroom characteristics correlated with learning outcomes vary enormously across countries. That is, the types of school and classroom practices that improve learning outcomes take on different "sizes" in different countries. The implication of this is that countries need to be able to address their own educational situations, using data from their own systems.

The next section reviews the evidence from RCTs of interventions that were implemented in Sub-Saharan Africa to specifically enhance the learning outcomes (and school participation) of students, especially those from more disadvantaged backgrounds.

Effective Interventions in Sub-Saharan Africa

Carefully designed randomized controlled trials (RCTs) provide the strongest evidence regarding what works in education. Relatively few RCTs have been carried out in Sub-Saharan Africa. The most recent meta-analysis of interventions to improve learning or increase school participation (enrollment and attendance) in Sub-Saharan Africa covers 56 studies of 52 unique interventions carried out in 21 countries, 1990–2015 (Snilstveit et al. 2015).[22] It includes all impact evaluations through 2013 reviewed by Evans and Popova (2015) but

adds more recent studies through 2015; it also estimates the effect sizes for each intervention, allowing a comparison of their effectiveness. The review covers interventions for primary and lower-secondary education, although most are for primary education.

The review includes the following intervention targets:

- *Child-level* interventions aimed at improving children's ability to benefit from schooling or increasing their motivation to invest time and resources in their own education
- *Household-level* interventions aimed at reducing or removing household financial barriers to education
- *School-level* interventions aimed at improving the quality of the learning environment in schools and classrooms
- *Teacher-level* interventions aimed at teachers directly, such as hiring more teachers, reducing the teacher-student ratio, or improving teacher training
- *System-level* interventions aimed at changes to the education system at the community, local government, and district/state or national levels
- *Multilevel* interventions that included any combination of interventions aimed at two or more of the above-noted levels

In many cases, interventions implemented in other low- and middle-income countries have not been implemented in Sub-Saharan Africa (table 2.2). The most-studied interventions in the region were structured pedagogy (11 studies) and cash transfers (7 studies). There were no impact evaluations of three interventions—computer-assisted learning, remedial education, and diagnostic feedback—and only one impact evaluation of teacher training in Sub-Saharan Africa. Also, impact evaluations of certain interventions that are particularly applicable to countries in Sub-Saharan Africa were not undertaken during the review period, particularly impact evaluations of providing boarding schools and changing the language of instruction. Overall, there were 11 studies each of child and household interventions, 18 studies of school-level interventions, 5 studies of teacher-level interventions, 8 studies of system-level interventions, and 3 studies of multilevel interventions.

In terms of country coverage, Kenya, with 20 studies of various interventions, is the clear outlier among Sub-Saharan African countries. Other countries with impact evaluations of interventions are Uganda (6); Burkina Faso (4); Madagascar, Malawi, and South Africa (3 each); The Gambia, Niger, and Senegal (2 each); and the 12 remaining countries, with 1 study each (table 2.3). In most cases, the average effect sizes in Sub-Saharan Africa represented a small number of studies relative to the number of studies included in calculating the average effect size for all studies.

Table 2.2 Types of Interventions to Boost Learning Evaluated by High-Quality Studies in Low- and Middle-Income Countries, Globally and in Sub-Saharan Africa, 1990–2015

Intervention level	Intervention type	All studies	Studies in Sub-Saharan Africa	Sub-Saharan African countries and number of studies per country (in brackets)
Child	School feeding programs	16	3	Burkina Faso (1), Kenya (1), Senegal (1)
	School-based health programs	16	5	Kenya (3), Malawi (1), Zambia (1)
	Providing information to children	4	1	Madagascar (1)
	Merit-based scholarships	11	2	Benin (1), Kenya (1)
Household	Cash transfers	49	7	Malawi (2), Burkina Faso (1), Lesotho (1), South Africa (1), Tanzania (1), Zimbabwe (1)
	Reducing or eliminating user fees	9	4	Gambia, The (1), Kenya (1), South Africa (1), Uganda (1)
School	Structured pedagogy	21	11	Kenya (5), Uganda (2), Liberia (1), Mali (1), South Africa (1), Sudan (1)
	Computer-assisted learning	18	None	
	Remedial education	4	None	
	Extra time in school	3	1	Ethiopia (1)
	Grouping students by ability	3	1	Kenya (1)
	New schools and infrastructure	7	2	Kenya (1), Niger (1)
	Interventions providing materials	4	3	Kenya (2), Sierra Leone (1)
Teacher	Teacher incentives	10	1	Kenya (1)
	Diagnostic feedback	2	None	
	Teacher training	1	1	Congo, Dem. Rep. (1)
	Hiring additional teachers	8	3	Kenya (2), Togo (1)
System	School-based management	14	3	Gambia, The (1), Niger (1), Senegal (1)
	Community-based monitoring	11	4	Uganda (2), Kenya (1), Madagascar (1)
	Public-private partnerships and private provision of schooling	13	1	Uganda (1)
Multilevel	"Multilevel" interventions	12	3	Burkina Faso (2), Kenya (1)

Source: Compiled from Snilstveit et al. 2015.

Table 2.3 Number of Learning Intervention Studies in Meta-Analysis, Sub-Saharan African Countries

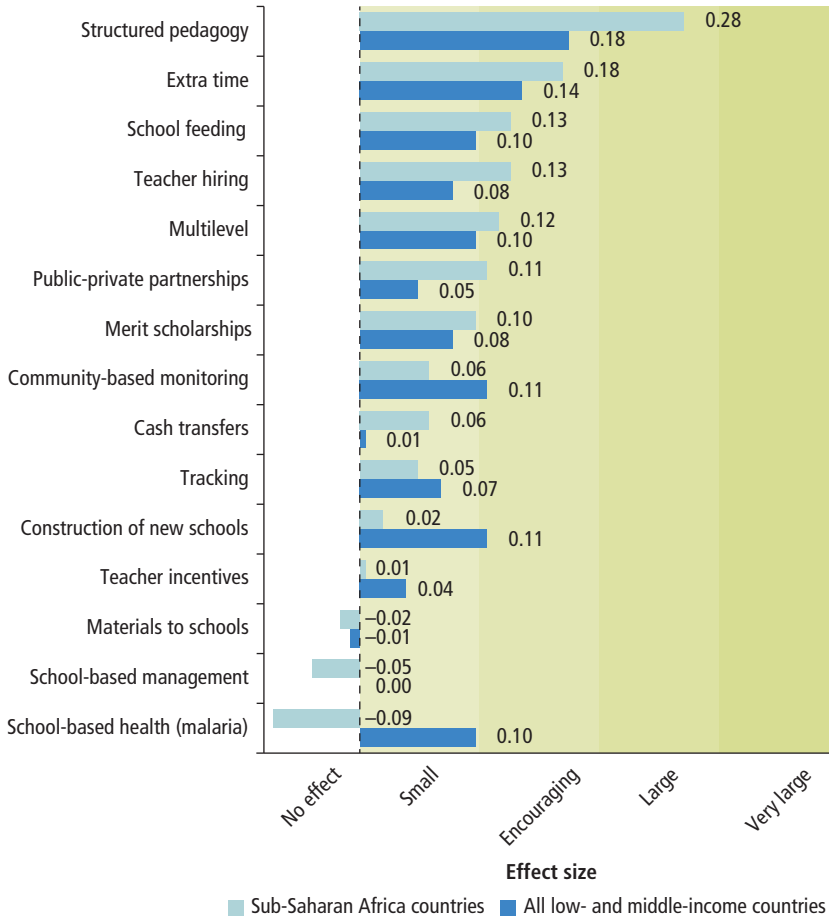
Number of studies per country	Countries
20	Kenya
6	Uganda
4	Burkina Faso
3	Malawi; South Africa
2	Gambia, The; Madagascar; Niger; Senegal
1	Benin; Congo, Dem. Rep.; Ethiopia; Lesotho; Liberia; Mali; Sierra Leone; Sudan; Tanzania; Togo; Zambia; Zimbabwe

Source: Compiled from Snilstveit et al. 2015.

Interventions That Improve Learning

On average, the impacts (effect sizes) of the specific types of interventions to boost learning in Sub-Saharan African countries were larger than the impacts of comparable interventions across all low- and middle-income countries (as shown in figure 2.36). Interventions targeted at the school and teacher, as well as "multilevel" interventions, showed the greatest impact on

Figure 2.36 Average Effectiveness of Interventions to Boost Learning Outcomes, Sub-Saharan African Countries Compared with All Low- and Middle-Income Countries



Source: Constructed from Snilstveit et al. 2015; data in online appendix B.8.
Note: "Extra time" refers to added learning time through an extended school day or year. "Multilevel" refers to interventions that target all levels: students, teachers, schools, and parents. "Structured pedagogy" is a package of teacher training, ongoing pedagogical support, and instructional materials. "Effect size" refers to the effectiveness of a given intervention, shown as a unit of 1 standard deviation: effect sizes of less than 0.1 are "small," of 0.1–0.25 are "encouraging," and of more than 0.25 are "large."

improving learning in Sub-Saharan Africa (for details, see online appendix B.8.) Teacher interventions appear particularly important in the region compared with all low- and middle-income countries. These are discussed further in chapter 4.

Some specific interventions were more effective than others, and some were more effective in the region than across all low- and middle-income countries globally (figure 2.36). The five top interventions that boosted learning in Sub-Saharan Africa were the following:

- *Structured pedagogy*, with an average effect size of 0.28 (in Kenya, Liberia, Mali, South Africa, and Uganda), defined as a package of teacher training, ongoing teacher support, resources or materials for teachers, and classroom learning materials for students
- *Additional time for learning*, with an average effect size of 0.18 (in Ethiopia), defined as a longer school day through eliminating "shifts" or adding extra learning time to the school day or year
- *School feeding* (in Burkina Faso, Kenya, and Senegal), defined as in-school meals or take-home rations
- *Teacher hiring* (in Kenya and Togo), defined as the addition of teachers, including contract teachers
- *Multilevel interventions* (in Burkina Faso and Kenya), defined as packages of additional classrooms, instructional materials, longer school days, uniforms, meals, additional teachers, and parent training

Earlier in the chapter, box 2.3 described some of the most effective interventions in greater detail, including examples selected to represent school feeding and structured pedagogy interventions with some of the larger effect sizes on student learning. Box 2.4 describes a "multilevel" program (BRIGHT, for Burkinabe Response to Improve Girls' Chances to Succeed) that has gone to scale in Sub-Saharan Africa and continues to be effective in boosting learning.

Interestingly, school-based health (malaria) interventions, materials to schools, and school-based management interventions had negative effects on learning outcomes such as mathematics and language test scores in Sub-Saharan African countries. Interventions that did not improve learning meaningfully (effect sizes below 0.10) or even in some cases, negatively, include the following:

- School-based health interventions
- Community-based monitoring
- Cash transfers

BOX 2.4

BRIGHT: A "Multilevel" Education Intervention Targeting Girls in Rural Burkina Faso

Burkinabe Response to Improve Girls' Chances to Succeed (BRIGHT) refers to a "girl-friendly" primary school construction program in rural Burkina Faso that sought to increase girls' primary school enrollment and completion rates in the 10 provinces with the lowest rates of girls' primary school enrollment. The BRIGHT program consisted of the construction of 132 primary schools and the development of a set of complementary interventions designed to increase girls' enrollment rates. The schools were based on a model that included three classrooms, housing for three teachers, and separate latrines for boys and girls. Their locations within each selected village were deliberately chosen to be near water sources, and a borehole was installed close to each one. Three classrooms (grades one through three) were built in each of the 132 schools between 2005 and 2008, with three additional classrooms (grades four through six) built between 2009 and 2012.

The complementary interventions implemented throughout these seven years included the following:

- School canteens (daily meals for all boys and girls who attended school)
- Monthly take-home rations for girls who had a 90 percent attendance
- School kits and textbooks for all students
- A community mobilization campaign around girls' education
- Adult literacy training and mentoring for girls
- Local partner capacity building for local officials in the Ministry of Basic Education (MEBA), *bisongo* (day-care) monitors, and teachers

The program was implemented with fidelity. An impact evaluation compared outcomes for children in the 132 BRIGHT villages (participant group) with children in 161 similar villages that applied to participate in BRIGHT but were not chosen (comparison group). Short-, medium-, and long-term assessments were made in 2008, 2012, and 2015, respectively.

Table B2.4.1 shows difference in outcomes between children in BRIGHT schools and children in comparison schools. In all cases, outcomes are more positive for children in BRIGHT schools. After 10 years, BRIGHT continued to have large positive impacts on school enrollment and test scores, even though the magnitude of the impacts declined over time. Primary school completion rates were also higher for children in BRIGHT schools, and the size of the effect was greater for girls. The impacts on test scores were greater for girls than for boys.

(continued next page)

Box 2.4 (continued)

Table B2.4.1 Impacts of BRIGHT on Primary School Enrollment, Test Scores, and Completion Rates in Burkina Faso, 2008–15

Impact type	2008	2012	2015
Self-reported enrollment (ppts)	18.5***	15.4***	6.0***
Present in school on day of visit (ppts)	16.0***	n.a.	n.a.
Test scores, math (sd)	0.40***	0.29***	0.19***
Test scores, French (sd)	0.37***	0.29***	0.18***
Completed primary school: girls (ppts)	n.a.	n.a.	13.5***
Completed primary school: boys (ppts)	n.a.	n.a.	8.8***

Source: Davis et al. 2016.
Note: n.a. = not applicable; BRIGHT = Burkinabe Response to Improve Girls' Chances to Succeed; ppts = percentage points; sd = standard deviation; The entries in the table compare BRIGHT student outcomes with a control group of students.
*** $p < .01$.

- Tracking
- Teacher incentives
- School materials
- New schools
- School-based management

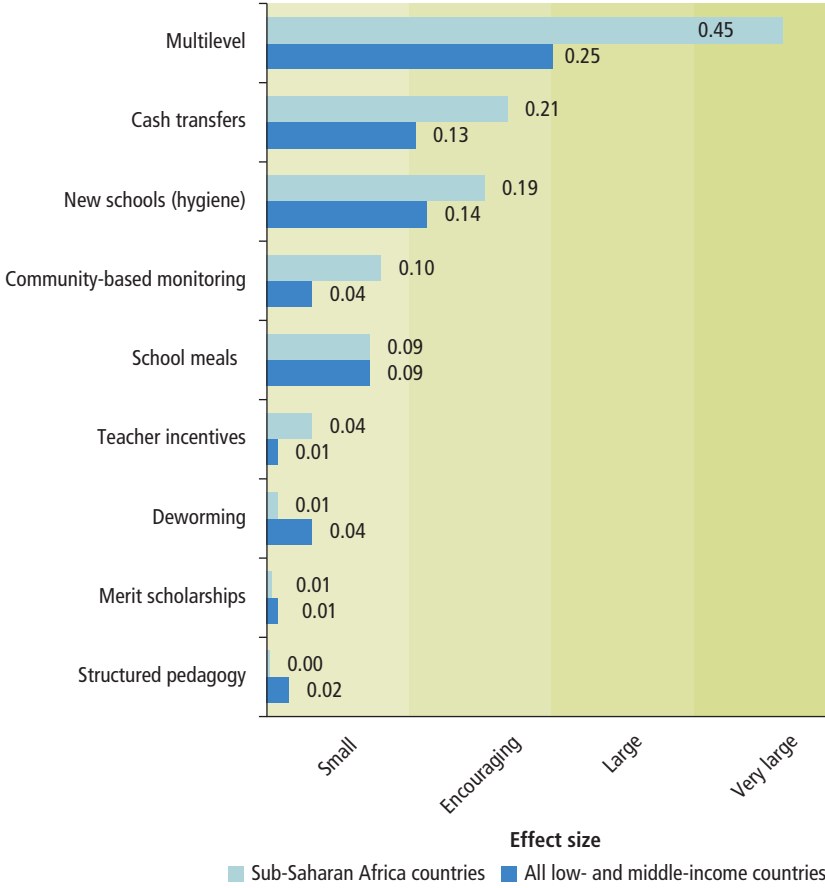
In a few cases, the impact of interventions on specific learning outcomes (either reading, mathematics or "composite" test scores) in the region was significantly larger than the impact of comparable interventions across all countries. Three of these were:

- *Structured pedagogy interventions* increased *mathematics and language arts test* scores more in Sub-Saharan Africa (effect size = 0.28 vs. 0.18, the average effect size for all countries).
- *School feeding programs* increased *composite test scores* more in Sub-Saharan Africa (average effect size for Kenya and Senegal = 0.26 vs. 0.14).
- *Public-private partnerships* increased *mathematics test* scores in Uganda (effect size = 0.14 vs. 0.05).

Interventions That Improve Student Attendance

Several education interventions improved student attendance in Sub-Saharan Africa, with effects that were generally more pronounced for the region's countries than among all low- and middle-income countries (figure 2.37).

Figure 2.37 Average Effectiveness of Interventions to Boost Student Attendance, Sub-Saharan African Countries Compared with All Low- and Middle-Income Countries



Source: Constructed from Snilstveit et al. 2015; data in online appendix B.8.
Note: "Multilevel" refers to interventions that target all levels: students, teachers, schools, and parents. "Structured pedagogy" is a package of teacher training, ongoing pedagogical support, and instructional materials. "Effect size" refers to the effectiveness of a given intervention, shown as a unit of 1 standard deviation: effect sizes of less than 0.1 are "small," of 0.1–0.25 are "encouraging," of more than 0.25–0.40 are "large," and of more than 0.40 are "very large."

Multilevel interventions, cash transfers, improving hygiene in school infrastructure, and community-based monitoring had meaningful impacts on raising student attendance (effect sizes = 0.10 or better). The effect size for multilevel interventions on student attendance in Sub-Saharan African countries was particularly large (0.45). Box 2.5 highlights some of the specific interventions in the region that proved successful in boosting student attendance.

BOX 2.5

Examples of Interventions to Boost Student Attendance in Sub-Saharan African Countries

Multi-level Interventions

Among the multilevel interventions that have boosted student attendance successfully is the Burkinabe Response to Improve Girls' Chances to Succeed (BRIGHT) program, described earlier in box 2.4. Below are several examples of the next most effective intervention types: cash transfers and hygiene infrastructure.

Cash Transfer Interventions

The Zomba Cash Transfer Programme in Zomba, Malawi, promoted school attendance of secondary-level students through monthly cash transfers to households and direct payments of school fees (Baird, McIntosh, and Özler 2010). Conditionality was based on monthly student school attendance. The cash payment points were centrally located: well-known places such as churches or schools. The conditional cash transfer program raised student attendance by 54 percent of 1 standard deviation, while the unconditional program raised attendance by 37 percent of 1 standard deviation.

The Zimbabwe Manicaland HIV/STD Prevention Project in urban and peri-urban schools provided households with a base cash transfer and an additional per-child transfer (up to a maximum of three children) (Robertson et al. 2013). Households in conditional cash transfer clusters were monitored for children's school attendance, and spot checks were done to verify. The conditional cash transfer program raised attendance by 36 percent of 1 standard deviation, and the unconditional program raised attendance by 30 percent of 1 standard deviation.

Hygiene Infrastructure Intervention

Hygiene promotion, water treatment, and sanitation in Kenya comprised two different interventions (Freeman et al. 2012). The first was a hygiene promotion and water treatment intervention that provided a three-day training for teachers on hygiene promotion, behavior change, and water treatment methods as well as regular follow-up visits throughout the school year. The program provided handwashing and drinking-water containers as well as a one-time, one-year supply of WaterGuard (a 1.2 percent chlorine-based, point-of-use water disinfectant). The second intervention provided all these, plus latrines. In addition, students in both interventions and in control schools were dewormed twice with a single 400 milligram dose of albendazole. The program raised student attendance by 19 percent of 1 standard deviation.

Summary: Implementing What Works in Africa

The analyses of learning in Sub-Saharan Africa show the following:

- The "crisis in learning" in Sub-Saharan Africa is clear: learning levels are low compared with countries in other regions, although there is evidence of improvements in some countries.

- Learning levels in Group 1 countries are generally higher than those in other country groups in the region, suggesting that countries can expand access while focusing on learning outcomes.
- Comparing the learning outcomes of students in Sub-Saharan Africa with those in other regions is hampered by the large differences between the backgrounds of students in this region and students in other parts of the world. A much higher share of students in Sub-Saharan Africa are disadvantaged with respect to household SES, with few home resources for learning, and are much likelier to live in rural settings and travel long distances to school.
- Home language plays an important role in shaping learning outcomes in Sub-Saharan Africa. The disconnect between language used at home and the language used in school sharply affects learning. A much higher share of students in Sub-Saharan Africa than in other regions do not speak the language of instruction at home, which strongly affects their early literacy and numeracy and continues to disadvantage these students as they move through the primary and lower-secondary levels of schooling.
- Gender differences in learning differ across countries, with girls outperforming boys in some countries and boys outperforming girls in other countries. Globally, few gender differences are found at the primary and lower-secondary levels, but in Sub-Saharan Africa, particularly in Group 1 countries, the average performance of girls is better in reading, and the performance of boys is better in mathematics.
- A high share of the variance in student learning outcomes comes from differences *between* schools rather than differences *within* schools, suggesting inequality in learning opportunities—for example, as follows:
  - Much of the between-school difference in learning outcomes can be explained by the average SES of the students in the school.
  - Students attending "high-SES schools" are typically advantaged by better learning environments: schools that have more resources, more emphasis on academic success, and fewer discipline problems. In francophone Africa, Burundi stands out for its greater equity across schools and higher student achievement.
- Early learning appears to have consequences for later learning. In francophone Africa, at the school level, there is a strong correlation between early literacy and numeracy and later literacy and numeracy.
- After considering average school SES, few school and classroom characteristics are consistently associated with student learning, and those that *are* correlated with higher student learning outcomes vary widely across

countries—underscoring the need for each country to conduct its own analysis to identify areas for potentially effective policy interventions.

Relatively few impact evaluations of specific interventions in Sub-Saharan Africa have been carried out in countries other than Kenya. The causal evidence that some interventions increase learning outcomes or improve student attendance is quite strong, however. This evidence can provide some guidance to countries seeking to improve on either score.

To boost student learning, the most effective interventions, mainly at the school and classroom levels, were the following:

- *Structured pedagogy*, particularly for language arts (reading and writing), as in Liberia and South Africa
- *Extra learning time*, specifically in Ethiopia
- *School feeding* for younger students, especially in Kenya and Senegal
- *Hiring contract teachers*, particularly in Togo
- *Multilevel interventions* that include many of the above features, particularly in Kenya

To increase student school attendance, the most effective interventions were the following:

- *Multilevel interventions*, such as the BRIGHT program in Burkina Faso
- *Cash transfers* to families, especially in Malawi and Zimbabwe
- *New schools with hygiene facilities,* which was also the most effective intervention for raising school enrollments in low- and middle-income countries overall, with an average effect size of 0.38
- *Community-based monitoring*

Some interventions were found to have negative impacts on student learning, however. The weight of evidence for four interventions—including school-based management—indicates that they do not work in the region.

And some interventions that are especially relevant for countries in Sub-Saharan Africa have not been rigorously evaluated for their effect on student outcomes. These include the use of ICT in teaching, boarding schools, and use of the child's home language as the language of instruction in early grades. These interventions are discussed further in chapter 3.

The policy implications from this review are clear:

- Greater attention needs to be paid to students who enter school with home disadvantages, particularly rural students, those who are unfamiliar with the language of instruction, and those whose families lack home learning resources.

- Greater attention needs to be paid to equalizing the conditions for learning across schools in most countries, and particularly in francophone countries.
- Countries in Groups 1 and 2 may wish to focus on the effective interventions that *increase learning* in Sub-Saharan Africa, whereas countries in Groups 3 and 4 may be able to *improve enrollments* through the implementation of interventions that have proven effective in other countries.
- Effective implementation of evidence-based interventions is essential for ensuring positive results.

A caveat to the discussion above is that, because relatively few studies evaluated specific interventions in Sub-Saharan Africa, it is not possible to say for certain how generalizable any one intervention may be. Nevertheless, two interventions—structured pedagogy and school feeding—increase students' learning outcomes across most contexts in Sub-Saharan Africa and have been studied extensively. Five other interventions show promise for boosting student learning: additional learning time, additional teachers, "multilevel" interventions, public-private partnerships, and merit-based scholarships. Interventions that are effective for improving school attendance are multilevel interventions, such as a combination of cash transfers, new schools, and community-based monitoring.

From a policy perspective, knowledge of the effectiveness of any intervention must be complemented with knowledge about the costs of the intervention and the feasibility of implementing at scale. Regrettably, the costs of many interventions are relatively unknown. Hence, it is difficult to compare their cost-effectiveness while making policy choices.

Notes

1. The large-scale assessments (data collection dates in parentheses) included the Second International Science Study (International Association for the Evaluation of Educational Achievement [IEA], 1983–84); Second International Mathematics Study (IEA, 1980–82); International Assessment of Educational Progress (Educational Testing Service [ETS], 1988, 1991); Study of Reading Literacy (IEA, 1990–91); Trends in International Mathematics and Science Survey (TIMSS) (IEA, 1995, 1999, 2003, 2007, 2011, 2015); Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) 1995, 2000, 2007, 2013; Programme for International Student Assessment Plus (PISA+) (Australia Council for Educational Research [ACER], 2010); Progress in International Reading Literacy Study (PIRLS) (IEA, 2011); and the Programme d'analyse du systémes éducatif de la CONFEMEN (PASEC) (Conference of Ministers of Education of French-Speaking Countries [CONFEMEN], 2014).
2. Among the 15 education systems, mainland Tanzania and the semiautonomous Tanzanian archipelago of Zanzibar have separate education systems.

3. The simple correlations between these cognitive skills and average interannual GDP growth per capita for these 13 countries are close to zero: −0.007 for math scores and −0.074 for reading scores.
4. The minimum performance levels are as follows, by assessment: STEP, reading at level 2 and above; TIMSS, mathematics percentage "low" and above; PASEC, mathematics percentage "sufficient" and above; PASEC, reading percentage "sufficient" and above; SACMEQ, mathematics percentage at level 4 and above; SACMEQ, reading percentage at level 4 and above; SDI, percentage who can read a sentence; EGRA, percentage above zero score; PISA-plus, reading, mathematics, and science percentages at level 2 and above.
5. Botswana tested students in grade eight in 2003 and 2007 but tested students in grade nine in 2011 and 2015. Ghana tested students in grade eight only. South Africa tested students in both grade eight and grade nine in 2003 but tested students in grade nine in 2011 and 2015. Comparisons of scores across years need to take into account any differences in the grades tested.
6. "High international benchmarks" refers to high TIMSS performance.
7. PISA Plus refers to the 2010 administration of PISA 2009 in 10 non-OECD countries (Walker 2011).
8. "PISA for Development" refers to a pilot project to increase low- and middle-income countries' use of PISA assessments by using enhanced PISA survey instruments that are more relevant to the contexts of those countries but that also produce scores on the same scales as the main PISA assessment (OECD 2016).
9. For example, on Level 3, "Students are able to combine two pieces of explicit information from a document or can carry out simple inferences in a narrative or informative text" (PASEC 2015, 47).
10. Mainland Tanzania and the semiautonomous Tanzanian archipelago of Zanzibar have separate education systems.
11. The language of instruction (LOI) in government schools in South Africa can be any official language. Many schools teach in an African language for grades one through three and switch to English LOI in grade four (Trudell 2016).
12. The prePIRLS assessment (now known as PIRLS Literacy), introduced in 2011 to make it easier for low- and middle-income countries to assess student ability at the end of the primary school cycle, is oriented toward the more basic elements of reading. Only three low- or middle-income countries participated in the prePIRLS assessment in 2011: Botswana, Colombia, and South Africa.
13. Scale center points on all assessments were set at 500, with the standard deviation set at 100 points.
14. The World Bank's Africa-wide SDI initiative collects data to assess the quality and performance of education and health services. It was launched in 2010 with pilot surveys in Senegal and Tanzania, followed by the first SDI survey in Kenya in 2012. Other surveys followed in Nigeria, Togo, and Uganda in 2013; Mozambique and Tanzania in 2014; and Niger and Madagascar in 2016. For more information, see the SDI website: http://www.sdindicators.org/.
15. The Malawi assessment was similar to that of SDI, but was not conducted as part of the regular SDI. Instructions were read aloud by the enumerators with a written test administered in a class setting.

16. The figures report the share of students in government primary schools in each country who have certain competencies. In Tanzania, the results in language are for 2,736 students, because the remainder were tested in Swahili. Individual country statistics are calculated using country-specific sampling weights (Bold et al. 2017).
17. The EGRA assessment asks the child to read words in a short paragraph and answer five simple questions about what he or she had read.
18. Neither the school location (urban or rural) nor the individual student characteristics (gender, age, motivation, and home SES) explains anything near this amount of between-school variance, and the full models explain 77 percent of the between-school variation in Botswana and 68 percent in South Africa.
19. These 31 items were (from Question 14 of the Student Questionnaire) the following: daily newspaper, weekly or monthly magazine, clock, piped water, borehole, table to write on, bed, private study area, bicycle, donkey or horse cart, car, motorcycle, tractor, electricity (mains, generator, solar), refrigerator/freezer, air conditioner, electric fan, washing machine, vacuum cleaner, computer, Internet, radio, TV, VCR player, DVD player, CD player, audiocassette player, camera, digital camera, video camera, and telephone or cell phone (Spaull 2012).
20. Indicators of teaching quality included, for example, better teacher attendance and more academic contact time between students and teachers.
21. The 3ie review covered 52 low- and middle-income countries and included 56 studies from Sub-Saharan Africa, 38 studies from East Asia and the Pacific, 87 studies from Latin America and the Caribbean, 51 studies from South Asia, two studies from the Middle East and North Africa, and one study from Europe. Multiple reports on the same interventions account for differences in the number of reports, impact evaluations, and interventions.
22. The Snilstveit et al. (2015) review was sponsored by the International Initiative for Impact Evaluation (3ie), London.

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Chapter 3

The Unfinished Agenda for Reaching Universal Basic Education

Introduction

This chapter focuses on how to improve progression and learning in basic education in Sub-Saharan Africa. When considering progress, we analyze three sets of issues:

- Building strong foundations of learning in the early grades
- Addressing bottlenecks to progressing from primary to lower-secondary education
- Expanding lower-secondary education cost-effectively while improving its quality and relevance

Equity is a crosscutting theme in this chapter because poor children, rural children, and girls are disproportionately affected by inadequate access and stifled progression through the system.

The Organisation for Economic Co-operation and Development (OECD) describes equity in education in two dimensions (OECD 2008): the first dimension is fairness—that is, ensuring that personal and social circumstances (for example, gender, socioeconomic status, disability, or ethnic origin) are not obstacles to achieving educational potential. The second dimension is inclusion—that is, ensuring a basic minimum standard of education for all (for example, ensuring that everyone can read, write, and do simple arithmetic). The two dimensions are closely intertwined: a fair and inclusive system that makes the advantages of education available to all is one of the most powerful levers to make society more equitable. Equity differs from equality in that the former emphasizes fairness and inclusion, whereas the latter is based on students getting the same resources (box 3.1). There are many paths to equity,

BOX 3.1

Equality versus Equity in Education

Equality in education is achieved when students are all treated the same and have access to similar resources. Equality can only be achieved if everyone starts at the same place. *Equity* is about fairness and is achieved when all students receive the resources they need so they graduate prepared for success after school. Sometimes differences in history create barriers to education participation, so we must first have equity in resources before equality can be achieved. This may require providing more resources to certain groups of students to overcome background and contextual challenges.

Source: CPE 2016.

including funding, comprehensive family support for disadvantaged children, good teachers, and mentorship and counseling for students.

The first part of this chapter addresses the issue of overenrollment, particularly in the first grade of primary school; poor learning environments and instructional practices in early grades; and the language of instruction.

The second part of the chapter describes the disparities in access to and progress in basic education (defined as nine years of schooling, comprising primary and lower-secondary education). It focuses on the reasons why children are dropping out of basic education, including structural barriers such as high-stakes examinations, which are a bottleneck for students to progress from primary to lower-secondary education in many African countries.

The chapter concludes by proposing some options to support the expansion of lower-secondary education, including the challenges of revising curricula and using technology to improve teaching and learning—a discussion that lays the groundwork for the focus of chapter 4: how to best manage and support teachers to improve the quality of education.

Early Grades: Building the Foundations of Learning

If the tremendous enrollment gains of the past two decades are to translate into improvements in learning, retention, and completion, the foundations of learning in grades one to three must be made strong for all children. Chapter 2 documented the extremely low levels of learning in the early grades, which exacerbate poor learning outcomes in the subsequent grades of upper-primary and lower-secondary education. Sub-Saharan African countries need to set themselves the target of ensuring that most children can read with fluency and acquire basic

concepts and skills in mathematics by the end of grade four and that they can progress through the system without repeating or dropping out.

Three sets of problems occur in the early grades. They are interrelated and compound each other: (a) swollen enrollments, especially in grade one; (b) poor learning environments and instructional practices; and (c) instruction in a language that is not familiar to the children.

The "Early-Grade Bulge" in Enrollment

Education systems in many Sub-Saharan African countries are characterized by swollen enrollments, particularly in grade one, with much smaller enrollments in the upper-primary grades. This "early-grade bulge" problem is usually attributed to the enrollment of overage and underage children in grade one, high official repetition rates, and high dropout rates between grades one and two. However, a puzzling aspect of Sub-Saharan African countries is the persistence of these trends over long periods, even if some of these indicators have shown improvement over time.

The analysis in this section demonstrates that the conventional wisdom is likely an incomplete representation of the phenomenon: millions of children are "churning" in the early grades, attending infrequently, repeating grades at rates higher than the official ones, and eventually leaving the education system with few cognitive skills. This has implications for the appropriate policies that need to be implemented. Current policies focus on reducing the official repetition rate or the apparently high dropout rate in early primary grades; however, policies might be more effective if they focused on ensuring that children enroll on time, attend regularly, and progress through the system.

Three Indicators of Early-Grade Enrollment

Efforts to enroll all children in grade one at the right official age (six or seven years, depending on the country) have not yet been successful in many Sub-Saharan African countries. This is indicated by the gross intake ratio (GIR) in grade one, which continues to be above 115 percent in 12 Sub-Saharan African countries out of 38 countries for which data are available.[1] In many countries, a GIR exceeding 150 percent has persisted for more than a decade. This reflects the large proportion of overage and possibly underage children who are entering grade one. However, the persistence of a high GIR (which, theoretically, reflects only new entrants net of repeaters) over many years raises the possibility that these children are, in fact, not all new entrants and may include children who are reenrolling in grade one, even though they are not classified as repeaters.[2]

Two other indicators demonstrate the problem: First, the gross enrollment ratio (GER) in grade one (total enrollment in grade one, including repeaters, expressed as a percentage of the population of the official age of entry) has remained high in many Sub-Saharan African countries, often for many years, with a median of about 150 (signaling 50 percent overenrollment), and with

some countries having a ratio close to 200 (signaling 100 percent overenrollment). Second, the ratio of grade two to grade one enrollment, also expressed as a percentage, is often below 80 percent in these same countries, again over long periods, suggesting that a significant proportion of grade one children are not reaching grade two each year.

Figure 3.1 shows the evolution of these three indicators for three Sub-Saharan African countries (Malawi, Rwanda, and Uganda) and compares them

Figure 3.1 Early-Grade Enrollment Indicators, Selected Sub-Saharan African Countries and Peru, 1990–2010

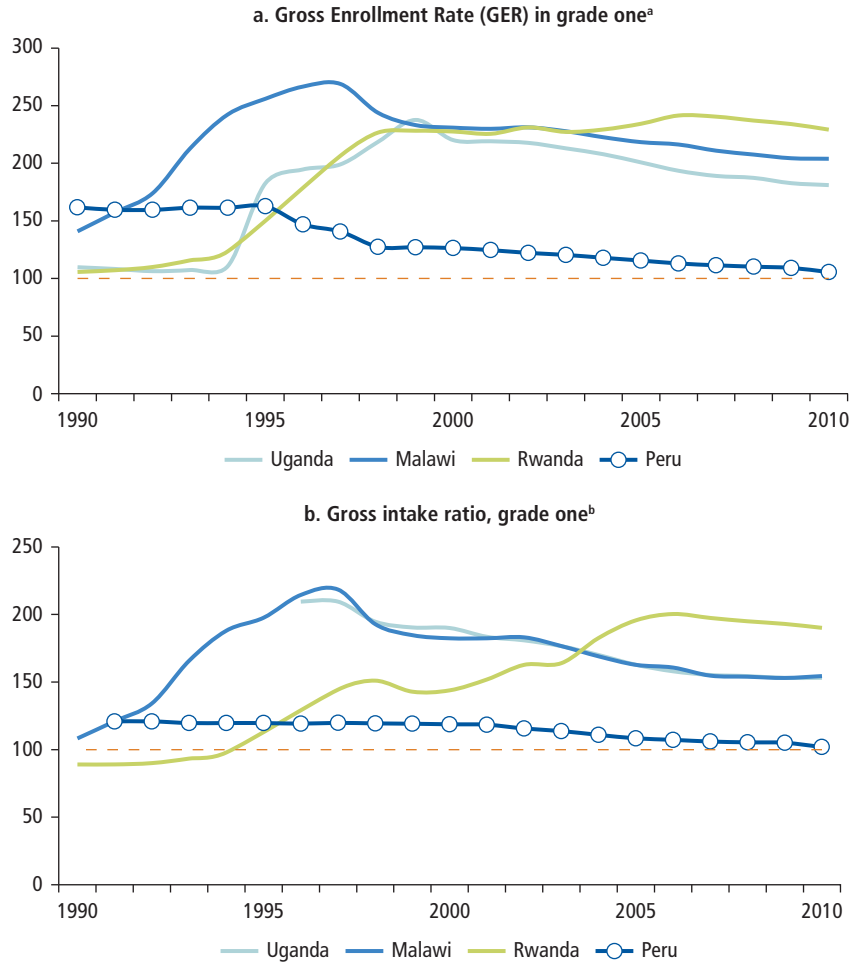

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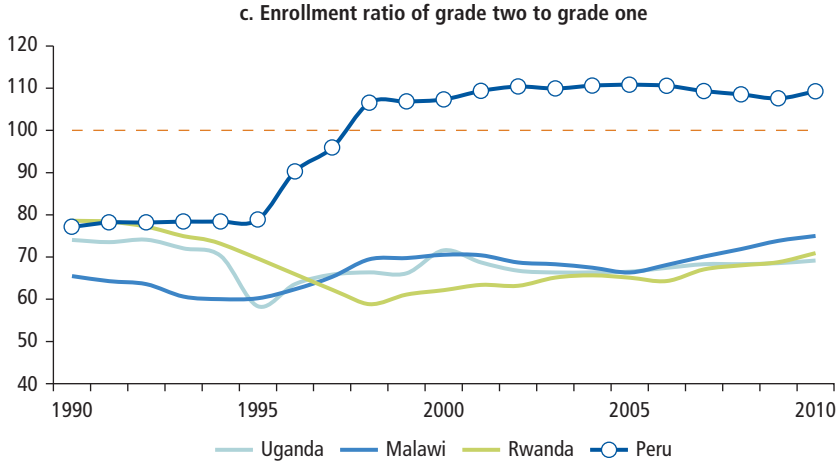
Figure 3.1 (continued)



Source: Constructed from UNESCO Institute for Statistics (UIS.Stat) database (accessed November 19, 2016), http://data.uis.unesco.org/.
Note: All indicators are smoothed using a five-year window.
a. Panel a shows total enrollment in grade one, including repeaters, compared with the population of the official age of entry.
b. Gross intake ratio into grade one is defined as the total number of new entrants in the first grade of primary education, regardless of age, expressed as a percentage of the population of theoretical entrance age. In the case of Uganda, data were not available prior to 1996.

with those for Peru. The latter was in a similar situation to Sub-Saharan African countries in 1990 but has brought about improvements in these indicators since 2000. In contrast, trends in the Sub-Saharan African countries show either stagnation or a worsening of the situation. The spike in both GERs and GIRs coincides with the introduction of universal primary education.

Official versus True Repetition Rates

Taken together, these indicators suggest a serious problem in the foundation years, which dramatically compromises the opportunities for millions of children to progress through the basic education cycle, even though they formally enroll in grade one. Official repetition, which has declined substantially since the 1990s, captures only a part of the problem. Official repetition rates exceeding 20 percent were prevalent in only six Sub-Saharan African countries in 2009 compared with 15 countries 10 years earlier (UIS 2012). Significant reductions were noted in Cameroon, the Republic of Congo, Ethiopia, Madagascar, Mozambique, and Rwanda, largely through the implementation of automatic promotion. Of the six countries with high official repetition rates, five were francophone, where repetition is treated as pedagogically acceptable: Burundi (36 percent) as well as the Central African Republic, Chad, the Republic of Congo, and Togo (each with 23 percent).

However, more detailed analyses available from World Bank country studies indicate that repetition rates are significantly higher than officially reported, especially in the early grades. In Malawi, a recent study found that approximately 25 percent of first-grade students and 20 percent of second-grade students had repeated at least one year; in fact, only 19 percent of students progressed to grade eight without repeating a year (Ravishankar et al. 2016).

Higher unofficial rates are prevalent in many low- and middle-income countries, partly because students who attend irregularly and leave during the school year and then reenroll in the same grade the following year are counted as "new entrants," not as repeaters, and partly because education administrations tend to underreport repetition because of official policies regarding automatic promotion (Schiefelbein and Wolff 1993 for Latin America; Crouch and Merseth 2017 for Asia and Sub-Saharan Africa). The first issue relates to a conceptual problem with the measurement of repetition in contexts where regular attendance is not monitored, while enrollment at the beginning of the academic year is treated as the key indicator.

Determining True Repetition: An Early Grade Bulge Index

Determining the "true" repetition rate, including hidden repetition, would ideally require a combined household and school survey. In the absence of such data, a composite index has been developed, that uses indicators that are readily available or can be easily constructed. This allows identification of the countries with the most serious problems in this area as well as the countries that have improved or deteriorated.

The index comprises four measures: (a) grade one GER; (b) ratio of enrollment in grade two to enrollment in grade one; (c) grade one GIR; and (d) preprimary GER. The rationale for the first three indicators was explained earlier; the fourth indicator (preprimary GER) captures the extent to which the early-grade "bulge" in enrollment may be due to enrollment of underage children arising from a lack of preprimary schools.[3] The official repetition rate is not used because of the measurement problems indicated earlier—nor is the dropout rate used, which is related to the repetition rate.[4]

A principal components analysis was used to create a single index from these four indicators for 103 low- and middle-income countries, a third of which are in Sub-Saharan Africa.[5] A high negative value (below –2) can be taken as a sign of low progression in early grades, while a high positive number indicates better progression in the early grades. Countries with low progression have four problems that have remained more or less constant for over a decade, sometimes for two decades:

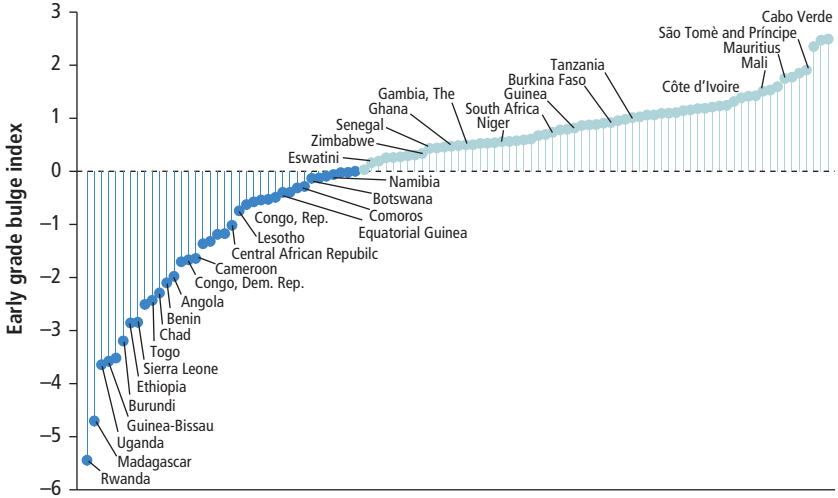
- A persistently *high (or increasing)* ratio of enrollment in grade one to the population of appropriate age, often as high as 150 percent or more
- A persistently *low (or decreasing)* ratio of enrollment in grade two to enrollment in grade one (that is, around 70–80 percent)

- A permanently *high* GIR into grade one, often around 150 percent
- *Low* provision of preprimary coverage

The results are striking (figure 3.2). Of the 10 countries in the world with the lowest early grade progression (the lowest values for the "bulge" index), seven are in Sub-Saharan Africa (in descending order of index magnitude): Rwanda, Madagascar, Uganda, Burundi, Ethiopia, the Democratic Republic of Congo, and Sierra Leone. Of the 20 worst-performing countries, 14 are in Sub-Saharan Africa.

Among the four country groups in terms of educational progress (detailed in chapter 1 and summarized in figure 3.4), Group 1 ("Established") countries are doing relatively well (Cabo Verde, Mauritius, and South Africa). Some countries in Groups 3 and 4 ("Emerging" and "Delayed" countries, respectively) appear to be doing relatively well on this index because they have still not ensured universal coverage of primary education. For example, Senegal (Group 4) has a better index value than Uganda (among the Group 2, or "Emerged" countries) partly because the former has a relatively large number of out-of-school children.

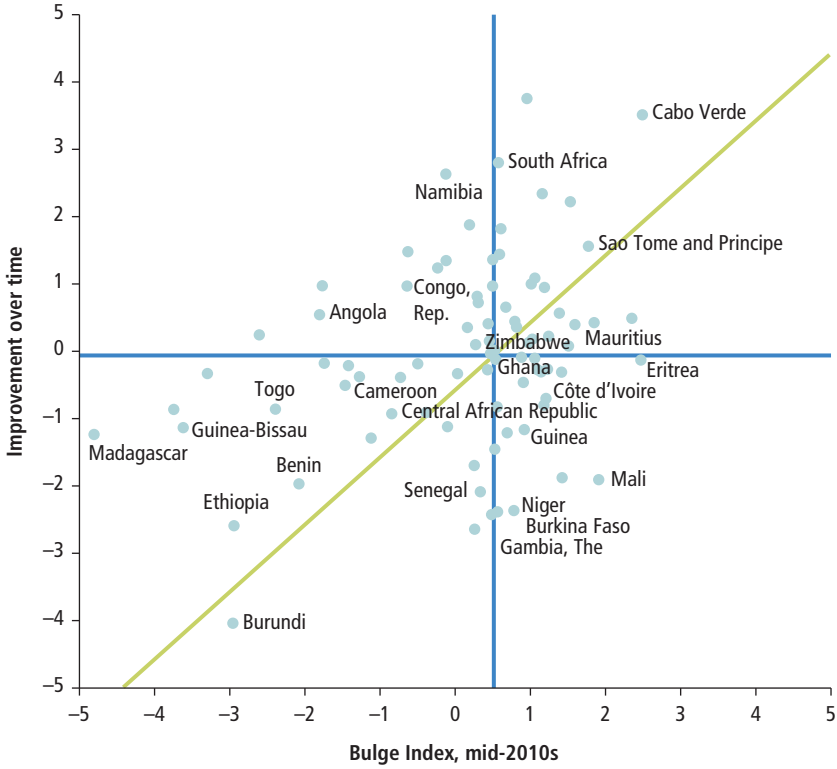
Figure 3.2 Early-Grade "Bulge Index" Rankings of Sub-Saharan African Countries



Source: Analysis of population data from UN Department of Economic and Social Affairs, and education indicators from UNESCO Institute for Statistics (UIS.Stat) database (accessed November 19, 2016), http://data.uis.unesco.org.
Note: The value of the index is the standardized predicted score estimated after applying factor analysis to four indicators: the gross intake ratio in grade one, the enrollment ratio in grade one, the ratio of grade two to grade one enrollment, and the gross enrollment ratio in preprimary education. Values over zero indicate better progression, and values under zero indicate lower progression, respectively, in the early grades. A country with a value of –2 or +2 is approximately 2 standard deviations away from the mean value of a linear combination of all indicators.

Figure 3.3 plots the value of this early-grade "bulge" index in the mid-2010s and its improvement over a 35-year period.[6] The upper-right quadrant indicates the "best" performers: these countries have a positive value for the "bulge" index *and* the index has improved over time. The bottom-left quadrant indicates the "worst" performers: these countries have a recent negative value for the "bulge"

Figure 3.3 Early-Grade "Bulge" in Mid-2010s and Improvement between 1975 and 2010, Sub-Saharan African and Other Selected Low- and Middle-Income Countries



Source: Analysis of population data from UN Department of Economic and Social Affairs, and education indicators from UNESCO Institute for Statistics (UIS.Stat) database (accessed November 19, 2016), http://data.uis.unesco.org.
Note: Figure labels only the Sub-Saharan African countries indexed. The x-axis shows the value of the "bulge" index as of 2015 (positive values = better performance). The y-axis shows the improvement in the index between 1975 and 2010 (positive values = better performance). Values reported in the y-axis are estimated using a regression model for each country separately; regression includes a term to capture the linear trend in the period of analysis. For further description of the factor analysis used in calculating index values, see figure 3.2.

index *and* the index has deteriorated over time. Only Sub-Saharan African countries are labeled.

Very strikingly, in the upper-right quadrant of best performers, the top 10 countries include four Sub-Saharan African countries: Cabo Verde, São Tomé and Príncipe, Mauritius, and South Africa. These are all Group 1 countries. The others include Peru, Mexico, and Vietnam. In the lower-left quadrant, of the 10 countries that most showed the opposite features—low and worsening early grade progression—there are five Sub-Saharan African countries: Benin, Burundi, Ethiopia, Guinea-Bissau, and Madagascar. Because of incomplete data in at least one indicator, improvement was not estimated for Malawi, Rwanda, and Uganda; however, based on their historical trajectories, these countries might fit in the same quadrant. These are all countries in Groups 2 and 3.

The persistence and even worsening of early grade progression has serious consequences for learning. Countries that do not allocate additional teachers or build new classrooms to reduce class sizes because of a lack of resources implicitly force children in the early grades into highly overcrowded classes that prevent them from acquiring basic competencies. Although class size is not the only condition for improving learning, a class size above 50 would make it virtually impossible to learn in early grades. On the other hand, countries that do spend more on teachers and resources are already implicitly bearing the fiscal cost of preprimary education and may be better off gradually expanding this level of education, which is developmentally more appropriate for younger children (Crouch and Merseth 2017).

Box 3.2 discusses South Africa's progress through a determined focus on addressing the early-grade "bulge." The government's strategies included: (a) the use of data to identify problems and develop policies; (b) the implementation of administrative policies to monitor and redress the problem at the school level, as well as policies to gradually introduce preprimary education; and (c) the close interaction with the Treasury (Ministry of Finance) to make the case for these policies.

Among the other factors exacerbating overenrollment in grade one, many parents do not enroll children in grade one at the official age of entry (ages 6–7 years). One reason is the distance to school, which affects household decisions on grade one enrollment. The enrollment ratio starts to decline at a distance of 500 meters and increases rapidly at 1–2 kilometers (Lehman 2003); other surveys have shown that enrollment falls drastically at distances beyond 2 kilometers. A recent study in Punjab (Pakistan) establishes that girls' enrollment decreases by 14 percent for every 500 meters (Andrabi et al. 2010).

BOX 3.2

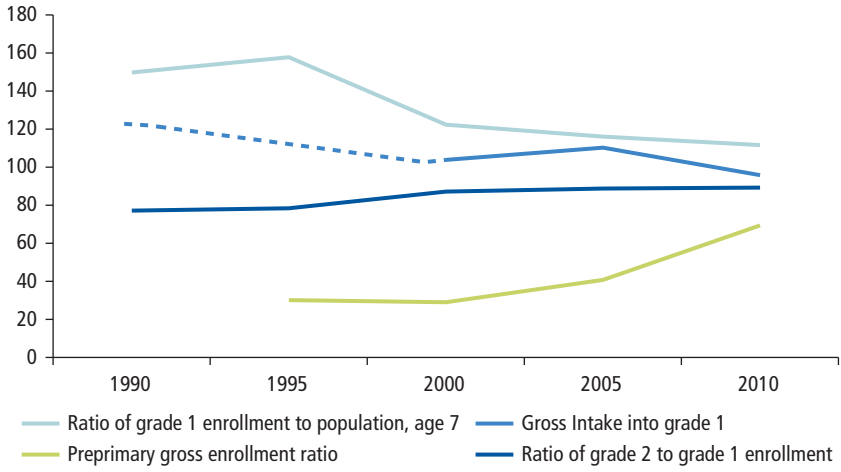
Improving Early-Grade Progression: An Example from South Africa

After the apartheid era ended (by 1994, to use a conventional point in time), South Africa had a rather high primary school GER and a relatively high primary school completion rate, though the latter was highly skewed by income and race. At the same time, South Africa suffered from low rates of early grade progression, as all four index indicators show (figure B3.2.1):

- The ratio of grade one enrollment to age-specific population was as high as in many other Sub-Saharan African countries today.
- The GIR into grade one was inflated.
- At 80 percent, the ratio of enrollment in grade two to grade one was low. This was often construed as evidence of a high dropout rate between the two grades.
- Importantly, preprimary enrollment was very low, at about 30 percent.

As figure B3.2.1 also makes clear, in the 20 years after 1995, the trends all moved in the right direction—and quickly in some cases.

Figure B3.2.1 **Trends in Early-Grade Enrollment Indicators, South Africa, 1990–2010**



Source: Analysis of education indicators from UNESCO Institute for Statistics (UIS.Stat) database (accessed November 19, 2016), http://data.uis.unesco.org.

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Box 3.2 (continued)

How was this accomplished? Several factors were responsible:

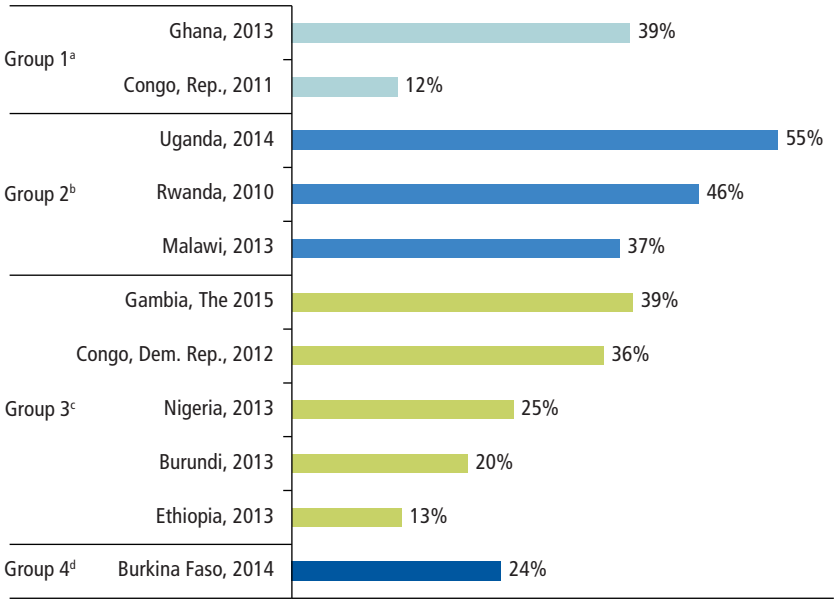
- *Grade- and-age-specific data established that the enrollment ratios in grade 1 were enormous* and that this was not because of dropping out but because of the artificial bulge in grade one. At the time—because the country was, in a sense, thoroughly remaking itself toward a new future—officials and academics paid a great deal of attention to data.
- *Age-grade norms were promulgated,* and effort was put into bringing the issue to the attention of lower-level officials, down to the school level. Automatic promotion, within grade bands, was also promulgated. Finally, realizing that part of the bulge was because parents needed to have their children in school, the government lowered the age of entry into primary school by one year. With these actions, the bulge in grade one enrollment began to diminish quickly, and the ratio of grade two to grade one enrollment started to go up, gently but systematically (DoE South Africa 1998).
- *A program of public support to preprimary schooling* resulted from an analysis finding that despite the age-grade norms and other such efforts, there was still a considerable bulge of overenrollment in grade one. The Department of Education and the Treasury made the case that the cost of preschool was already being paid through the bulge in grade one, because teaching and nonteaching personnel were allocated based on enrollment. The revised policy made preprimary schooling progressively available over a 10-year period (DoE South Africa 2008).
- *Publicly provided early childhood development (ECD) programs increasingly targeted poorer areas* because richer parents already self-financed preprimary schooling and there was no wish to substitute public for private spending (DoE South Africa 2001). The approach favored the poor in two ways: expansion of pre-primary started in the poorer areas, and the funding formula was also poverty-weighted. Better-targeted preprimary provision also reduced the grade one bulge faster, because the bulge occurred mainly in poorer areas owing partly to the absence of preprimary options.
- *Lower population growth helped to stabilize grade one enrollments.* South Africa was already, in the 1990s, undergoing a rapid demographic transition. The population of school-entry age was static and was forecast to start declining within a decade or two.

It should be noted that although these are achievements to be celebrated and perhaps emulated, many issues remain: the quality of pre-primary schooling is widely acknowledged by officials to be below desired levels, the contribution of pre-primary education to improve early-grade progression could be improved, and infrastructure and teaching could be better. A scholarly paper by South African officials and consultants details areas for improvement (Davids et al. 2015). Despite the evident need for improvements, however, a solid foundation has been laid.

Note: Box 3.2 is based on inputs from Luis Crouch.

Although most African countries established policies as early as the 1980s to ensure that all children had a primary school within 2 kilometers of home, the reality is still far from this goal (figure 3.4). For example, in Uganda, which declared universal primary education in the early 1990s, about 55 percent of children enrolled in a rural primary school in 2014 had to travel more than 2 kilometers to get there; in Rwanda, 46 percent of children going to rural primary schools had to travel more than 2 kilometers. By contrast, in Ethiopia, the proportion of such children was only 13 percent in 2013, a dramatic reduction

Figure 3.4 Percentage of Rural Primary-Age Children Living More Than 2 Kilometers or a Half-Hour's Travel Time to the Nearest School, Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s



Sources: Constructed from latest World Bank Living Standards Measurement Study (LSMS) for all countries except the Ênquête sur les Conditions de Vie des Ménages du Burundi (ECVMB) for Burundi and the Integrated Household Survey (IHS) for Gambia.
a. Group 1 ("Established") countries had high gross enrollment ratios (GERs) in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. Group 2 ("Emerged") countries had high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. Group 3 ("Emerging") countries had low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. Group 4 ("Delayed") countries had low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

from 2000, when 75 percent of rural children had to walk more than 2 kilometers (not shown in figure 3.4).

Distance negatively affects not only access to school but also students' learning, performance, and retention. Students who live far from school tend to arrive late in class more often, to be absent during hard weather, and to be tired and hungry in class. The risk that parents will withdraw girls from school increases with distance, as does the risk of sexual harassment on the way to school.

Poor Early-Grade Learning Environments and Instructional Practices

Although addressing inefficiencies in early-grade student progression is of critical importance to many countries that are struggling with the aftermath of universalizing primary school coverage, ensuring appropriate conditions for learning in the early grades should be a priority for all countries, including Group 1 countries.[7]

Among the most important learning conditions are class size and its age distribution, physical facilities, the availability of appropriate instructional materials, and time for learning. Instructional practices to teach reading and numeracy to young children—most of whom are first-generation learners with relatively few learning resources at home—are also critical.

Class Size

Systematic evidence on class sizes in the early grades are unavailable for most Sub-Saharan African countries. Data that are available through the Early Grade Reading Assessment (EGRA) surveys and other special surveys indicate that class sizes are higher in grades one and two than in other grades. This is partly the result of the "early-grade bulge" noted in the previous section, which is caused by high official and hidden repetition rates as well as continued population growth.

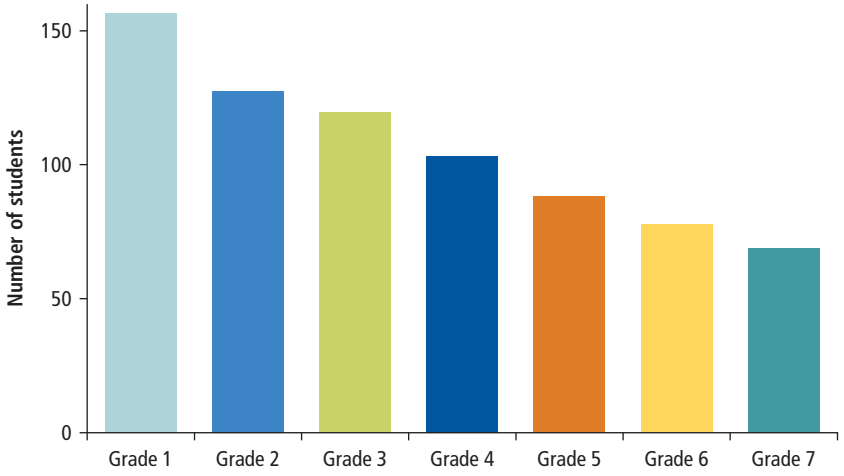
In Tanzania, according to 2014 EGRA surveys, 55 percent of grade two teachers reported class sizes exceeding 80 students, and another 15 percent had class sizes of 51–80 students. In Kenya, the 2012–13 EGRA surveys reported that about 26 percent of grade one classes and about 20 percent of grade two classes exceeded 51 students.

Extremely large class sizes are also seen in Malawi; similar class sizes are likely in Uganda, although those data are not available. Both countries display worsening student progression through the early grades, as discussed earlier. In Malawi, recent survey data (Asim 2017) show that the average class sizes in grade one and grade two are about 150 and 125 students per class, respectively, while the average class size in grade seven goes down to about 70 (figure 3.5).

Age Composition

Apart from class size, the enormous developmental heterogeneity of children in early grades poses serious challenges for teachers. A reflection of this

Figure 3.5 **Average Primary-School Class Size in Malawi, by Grade, 2016**



Source: Asim 2017.

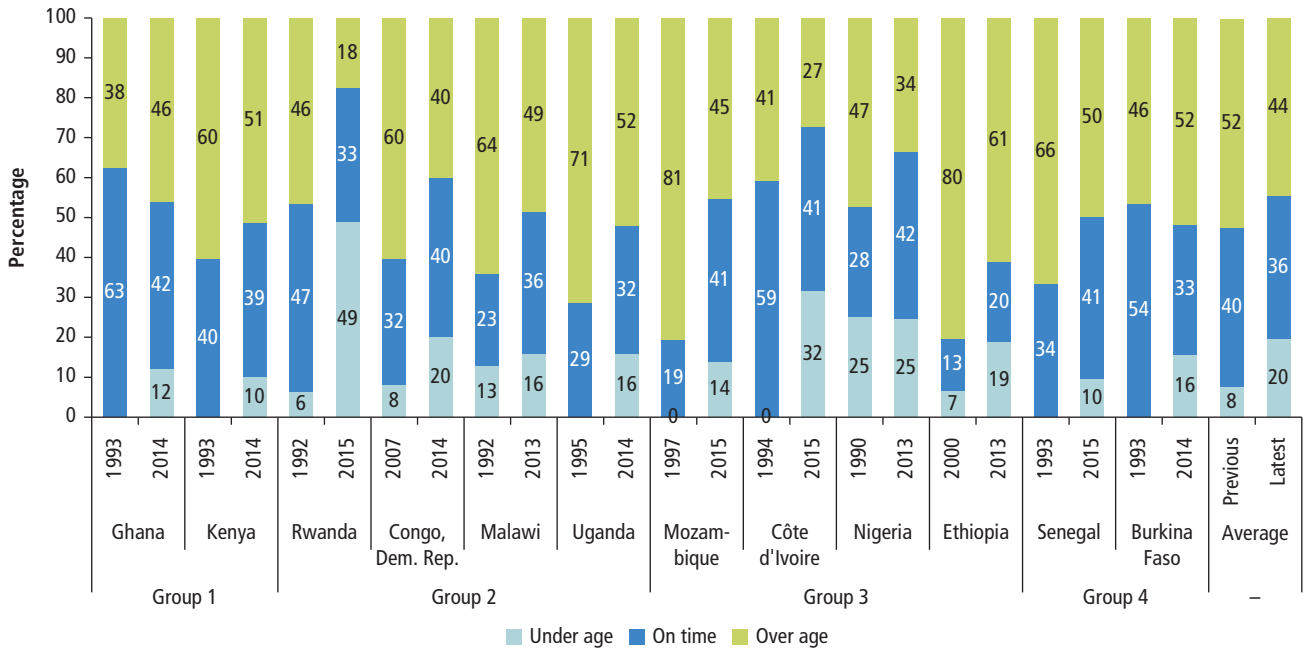
heterogeneity is the age composition of students in grade one, reported from household surveys (figure 3.6). This age composition is a consequence of low early grade progression discussed in the previous section.

Overage children (older than the official entry age of 5–7 years, depending on the country) constitute the largest share of grade one enrollments in many Sub-Saharan African countries, although this share has decreased over the past two decades or so (a 12-country average of 44 percent in the mid-2010s, compared with 52 percent earlier). Countries in Groups 2 and 3 have made substantial efforts to reduce this proportion. The high proportion of overage children is a result of both (a) delayed first-time enrollment (in some countries), and (b) high levels of either official or hidden repetition in grade one in many countries, as indicated earlier. A significant proportion of first-grade students are two years older than the official age of entry (not shown in figure 3.6).

At the same time, interestingly, the share of *underage children* in grade one has increased in all but one of the 12 countries (Nigeria), from 8 percent earlier to 20 percent recently. The proportion of underage children remains below 25 percent—except in Côte d'Ivoire, Nigeria, and Rwanda, where the share increased substantially. This may reflect increasing parental interest in education as well as the lack of preschool facilities.

As a result of these trends, the proportion of children of the "right" (or "on-time") age has not increased dramatically in most countries; in fact, it has gone

Figure 3.6 Age Composition of Grade One Enrollment in Selected Sub-Saharan African Countries, by Group, Previous and Latest Years

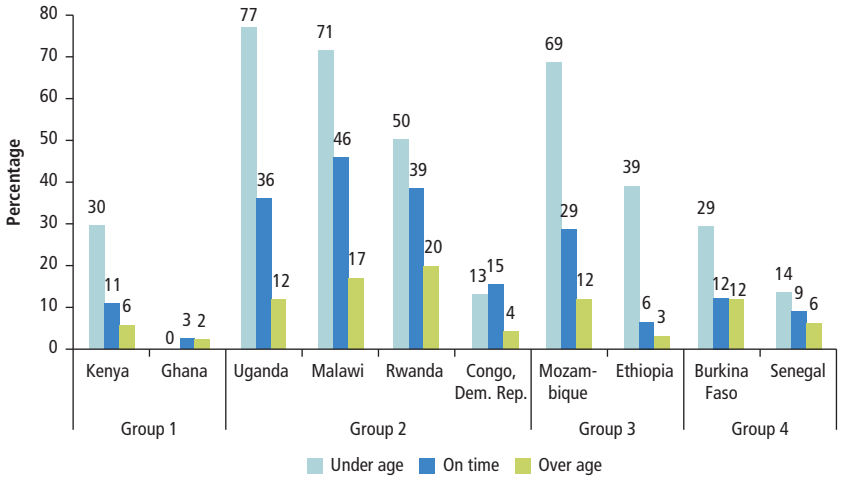


Sources: Demographic and Health Survey (DHS) and World Bank Living Standards Measurement Study (LSMS) data for designated years, by country.
Note: "On time" refers to children who enroll in grade one at the country's official entry age (generally ages 6–7 years). "Underage" generally refers to those aged 5 years or younger. "Overage" refers to those of ages 7–8 years or older, depending on the country. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

down in some countries (as in Côte d'Ivoire, Ghana, and Rwanda). With such a range of ages—from 5 to 8–9 years old—teachers face the challenge of devising differentiated teaching strategies for children at different levels of learning and development in large classes.

Although underage children still constitute a small share of grade one enrollment in most countries, a high proportion of them repeat grade one. Figure 3.7 shows the repetition rates, from household survey data, of children enrolled in grade one—comparing the repetition rates of those who enrolled at the appropriate age ("on time"), those who were underage, and those who were overage. Repetition is highest among the underage cohort and is also high among the children who enrolled "on time" in many countries in Groups 2 and 3, such as Malawi, Mozambique, Rwanda, and Uganda. Repetition is also present in the overage cohort but at a much smaller scale. In Malawi, Mozambique, and Rwanda, the preschool GER is less than 10 percent, a proportion that supports the hypothesis that underage children are being enrolled in grade one because no alternative preprimary or other early childhood education and care programs are available (Crouch and Merseth 2017).

Figure 3.7 Repetition Rates in Grade One, by Age Category, in Selected Sub-Saharan African Countries by Group, Latest Available Years



Sources: Demographic and Health Survey (DHS) and World Bank Living Standards Measurement Study (LSMS) data for latest available years.
Note: "On time" refers to children who enroll in grade one at the country's official entry age (generally ages 6–7 years). "Underage" refers to those of age 5 years or younger. "Overage" refers to those of age 8 years or older. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

Learning Materials

In addition to large class sizes and children at different developmental stages in early grades, the lack of appropriate and adequate learning materials in these grades is striking. Less than 25 percent of grade two teachers in Tanzania reported having adequate materials for teaching Kiswahili, mathematics, and English, according to the EGRA survey.[8] The EGRA report for Ethiopia (RTI International 2010) indicated a substantial regional disparity in availability of learning materials: over 80 percent of teachers in Addis Ababa, Amhara, Oromia, Simhara, and Tigray reported having sufficient learning materials, while this was the case for about 15 percent of teachers in Somali, 25 percent in Benishangul-Gumuz, and 56 percent of teachers in Harari.

Instructional Practices

Training of early-grade teachers and their instructional practices are critical to improving student learning. In Tanzania, just 28 percent of grade two teachers in the EGRA survey reported receiving any preservice training, and 21 percent reported in-service training. Similar proportions were reported in Rwanda by grade four teachers (14 percent and 18 percent, respectively). The proportions were significantly higher in Kenya, where over 40 percent of teachers reported receiving in-service training in the past three years. The EGRA report for Ethiopia shows that most schools had at least one teacher trained in mother-tongue instruction, though again, there are disparities across regions.

Data are sparse regarding instructional practices in the early grades. However, observational data from a few studies seem to indicate that teachers are not expert in teaching all the necessary skills for children who lack "pre-reading" skills: letter and number recognition, letter-sound correspondence, reading directionality, and so on. Further, because teachers have not received training on this earlier, it is not easy to change instructional practices. A study of almost 5,000 Malawian teachers in grades one, two, and three who were observed over two years as part of a program to improve early-grade reading showed that only 40–50 percent of teachers exhibited behaviors specific to reading instruction (RTI International 2016).[9] Further, although the percentages rose with more coaching visits, they were still below 70 percent even after four visits. Similar percentages were observed for phonics teaching practices, which are essential for teaching the foundations of reading.[10]

Examples of good instructional practices in the early grades are now available across Sub-Saharan Africa, mainly through learning-remediation programs supported by donors or nongovernmental organizations (NGOs). These include Literacy Boost in Ethiopia and Rwanda and Tusome ("Let's Read") in Kenya, as further discussed in box 4.7 of chapter 4.

Early-Grade Language of Instruction and the Transition to International Languages

The analysis of correlates of learning achievement presented in chapter 2 highlighted the effect of the language of instruction on student learning assessments—from early-grade reading assessments up to the lower-secondary mathematics and science assessments. The test scores of children who speak a different language at home from that used in school are lower than those for children for whom the school and home language are the same. For children in early grades, this issue is critical: whether children can get to the level where they can "read to learn" depends on whether they are taught in a familiar language—usually their mother tongue or other vernacular, which may be a lingua franca used by the community (what we refer to as the home language).

Knowledge of a language and the existing lexicon of oral vocabulary can serve as a solid foundation for learning to read when the language used to teach reading is the same as the child's home language. Many education experts agree that, assuming the presence of quality instruction, students learn to read more efficiently when they learn to read first in a familiar language (Nation 2006; Nation and Ming-Tzu 1999). An analysis of data from 49 countries participating in the 2011 Progress in International Reading Literacy Study (PIRLS) demonstrated a clear relationship between reading outcomes and language: learners had higher average achievement scores when their home language, or a language familiar to them, was the language of the assessment (Mullis et al. 2012). Knowing the language of instruction in early grades also facilitates the acquisition of a second language later (Ouane and Glanz 2011).

Language-of-Instruction Policy Challenges

Despite overwhelming research evidence regarding the importance of teaching in a familiar language for the acquisition of early literacy, devising an appropriate language-of-instruction policy has been challenging given the enormous linguistic diversity of Sub-Saharan Africa, the complex interaction of domestic and international politics, and the lack of a consensus on how to address this issue.[11]

The African models of bilingual education are predominantly "early-exit" and "subtractive" in nature; that is, the local language is used for a few years at the primary level, usually for two or three years but sometimes just for the first year. The exceptions to this are Ethiopia and Tanzania, which use the local language for the entire primary cycle, after which the language of instruction is English, which is taught as a subject in the early primary grades. Burundi uses the local language for the first four years of the primary cycle, with French being taught as a subject from grade one and becoming the language of instruction in grade five.

Although there is no consensus yet on the point at which the language of instruction should change from the mother tongue (or home language) to

another language, research shows that switching at the end of grade three does not allow most learners to acquire the skills required for "reading to learn" (Heugh 2011). Heugh notes that "South African speakers of African languages have about 500 words in English and enough early literacy skills in the second language to read simple three- to seven-word sentences (usually in the simple present tense) by the end of year three." To be able to learn effectively, the child needs to acquire academic literacy in the second language, which typically takes six years under well-resourced conditions (that is, well-trained teachers using appropriate materials with effective teaching strategies) and may take longer in different circumstances.

Policy Implementation Issues

Even as the language-of-instruction policies themselves may be inadequate, equally serious problems are the frequent changes in policy and the lack of consistent implementation (table 3.1). Frequent changes in policy make implementation difficult because changes in curricula, teacher training, materials, and assessment need to be coordinated. Even where policy remains officially unchanged, inconsistent implementation means that, although the policy exists on paper, teachers are not trained in the local languages, and, more important, there are insufficient reading materials in the local languages for children.

Often, the sole reading material in the local language is the textbook, which is shared among many children, and even grade one textbooks are often pitched at a high level of difficulty, starting with full sentences when children have not mastered the alphabet. A recent survey of early-grade reading materials in local languages in 11 African countries found that "[a] third of all supplementary reading materials had more than 75 words per page [wpp], which is only appropriate for readers who have already attained fluency. Materials with fewer wpp, which are appropriate for children in the earlier stages of literacy development, were not as numerous: Only 13 percent of titles were found in the 51–75 wpp range (intermediate), followed by 14 percent in the 1–10 wpp range (beginning)" (RTI International 2015b).

Ineffective implementation of a language-of-instruction policy (or a lack of one) shows up in country comparisons of EGRA test results. Among the countries tested, those with consistent language policies that have been implemented consistently do relatively better. Ethiopian and Tanzanian children, for example, do relatively better in the reading comprehension task, with at least 50 percent of the children scoring greater than zero; and in Burundi, 40 percent of children score greater than zero, as discussed in Chapter 2. (Box 3.3 provides more information on Ethiopia's language-of-instruction policy.) Ethiopian children were tested in six of the country's multiple languages used at the primary level.[12] Although Tanzania has high linguistic diversity, Kiswahili has been used consistently at the primary level since independence and is the lingua franca of the

Table 3.1 Language-of-Instruction Policies and Implementation in Primary Education, Selected Sub-Saharan African Countries, by Group

Policy and implementation type	Group 1	Group 2	Group 3	Group 4
Single local language, consistently implemented	*Botswana:* Local language is LOI up to and including grade two.	*Tanzania:* Kiswahili is LOI up to and including grade seven.	*Burundi:* Kirundi is LOI up to and including grade four.	*Somalia:* Somali throughout school education up to 1986; education system collapsed after start of civil war.
Multiple local languages, consistently implemented	*Mauritius:* Choice of languages up to grade three, English is LOI from grade four.[a] *Namibia:* Local language is LOI up to and including grade three. *South Africa:* Local language is LOI up to and including grade three.	*Uganda:* Local language is LOI up to grade three.	*Ethiopia:* Local language is LOI up to and including grade eight.	None
Single local language, changes in policy and/or inconsistently implemented	*Eswatini:* SiSwati is LOI up to and including grade four; implementation is inconsistent.	None	*Madagascar:* Policies have changed; implementation is inconsistent. *Rwanda:* Kinyarwanda in Grades 1-3; since 2008, LOI after grade 3 has been English, with frequent changes in policy before that year.[b]	None
Multiple local languages, changes in policy and/or inconsistently implemented or only as pilots	*Congo, Rep.:* Implementation is inconsistent. *Ghana:* Policy changed in 1971, 2002, and 2004. *Kenya:* Local language policy is not implemented in practice; English is used as LOI. *Zimbabwe:* Local language policy is not implemented in practice; English is used as LOI.	*Congo, Dem. Rep.:* Implementation is inconsistent. *Malawi:* Policy changed in 1996 and 2014.	*Angola:* LOI policies are implemented as pilots. *Benin:* Implementation is inconsistent. *Mauritania:* Implementation is inconsistent. *Mozambique:* Policy changed in 2003; new policy is expected in 2017. *Nigeria:* Implementation is inconsistent; English is widely used as LOI starting in grade one. *Zambia:* Policy changed in 1996 and 2013.	*Burkina Faso:* Implementation is partial. *Mali:* Implementation is inconsistent. *Niger:* Implementation is inconsistent. *Senegal:* Local language policy is not widely practiced; French is LOI from grade one in practice.

Sources: Compiled from Early Grade Reading Assessment (EGRA) reports; CIEP 2014; Ouane and Glanz 2011; RTI International 2015b; Trudell 2016.
Note: LOI = language of instruction. References to changes in policy indicate that policies have changed in the past 20 years. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.
a. Mauritius is classified in this table as having a consistently implemented LOI policy because it has been in place for more than 60 years. The Education Ordinance of 1957 states that in government and aided schools, any one language may be used as the LOI up to and including Standard 3, "being a language which in the opinion of the Minister is most suitable for the students." After Standard 3, the language of instruction is English. Although the regulations allow, in principle, for use of the mother tongue (such as Kreol) in the early grades, in practice the government does not provide materials or teacher training in languages other than English or French. Teachers use a combination of languages to facilitate comprehension by students in early grades.
b. The LOI after grade 3 has changed several times. From 1962–78, it was French; from 1978–91, the LOI was Kinyarwanda for grades 1 to 8; from 1991–94, the LOI after grade 3 became French; from 1994–2008, both English and French could be used as the LOI for grades 4 to 6; and from 2008 onward, English became the LOI.

BOX 3.3

Countrywide Teaching in Local Languages: Policy and Implementation in Ethiopia

The Context: A Microcosm of Polyglot Sub-Saharan Africa

More than 90 languages are spoken by Ethiopia's estimated 92 million people. However, as in many other Sub-Saharan African countries, there are several large language groups, together with a large number of languages spoken by a relatively smaller number of people.

Oromo and Amharic together are spoken by about 63 percent of the population. Somali and Tigrinya are spoken by about 5–6 percent of the population, with other language groups being spoken by about 1–2 percent of the population. The Southern Nations, Nationalities, and Peoples (SNNP) Region is the most linguistically diverse state, with an estimated 56 languages and 31 used as languages of instruction.

In one respect, however, Ethiopia differs from much of the region: Because it did not have a long history of colonialism, the use of English or other European languages is not as widespread among the population as in many other Sub-Saharan African countries (World Bank 2017).

Language-of-Instruction Policy and Key Results

With the advent of a new government in 1991, Ethiopia adopted one of the most comprehensive language-of-instruction (LOI) policies in the region. The Education and Training Policy of 1994 called for the use of the mother tongue as the language of instruction in grades one through eight, as well as for primary teacher training to be in the relevant language. All students learn Amharic as a national language, although the policy does not indicate when the study of this language should begin. English is taught as a subject from grade one and is the LOI from grade nine onward. In practice, the states have the right to determine the grade in which English can be introduced as language of instruction, and some have introduced it in grade five or grade seven. Before the 1994 policy, all Ethiopian students were taught in Amharic.

An analysis of Ethiopia's national learning assessments in science, mathematics, and English at the end of grade eight in 2000 and 2004 found that children who were taught in the mother tongue for eight years of primary education consistently performed better than those who were taught in the mother tongue for five years and in English in the upper-primary grades (Heugh et al. 2007).

In SNNP, children who had learned first in the mother tongue performed better on grade five mathematics and literacy tests in English. The study used data from the Young Lives project[a] and exploits two sets of differences in policy implementation: (a) children transfer to English language instruction in grades seven or nine in other states, and (b) a substantial number of children in SNNP are taught in a language that is not their mother tongue (Seida 2017).

(continued next page)

Box 3.3 (continued)

Another study found that the introduction of the mother-tongue-based instruction policy in schools had a positive effect on primary school completion rates (Ramachandran 2012). The study used the Amharic language group as the control group (which faced no change after the 1994 policy) and compared it with the Oromo language group in four regions of the country where, after 1994, students could get primary schooling in their own language. Using data from the 2011 Demographic and Health Survey, the analysis showed that the change led to an increase of 0.75 to 1 year of schooling.

Language Policy Implementation

Ethiopia's "trilingual" policy (mother tongue, Amharic, and English) has been implemented nationally, albeit with variation across states, through the preparation and production of textbooks and learning materials in mother tongue, training of teachers in mother-tongue instruction, and examinations conducted in the language of instruction. By 2017, 51 languages had been adopted as LOI, compared with only Amharic before 1994.

All donors have supported the policy. About 106 million textbooks in seven mother tongues for primary grades and an additional 37 million supplementary materials were printed in the past 10 years under the donor-funded General Education Quality Improvement Program (Phases 1 and 2). For other languages, regions have printed their own textbooks. Because teachers are recruited by districts (*woredas*), native-language teachers are more easily trained and deployed according to specific language requirements.

a. The data used in Seida (2017) come from the project's 2012/13 Ethiopian school survey, which administered mathematics and literacy tests to students in grades four and five at both the beginning and the end of the 2012/13 school year.

country, to which most children are exposed. Tanzanian children's contrasting performance in Kiswahili and English is revealing: less than 40 percent of grade two children scored zero in Kiswahili compared with almost 95 percent on the English test.

By contrast, in countries with multiple languages that do not use the local language in class or do not implement it well in the early grades, 70–90 percent of children could not answer a single question on the reading comprehension part of the EGRA test. These countries include Ghana (11 languages tested), Mali (4 languages), and Zambia (7 languages). Another example is Malawi, which officially used multiple languages in the early grades along with Chichewa; it has a poor performance in Chichewa (the only language tested), with close to 90 percent of children being unable to answer a single question.[13]

Kenya provides an example of inconsistent implementation of the language policy. The official policy indicates that the mother tongue should be used as the language of instruction in grades one through three, while in practice English is used from grade one. An analysis of EGRA 2009 assessment data for 2,000 Kenyan children shows that although grade three children demonstrate a greater ability to decode words and have greater oral reading fluency in English than in

their mother tongue, their reading comprehension is lower in English than in the mother tongue, even though less instructional time is spent on the latter (Piper, Schroeder, and Trudell 2016). The authors surmise that children lack the oral vocabulary to understand what they read and do not get enough time to practice their reading skills. One conclusion is that the teaching of English is ineffective; better results could be obtained if children could master reading skills in their mother tongue. The implication is that Kenya—a relatively good performer in the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) assessments—could potentially increase its performance if it implemented its language-of-education policies consistently.

Senegal is an example of a country with *no* policy on language of instruction. Although all languages that are codified are recognized by the Constitution of 2001, there is no official language policy. A study of 176 classes using the EGRA observation protocol together with a language-of-instruction protocol found that many classrooms were linguistically homogeneous, although some had sizable minorities who spoke languages other than the language of instruction (Varly 2010). Although ostensibly teaching in French, teachers and students switched languages during the class. Almost no teachers had teaching materials in a national language, and none had received training in using national languages as the language of instruction.

Many pilot programs have been tried in Sub-Saharan African countries over the past three decades, some of them on a small scale and some on a large scale. Among the latter are the Primary Reading Program in Zambia, the Pédagogie Convergente in Mali, and bilingual programs in Burkina Faso and Niger. However, wherever the language-of-instruction policy is not effectively integrated into national education planning and reflected in the national budgets (for instance, for the training and deployment of teachers who master the local language, or for the preparation of materials), such pilot programs are rarely sustained. In Senegal between 2002 and 2008, for example, the government promoted the use of national languages in 465 classrooms, and subsequent programs have been on an even smaller scale (RTI International 2015a). Such small-scale programs are the norm in most Sub-Saharan African countries, and thus have no national impact.

Priority Actions to Unblock the Early-Grade "Traffic Jam"

A perfect storm awaits most children entering grade one in Sub-Saharan African countries: overcrowded classes, which they attend irregularly; few reading and other instructional materials; teachers with limited skills for teaching reading and numeracy; and instruction in a language that children cannot understand. The foundations for future learning are shaky at best, and students will either leave after a few years or progress within the education system with limited cognitive skills, contributing to the region's learning crisis in basic education.

The consequences of this "traffic jam" are also deleterious at the system level. In the short run, large class sizes and overcrowded classrooms hinder day-to-day teaching and learning. In the longer term, budgetary resources for education become strained as governments try to ameliorate these conditions by hiring more teachers and building more classrooms.

The recommended policy actions to unblock the gridlock in the early grades center on three axes:

- Expanding access to primary and preprimary education so all children can enter school at the right age and with adequate preparation
- Providing a conducive early-grade learning environment
- Aligning the language of instruction with the home language

Actions along each axis would help in some way, but coordinated action along all three axes would have a powerful impact. For instance, reducing class sizes and repetition by ensuring an orderly progression of children through the early grades would improve the conditions for learning, but children will learn much more if they are taught by teachers who are trained and who use the home language.

Countries with this early-grade enrollment bulge need to take a few concrete steps to improve early-grade progression. Most of the countries in Group 1 have addressed this issue, although improvements can still be made; other Sub-Saharan countries can learn from them. Recognition of the problem—by analyzing the key "bulge" indicators and identifying the regions and localities where early-grade progression is a problem—is a good way to start.

The next step is to get lower levels of administration and individual schools to monitor the progression of students grade by grade and introduce measures to reduce official repetition and identify hidden repetition (for instance, by capturing data on children who repeatedly enter grade one). Ensuring regular attendance of children in school can partly be addressed by regular school monitoring and tracking of children at risk, but it may also require addressing demand-side constraints created by poverty. Impact evaluations, for example, show that school feeding boosts attendance (Snilstveit et al. 2015).

Expanding Access to Primary and Preprimary Education

An important area of action is to bring schools closer to communities to facilitate entry into grade one at the right age as well as regular attendance. However, merely building classrooms and appointing teachers is not sufficient: the basic package of materials and teacher support required to ensure learning must also be provided. This can be expensive to provide in remote areas. Some options that have been tried, such as "satellite schools" with just the early grades, have not been evaluated, but there have been problems of implementation leading to greater inequality between types of schools and poor transition to

upper-primary grades. Another option is multigrade teaching, but this also requires specific strategies for training and supporting teachers.

For countries that face the need to build schools, it would be preferable to geospatially map the school network relative to the human settlement network and develop a short- to medium-term school construction strategy that brings new schools closer to where children live. Adopting cost-effective ways of constructing schools would also ease the burden on resource requirements. These costs are affected by many factors, among which procurement modalities also figure, as discussed further in chapter 5. The approach in densely populated countries would be different from those with sparse populations.

Finally, the gradual expansion of preprimary education needs to be considered. As the example of South Africa illustrates (box 3.2), one option is to prioritize rural and poor communities for publicly financed preprimary education. Lower-cost, community-based approaches with standards for quality would be a sustainable approach.

Providing a Conducive Early-Grade Learning Environment

These measures to expand access alone will not improve cognitive learning in the early grades, which is a big challenge for all countries. Even Group 1 countries—where primary GERs and retention rates are close to 100 percent, such as in Ghana and Kenya—demonstrate the learning gaps that need to be bridged (as detailed in chapter 2).

Immediate improvements in the learning environment can be brought about by reducing class sizes in the early grades. Based on chapter 2's analysis of Programme d'analyse du systèmes éducatif de la CONFEMEN (PASEC) data as well as an analysis by Majgaard and Mingat (2012), class sizes above 50 appear to reduce learning. Ensuring reasonable class sizes (ideally, fewer than 50 students in the early grades) requires paying attention to teacher deployment both across schools and within schools, and hence efforts at both the system and school levels.

Improving instruction in early literacy and numeracy requires designing support for teachers in classrooms, most of whom have not received any specific training for teaching reading or numeracy. An essential element of this effort is the design, publication, and distribution of printed materials (textbooks and other materials) that teachers can use to promote regular reading and arithmetic practice. The development and distribution of low-cost, locally developed materials should move away from donor-financed projects and become part of countries' education policy. The almost exclusive focus on a single textbook will be insufficient to build the reading and numeracy skills that are essential in the early grades. Training of teachers must be based on using these materials in classrooms and on formative assessments that can help to gauge students' progress on a regular basis.

Effective approaches to teaching literacy require explicit instruction in the five key components identified in a U.S. meta-analysis by the National Reading Panel (NICHD 2000): phonemic awareness (knowing the sounds of one's language), phonics (matching sounds to the alphabet), fluency, vocabulary, and comprehension. To learn to read, children require ample reading materials that match their reading levels. Reading must be taught every day, and teachers and administrators need to maximize the amount of time spent on reading. Assessment should be conducted in classrooms to ensure that teachers are aware of children's progress and instructional needs. Assessment must also be conducted at the national level to support data-driven policy making. Finally, beginning reading instruction must be conducted in a language that children speak and understand. Acquiring solid reading skills in their first language allows children to learn content and to become successful learners of other languages.

Aligning the Language of Instruction with the Home Language

Sub-Saharan African countries will need to formulate policies related to the language of instruction that address the need for children to acquire foundational skills in reading and numeracy in a language they know, with the eventual transition to the official language. Two key decisions are (a) the number of African languages that will be used as the language of instruction, and (b) the grade in which the transition to the official national language takes place.

Evidence suggests that using the local language as the language of instruction for at least the lower-primary cycle (about six years of schooling) is required (Ouane and Glanz 2011; Trudell 2016). This is because children need to acquire not only early literacy and numeracy skills but also the skills for studying more complex topics. Research evidence should inform these decisions; but at the same time, information sharing and consultation with stakeholders, including parents, are required to ensure acceptance of these policies. Further, both to garner social acceptance and to ensure student learning, such policies cannot be formulated in isolation from the practical aspects of implementation, including the development of curricula, teacher recruitment and deployment (to ensure that teachers know the local language), teacher training, materials, and assessment.

A consultative process, informed by technical considerations, is required to determine the local language that would be used as the language of instruction in primary education and to create a stable policy that enjoys a broad consensus. The next step is to move from policy to planning, specifically estimating the requirements for bilingual teachers, teacher deployment and recruitment as well as for the development of materials and assessment in local languages. Finally, moving from planning to implementation means that the resources required to implement the policy should be integrated into the national budget so that they are sustainable.

The expansion of reading materials in African languages can begin with the collection of stories, poems, and translations in local languages as well as the development of nonfiction and materials for the teaching of mathematics and science. A particular focus should be on the development of materials for readers at different levels. Although it may be impossible to provide materials in all African languages, the many cross-border language groups create the potential for large markets for materials in those languages. Developing these materials would require regional collaboration and attention to issues such as copyright.

A major aspect of language policy—complementing the use of the mother tongue as the language of instruction at the primary level—is the effective teaching of the official national language (which becomes the language of instruction in later grades), so that children in disadvantaged schools are not penalized when they progress to higher grades. Remedial lessons in later grades can help to bridge some of the learning gaps in earlier grades. However, a more sustainable plan would require that at least one teacher per school be adequately equipped to teach the official language as a subject.

Difficult as these steps may seem, the failure to have such a national policy—and mechanisms to implement it—carries heavy costs for generations of children who will not have more than the most rudimentary skills for the rest of their lives. Whatever language policy is determined, countries should avoid abrupt and frequent changes in their policies, which make adequate planning and implementation impossible.

Unblocking the "traffic jam" in early-grade progression is essentially about improving equity throughout the system. A child who cannot read for meaning and knowledge by the end of grade two, or by the end of grade three at the latest, cannot make significant academic progress thereafter. Such children are heavily concentrated in poor communities and in schools where the average socioeconomic status of students is low. Addressing the constellation of issues to improve early-grade progression and learning should be a priority for policy makers.

Improving Access and Progression in Basic Education

The early-grade "bulge" described in the previous section has led to high repetition rates and many children eventually dropping out of school without having basic literacy and numeracy skills. Many more drop out before or at the transition between the upper-primary and lower-secondary levels, and even more drop out before they complete lower-secondary education.

This section focuses on disparities in progression in the schooling system and how disparities widen by the time children move into lower-secondary education. It examines why children are dropping out of school at both the primary and secondary levels as well as the structural barriers related to

high-stakes examinations that create a bottleneck for student progression from primary to lower-secondary education. Last, it discusses some options to support the expansion of lower-secondary education.

Disparities in Access

Along the same lines as disparities in learning outcomes, wide disparities exist in access to primary education by household disadvantage (income level and whether a child lives in a rural area or urban area) and gender. Regarding household background, the analysis shows a striking difference between children from the poorest and wealthiest households in their access to primary education.

There are particularly large disparities in primary school access by income quintile in many francophone African countries, such as Mali (primary GER of 101 percent for the wealthiest quintile versus 41 percent for the poorest quintile); Benin (114 percent versus 58 percent, respectively); and Senegal (103 percent versus 60 percent, respectively).[14] The countries that have achieved universal access to primary education (such as Botswana, Kenya, Lesotho, Malawi, Togo, and Uganda) do not display any differences in access to primary education by wealth quintile. (For details by country, see online appendix C.1, figure C.1.1.)[15] However, disparities in access between the wealthiest and poorest quintiles widen as children move to lower-secondary education.

A national priority for many Sub-Saharan African countries has been to ensure access to education in rural areas—where more than 62 percent of the region's population lives.[16] Although the gap in access to primary education between children living in urban and rural areas persists across all country groups, it is more prominent in countries in Groups 3 and 4 (figure 3.8 panel a). In Liberia, Mali, and Niger (all Group 4 countries), for example, about 50 percent of primary-school-age children living in rural areas are enrolled in school, while almost all those living in urban areas are enrolled in school.

Again, the disparities in access widen at the lower-secondary level (figure 3.8 panel b), with the access gap between urban and rural children reaching as high as 81 percentage points in Mozambique (111 percent GER in urban areas versus 30 percent in rural areas); 73 percentage points in Ethiopia (117 percent in urban areas versus 44 percent in rural areas); and 74 percentage points in Gabon (112 in urban areas versus 38 percent in rural areas).

As for gender, although there has been significant progress at the primary education level, most countries in Sub-Saharan Africa are still lagging in gender parity at the lower-secondary level. Over two-thirds of the Sub-Saharan African countries have a Gender Parity Index (GPI) of 0.95 or above at the primary level (see online appendix C.1, figure C.1.2).[17] Almost all countries in Groups 1, 2, and 3 have achieved gender parity in primary education, with Group 4 lagging behind.

Figure 3.8 **Gross Enrollment Ratios of Primary and Lower-Secondary Education, Rural versus Urban Location, in Sub-Saharan African Countries by Group**

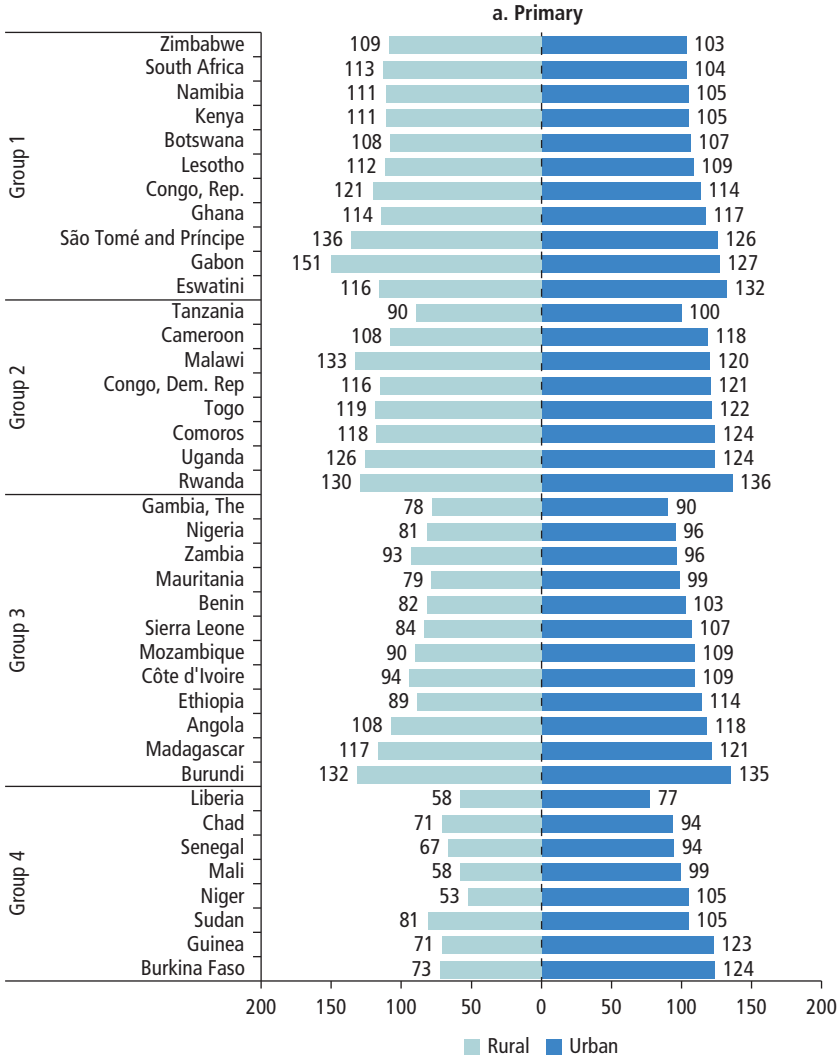


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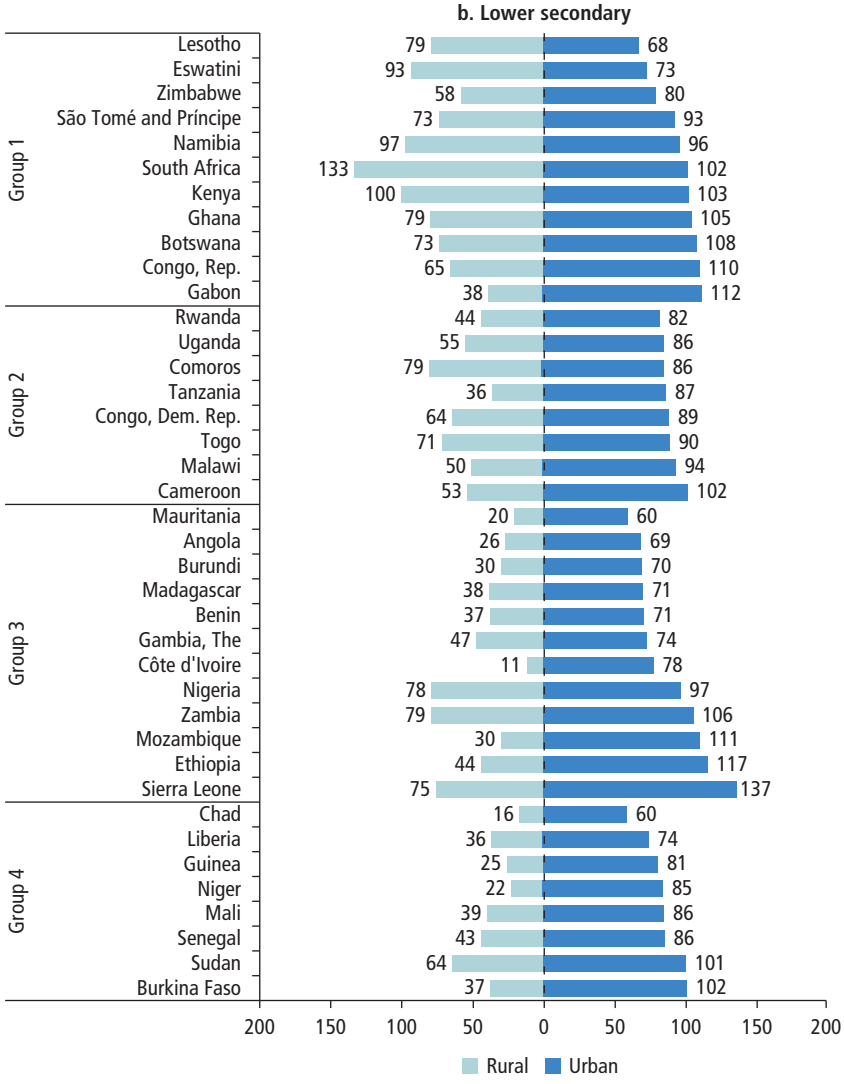
Figure 3.8 (continued)



Sources: Constructed from latest World Bank Living Standards Measurement Study (LSMS) and Demographic and Health Survey (DHS) data, latest available year by country.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

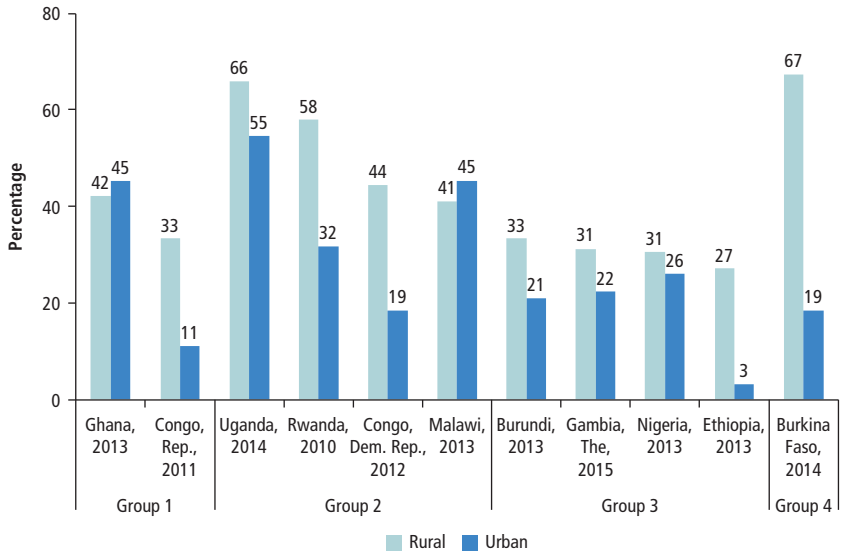
In summary, across Sub-Saharan Africa, children from poorer households and from households in rural areas have less access to primary school than children from wealthier households and households in urban areas. This gap by income and location widens as children move into lower-secondary education, and at this level, girls have less access to schooling than boys.

The Exclusivity of Lower-Secondary Education

In most Sub-Saharan African countries, lower-secondary education benefits the better-off urban population but remains largely inaccessible for rural populations, with girls at a disadvantage. For every child from a rural area attending lower-secondary education regionwide, almost three children are from urban areas. A big factor affecting access to school is the distance children must travel to get to school.

Data on distance to school—available from recent household surveys in 11 Sub-Saharan African countries—highlight significant cross-national and urban/rural disparities (figure 3.9). In urban areas, the share of children of lower-secondary school age who live more than 3 kilometers (or more than a half hour's walk)

Figure 3.9 Percentage of Rural and Urban Children of Lower-Secondary Age Living More Than 3 Kilometers or a Half Hour's Walk from the Nearest Secondary School in Selected Sub-Saharan African Countries, by Group



Sources: Constructed from latest World Bank Living Standards Measurement Study (LSMS) and Country Household Surveys.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

from the nearest secondary school ranges from 55 percent in Uganda to just 3 percent in Ethiopia. In rural areas, the share is often substantially higher than in urban areas: by 11 percentage points in Uganda, 24 percentage points in Ethiopia, 36 percentage points in Rwanda, and by 20–25 percentage points in the Republic of Congo and the Democratic Republic of Congo. However, in three countries—Ghana, Malawi, and Nigeria—the gap is modest or even slightly reversed.

A long distance between home and school can compound the effects of poverty, with poor households often unable to cover the cost, either of transportation or of attending a boarding school. In addition, distance is associated with opportunity costs; more time spent traveling to and from school implies greater loss of income or output from a child's work contribution through domestic chores, working on the family farm, or other types of productive labor (UNGEI and GPE 2014). Longer distances also reinforce security concerns for girls, because many may encounter some form of harassment while commuting to school. In some countries in the Sub-Saharan Africa region, early marriage or pregnancy prevents girls from going to school.

These factors have resulted, on average, in a low ratio of girls to boys who are enrolled in lower-secondary education (figure 3.10)—in contrast to primary education, where gender parity in access to schooling is almost universal. Out of 39 countries, girls are at a disadvantage in 18 countries at the lower-secondary level; in 13 countries, parity in access has been achieved; and in 8 countries, access favors girls.

Improvements in overall enrollment, if not reaching close to universal access, may not always result in greater gender parity in access. The cases of Benin and Ethiopia are illustrative: In Benin, access to secondary education improved from a GER of 29 percent in 2000 to 66 percent in 2015, but the GPI stayed the same at 0.65. In Ethiopia, however, the lower-secondary GER improved from 17 percent in 2000 to 56 percent in 2015, with the increase benefiting girls, as indicated by a GPI of 1.02.

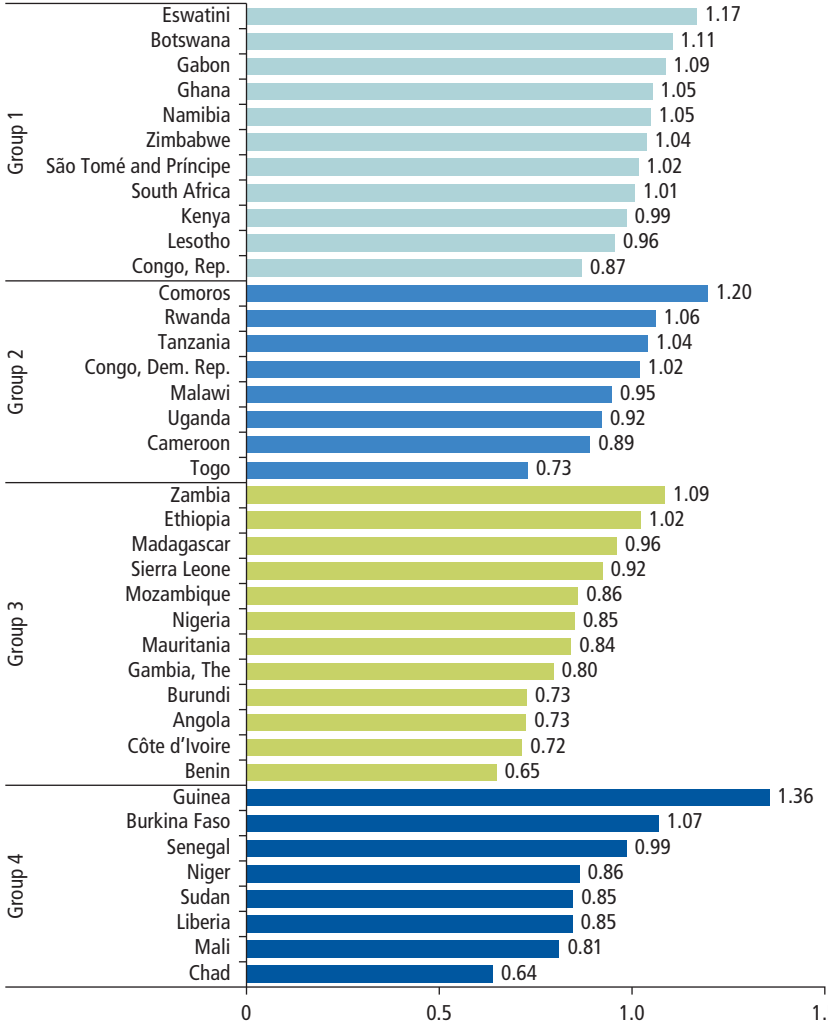
Disparities in Opportunities to Progress in Basic Education

The disparities observed in lower-secondary education are partly the result of a lack of rural schools and partly the result of poorer children dropping out before completing primary education. Although many countries in Sub-Saharan Africa have succeeded in increasing the percentage of children enrolling in school, ensuring that children stay in school and complete their education remains a key challenge.

Basic Education "Survival Rates"

Starting from the full (100 percent) cohort of students enrolled in the first grade in a given school year, a basic-school "survival rate" can be estimated—as shown

Figure 3.10 **Gender Parity Index for Lower-Secondary Education, Selected Sub-Saharan African Countries, by Group**

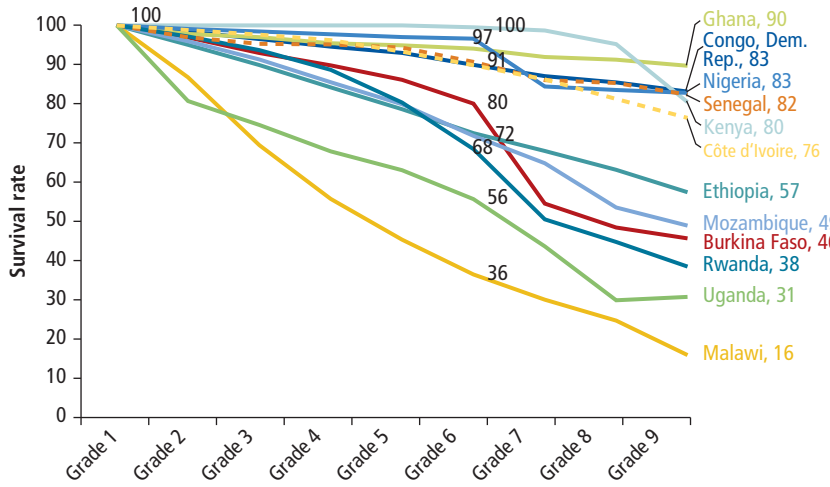


Sources: Construction based on latest available World Bank Living Standards Measurement Study (LSMS) and Demographic and Health Survey (DHS) data.
Note: The Gender Parity Index (GPI) reflects the ratio of females to males enrolled at a given stage of education. A GPI of 1 indicates parity between the sexes; a GPI that varies between 0 and 1 typically means a disparity in favor of males, whereas a GPI greater than 1 indicates a disparity in favor of females. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

here, the percentage of that cohort expected to reach grade six and grade nine (figure 3.11).[18] For example, in Mozambique, 72 percent of children who enroll in grade one are expected to complete grade six, and less than half the children enrolled in grade one are expected to complete grade nine. For Group 1 countries like Ghana and Kenya (which have universal access at grade one and low out-of-school rates), retention is high, resulting in survival rates to grade nine of 90 percent and 80 percent, respectively. These countries are effective in keeping students within the education system.

On the other hand, countries like Malawi and Uganda, which are in Group 2, have had successful primary education expansion policies (with near-universal access at grade one and low out-of-school rates), but these countries retain only 36 percent and 56 percent of students in grade six, respectively, and only 16 percent and 31 percent of students in grade nine, respectively. Countries like the Democratic Republic of Congo, Côte d'Ivoire, Nigeria, and Senegal have high retention rates of children through grade nine, but they are also countries in Groups 3 and 4 with high out-of-school rates and relatively low GERs. In other words, these countries tend to enroll smaller percentages of children in school, but once children enter the education system, they are more likely to complete their education.

Figure 3.11 **Survival Rates through Grade Nine, Selected Sub-Saharan African Countries**



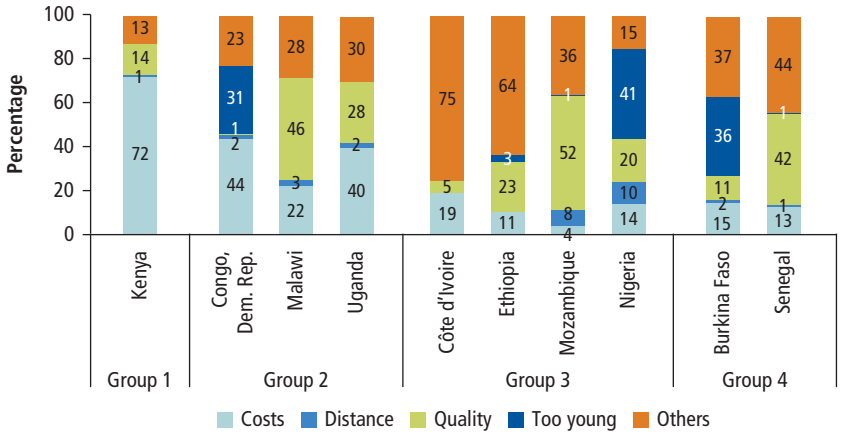
Sources: Analyses of microdata (most recent year) from the World Bank Living Standards Measurement Studies
Note: The "survival rate" is the percentage of a cohort of students enrolled in first grade, in a given school year, who eventually reach grade six and grade nine, regardless of repetition. Survival rates are estimated using the reconstructed cohort method. Primary education in Malawi includes grades 1–8; grade 9 is the first year of lower secondary education.

Across the board, retaining students from grades one through nine is a challenge, particularly for countries in Groups 2 and 3. For countries in Group 4, the focus should be on improving access to education in grade one and maintaining a high retention rate through the basic education cycle. For Group 1 countries, the inability to retain the small percentage of students from disadvantaged and vulnerable households who are dropping out is the biggest hurdle to achieving universal completion of basic education.

Reasons for Dropping Out

Why are children in Sub-Saharan Africa dropping out of school before completing basic education? Data from household surveys of 12 countries point to the main reasons, as reported by their parents (figure 3.12). For children who are of primary-school age, the most commonly reported reasons across countries are the high cost of school, the poor quality of education, the distance to school, and the perception that children are "too young" (not ready to be in school, perhaps if long walking distances are involved). These reasons are sometimes

Figure 3.12 Main Reasons Why Primary-Age Children Drop Out of School, Selected Sub-Saharan African Countries, by Group



Sources: Analyses of latest World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data.
Note: "Primary-age children" are mostly either ages 6–11 or 7–12 years, depending on the country's official entry age. The "quality" indicator combines three possible reasons: (a) students do not see the value of education and are therefore not interested, (b) parents do not see the value of education and therefore do not want to send their children to school, or (c) the student has failed an examination. Other reasons provided and not shown in the figure were not comparable across countries. In the three countries where most (or the largest share of) responses fell into the "others" category, households primarily responded as follows: In Côte d'Ivoire, "others" included disability and families not allowing a child to go to school, among other reasons. In Ethiopia, "others" included work, sickness, domestic obligation, and "too old," among other reasons. In Senegal, "others" included work and other reasons. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

linked: for example, *distance* to school could be the main factor driving the *costs* of attending school, and the issue of costs is often relative to the benefits (or *quality*) that education brings. By this reasoning, households send children to school only if the benefit is at least as great as the cost. Other reasons were reported in each country, but they could not be compared across countries.

The main reasons for dropping out of school and the magnitude of the problem differed by country. For example, in Kenya, 72 percent of parents reported their children dropped out of school because of the high cost of education, and 14 percent reported that children dropped out because of the poor quality of education. In other countries, like Ethiopia and Mozambique, cost was not the main reason for children dropping out of school, but rather quality was the key constraint—reflecting, in part, the effectiveness of the fee-abolition policy in these countries. Countries like Burkina Faso, the Democratic Republic of Congo, and Nigeria also reported large percentages of children dropping out of school because they are considered "too young" (not ready) for school.

The analysis shows a combination of *supply-side factors* (availability of schools within a reasonable walking distance of populated areas or other adapted solutions for children of families in sparsely populated areas or children of nomadic families) and *demand-side factors* (direct and indirect costs of sending children to school) that influence whether children drop out of school. However, as supply increases, the main constraint, even in countries with lower enrollment, shifts toward demand factors. Increasingly, direct and indirect costs to parents are a major obstacle to attaining universal access, as further discussed below.

Direct and indirect cost issues Both indirect and direct costs are often higher in rural areas, where most of the poor live, than in urban areas. Regarding indirect costs, rural children often have chores to do at home (for example, collect firewood, fetch water, mind younger siblings, herd livestock, or help in the fields); hence, sending them to school often entails significant opportunity costs for parents. Strategies to address these costs must be a more integral part of education sector planning. Even a well-endowed school will not retain children and ensure their learning if children are ill-nourished, work long hours at home, walk long distances to school, or live under conditions in which they cannot do their homework (World Bank 2009).

A closer look at the direct costs to households indicates that the share of education in per capita consumption is high for many countries (table 3.2). For example, in Kenya and Uganda, households spend 75 percent of their expenditures for one child on his or her education. That the percentages are far lower in Ethiopia and Malawi (11 and 23 percent, respectively)—which correspond with figure 3.12—indicates that cost is not a major reason for dropping out of school in these countries.

Table 3.2 Average Percentage of Household Expenditures per Child Spent on Education, Selected Sub-Saharan African Countries
Percentage

Country and group	Share of expenditures per child going toward education
Kenya (Group 1)	75
Uganda (Group 2)	75
Malawi (Group 2)	23
Côte d'Ivoire (Group 3)	46
Ethiopia (Group 3)	11
Nigeria (Group 3)	67
Senegal (Group 4)	52

Sources: Analyses of latest World Bank Living Standards Measurement Study (LSMS) data.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

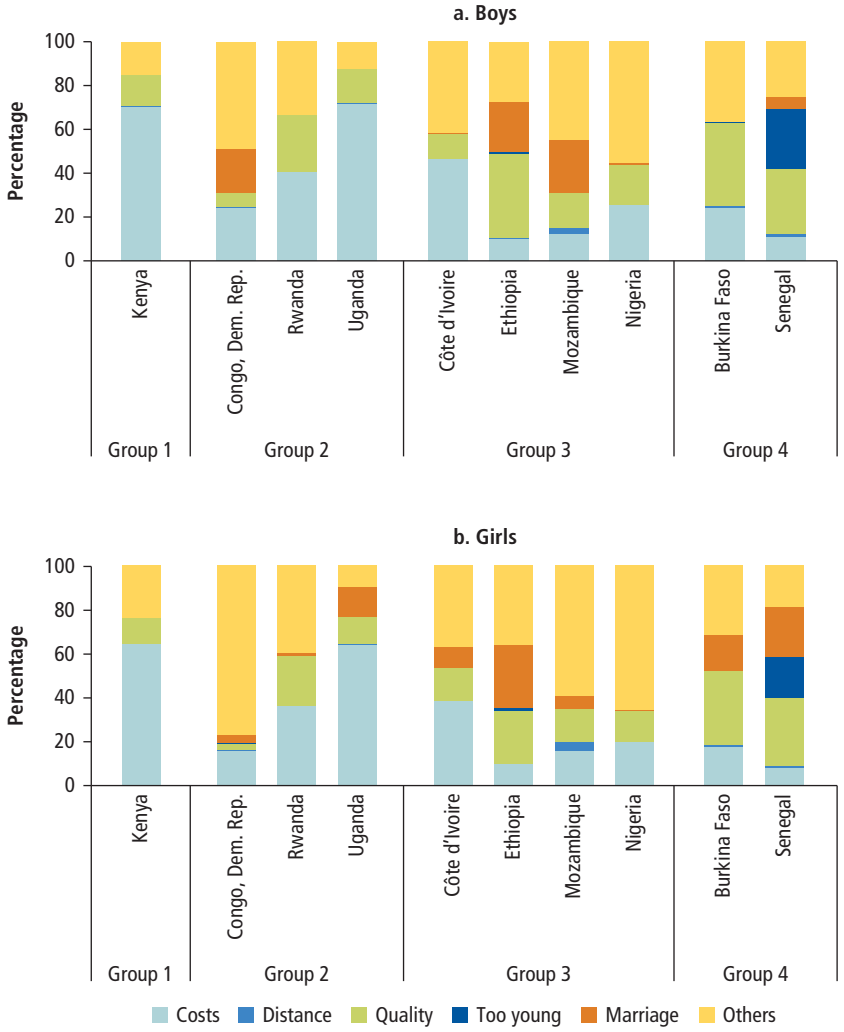
At the lower-secondary level, across the countries, cost is also the main reason for children dropping out of school, followed by the quality of schooling (figure 3.13). Although distance does not come up as a major reason for dropping out of school at the secondary level, this is likely because distance is considered to fall within the "cost" element of schooling; that is, parents are willing to send older children longer distances to attend school, but there is a higher cost associated with traveling longer distances to school.

Gender-specific issues At the lower-secondary level, marriage (and, for girls, pregnancy) is also a major reason why children drop out of school. Ethiopia has a large percentage of boys and girls dropping out because of child marriage (23 percent and 29 percent, respectively).[19] Interestingly, the Democratic Republic of Congo and Mozambique have higher percentages of boys than girls dropping out of school because of child marriage. In countries like Burkina Faso, Senegal, and Uganda, child marriage (and pregnancy) is much more of a reason for girls to drop out than for boys. At the upper-secondary level, child marriage and early pregnancy become even bigger issues and causes for dropping out of school.

Although multiple factors may lead girls to drop out prematurely, child marriage remains a leading cause of the gender gap in education at the secondary level in Africa (Nguyen and Wodon 2017). The impact of child marriage on educational attainment has important economic implications, because earnings for women tend to be lower in adulthood when their educational attainment is lower. Child marriage is estimated to lead to a loss of earnings averaging about 9 percent for the women who married early across 15 countries globally, including 11 countries in Sub-Saharan Africa (Wodon et al. 2017).

Keeping girls in secondary school must be a priority for African countries. Well-educated girls have better health outcomes and substantially higher

Figure 3.13 **Main Reasons Why Boys and Girls of Lower-Secondary Age Drop Out of School, Selected Sub-Saharan African Countries, by Group**



Sources: Analyses of latest World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data.
Note: "Lower-secondary age" generally refers to children of ages 12–14 or 13–15 years, depending on the country's official entry age. "Quality" regroups three possible reasons: (a) students do not see the value of education and are therefore not interested, (b) parents do not see the value of education and therefore do not want to send their children to school, or (c) the student has failed an examination. Other reasons provided are not reported here because they were not comparable across countries. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

earnings in adulthood. They are less likely to have children before they are ready to do so and tend to have fewer children over their lifetimes. In countries with high fertility rates, secondary education for girls may help expedite the demographic transition and the benefits from the demographic dividend. Well-educated girls are also less likely to marry as children or to suffer from a lack of household decision-making power and from intimate partner violence. In addition, well-educated mothers are better equipped to support the optimal development of their children in the early years, as well as their own transition into adulthood. This leads to intergenerational benefits that influence the long-term development of societies.

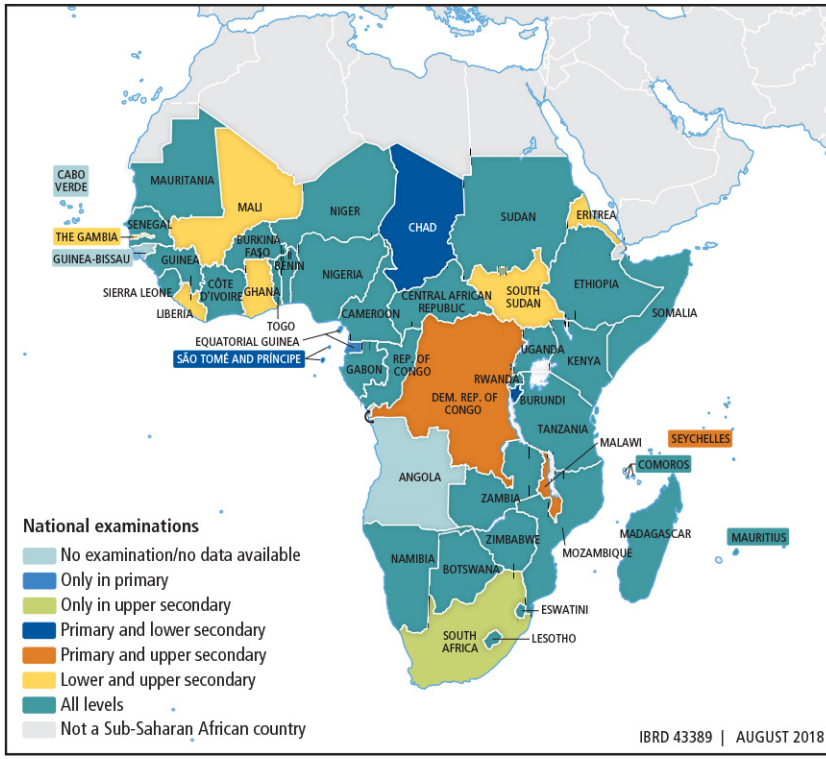
High-Stakes Examinations: A Further Bottleneck to Lower-Secondary Education

National examinations are essential determinants of progress from primary to lower-secondary or from lower- to upper-secondary education in many Sub-Saharan African countries. In most countries, examinations also control access to tertiary education. In 28 of the 43 countries for which data are available, examinations take place at all education levels: primary, lower-secondary, and upper-secondary. Examinations are administered at the end of each school cycle and are used for:

- *Selecting students into the next cycle* (lower-secondary for primary students, upper-secondary for lower-secondary, and higher education institutions for upper-secondary);
- *Tracking students* into academic and vocational tracks;
- *Certifying successful completion* of an education cycle; and
- *Holding teachers and schools accountable for learning,* particularly when the results of students' performance on examinations are published (Omolewa and Kellaghan 2003).

These selection examinations are considered "high-stakes" because they regulate access or placement into the next education level. Countries that have moved toward consolidating primary and lower-secondary into a "basic education" cycle of around nine years of schooling typically have eliminated examinations at the end of the primary cycle (map 3.1).[20] High-stakes examinations have been criticized because the passing grade depends mostly on the number of places available at the next level rather than on mastering the materials being tested (World Bank 2013). For example, the cut score for the Basic Education Certificate Examination administered in grade nine in Ghana is relative to the number of places available in secondary education.

Map 3.1 National Selection Examinations, by Education Level, in Sub-Saharan African Countries, 2016



Source: IBRD No. 43389, December 2017. ©World Bank. Further permission required for reuse.

Consequences of High-Stakes Selection Examinations

Three consequences of high-stakes examinations are: focus of instructional time on test preparation, malpractice, and increased repetition. Kellaghan and Greaney (2003) find that teachers and students put considerable effort and time into drill-dominated preparation for high-stakes examinations. Thus, time is lost to instruction (for example, taking "mock examinations"). Test preparation activities can also distort teaching and learning. For example, if an examination consists of multiple-choice questions, normal teaching may take the form of statements accompanied by options from which students select a response. The focus on test-preparation skills might also induce students to direct their efforts toward mastering test-taking strategies rather than toward developing subject mastery and honing lasting competencies. Although "teaching to the test" is

proposed as an advantage of high-stakes examinations, the downside is that such teaching might become limited to only the subset or sample of an entire achievement domain that an examination assesses.

High stakes can also be associated with malpractice. To obtain high scores, students (and sometimes teachers and others) might resort to various forms of cheating to give a candidate an unfair advantage over others (Greaney and Kellaghan 1996). Malpractice takes many forms: copying from other students during an examination, collusion between students and examination supervisors, use of material smuggled into the examination hall, bribing or intimidation of examiners, and purchasing of examination papers. Given that malpractice can erode the credibility of an examination system, a variety of practices to prevent it (such as having examination papers printed outside the country, or keeping markers in isolation while scoring papers); to detect it (such as by matching the response patterns of students who sit close to each other in an examination); and to punish it (for example, with a prison sentence) are in place in many countries (Kellaghan and Greaney 2003)—all of which add to the costs of examinations.

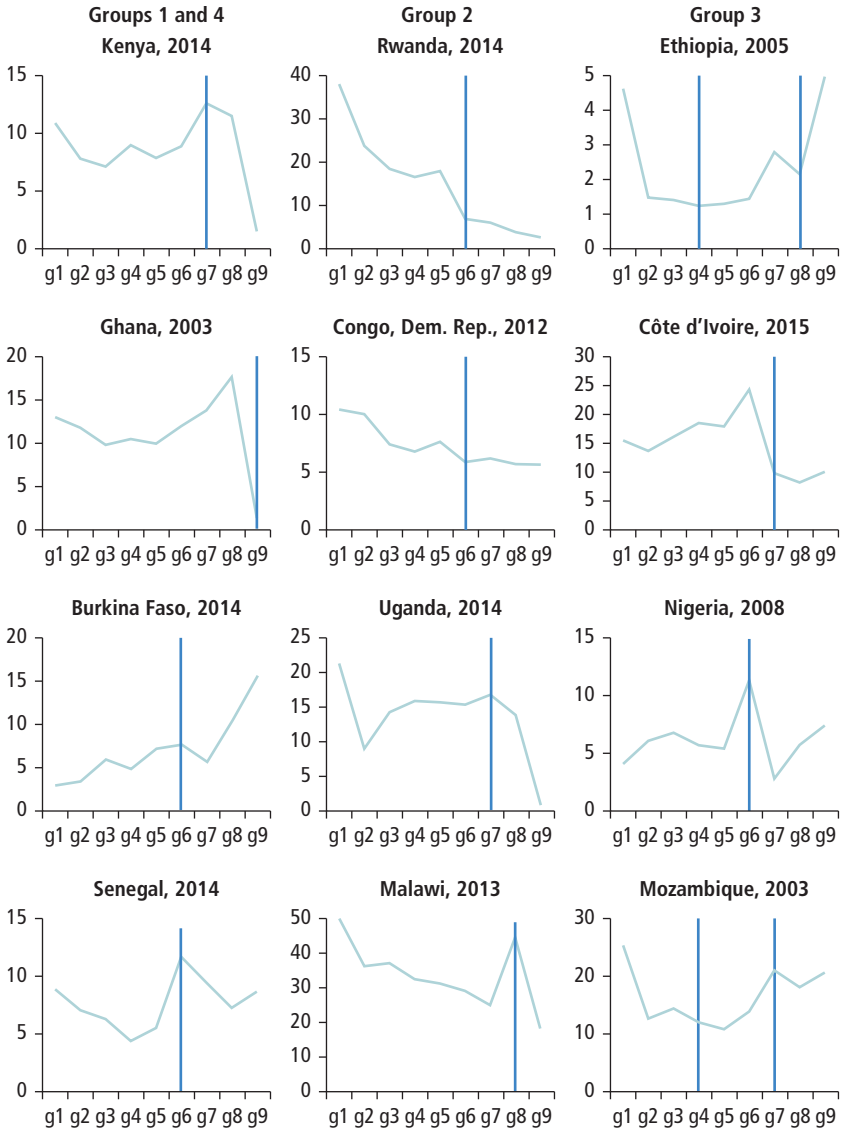
High-stakes examinations can also conflict with aspects of education policy, especially relating to equity. One way this can happen is if teachers—whose reputations depend on how well their students perform in examinations—focus their efforts on the students who are most likely to succeed. To increase pass rates, it appears that schools in many Sub-Saharan African countries tend to hold back learners who are unlikely to succeed in the exams.

Indicating this possibility, figure 3.14 shows the repetition rates by grade for 12 countries, where the dark blue line depicts the grade when national examinations are held.[21] Countries like Burkina Faso, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, and Rwanda show a spike in repetition rates in the grade prior to national examinations, suggesting that schools are only passing children whom they consider "ready" for national examinations. Other countries—such as Côte d'Ivoire, Malawi, Mozambique, Nigeria, and Senegal—show high repetition rates in the same grade as when examinations are administered.

Disparities by Gender, Household Location, and Wealth

Statistical estimates find that girls are more likely to repeat primary education than boys, especially in Kenya (where girls are 26 percentage points more likely to repeat than boys), Malawi (29 percentage points more likely), Rwanda (13 percentage points more likely), and Senegal (22 percentage points more likely). Children living in rural areas in these countries, except Nigeria, also are more likely to repeat primary grades than those in urban areas. And across all 12 selected countries, children from poorer households are also more likely than children from richer households to repeat primary education.

Figure 3.14 Repetition Rates by Grade in Selected Sub-Saharan African Countries, by Group



Sources: Analysis of latest World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data.
Note: The dark blue line in each panel denotes the point of examination. "Repetition" occurs when a child enrolls in the same grade for a second time, whether the child had formally failed or not. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

The higher the repetition rate, the fewer the children who complete primary schooling and the more likely that children who have repeated will eventually drop out (Bernard, Simon, and Vianou 2005). Bernard, Simon, and Vianou (2005) argue that repetition puts a brake on universal primary education, with around half of the delay in francophone countries being related to the policies and practices of repetition.

Because children from vulnerable backgrounds are more likely to repeat and drop out before completion of the primary cycle, the transition to lower-secondary education reflects many of the same inequalities affecting access to primary education. Fewer children from rural areas and from poorer households go on to lower-secondary education (figure 3.15), further perpetuating an intergenerational poverty cycle, given the correlation between education and well-being. Much less variation is observed between genders, though francophone African countries (not captured in figure 3.15) have a higher percentage of boys than girls who make the transition to lower-secondary education (Bernard, Simon, and Vianou 2005).

Figure 3.15 **Transition Rates from Primary and Lower-Secondary Education, by Location Type, Wealth, and Gender, in Selected Sub-Saharan African Countries, by Group**

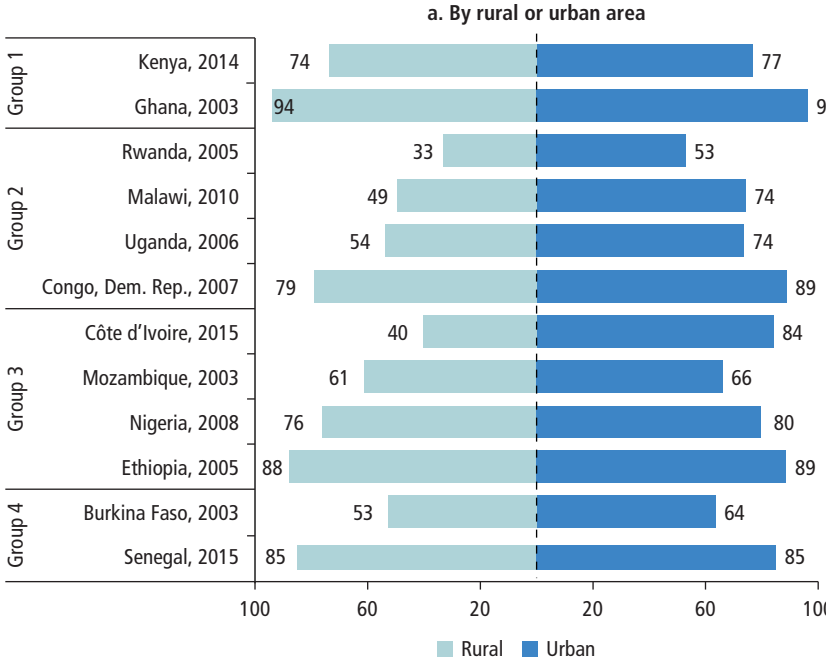


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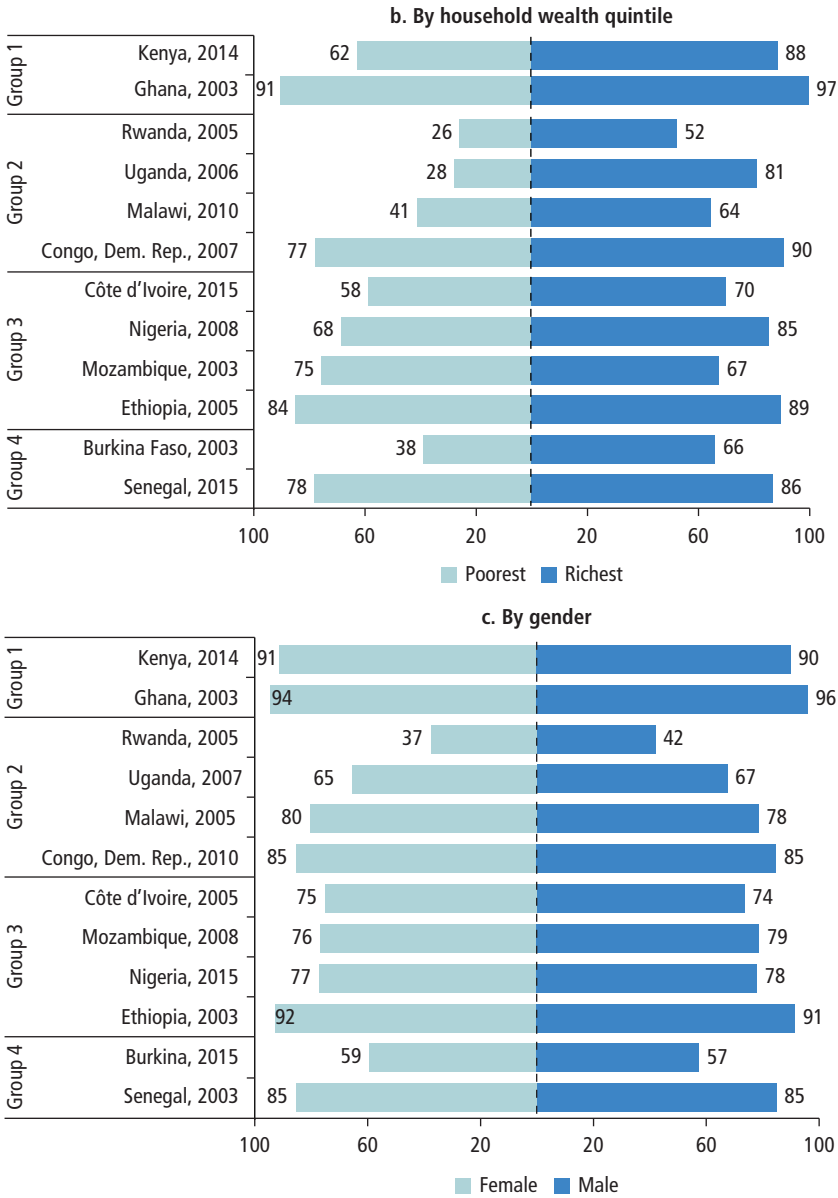
Figure 3.15 (continued)



Sources: Analysis of latest World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data.
Note: The "transition rate" is the number of students admitted to the first grade of a lower-secondary education in a given year, expressed as a percentage of the number of students enrolled in the final grade of primary education in the previous year. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

Botswana exemplifies several approaches that could help improve overall progression from primary to lower-secondary education and arguably help to reduce disparities as well (box 3.4). The country, among other policy changes, eliminated its high-stakes national examination in 1987, which almost immediately increased lower-secondary enrollment.

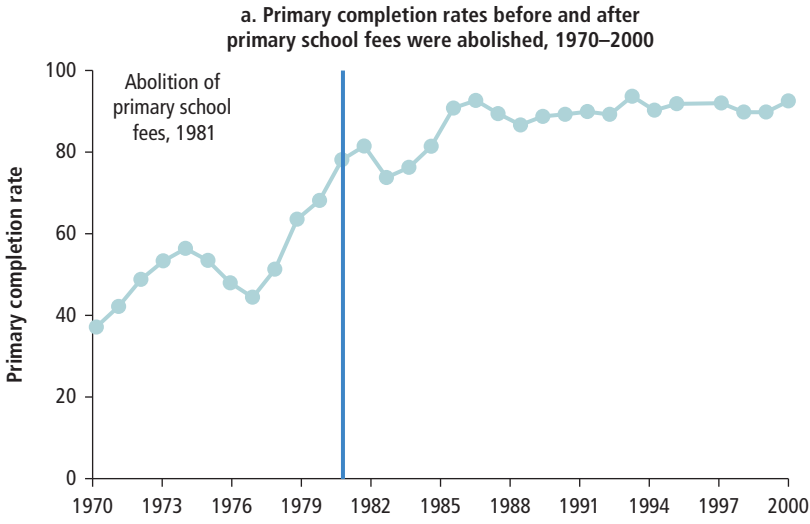
BOX 3.4

Botswana's Transition to Basic Education: An Impetus for Dramatic Change

The National Policy on Education of 1977, titled "Education for Kagisano" (Education for Social Harmony), marked the first of two major postindependence national reforms of the education sector in Botswana. The policy introduced the "basic education" concept (fully implemented in 1987) that shifted the education structure from seven years of primary schooling to nine years of basic education (seven primary years plus two junior secondary years).

The policy had also introduced other key initiatives, such as the abolition of school fees (primary school fees in 1981 and junior secondary school fees in 1989) and other prohibitive user fees, along with a rapid expansion of infrastructure to accommodate increased demand through the Primary Education Improvement Project (PEIP) and Junior Secondary Education Improvement Project (JSEIP).

Figure B3.4.1 Effects of Education Sector Reforms in Botswana



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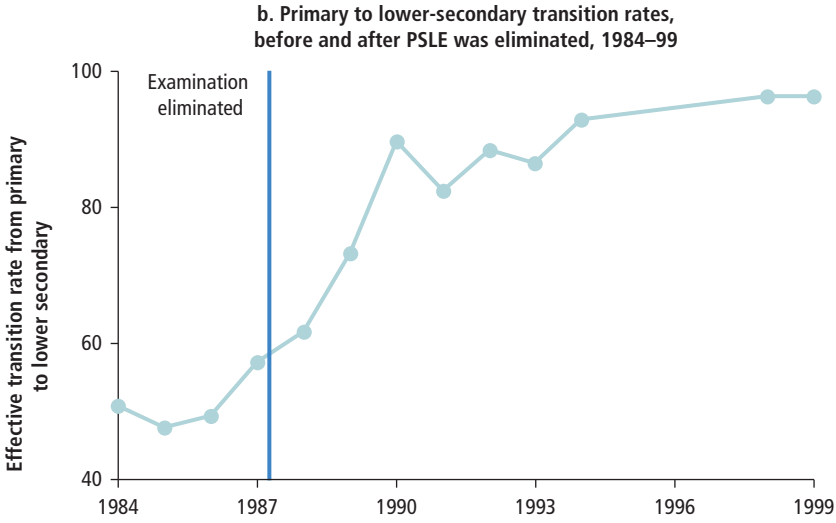
Box 3.4 (continued)

Figure B3.4.1 (continued)



Source: Based on data from UNESCO Institute for Statistics UIS.Stat database (accessed August 17, 2017), http://data.uis.unesco.org.
Note: In 1987, Botswana eliminated its national Primary School Leaving Examination (PSLE). "Effective transition rate" measures the transition from a lower to a higher level of education, regardless of repetition.

These programs collectively had a significant impact on the education sector, leading notably to a significant increase in enrollment, and, more important, to an increase in the primary completion rate. By 1987, when basic education was fully implemented, the primary completion rate was 92.6 percent, up from 44.2 percent in 1977 (figure B3.4.1, panel a). This provided the right environment for the expansion from seven years of primary to nine years of basic education.

Botswana's second major education reform occurred when the Primary School Leaving Examination (PSLE) was changed in 1987 from a high-stakes examination used for selection into junior secondary school to a certification examination in grade seven to assess students' competency and mark completion of the primary cycle. This effectively removed the PSLE as a barrier to student progression, and its impact was felt almost immediately: transition rates increased from 57 percent in 1987 to nearly 90 percent by 1990 (figure B3.4.1, panel b).

Sources: IBE-UNESCO 2007; Selolwane 2013; Wehmeyer and Patton 2017.

In summary, there are significant disparities in access to lower-secondary education. Secondary schools are mainly located in urban areas, and urban schools tend to have more resources than rural schools. Although these are *supply-side disparities* in school-level resources based on location, there are also *demand-side disparities* arising from the children's characteristics: of the children who enroll in and complete lower-secondary education, most are from richer households, live in urban areas, and are boys.

These disparities begin in the early grades, as children repeat grades in countries experiencing the "early-grade bulge," and many eventually drop out. In all countries in Sub-Saharan Africa, except for a few in Group 1, a large percentage of children drop out of school, especially during their primary education. These children *are* usually from poorer households or live in rural areas, and as children move to lower-secondary education, access to schooling varies by socioeconomic status, residence, and gender.

When children from poor and rural households *can* enroll in school, they tend to face further challenges and exclusion through forced repetition and eventually drop out of school. The consequences of these inefficiencies in the basic education cycle are thus more severe for the poor, further propagating inequalities of opportunity. The next section discusses some of the policy options to improve progression in primary education and options to expand lower-secondary education.

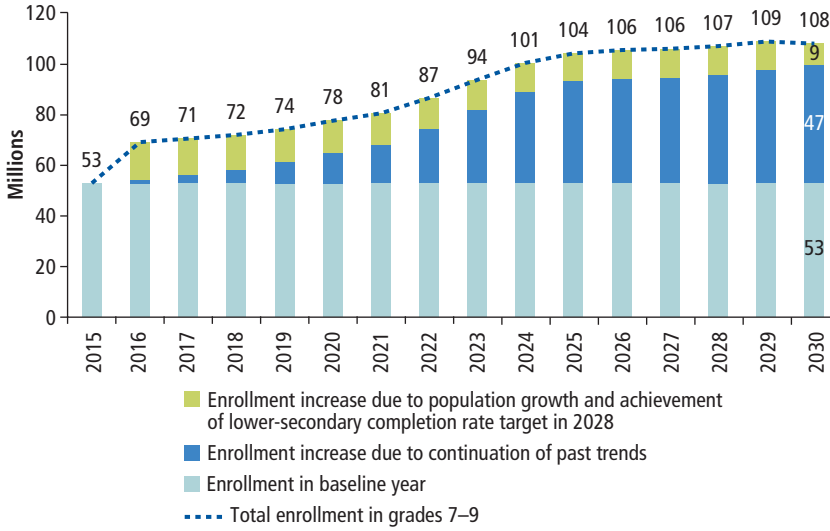
Expanding Lower-Secondary Education with Quality and Relevance

This section considers options for enabling all children to progress through primary education more easily and for expanding lower-secondary education efficiently to accommodate the growing number of children who will be exiting the primary education cycle.

The share of children enrolled in lower-secondary education in Sub-Saharan Africa rose from 41.7 percent in 2000 to 63.1 percent in 2013.[22] An estimated 53 million children were enrolled in lower-secondary education in 2015 across the region. By 2030, 47 million more children will be in lower-secondary education if the pace of expansion follows historical rates, and 9 million more will be added if no student drops out before finishing the cycle. If completion rates are universalized in primary schooling by 2025 and in lower-secondary schooling by 2028, aggregate enrollment in lower-secondary education will reach 108 million by 2030, more than double the 2015 enrollment (figure 3.16).

Although the projected expansion of enrollment creates immense challenges, it also creates opportunities. Significant new investments will be required

Figure 3.16 **Projected Lower-Secondary Enrollment in Sub-Saharan Africa, 2015–30**



Sources: Based on projections of the World Bank Living Standards Measurement Study (LSMS) datasets and the UNESCO Institute for Statistics (UIS.Stat) database (accessed July 18, 2016), http://data.uis.unesco.org.
Note: "Lower-secondary" refers to grades seven through nine.

in school infrastructure and material resources as well as in teacher training and recruitment—pressures that will undoubtedly stretch the capacity of Sub-Saharan African countries to finance and manage the new investments. Yet these trends also permit a dynamism for improvement, notably through wise choices to broaden access to lower-secondary schooling and strategies to shift the distribution of schools toward enrollment sizes that take advantage of economies of scale in service provision.

In all Sub-Saharan African countries, persistent diversity in student profiles and local conditions will remain, implying that no single template for expansion will work in all situations (for example, schools for special-needs students, for top-scoring elite students, or for those living in small catchment areas in remote locations). Instead, a process for improving access while keeping costs under control, with continuous feedback for course correction and scaling up, appears to be a promising approach.

The lack of distinct patterns in the growth of lower-secondary education across the four country groups suggests that each country's current network of secondary schools is probably at a different stage of development; expansion strategies will thus vary accordingly. For the bulk of the secondary-school-age population, two main options are available to the government to improve access

to secondary schooling: (a) add new classrooms to existing primary or secondary schools, or (b) build new secondary schools. Double-shifting—in which two groups of students share the same premises on different schedules—is a potential third option that countries in other parts of the world have used successfully (for example, Singapore is in the early stages of developing double-shifting), although it is feasible mainly in densely populated urban areas.[23]

Policies to Improve Access to Basic Education

The policies discussed in this section to improve access to basic education include lowering the costs of constructing new schools, attracting and retaining girls in lower-secondary education, targeting financial incentives for children from poorer households, eliminating high-stakes examinations to improve the transition from primary to lower-secondary education, and leveraging and regulating private education providers to support system expansion. Aside from the construction of new schools, there is an urgent need to improve the quality and relevance of secondary education. Examples of such reforms will also be discussed in this section, including making the curriculum for lower-secondary more relevant to a modern society and using technology to improve teaching and learning.

Reconsider the Standard School Package of Facilities

Universalizing lower-secondary education through an affordable mass construction program requires governments to strategically reconsider the specification of the standard school package of facilities based on low-cost, good-quality solutions for infrastructure development. Facilities that significantly affect costs include laboratories, boarding facilities, and teacher housing. Finding effective and lower-cost alternatives are essential if the cost of universalizing lower-secondary education is to be manageable.

Apart from expanding the network of schools to rural areas, other potential options for consideration by ministries of education include subsidizing transportation, operating school buses, or providing boarding facilities in schools. All these options are hard to scale up affordably or sustainably in low- and middle-income countries.

Laboratories versus lower-cost science teaching options Laboratories are expensive and not necessarily effective. Science teaching is based on practical work performed in laboratories that are designed on a 19th-century model largely inspired by university-level science teaching. Such laboratories are highly expensive to build, operate, and maintain, and they require high-level teaching skills. Typically, in Africa, one laboratory room costs at least four times (Uganda) to eight times (Lesotho) the cost of one classroom because of the complexity of building pipes (gas, water, and power) through the room to each desk. Many countries do not include laboratories in most secondary schools;

78 percent of secondary schools in Kenya and 70 percent in Tanzania have no laboratories (Theunynck, forthcoming).

Even when laboratories exist, they often do not function as they should because of the lack of recurrent funds to maintain equipment and supply materials, as well as the lack of teachers' skills for lab work. In addition, the learning outcomes are far from commensurate with the investment cost. This situation is not specific to low- and middle-income countries; the use of laboratories yields poor outcomes in high-income countries for the same reasons (Theunynck, forthcoming).

Another question concerns the difference between the science curricula of lower-secondary schools and that of upper-secondary schools and whether the same infrastructure is required for both levels of education. Countries in Sub-Saharan Africa have responded differently on this issue: Malawi and Uganda keep the same lab standard for both levels of education, typically in large lower-secondary schools (Theunynck, forthcoming). Other countries—such as Côte d'Ivoire, Ghana, Togo, and Zambia—have designed lower-secondary schools without specific labs but instead use ordinary multipurpose rooms for practical science activity, typically in small neighborhood lower-secondary schools (or *petits collèges de proximité*).

Lower-cost alternatives exist and, although they have not been fully evaluated, they are promising because they are based on pedagogy that is student-centered, project-based, and inquiry-based—features that are key for teaching and learning the sciences. Using ordinary multipurpose rooms with minimum space and equipment, these alternatives include the following:

- *Science kits.* Science kits are a well-known alternative and have been implemented in many countries over time. However, the implementation of science kits has met with strong resistance from teachers who consider science kits to be an inferior option. The exception is Zimbabwe, where science kits have been successfully implemented since the 1980s and integrated into the curriculum (Theunynck, forthcoming).
- *New technologies and tools*. Newer lower-cost options have recently emerged in Sub-Saharan Africa based on a complete paradigm shift in science pedagogy and facilitated by the rapid spread of new technologies. These options include (a) virtual labs requiring an internet connection; (b) use of open-source teaching materials with smart boards and remote devices to enable students and teachers to conduct formative assessment processes; and (c) fabrication laboratories ("Fab Labs"), where low-cost experiments can be developed with the most recent generation of electronic tools in nonspecialized environments.[24]

For any of these alternatives to work, it is essential that there be a cadre of competent teachers who can teach science. A 2007 study conducted as part of the World Bank's Secondary Education Initiative in Africa (SEIA) found that the science, mathematics, and information and communication technology (ICT)—or, SMICT—teaching force is largely inexperienced, and teachers tend to have a

limited understanding of SMICT subjects despite statistics suggesting that most teachers are qualified (Ottevanger, Akker, and Feiter 2007). All the assessed countries reported serious problems with the supply of good SMICT teachers. Even though student learning in science education is enhanced by activities in which students actively construct their own knowledge (through interaction with their existing knowledge and from ideas provided by materials, other students, and the teacher), the general classroom practice in many of the countries assessed was still largely dominated by teachers, with students silently copying notes from the blackboard. Strategies to recruit, train, and manage teachers to deliver high-quality lessons are described in chapter 4.

Boarding facilities versus day schools Boarding facilities for students are within the standard package of facilities for secondary schools in several anglophone countries. In Zambia, for example, almost all secondary schools are boarding schools. In Kenya (2014), four out of five secondary schools offered boarding facilities. In Uganda (2015), 44 percent of secondary schools offered full or partial boarding facilities (Theunynck 2017).

The main justification for boarding schools is that many communities are too far from schools, and boarding is considered an efficient way to close disparities in access. However, the construction of boarding facilities not only requires significant investment but also results in high recurrent costs to maintain and operate the facilities. In Zambia, for instance, the average annual fees paid by parents are more than three times higher per child in boarding schools than in day schools (Theunynck 2017).

The boarding school model is expensive and difficult to replicate at scale. Although possibly suitable for particular groups in order to achieve certain social goals—for example, enabling top-performing students (likely future leaders) from across the country to live together and build bonds during a particularly formative time in their lives—the model is inappropriate for large-scale school expansion programs.[25] In particular, boarding schools are not cost-efficient in ensuring that students complete their studies and improve their cognitive achievement (see box 3.5). Last but not the least, a number of recently reported cases raise serious concerns about safety in boarding schools. Several reports show that children educated in boarding schools, particularly girls, are more likely to be victims of physical and sexual violence than those educated in day schools.

The lower-cost alternative is simply to build lower-secondary schools closer to students' homes. Reducing distance to school not only decreases the need to offer boarding facilities but also reduces disparities in access to education by marginalized communities.

Teacher housing versus other teacher incentives Countries that offer boarding facilities in the standard package also tend to offer housing for teachers on the school site. The typical justification for providing teachers' houses is that they are a necessary incentive for teachers to accept working in rural areas,

BOX 3.5

Boarding Schools: Effective but Not Cost-Effective

Boarding schools are an alternative to day schools, particularly for students whose families live in remote rural areas. They can also be more effective than day schools because they give students a greater opportunity to study. Little research is available comparing boarding schools with day schools, but four recent studies provide some information about the effectiveness and cost-effectiveness of boarding schools. Most found that boarding schools were not cost-effective in terms of the learning outcomes reflected in student assessment scores.

Secondary Boarding Schools for Girls in Kenya: Not Cost-Effective

Ngeno, Simatwa, and Ayodo (2012) compared the costs and student performance for 103 boarders and 21 day students in six schools in the Kericho District of Kenya. In general, the boarding schools served girls whose homes were far from the school. The homes of two-thirds of the boarding students were 3 kilometers or more from the school; by comparison, the homes of only 24 percent of the day students were that far away.

The average cost to educate a day student (K Sh 48,339) was lower than that of educating a boarding student (K Sh 63,564). However, average scores on the Kenya Certificate of Secondary Education were lower for day students (ranging from 2 to 3.5) than for boarding students (ranging from 3.1 to 3.8). The ratio of cost to score showed that boarding school education was less cost-effective than day school education (table B3.5.1).

Urban Boarding Schools for the Disadvantaged in France: Not Cost-Effective

Behaghel, De Chaisemartin, and Gurgand (2017) conducted a randomized controlled trial (RCT) to examine the impact of attending the first "Internat d'excellence" in France—a boarding school designed to serve disadvantaged youth. Students were

Table B3.5.1 Cost per Test Score Unit in Day and Boarding Secondary Schools for Girls, Kericho District, Kenya, 2010
Kenyan shillings

School	Day students	Boarding students
A	18,556	18,440
B	14,485	14,968
C	11,701	21,422
D	12,109	16,560
E	17,170	19,737
Average	14,804	18,225

Source: Ngeno, Simatwa, and Ayodo 2012.
Note: Calculation of cost per test score unit is based on each school's average score on the Kenya Certificate of Secondary Education examination.

(continued next page)

Box 3.5 (continued)

selected by lottery from among applicants to the boarding school, and the subsequent performance of "lottery winners" and "lottery losers" was compared. The boarding school offered smaller classes, better classroom conditions, better support for learning, and higher academic demands.

After two years, boarding school students scored 21 percent of 1 standard deviation (effect size = 0.21), per year, higher than the student control group on tests of mathematics but no higher in French. Most of the positive effect was concentrated among students with initial higher ability (effect size 0.7), and negative effects were found for students with initial lower ability (effect size –0.3). In addition, the boarding school reduced students' sense of well-being. The cost per student for the boarding school (€21,600) was about twice as high as in the control schools (€10,700). The cost-effectiveness of the boarding school was equivalent to reducing class size by half.

Urban Boarding Schools in the United States (Washington, DC): Not Cost-Effective

Curto and Fryer (2014) conducted an RCT to examine the impact of attending a School for Educational Evolution and Development (SEED) boarding school in Washington, DC, on the reading and mathematics performance of disadvantaged youth. At the lower-secondary level, the SEED school emphasizes mastery of basic skills, and students receive extra tutoring and extra instructional time as well as an extended school day (eight hours).

Students who attended SEED ("lottery winners") scored 0.198 standard deviation higher per year in reading and 0.230 standard deviation higher per year in mathematics than the control group ("lottery losers"). Girls who attended SEED scored significantly higher than boys in both subjects. The cost per student for SEED is US$39,000 per year, and the return on investment in SEED schools was estimated as 4.6 percent, compared with 18.5 percent for a comparable nonboarding school.

Boarding Schools for Rural Students in China: Mixed Results

Shu and Tong (2015) included 2,049 rural children, ages 10–15 years, from 1,682 households in 123 counties in China in a study to examine the difference between children attending boarding schools and those attending day schools with respect to mathematics and reading, physical health, and psychological well-being. Controlling for student background, the study found that students who attended a boarding school scored approximately 11 percent of 1 standard deviation higher on tests of word knowledge but not on tests of mathematics, compared with similar day students. However, boarding school students were 40 percent more likely to be sick, and they reported greater depression than similar day students.

particularly in hard-to-reach villages; they limit teacher absenteeism in classes; and they attract female teachers. However, in countries where this is a norm, the actual practice is to provide teachers with housing at any type of school, including in urban areas.

Building teachers' houses in schools is an expensive investment, and the operation and recurrent maintenance costs are high. In Malawi, a modest house

accommodating three teachers costs 25 percent more than a two-classroom block. Countries such as Benin, Côte d'Ivoire, Ghana, and Mauritania have targeted the provision of such housing to remote, hard-to-reach schools, and this can be a useful strategy to reduce costs.

Lower-cost, more efficient alternatives to teacher housing should be considered: salary-based incentives to compensate teachers who work in remote areas; offsetting transportation costs; and providing good working conditions (such as teachers' latrines, teaching support, and a common teacher's room). Evaluations of such programs to incentivize teachers should be conducted on an ongoing basis to ensure that they are targeted to yield the intended results.

In summary, building schools closer to where children live is essential to bridge the access gap, and this means expanding the lower-secondary school network to rural areas where poorer families live. The large standard package of facilities described above (which includes laboratories, libraries, boarding facilities, and teacher housing) tends to be found in countries with large schools in urban areas. The promotion of a minimum package of facilities is consistent with the promotion of smaller-neighborhood lower-secondary schools, or *petits collèges de proximité*, close to where children live.

Evidence from Sub-Saharan Africa suggests that beyond a size of 150 students for a three-year course, or 200 for a four-year course, the reduction in marginal cost per student is limited and would almost certainly be outweighed by the marginal benefit of being in a smaller school (World Bank 2008). In many countries, even smaller sizes may be economical if measures were implemented to eliminate inefficiencies in resource utilization.

Attract and Retain Girls in Lower-Secondary Education

As shown earlier, a significant percentage of girls drop out of lower-secondary school owing to child marriage or pregnancy. In fact, a large percentage of girls never go to secondary school for the same reason. What are the underlying causes of child marriage? Situations depend on the country context, with variations even within countries, but the case of Hausa communities in Niger and Nigeria illustrates some of the challenges faced by parents and girls. Qualitative work by Perlman, Adamu, and Wodon (2017) suggests that the parents' primary rationale for early marriage is to keep their daughters safe and ensure that they find a suitable husband. Getting a daughter settled in her new home is considered a moral duty of parents, and marriage is considered the primary avenue to secure her future. It is also an opportunity for families to forge strategic alliances that could offer socioeconomic benefits, but those benefits are often not the primary motivation for marrying a girl early.

A commonly held belief drawn from the communities' experience is that the window of opportunity for a girl to obtain a suitable husband is limited. There is an element of control in marrying girls early, because parents fear that the older

their daughter is, the more assertive she will be and therefore possibly beyond the control of a husband. But parents also want to minimize the risk of their daughter not finding a husband, of being sexually harassed, or even of being assaulted.

Parents also want to avoid the risk of a pregnancy out of wedlock because this can bring girls significant hardship and social exclusion. If a girl becomes pregnant before marriage, the social cost to her and her family is tremendous. The girl may be kept secluded or sent to live with kin in another village until she delivers or aborts. She loses her freedom and will not be sent to sell goods on markets (hawking), resulting in a serious loss of revenue.

The best option for a girl to delay marriage is to remain in school. Once a girl has passed puberty and has developed secondary sexual characteristics, if she is not in school, her parents would rather see her married than have her at home idle. As one father explained (Wodon et al. 2017), "Girls who are not in school are married earlier. If a girl is not in school her idleness makes her more vulnerable to bad influences. You can't watch over your adolescent girl all the time. Even if you don't let her go out at night, she goes out in the day to hawk and might get involved with all sorts of dangers a parent may not be aware of."

Unfortunately, schools are often of low quality, and the job prospects for girls who remain in school may not be good. In other words, the problem is that the economic, cultural, and social environment does not provide viable alternatives to marriage for adolescent girls. Improving the availability of formal education and job opportunities for girls is essential. But nonformal education programs could help as well. They may strengthen literacy and numeracy skills for participating girls and provide them with life skills through safe spaces where they can express themselves with appropriate mentors. A recent program that was offered in Nigeria provides an example of this approach (box 3.6).

Aside from social and economic barriers to attending schools, the lack of toilets and water in lower-secondary schools are deterrents for both girls and boys. Data across Sub-Saharan African countries show each country's percentage of lower-secondary schools with access to separate toilets for boys and girls (figure 3.17). Almost all the schools in countries in Group 1 (except for Ghana)—which have the highest rates of access to lower-secondary education—have separate toilets for girls and boys. Countries in Group 4 do worse than the regional average (apart from Senegal, which does slightly better), generally having only limited access to separate toilets in the lower-secondary schools.

Providing the minimum conditions for children to have a safe and hygienic learning environment (as further discussed in chapter 4, along with other minimum conditions of effective teaching and learning) must be a priority as countries expand their education systems. Without meeting these minimum conditions, it would be challenging to retain children, especially girls, in school, much less attract them to enter school.

BOX 3.6

How to Delay the Age at First Marriage Where Early Marriage Remains Widespread: A Model Program in Nigeria

In rural Hausa communities in Niger and Nigeria, three out of four girls marry before the age of 18. The Center for Girls' Education (CGE)—a girls' education training, practice, and research center in northwestern Nigeria—was established in 2008 with the aim of delaying the age of marriage in rural communities by reducing social and economic barriers to schooling and providing group-based mentoring and support. The CGE dedicated its founding year to a baseline survey and exploratory ethnographic research in the rural communities that it planned to serve. The survey found the mean age of marriage to be about 15 years and that 45 percent of adolescents ages 15–19 years had begun having children. Only 8 percent of women ages 18–24 years had completed primary school, and just 5 percent had completed secondary school. In contrast, more than twice as many men of this age range had completed primary school (17 percent) and secondary school (14 percent).

The ethnographic component of the research found education to be one of the few socially appropriate alternatives to early marriage. However, given the low quality of public education, most parents said they were reluctant to make the sacrifices required to send their daughters to school. "My first daughter graduated from primary school and can't read a word. I won't send my second daughter," said one mother. When asked what it would take under these circumstances to permit girls to transition from primary to secondary school, several parents indicated that a reduction of secondary-school registration fees and the opportunity for good-quality education would make the difference.

The CGE's innovative after-school educational enrichment programs for rural and low-income urban girls were based on the findings of the ethnographic baseline research. The center piloted and evaluated a range of interventions and combined the most promising into programs that complement government secondary schooling.

Mentored safe-space clubs are the heart of the CGE's programming. The CGE adapted the safe-space methodology to address the parents' and girls' requests for strengthened core academic competencies (especially literacy and numeracy) and mentored support as they face the challenges encountered in underfunded and understaffed rural schools. The clubs are led by female teachers from the girls' own schools who receive ongoing training in accelerated literacy instruction, group facilitation, and student-centered teaching methods. Participation provides the girls with opportunities to gain crucial life skills not offered in secondary school. The girls discuss their reproductive health concerns, visit local health services, develop relationships of trust, and build social networks. Through ongoing engagement of parents and religious and traditional leaders, the CGE works to increase community-level support for girls' education.

An evaluation by Perlman, Adamu, and Wodon (2017) suggests that the program is achieving substantial gains. The 2007 baseline found that less than 25 percent of girls

(continued next page)

Box 3.6 (continued)

graduating from primary school in participating communities made the transition to junior secondary, and only 4 percent graduated from senior secondary. Of the first 800 girls to go through the program, 97 percent progressed from primary to secondary school, and 82 percent graduated from secondary school. The data also suggest that participation in the program is associated with a 2.5-year delay in the age at first marriage. This was not an RCT evaluation (such evaluations are in process, but results are not yet available), and some of the gains may reflect recent regional trends toward later marriage. Yet the gains apparently achieved through the program are much larger than the gains achieved regionally. Part of the program's success is that parents see that their daughters are learning.

The CGE program builds on the aspirations of girls and their families. As the girls participating today in the program become mentors, teachers, and health workers, they will be able to serve as role models and expand the potential of other girls in their region to redefine and expand the social limits of what is seen as possible. As a father with a daughter enrolled in the program explained it (Perlman, Adamu, and Wodon 2017), "Some people saw me as someone who didn't know what he was doing. They thought that I should marry my daughter off rather than keeping her in school. They said the program is not religiously acceptable. But our religion isn't like that. Islam does not disallow a child from getting an education. I insisted, because it is my right to allow her to go to school and become someone. Now even the [imam] [the head of religious leaders in the community] has two of his daughters in the program."

Note: Box 3.6 material relied on inputs from Quentin Wodon.

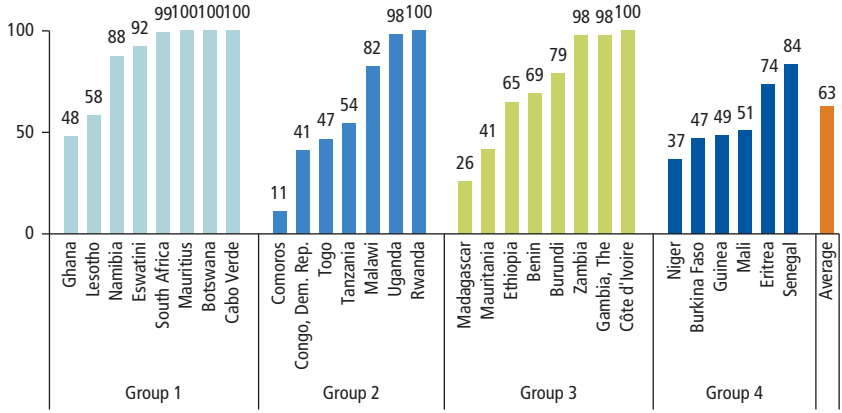
Target Financial Incentives for Children from Poorer Households

Financial incentives targeted to poor households have proved to be an effective strategy in increasing school attendance. By providing families with additional funds, cash transfers aim to increase school enrollment and attendance, while also reducing the risk of children dropping out, by decreasing the direct costs (uniforms, textbooks, and so on) and indirect costs (loss of income) of schooling.

In a recent meta-analysis of 50 studies on the impacts of cash transfer programs, 38 unique programs from around the world suggest consistently positive effects of cash transfers on enrollment and attendance (Snilstveit et al. 2015). The analysis also suggests that there is a reduction in dropout rates as well as an average improvement in school progression and completion rates. Programs where the recipient of the cash transfer is the household, rather than the mother or student, are also associated with a larger effect.

Of the 38 programs analyzed, 8 were programs implemented in Sub-Saharan Africa. Some of these programs evaluated a combination of conditional cash transfers (CCTs) and unconditional cash transfers (UCTs). CCTs are financial incentives transferred to poor households or individuals conditional on certain

Figure 3.17 Percentage of Lower-Secondary Schools with Gender-Separate Toilets in Sub-Saharan African Countries, by Group



Source: UNESCO Institute for Statistics (UIS.Stat) database, http://data.uis.unesco.org; latest years available.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

behaviors of the recipient, and UCTs are transfers to poor households or individuals with no strings attached. Below are the findings of two of these studies that point to when each type of program could or should be used.

Zomba Cash Transfer Program, Malawi Baird et al. (2013) evaluated the Zomba Cash Transfer Program in Malawi to test the effect of a CCT program on a range of direct and indirect outcomes, including school enrollment, attendance, marriage, childbearing, sexual behavior, and prevalence of sexually transmitted diseases. They also compared conditional and unconditional transfers to test the effect of conditioning the payment on school attendance.

A group of unmarried females ages 13–22 years were randomly selected from 88 districts to participate in the program. One group received an unconditional monthly stipend, while the other group received the same amount as a conditional monthly stipend, and a third group (the comparison group) did not receive any stipend. The results showed that the CCT program improved schooling outcomes more effectively than the UCT program. Females in the CCT group performed better on enrollment and attendance. Interestingly, the UCT program did not significantly affect attendance. Those in the CCT group performed better on tests of English reading comprehension and cognitive ability, but the UCT program had no effect on test scores.

On the other hand, the UCT program was more effective than the CCT program in delaying marriage and childbearing. Among these females, 18 percent

of the comparison group had married after two years. Those in the CCT group were just as likely to be married, but those in the UCT group were nearly 8 percentage points less likely to be married. About a quarter of the comparison group became pregnant during the program. Those in the CCT group were equally likely to become pregnant, but those in the UCT group were nearly 7 percentage points less likely to become pregnant.

The researchers suggest the unconditional transfer allowed females who dropped out of school to support themselves without relying on a husband or having transactional sex with older men, thereby delaying marriage and childbearing. This suggests that policy makers may have to consider the trade-off between education and marriage or fertility decisions when designing cash transfer programs.

Nahouri Cash Transfers Pilot Project, Burkina Faso A similar program was piloted in rural Burkina Faso. A study of the two-year pilot program, the Nahouri Cash Transfers Pilot Project (NCTPP), randomly distributed four cash transfers that were either conditional (CCT) or unconditional (UCT): CCTs to fathers, CCTs to mothers, UCTs to fathers, and UCTs to mothers (Akresh, De Walque, and Kazianga 2013). Families under the CCT schemes were required to have their children of ages 7–15 years enrolled in school and attending classes regularly. The unconditional programs imposed no such requirements.

Results indicate that UCTs and CCTs have a similar impact on increasing the enrollment of children who are traditionally favored by parents for school participation, including boys, older children, and higher-ability children. However, CCTs are significantly more effective than UCTs in improving the enrollment of "marginal children"—those who are initially less likely to go to school, such as girls, younger children, and lower-ability children. The research suggests that conditionality plays a critical role in benefiting children who are less likely to receive investments from their parents.

The results of these evaluations suggest that cash transfers do indeed have positive impacts on school enrollment and attendance. However, the choice between CCTs and UCTs should be influenced by the objectives of the education policy. If the objective is to increase overall enrollment in countries that are lagging (Group 4 countries especially), where poverty challenges are the main barrier to accessing education, UCTs might have effects comparable to CCTs. Because CCT programs are generally significantly costlier to administer (because of the expenses associated with monitoring that the conditions are met), UCTs are generally assumed to be more cost-effective under that objective. However, if the objective is to target small pockets of vulnerable and marginalized communities (such as countries in Group 1) that are less likely to be part of the education system, CCTs are likely to have larger impacts and to be more cost-effective.

Eliminate High-Stakes Examinations to Improve the Transition from Primary to Lower-Secondary

Expanding the network of schools cost-effectively to meet the basic minimum infrastructural requirements is a supply-side response being pursued in many countries in Sub-Saharan Africa. Demand-side responses to encourage parents to send their children to schools include financial incentives and mentorship clubs specifically for girls. Structural barriers also need to be addressed to improve progression in basic education, and one such barrier is high-stakes examinations.

There is an ongoing debate in many African countries about the use of high-stakes testing versus the benefits of a testing for certification complemented with classroom assessments. Classroom assessments, also referred to as continuous assessments, are those carried out by teachers and students in the course of daily activity (Airasian and Russell 2007). They encompass a variety of standardized and nonstandardized instruments and procedures for collecting and interpreting written, oral, and other forms of evidence on student learning or achievement. Examples include oral questioning and feedback, homework assignments, student presentations, diagnostic tests, and quizzes. The main purpose of these assessments is to provide real-time information to support teaching and learning (Clarke 2011). Much of this kind of assessment is subjective, informal, immediate, ongoing, and intuitive, as it interacts with learning as it occurs—monitoring student behavior, scholastic performance, and responsiveness to instruction. Data generated in the classroom for summative purposes (usually referred to as school-based assessment) can contribute to the grade students are awarded in an external public examination.

Several examination systems in Africa have introduced an element of school-based assessment to their public examinations, with varying success. For example, the school-based element contributes 5 percent to students' grades on a public examination in Eswatini (though the country hoped to increase it to 50 percent) (Kellaghan 2002). However, in Namibia, the school-based element contributes between a third and a half, depending on the subject (Van der Merwe 1999).

One of the biggest challenges to school-based assessment in many countries in Sub-Saharan Africa is that the quality of teachers' assessment practices may be deficient in many ways. Problems that have been identified include the use of poorly focused questions, a predominance of questions that require short answers that show factual knowledge, the evocation of responses that require repetition rather than reflection, and a lack of procedures designed to develop students' higher-order cognitive skills (Kellaghan and Greaney 2003).

Improving teachers' classroom assessment practices requires a medium-term investment in in-service training for teachers because changing teaching

practices takes time, as well as the creation of item banks of appropriate questions teachers can use. If implemented effectively, classroom assessments would be a much more effective way to track students' progress and support their learning throughout the school year.

Although improving classroom assessment should be the medium-term strategy, the elimination of high-stakes examinations in favor of assessments for certification purposes is essential if the transition between primary and lower-secondary education is to improve substantially. However, this can be done only if a strong inspection system is in place to assess performance and support teachers in effectively delivering curriculum content and monitoring students' progress.

Leverage and Regulate the Private Sector to Expand Quality Basic Education

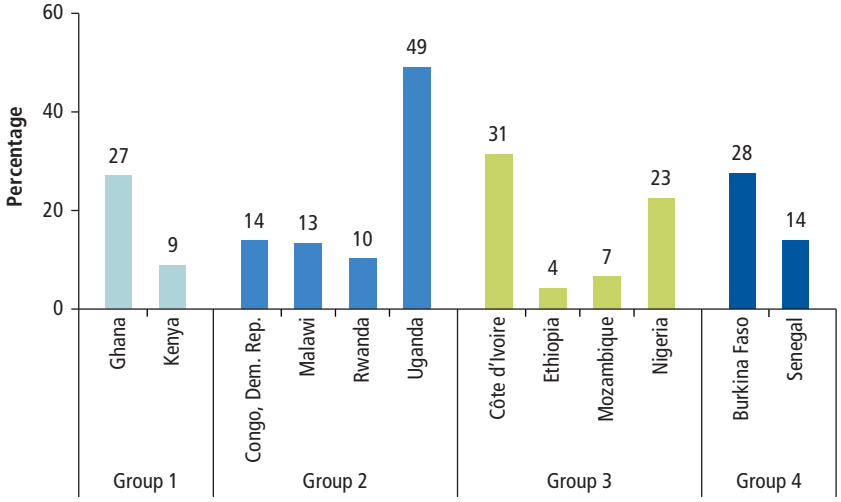
As described earlier, the challenge of meeting the growing demand for secondary education places is significant. Building new classrooms and schools, hiring competent teachers, and revising and implementing new curricula will require substantial financial resources. As chapter 5 highlights, education resources in many Sub-Saharan African countries will continue to be constrained in the medium term, requiring ministries of education to explore creative ways of providing additional school places.

While providing education is the primary responsibility of the state, education can also be provided by nonstate actors, including religious institutions, NGOs, community-based groups, trusts, enterprises, and individual proprietors (or what we refer to as "private providers"). In fact, Sub-Saharan Africa, the Middle East, and South Asia are the regions with the largest growth in the private provision of education (IBE-UNESCO 2007).

The share of children enrolled in private lower-secondary education, as opposed to public education, in 12 Sub-Saharan African countries ranges between 4 percent in Ethiopia and 49 percent in Uganda (figure 3.18). Although enrollments continue to grow, ministries of education in these countries continue to grapple with how to regulate and also effectively partner with these private schools to support education service delivery.

Leverage the private sector In the most common type of partnership with private providers, governments fund existing private schools, mainly to increase access to education but also to enhance quality by enabling poor students to attend better private schools and by introducing school competition to promote efficiency. In more recent types of public-private partnerships, governments have contracted with private providers to deliver a range of inputs and services, with the expectation that they will introduce new pedagogical skills and management efficiencies that the public sector lacks, thus generating alternatives to traditional forms of public education (Patrinos, Barrera-Osorio, and Guáqueta 2009).

Figure 3.18 **Percentage of Lower-Secondary Enrollment in Private Schools in Selected Sub-Saharan African Countries, by Group**



Source: Analyses of latest World Bank Living Standards Measurement Study (LSMS) and country Demographic and Health Survey (DHS) data.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

Whatever the model for engaging with private providers, the regulatory function of the state is crucial and probably more important in education than in some other industries because it can be difficult for students and their families to judge the quality of the education they are receiving. Comprehensive learning is difficult to observe, and once a mistake is made, the years wasted are irreversible (Arias, Santos, and Evans, forthcoming).

Regulate the private sector When it comes to regulation, most ministries of education want to ensure that private providers meet some minimum standard of observable characteristics of the school (such as classroom size, availability of qualified teachers, access to toilets, and so on). When considering two countries in Africa (Côte d'Ivoire and Uganda) with a significant percentage of children enrolled in private schools, physical infrastructure on average is better in private schools than in public schools (table 3.3). As for the qualifications of teachers in private schools in these countries, there is insufficient information to make this comparison.

Other than assessing the minimum standards in schools, student test scores are another indicator of learning in schools. However, this system has some weaknesses and creates perverse incentives, some of which were described in the earlier subsection on high-stakes examinations. The biggest weakness is that

Table 3.3 Selected Characteristics of Public and Private Secondary Schools in Côte d'Ivoire and Uganda, 2015

Resource type	Uganda		Côte d'Ivoire	
	Public schools	Private schools	Public schools	Private schools
Student-teacher ratio (lower-secondary)	37	26	52	—
Secondary schools with tap water (%)	41	51	78	86
Secondary schools with electricity (%)	61	62	80	89
Secondary schools with latrines (%)	21	19	76	98

Source: Analysis of 2015 EMIS data from Côte d'Ivoire (Secondary School Survey) and Uganda.
Note: — = unavailable.

student scores are largely influenced by household disadvantage, as further described in chapter 2. Student test scores, therefore, penalize schools in disadvantaged areas with a disadvantaged student intake, some of which may nonetheless manage to teach their students successfully. By using unadjusted scores, the ministries of education inevitably reward schools that have high achievers upon entry and penalize those with a low-achieving intake, not least those in lower-income areas. Schools are judged on their intake as much as the quality of their teaching (Crawfurd 2017). This makes it challenging for ministries of education to regulate the private sector based on average student test scores at the school level.

Despite these challenges, private delivery of education can have a positive impact if adequately regulated by the public sector. The positive impacts include (a) increasing availability and accessibility to school, either by increasing the overall number of schools in a country or increasing economic viability by putting in place vouchers, grants, and scholarships; and (b) wider school access by low-income groups that lack a viable public option (Moumne and Saudemont 2015). In some fragile and conflict-affected countries—for example, the Democratic Republic of Congo, Somalia, and, more recently, Liberia—public provision and financing have virtually disappeared, and private providers are responsible for the delivery of education services.

The rapid emergence of "low-fee private schools" in the Sub-Saharan Africa region does draw households in the bottom half of the income distribution, often because public schools are perceived to be of poor quality. However, these function as a tax on the poor because even low fees can require a significant proportion of household income, especially with multiple children to be educated. It is up to the state to include equity considerations in its contractual relationships with private providers, to serve the poorest children (Arias, Santos, and Evans, forthcoming).

Policies to Improve the Quality and Relevance of Basic Education

Make the Curriculum More Relevant to the Needs of a Modern Society

Expanding lower-secondary education is not just about accommodating more children in the system, but also about imparting knowledge and skills that are relevant for today's society. The curricula implemented in secondary schools in many countries in Sub-Saharan Africa date back to the 1970s and have not undergone any fundamental reform. At that time, curricula were designed for a small, academic minority and did not cater to the broad range of students entering secondary education through the provision of free basic education. Society is increasingly demanding that secondary education encompass issues such as the environment, human rights, drug addiction, acquired immune deficiency syndrome (AIDS), poverty, and unemployment to prepare youth for life and citizenship and for collective as well as individual responsibility. To integrate these new topics into secondary education, programs, content, and even structures must be redefined to meet the needs of modern society (World Bank 2008).

Secondary education is also undergoing a profound transformation all over the globe in terms of how it is structured, how teaching-and-learning processes are organized, and how the curriculum is structured and delivered. The most recent example is Finland,[26] which in August 2016 started implementing a far-reaching reform of the national core curriculum[27] of its basic education cycle—a reform that reconceptualizes the specific content of key subjects, how they are linked to each other, how they are taught, and how teachers work and collaborate within as well as between schools.

The new Finnish curriculum emphasizes the development and acquisition of transversal competencies[28] while students acquire knowledge and skills associated with traditional core subjects (mathematics, language, science, arts, and social studies). It goes beyond the traditional cross-curricular approach of integrating these competencies in teaching each core subject by shifting the emphasis to multidisciplinary learning modules, where skills and knowledge of various school's subjects are integrated, teachers work together to teach them, and students participate in the planning of the modules.

Some countries in Sub-Saharan Africa have attempted to shift the curriculum in lower-secondary education from subject-focused learning to integrated learning but have encountered resistance from parents, communities, and academics who view the change as "watering down" the curriculum. There are also resource and coordination challenges to curriculum reform, given what is involved:

- Launching a large communications and marketing strategy to ensure the buy-in of relevant stakeholders

- Retraining the entire cadre of teachers on the new curriculum
- Reforming the preservice teacher training curriculum
- Rolling out the implementation of the new curriculum in schools under the auspices of the school leadership
- Developing and publishing new teachers' guides and textbooks
- Reforming and implementing a new assessment system that aligns with the new curriculum
- Monitoring and evaluating the implementation of the curriculum

BOX 3.7

Challenges of Implementing a New Lower-Secondary Curriculum in Uganda

As part of the Ugandan government's Universal Post-Primary Education and Training Program, the Ministry of Education and Sports (MoES) initiated the Lower Secondary Curriculum, Assessment, and Examination Reform Program. Between 2011 and 2014, a Cambridge Education team, mainly based at the National Curriculum Development Centre (NCDC), provided technical assistance to the MoES. The team started by analyzing the capacity among curriculum specialists, analyzing the existing school curriculum, and undertaking a labor market survey.

The curriculum analysis reiterated findings of earlier studies and listed the challenges in lower-secondary schools, including the following:

- A curriculum largely unchanged since the era of subject content set by external examination bodies during colonial times
- Learning programs overloaded with content to be learned by rote
- Textbooks that entrenched the rote-learning culture by having pages of text devoid of illustrations, activities, or assessment assignments
- Teaching styles that were almost entirely teacher-centered and focused on chalkboard copying of bodies of fact-centered material for subsequent regurgitation in high-stakes examinations
- A student learning experience that did not afford students the opportunity to acquire the spectrum of skills and competencies so essential for life

In the labor market survey, employers were critical of lower secondary graduates. More than 60 percent of firms responded that the graduates' lack of skills was a major constraint for their businesses, with the most severe shortcomings related to areas requiring higher cognitive skills.

(continued next page)

Box 3.7 (continued)

Using the findings of their analyses, NCDC specialists, together with key education stakeholders, developed a curriculum and assessment framework that aimed to provide "a holistic education for personal and national development" (NCDC 2013). Extensive consultations were held during the curriculum framework development process, and numerous iterations were made over this period. A 2013 curriculum framework included eight agreed-upon learning areas (NCDC 2013): creative arts, languages, life education, mathematics, religious education, science, social studies, and technology and enterprise. Values and generic skills were integrated into all learning areas. After agreeing on the framework, learning area working groups comprising curriculum specialists, examination officers, teachers, teacher trainers, and inspectors prepared syllabuses, sample examination papers, learning materials, and teacher training materials. These were completed by mid-2014, along with a costed-curriculum implementation plan.

The new curriculum was designed to be inclusive and aimed to help all children to learn, as opposed to the old curriculum, which targeted the minority of learners whose parents could afford to send their children to school before lower-secondary education became free in Uganda. This reform led to criticism, particularly from academics, of what was perceived as a "dumbing down" of the curriculum. The resistance from these quarters led to stalling the rollout of the curriculum, and as of 2017 no progress on implementation had been made.

Although resistance from academics was one barrier that impeded the curriculum rollout, another significant impediment was cost. At the end of 2016, the president of Uganda declared that the implementation of the curriculum should be put on hold until 2020 owing to a lack of funds. The reform is ambitious and requires teachers to receive considerable training to enable them to handle the new learning areas and teach learners in a way that supports the development of competencies. Currently, only mathematics and science secondary school teachers receive regular in-service training in Uganda. In addition, quality text books need to be developed and made available to teachers and learners. A new curriculum without the supportive elements of teacher training, textbooks, and revised examinations will not have the desired effect.

Curriculum development is highly political. A stronger emphasis on political and media engagement from the outset could have led to a more positive outcome. A series of workshops and briefing days were held, yet some key stakeholders did not attend. A curriculum task force was constituted in 2013 and reviewed some of the documentation, yet it did not become a real advocate of the reform. The lack of costing and planning for adequate financing of the curriculum reform remains a significant shortcoming.

Note: Box 3.7 material relied on inputs from Laura McInerney.

Curriculum reform requires long-term commitment, leadership, capacity, and adequate resources to be implemented successfully. Box 3.7 describes Uganda's experience in attempting to reform its curriculum. Chapter 6 highlights the importance of sufficient capacity in ministries of education to undertake curriculum reform.

The challenges faced by many countries while implementing new curricula have highlighted the need to provide constant professional development for teachers, which in turn requires changes in how preservice education programs are organized and delivered and how in-service professional development is prepared, structured, and delivered. These changes have not materialized in most countries at the speed and depth required.

In the countries where the reforms have been implemented, the integration of subjects brought about by the emphasis on cross-curricular competencies and interdisciplinary learning is leading to changes in how subject-matter teachers are prepared. Subject knowledge is no longer enough; area knowledge as well as pedagogical content-area knowledge is emphasized, with teachers specializing in two or more of the traditional disciplines. In addition, teachers are required to have solid competencies in research-based approaches, curriculum knowledge and curriculum planning skills, and solid understanding and knowledge of alternative assessment strategies and data interpretation. Training in curriculum design, planning, and implementation is emphasized during tertiary-level education as well as during in-school practice. (For a detailed discussion about training and preparing secondary education teachers, see chapter 4.)

Use Technology to Improve Teaching and Learning

Technology has the potential for improving learning outcomes under certain conditions:

- When learning contents are integrated into the school curriculum and teachers' classroom instruction (Barrera-Osorio and Linden 2009)
- When learning software is used at the children's own learning pace and knowledge level
- When teachers are trained in technologies as well as pedagogy using those technologies
- When technologies do not reduce original learning time (He, Linden, and MacLeod 2008)
- When interventions are monitored and evaluated

In particular, technology can help support the teaching of mathematics and science at the lower-secondary level, where the shortage of adequately trained teachers constrains the expansion of coverage.

Information on ICT policy in education and its implementation in Africa is sparse. The most comprehensive survey to date was done by the World Bank's Information for Development Program (*info*Dev) in 2007 for 53 African countries (Farrell and Isaacs 2007). It documents each country's policies regarding ICT in education; ICT infrastructure, including electricity and internet connectivity; available digital content and online systems; public-private partnerships and stakeholder mapping; and regional initiatives.

The United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Institute for Statistics captured some aspects of the use of ICT in education in Africa in 2015, including quantitative information on ICT in education policy, digital skills training and ICT-integrated subject teaching in the curriculum, school-level infrastructure (electricity and internet access), learner-to-computer ratios, and computer-assisted instruction (UIS 2015). Table 3.4 summarizes the key indicators for countries in different educational progress groups.

Many Sub-Saharan African countries have developed strategies on ICT in education, reflecting the desire and intent to use technology. This is true even of the "Delayed" countries in Group 4 (of those that reported information). More countries in Groups 1–3 report that their curricula include specific objectives on either ICT as a subject or the use of ICT in teaching. This is more common at the

Table 3.4 ICT Use in Teaching and Learning in Primary and Secondary Education, Selected Sub-Saharan African Countries, by Group

Group / Countries	Strategies to promote integration of ICT in Education	Curriculum includes specific objectives or a subject on basic computer skills (or computing)		Curriculum includes recommendations for ICT-assisted instruction to form part of subject delivery		Computer-assisted instruction	
		Primary	Secondary	Primary	Secondary	Primary	Secondary
1 Botswana	Yes	Yes	Yes	Yes (not in language)	Yes (not in language)	Yes	Yes
Ghana	Yes	—	—	—	—	—	—
Kenya	Yes	—	—	—	—	—	—
Lesotho	—	—	Yes	—	—	—	Yes
Mauritius	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Namibia	Yes	—	—	—	—	—	—
São Tomé and Príncipe	Yes	No	Yes	No	No	—	Yes
South Africa	Yes	No	Yes (upper-secondary only)	Yes	Yes	—	Yes

(continued next page)

Table 3.4 **ICT Use in Teaching and Learning in Primary and Secondary Education, Selected Sub-Saharan African Countries, by Group** *(continued)*

Group / Countries		Strategies to promote integration of ICT in Education	Curriculum includes specific objectives or a subject on basic computer skills (or computing)		Curriculum includes recommendations for ICT-assisted instruction to form part of subject delivery		Computer-assisted instruction	
			Primary	Secondary	Primary	Secondary	Primary	Secondary
2	Cameroon	No	Yes	Yes	Yes	Yes	Yes	Yes
	Comoros	No	No	No	No	No	—	Yes
	Rwanda	Yes	—	—	—	—	Yes	Yes
	Togo	Yes	No	Yes (upper-secondary only)	No	No	—	—
	Tanzania	Yes	—	—	—	—	—	—
	Uganda	Yes	Yes	Yes	Yes (math and natural sciences only)	Yes (math and natural sciences only)	—	—
3	Angola	Yes	Yes	Yes	Yes	Yes	—	—
	Côte d'Ivoire	Yes	Yes	Yes	Yes	Yes	—	—
	Ethiopia	Yes (upper-secondary only)	No	Yes	No	Yes	—	—
	Gambia, The	Yes	No	Yes (upper-secondary only)	No	Yes (upper-secondary only)	Yes	Yes
	Madagascar	No	No	No	No	Yes (upper-secondary only except for social sciences and second language)	No	Yes
	Mozambique	Yes	—	—	—	—	—	—
	Zambia	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	Burkina Faso	Yes	No	No	No	No	—	—
	Eritrea	Yes	—	—	—	—	—	—
	Liberia	—	No	Yes	Yes	Yes	—	—
	Niger	Yes	No	No	No	No	—	Yes
	Senegal	Yes	—	—	—	—	—	—

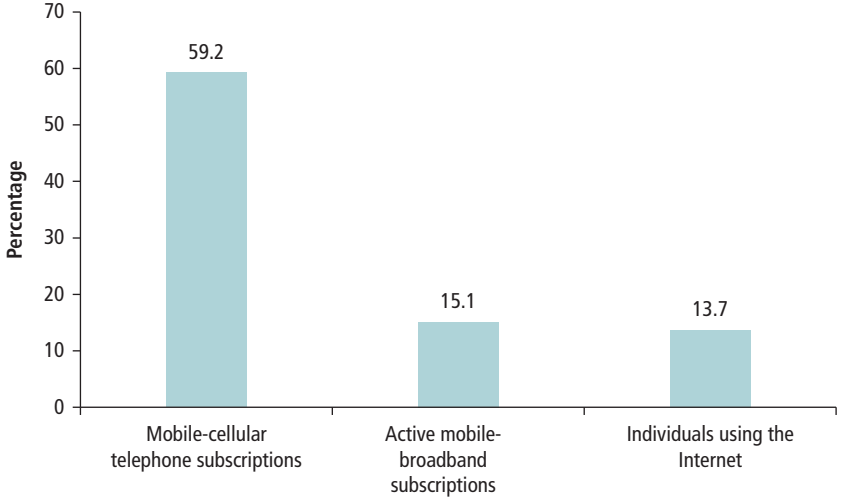
Sources: Compiled from Farrell and Isaacs 2007; Isaacs 2007; MoE Ghana 2015; Souter et al. 2014; UIS 2015.
Note: ICT = information and communication technology; — = data not available. For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

secondary level than at the primary level. Computer-assisted instruction is used in a number of the Group 1 countries at the secondary level. Overall, Botswana, Mauritius, and South Africa appear to be the most advanced in the use of ICT. It is important to note, however, that the data do not capture initiatives in all countries.

One such example is Kenya, which initiated a Digital Literacy Program in 2013 to integrate the use of digital technologies into learning at public primary schools. In October 2016, the project started its implementation to reach all 23,951 public primary schools in the country, with over 1.2 million laptops with preloaded content expected to be delivered.[29]

The exponential rise of mobile-phone users, mobile-broadband data users, and individual internet users in Africa creates new opportunities for using technology targeted to individuals (teachers or students). Fifty-nine percent of the population in Africa had mobile-phone subscriptions as of 2015 (figure 3.19), and that number continues to grow. Although the proportion of mobile-broadband subscribers (15 percent) is not as high as in other regions, 3.1 times more Africans (13.7 percent of the region's population) were accessing the internet using mobile phones in 2015 than in 2010. Nevertheless, less than one-fourth of the region's population was using either the internet or mobile broadband as of 2015.

Figure 3.19 Percentage of African Population Using Mobile Phones, Broadband, and Internet, 2015



Source: "Key ICT Indicators for Developed and Developing Countries and the World," International Communication Union (ITU) World Telecommunication / ICT Indicators database file (accessed October 24, 2017), http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2017/ITU_Key_2005-2017_ICT_data.xls.

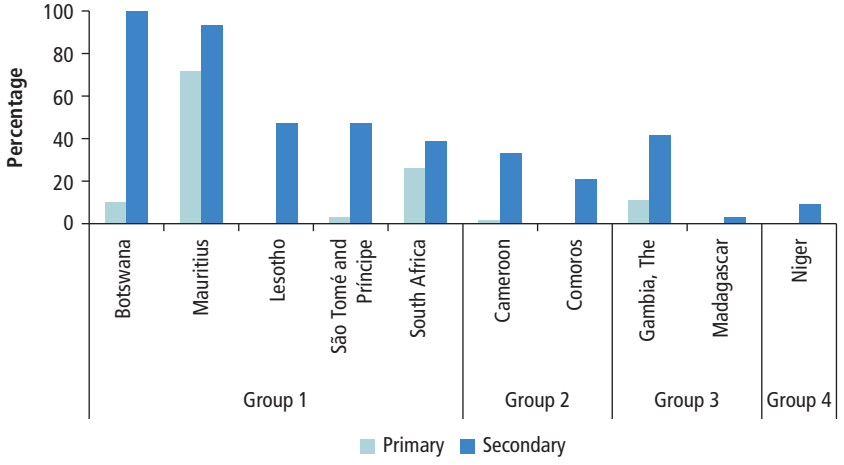
Leveraging the high mobile-penetration rate, mobile learning initiatives have sprung up, primarily in the private sector. These target individual students and teachers and offer services such as a virtual tutor and teacher's assistant. A singular feature of such services is the use of device-agnostic platforms that allow the services to reach many users with different devices.[30]

However, to teach digital literacy, basic computer skills, and computer programming skills—which are critical for future employment—students need access to computers or other devices. Building computer labs has been the favored approach, and they are quite common in the Group 1 countries for which data are available. However, this is not necessarily a cost-effective approach. Infrastructure costs (of building an extra classroom) are high, and resource constraints lead to inequality among schools. Computer labs also tend to be locked up and not available for all classes. More important, students generally learn rudimentary skills by using standard software packages rather than by using curriculum-mapped digital resources, much less by using the internet to access more resources. Figure 3.20 shows the proportion of schools that have computer labs in selected Sub-Saharan African countries.

Constraints on Technology Use

The fundamental constraints on greater use of ICT in Sub-Saharan Africa are the lack of supporting infrastructure (primarily electricity), the limited choice

Figure 3.20 Percentage of Schools with Computer Laboratories, by Education Level, in Selected Sub-Saharan African Countries by Group, 2014 or Latest Available Year



Source: Analysis of UNESCO Institute for Statistics (UIS) Information and Communication Technology (ICT) in Education database (accessed October 24, 2017), http://uis.unesco.org/sites/default/files/datacentre/ICT%20infrastructure%20I%20%E2%80%93%20L%E2%80%99infrastructure%20des%20TIC%20I.xlsx.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

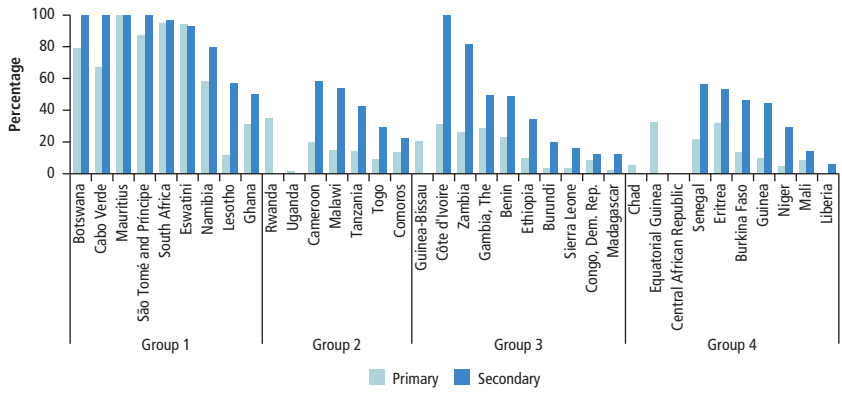
of appropriate hardware, the limited availability of appropriate digital content aligned with the curriculum, and the need to train teachers on how to use digital materials in their classrooms.

Lack of electricity The greatest infrastructure constraint is the lack of electricity connection in schools, which is more limiting at the primary level than at the secondary level. The push to connect all educational institutions and increase access to electricity should help to overcome this constraint. The use of solar energy also creates opportunities, but maintenance and operating costs need to be taken into consideration.

Currently, Group 1 countries provide more or less universal access to electricity, especially at the secondary level (figure 3.21). The proportions are significantly lower in the other groups (except for secondary schools in Côte d'Ivoire, where there is universal access). Further, disparities between rural and urban schools are likely to be high.

Choice of hardware A second constraint relates to the choice of the appropriate device and is intimately linked to how technology will be used in instruction; however, often these choices are made purely on technical grounds rather than on educational grounds. Different devices—such as computers, tablets, mobile phones, projectors with secure digital (SD) cards, and smart boards—can be used. Further, if the internet is to be used, it is important to improve local

Figure 3.21 Percentage of Schools with Electricity, by Education Level, in Sub-Saharan African Countries by Group, 2014 or Latest Available Year



Source: Analysis of UNESCO Institute for Statistics (UIS) Information and Communication Technology (ICT) in Education database (accessed October 24, 2017), http://uis.unesco.org/sites/default/files/datacentre/ICT%20infrastructure%20l%20%E2%80%93%20L%E2%80%99infrastructure%20des%20TIC%20l.xlsx.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 3.4.

networks in the schools so that devices can be used in the classroom. However, countries often neglect to budget for this, limiting the use of expensive hardware.

Absence of digital content A third related constraint is the lack of digital content aligned with the curriculum. One of the cost-effective options would be to leverage open educational resources (OER), which are "teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution," as described by UNESCO.[31] However, even open-access resources require investment in adaptation to local contexts and curricula.

Nevertheless, especially for mathematics and sciences at the junior secondary level where curricular content is much more standardized, this approach seems promising. Examples include the use of Khan Academy,[32] CK-12,[33] and OER libraries,[34] which some countries are currently piloting. For instance, Nigeria used contents from Khan Academy as a pilot to assess the impact of OER in teaching and learning (World Bank 2015). Through partnering with Learning Equity, a nonprofit organization delivering OER to students with no internet access, Khan Academy contents were delivered to schools in an offline setting.

While adapting OER contents from high-income countries is one way, another approach is to develop Africa-relevant contents. Universities can take an important role in developing, contextualizing, and adapting OER, and such initiatives are already taking place. Notable examples are the following (Mulder 2008):

- *African Virtual University's Teacher Education in Sub-Saharan Africa (TESSA) OER project*, which focuses on core teaching skills at the primary level, together with a consortium of 14 African universities, the Commonwealth of Learning, and the BBC World Trust
- *The Free/Libre and Open Source Software for Education in Africa (FLOSS4Edu)* initiative, which promotes the development of free content by Africans for Africa by using wiki-based technologies
- *The Virtual University for Small States of the Commonwealth (VUSSC) platform*, in which small African states—including Botswana, Eswatini, The Gambia, Lesotho, Mauritius, Namibia, and Sierra Leone—participate in the creation of postsecondary, skills-related OER
- *Science, Technology, and Mathematics Programme 2000+ (STAMP 2000+)*, which was initiated by seven countries from the Southern African Development Community (SADC) in 2000 and produced 1,800 pages of OER clustered in 18 modules to train and upgrade upper-primary and junior secondary teachers and administrators in southern Africa.

In addition to these university efforts, nonprofit organizations and private companies have also contributed to content development. For instance, in Angola, the Discovery Channel Global Education Fund partnered with the Angolan Ministry of Education and Culture to promote the use of inquiry-based learning in the classroom. Another example is Mindset Learn, which delivers curriculum-aligned e-learning contents and materials by television and the internet and can be used by students, teachers, and parents in the classroom and at home (Moon and Villet 2016). All the materials are available for free and can be accessed via YouTube, reaching 3.5 million homes across South Africa (Farrell and Isaacs 2007). Botswana is also exploring video content; the Mochudi Media Centre trains teachers in the development and use of video in the classroom (Isaacs 2007).

Although progress has been made to develop OER for Africa, one important issue to be addressed is the delivery and storage of the contents. Because each country has different infrastructural challenges and urban/rural disparities, it is important to make digital contents available in a device-agnostic format. For content storage, e-cloud storage is a cost-effective and easy way to store digital content and make it accessible via different devices (ITU 2012). It provides immediate access to the latest innovation, and it eliminates the need for heavy investment in infrastructure. Africa is viewed as a relatively favorable location for network infrastructure development, and Sub-Saharan African countries are moving ahead with such projects. There are 15 data centers in South Africa, 11 in Ghana and Nigeria, and 10 in Kenya. In Kenya and Ethiopia, e-cloud development is under way; Kenya is already starting its implementation to host various digital contents.

Limited capacity of teachers to use ICT Despite this progress, none of these approaches can improve learning unless teachers use the materials in their daily instructional practice. Adaptation of OER (with inclusion of local materials)—linked tightly to formative assessment, training teachers on their use, and providing regular ongoing support—seems to be a promising way to improve learning quality. Mobile technology can be used to provide continuous ongoing support to teachers through examples and tips.

There are many challenges to building capacity for the effective use of ICT and of coordinating the different arms of the government and the education system involved in the effort. Governments can assist in this process in a number of ways: providing a policy and implementation framework, continuously monitoring and evaluating ICT in education, assessing digital content, integrating digital content into the curriculum, hosting e-cloud storage for digital content, procuring devices and software as needed, and exploring public-private partnerships to reduce the cost of implementation. The implementation of ICT in education would need to adopt a phased approach and an iterative process based on piloting and evaluation. Given the benefits of harnessing ICT in the classroom—particularly in secondary education, where the alternative is to provide expensive laboratories and traditional libraries—these efforts should be seriously considered.

Summary

This chapter has focused on the bottlenecks to progression in access to basic education in the Sub-Saharan Africa region. The region's unfinished business of universalizing basic education is a priority that must be addressed to build the knowledge capital required for socioeconomic transformation.

The progression of bottlenecks in the system are (a) the early-grade "traffic jam" (particularly in Group 2 and 3 countries); (b) children dropping out of school because of cost, quality, and distance concerns in primary schools, and because of factors such as early marriage and pregnancy during the secondary-school years; and (c) high-stakes examinations that regulate access into the next level of education. These bottlenecks in the system adversely affect children from poor households and children who live in rural areas, which reinforces disparities in access to education. Girls are particularly affected at the lower-secondary level.

The chapter suggested several policy options to reduce these disparities in access and learning:

- *Unblocking the early-grade "traffic jam"*: The biggest priority is to provide more conducive learning environments for the large numbers of children entering primary school, particularly in country Groups 2 and 3 now and probably at a later stage in Group 4 (if access improves rapidly). The strategy could be three-pronged:
  - First, recognizing the early-grade problem related to a large percentage of children repeating (either official repetition or hidden repetition) is a good start. It is crucial to build schools closer to communities to facilitate entry into grade one at the right age as well as to foster regular attendance.
  - Second, improving cognitive learning in the early grades is essential and can be done through a combination of pedagogical training for teachers, provision of age-appropriate instructional materials, daily instruction on numeracy and literacy, and regular assessment of progress.
  - Third, beginning reading instruction must be conducted in a language that children speak and understand.
- *Addressing disparities in access to primary education:* The main reason why children drop out of school at the primary level is related to cost. Reducing the cost of education through financial incentives targeting households (such as through CCTs or UCTs) could help to improve enrollment and attendance. The decision on whether financial incentives should be conditional or unconditional depends on the objectives of the expansion program—for example, whether to increase the overall percentage of children entering the system or to target vulnerable children to enroll and stay in school. Another option is to build schools closer to where children live

and thereby reduce the cost to households. Cost-effective solutions have been found in many parts of the Sub-Saharan Africa region, and these are highlighted in chapter 5.

- *Addressing disparities in access to lower-secondary education:* At the lower-secondary level, financial incentives for poor households may also address cost barriers to entering and staying in school. At this level, though, girls are also at a disadvantage owing to the large numbers who drop out of school because of child marriage or pregnancy. Formal or informal programs targeting girls (and their parents and communities) by linking them with role models or mentors and providing safe learning environments are also key to improving access for girls. Further, eliminating high-stakes examinations will address the bottleneck in transition from primary to lower-secondary education, though this strategy should be pursued alongside a strategy to adequately train teachers to implement school-based assessments.
- *Expanding access to and the relevance of lower-secondary education:* Lower-secondary schools need to be more accessible to children in both rural and urban areas, and double-shift solutions need to be more effectively delivered. Given the numbers of new schools that will be required, reconsidering the standard school package of facilities should be a priority. Leveraging the private sector to support the expansion of lower-secondary education is also an option, though it should be pursued with due consideration of regulation through the use of minimum standards and learning assessments in ways that do not penalize schools that provide education for disadvantaged children. Improving the quality and relevance of lower-secondary education is crucial and must be addressed. Reforming the curriculum in a comprehensive manner is an opportunity to catalyze change in how lower-secondary education is delivered, but it also takes time and resources as well as a high level of implementation capacity. Last, new technology has the potential to improve teaching and learning, but countries must be aware of the capacity constraints of teachers and other structural barriers (such as electricity and the absence of digital content). Other considerations to improve the quality of basic education, namely the quality of teachers, are addressed in chapter 4.

Notes

1. The GIR is defined as the total number of new entrants in the first grade of primary education, regardless of age, expressed as a percentage of the population of theoretical entrance age. We chose a threshold GIR of 115 to allow for possible inaccuracies in age-specific population estimates.
2. A GIR over 100 indicates that overage and underage children—new entrants excluding repeaters—are enrolling in grade one. However, this situation cannot persist over

many cohorts, because within a few years all overage children would already have enrolled in school. The proportion of underage children in grade one is rising but still below 15 percent in many countries. Hence, a persistently high GIR is logically impossible and indicative of other underlying phenomena.

3. The rationale for the indicators is discussed by Crouch and Merseth (2017).
4. If the repetition rate is underestimated, the "dropout rate" will be overestimated.
5. Principal components analysis (PCA) was applied using the most recent values in the four indicators. Weights from the PCA were used to create an index as the linear combination of the indicators. A country with a zero-score value indicates it is situated around the mean value of the distribution for each indicator that composes the index.
6. Because at least four data points are required for this analysis, the analytical sample was reduced to 94 countries.
7. This section reports on the original analysis done with Early Grade Reading Assessment (EGRA) datasets in Kenya, Rwanda, and Tanzania, where EGRA results are reported, unless otherwise indicated.
8. EGRA datasets were analyzed for Kenya, Rwanda, and Tanzania; the last was the only country for which the survey included a question on the availability of materials.
9. The behaviors specific to reading instruction include the following: (a) teacher teaches new words using a relevant strategy (for example, actions or pictures) to ensure that learners show understanding; (b) teacher verifies predictions; (c) teacher asks comprehension questions; (d) teacher helps learners find answers; and (e) teacher asks learners to predict the story from the title and picture.
10. The phonics teaching characteristics include the following: (a) teacher reviews previously learned sounds, syllables, and words, adding the new sounds to create words; (b) teacher is able to manipulate sounds; (c) teacher demonstrates on the chalk board the mechanics of how to write letters; and (d) teacher provides opportunity for learners to practice writing or drawing.
11. Linguistic diversity is one of the seven key challenges to education used in this report to categorize countries by the extent of their baseline economic and social challenges (that is, their starting points in the 1990s): as facing "few challenges," "some challenges," or "many challenges." For a detailed discussion of these categories and the countries assigned to each, see chapter 1.
12. Twenty-two Ethiopian languages in addition to Amharic have been allowed as the language of instruction for at least six years.
13. Even though the Malawian students in grades one to four were allowed to be instructed in local languages according to a language policy from 1996, they were required to learn how to read in Chichewa, which is also the language used by most schools.
14. GERs are calculated from country-level Demographic Health Survey (DHS) and Living Standards Measurement Study (LSMS) data.
15. For the appendixes, go to https://openknowledge.worldbank.org/handle/10986/29377.
16. Regional rural population data are from World Development Indicators, World Bank, https://data.worldbank.org/products/wdi.

17. The GPI, an index released by UNESCO, is the ratio of females to males enrolled in a given stage of education. A GPI of 1 indicates parity between the sexes; a GPI that varies between 0 and 1 typically means a disparity in favor of males; and a GPI greater than 1 indicates a disparity in favor of females.
18. Survival rates are estimated using the reconstructed cohort method.
19. The term "child marriage" refers to marriage of children below the age of 18.
20. The countries with selection examinations are the following, by level type (Kanjee 2012; Sayed and Kanjee 2013): (a) *primary school leaving examinations* (Botswana, Burkina Faso, Chad, Comoros, the Democratic Republic of Congo, Eritrea, Eswatini, Ethiopia, Kenya, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia, and Zimbabwe; (b) *lower-secondary examinations* (Botswana, Burkina Faso, Chad, Comoros, Eswatini, Ethiopia, The Gambia, Ghana, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia, and Zimbabwe); (c) *upper-secondary university entrance examinations* (Angola, Benin, Botswana, Burkina Faso, Chad, Comoros, the Democratic Republic of Congo, Eritrea, Ethiopia, The Gambia, Ghana, Kenya, Lesotho, Mali, Malawi, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe); and (d) *postsecondary university examinations* (Mauritius, South Africa, Tanzania, and Zimbabwe).
21. Repetition takes place when a child enrolls in the same grade for a second time, whether the child was formally failed or not.
22. Lower-secondary GER calculated using UNESCO Institute for Statistics (UIS.Stat) database (accessed July 18, 2016), http://data.uis.unesco.org.
23. Even in urban areas, double-shifting may fail because of a lack of support from teachers and other stakeholders, as illustrated by Uganda's experience (Barrera-Osorio et al. 2016).
24. For more information about Fab Labs, see http://fabfoundation.org/.
25. The inappropriateness of boarding schools for the large-scale expansion of lower-secondary education is buttressed by the findings in Lucas and Mbiti (2014)—based on data for Kenya using discontinuity regression analysis—that while students attending a national school may gain exposure to a higher-quality, more diverse peer group in a better-resourced schooling environment, their probability of timely progression through secondary school is not superior to that of other students. There is also little evidence that these students scored higher on standardized examinations. Similar analysis for Malawi (de Hoop 2010) is consistent with these findings.
26. Other education systems that have been reforming their curricula during recent years are, among others, Australia; Brazil; Chile; Hong Kong SAR, China; Japan, the Republic of Korea; Malaysia; Poland; Scotland; Shanghai, China; and Thailand.
27. In Finland, basic education covers grades one to nine. Upper-secondary education encompasses two interconnected streams: (a) general upper-secondary education, and (b) upper-secondary vocational education and training. Upper-secondary education is flexible and nongraded—that is, not structured by grade but by learning goals to be acquired in three or more (and, in some cases, fewer) years.
28. Transversal competencies are areas of competence that are needed not only in the labor market but also in private relationships, in political engagement, and so on: thinking (critical and innovative) and learning to learn; cultural competence,

interaction, and expression; taking care of oneself and others, managing daily activities, and safety; multiliteracy; ICT competence; competence for the world of work and entrepreneurship; participation, influence, and building a sustainable future; and global citizenship.

29. "Digital Literacy Programme Launched at Kyandula Primary," Latest News (October 14, 2016), Government of Kenya website, http://www.mygov.go.ke/digital-literacy-programme-launched-at-kyandula-primary/.
30. For instance, Eneza, a company in Kenya, offers a virtual tutor and teacher's assistant. The web-based platform, short message service (SMS), and mobile app provides primary and secondary school students with exercises in different subjects and a platform to ask teachers questions and track their performance to prepare themselves for the national exams. Teachers are also using this platform to improve their pedagogy, upgrade their skills, and prepare for the certification exams. There were 1.8 million unique users across over 8,000 schools in Kenya as of June 2017. Around 30 percent of the users are outside the formal school setting (Eneza Education 2014).
31. "Open Educational Resources," UNESCO website: http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/open-educational-resources/.
32. Khan Academy is a nonprofit educational organization created in 2006 to provide free online educational resources, mainly in the form of YouTube videos to help students learn. For information, see https://www.khanacademy.org/.
33. CK-12 Foundation is a California-based nonprofit organization that provides online learning resources, including videos, exercises, and textbooks to reduce the cost of and increase access to K–12 education in the United States and worldwide. For information, see https://www.ck12.org/.
34. One OER library is OER Commons; for information, see https://www.oercommons.org/.

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Chapter 4

Managing Teachers

Introduction

Teachers are essential to Sub-Saharan Africa's quest for universal basic education that ensures learning. Chapter 2 highlighted findings from global and regional assessments on the most consistent sources of impact on student learning: teacher knowledge, teaching practice, and instructional time. In Sub-Saharan Africa, where education systems are often poorly resourced, additional factors that matter (albeit to varying degrees in different country contexts) include the availability of textbooks and pedagogical resources, better school and classroom facilities, and smaller classes. The accumulating evidence from rigorous impact evaluations is consistent with these findings, pointing particularly to the significance of structured pedagogy, defined as a package of training, support, and materials that enhances teacher knowledge and pedagogical practice.

Teachers are also at the heart of policies for universalizing basic education in Sub-Saharan Africa. As chapter 3 explained, these policies must address two broad challenges: (a) improving early-grade learning, and (b) raising retention rates in subsequent grades, leading to completion of lower-secondary schooling. Tackling the former requires teachers equipped to provide instruction in the local language—a proven approach for early-grade learning. The latter requires removal of demand-side barriers (for example, direct costs and excessive distance to school) as well as more and better schooling services. Increasing the number of teachers in lower-secondary education, particularly those able to teach mathematics and science, is an indispensable part of the solution.

Countries in Sub-Saharan Africa have recruited and trained tens of thousands of teachers to cope with the surge of enrollments in primary and secondary schools. More needs to be done, however, to ensure expansion of

coverage along with quality in the coming years. Critical to this agenda is better management of teachers and the teaching workforce—the focus of this chapter.

The discussion uses the country groups developed in chapter 1 to sharpen the comparative analysis for cross-country learning.[1] The chapter takes advantage of the "science-to-service delivery" framework (also presented in chapter 1) to focus attention on two classroom conditions that ultimately matter for student learning: that a teacher is present to teach, and that the teaching is effective.

These conditions depend on a long chain of actions that separate the science, which helps identify promising policies, from the realities of policy implementation. Budget constraints and processes, for example, can short-change Sub-Saharan African countries' focus on quality-enhancing investments (such as teacher training, support, monitoring, and inspection), and gaps in institutional capacity (for recruiting, inducting, deploying, and processing the transfer of tens of thousands of teachers) can perpetuate or even exacerbate inequities in teaching and learning conditions across schools. Sub-Saharan African countries' heavy dependence on donors, each with their own approaches, can also add to the difficulties—for example, by creating stand-alone programs with limited integration into national systems for teacher preparation and development.

To inform policy development, this chapter documents key aspects of Sub-Saharan Africa's teacher workforce: the profile of the recruits, teachers' presence for work, their knowledge and skills for the job, and their workplace conditions. The policy levers for systemic reform—relating to budgets, capacity, and the broader policy environment—receive attention in chapters 5 and 6.

The rest of the chapter is organized as follows:

- *"Africa's Challenges in Teacher Management"* reviews the key challenges concerning teacher management in Sub-Saharan Africa and explains the analytical plan of the chapter.
- *"Sub-Saharan Africa's Teachers"* focuses on teacher recruitment, presenting data on the profile of the teacher workforce and on the attractiveness of teaching as a profession for educated workers.
- *"Teacher Deployment and Presence in School and at Work"* considers the region's school staffing allocations and teachers' presence at work.
- *"Teaching and Learning in the Classroom"* discusses teachers' professional knowledge and skills.
- *"Teachers and Their Workplace Conditions in Sub-Saharan Africa's Primary Schools"* examines the conduciveness of school work environments to effective teaching.

- *"Strategic Priorities for Improving Teacher Management"* relies on these analytical findings to distill potential priorities for policy development to improve teacher management in Sub-Saharan Africa.

Africa's Challenges in Teacher Management

Much is now known about how high-performing education systems manage teachers: recruit the best; pay competitive salaries and provide career pathways; support and nurture teachers for professional growth; monitor and reward performance, with a focus on student outcomes; and so on (see, for example, Darling-Hammond 2011; Lee, Lee, and Low 2014; OECD 2005; Tucker 2011).[2] While intuitively appealing, many of these suggestions are difficult to implement in Sub-Saharan African countries. Their economic conditions are less favorable than in other regions, and their education systems lack capacity to navigate the consequences of unprecedented expansion over the past few decades while also preparing for continued expansion in the coming years. Most Sub-Saharan African countries must simultaneously address extensive quality and management issues among both incumbents and new teacher recruits—doing it all within tight budgets.

Three features often highlighted in recent studies on education in the region draw attention to the daunting yet rudimentary nature of teacher management challenges that undermine teaching and learning, and, by implication, student learning (Lassibille et al. 2010; Majgaard and Mingat 2012; Molina and Martin 2015; Patrinos 2013):

- Wide disparities in teacher allocation and in staffing ratios across schools
- High prevalence of teacher absenteeism, resulting in low teaching times
- Teachers' modest content knowledge and limited repertoire of pedagogical skill for effective teaching

Sub-Saharan African countries vary widely in their progress in tackling these difficulties. Which among them have been relatively successful? What institutional arrangements and capacities did they build to design and improve policies and to ensure effective implementation? To explore possible answers, this chapter mobilizes evidence relevant to two specific areas of policy intervention:

- Improving the quality of new teachers entering the teaching force
  - Who enters the teaching profession? What are some feasible options for attracting better-quality entrants into the teaching force?
  - What strategies are promising for improving teacher preparation programs?

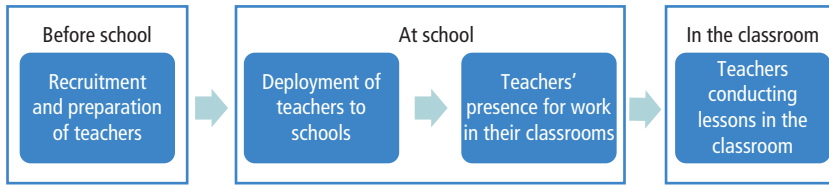
- Managing the existing stock of teachers
  - How has teacher availability in schools evolved? What are promising approaches to improve consistency and equity in teacher allocation across schools?
  - What options are available to deal with the different types of teacher absenteeism?
  - What is the level of teachers' content knowledge and pedagogical skills? What can be done for teachers who do not meet minimum standards of competence?
  - How can teachers be supported to improve their effectiveness? Which types of in-service training and school support seem to have worked?

Both areas of policy intervention are highly relevant to Sub-Saharan Africa's efforts to improve learning outcomes. This chapter seeks answers from a wide range of data sources; although still limited in scope, particularly regarding secondary education, the available cross-country data nonetheless shed sufficient light on promising approaches to improving learning.[3] Consistent with this book's conceptual framework of "from science to service delivery," the discussion focuses on teacher management issues arising from potential implementation obstacles at three junctures: entry of recruits to the teaching workforce, allocation of teachers across schools, and teachers' delivery of lessons in their assigned classes (figure 4.1).

Systemwide measures relating to recruitment standards, teacher preparation, and remuneration affect both the growth and profile of the teaching workforce. Those pertaining to the rules for teacher allocation, including the flexibility allowed for local adaptation, affect teacher availability across schools. Teacher absenteeism is tied to within-school arrangements for teacher management and supervision, and also to broader factors beyond the immediate control of school managers (for example, leave policy and statutory entitlement).

In relation to learning outcomes, teacher management faces its real test in the classroom, the venue for teaching and learning. A combination of factors

Figure 4.1 Areas of Teacher Management Challenges



matters for outcomes here: the teacher's professional competence, consisting of both content knowledge and pedagogical skill; consistency in class attendance by both teacher and students; and the conduciveness of the classroom environment for teaching and learning.

Below, we present findings revealed by the lenses shown in figure 4.1 and piece them together for an overall picture of the areas of promise and challenge in teacher management in Sub-Saharan Africa.

Sub-Saharan Africa's Teachers

Some 60 million individuals work as schoolteachers around the world today, of whom nearly 6 million are in the schools of Sub-Saharan Africa. This section puts the profile of the continent's teachers in international and regional perspective by providing a broad-brush overview of several trends: the pace of growth of the teacher cadres in primary and secondary education, the evolution of staffing ratios, and the distribution of teachers by contractual arrangements. A highlight of the section is the analysis of teachers' employment relative to other educated workers based on data from labor force and household surveys.

Teacher Cadres in Sub-Saharan Africa: The World's Fastest-Growing, and with the Lowest Share of Women

Over the past 15 years, the size of the teacher workforce in Sub-Saharan Africa has expanded rapidly, growing by an average of 4.1 percent a year in primary education and by 6.6 percent a year at the secondary level, much faster than the corresponding global averages of 1.4 percent and 1.7 percent a year, respectively (table 4.1). The primary school teacher cadre in Sub-Saharan African countries in 2014 was 1.8 times its size in 1999; in secondary education, it was 2.6 times as large. In South Asia and the Arab states—two regions with the two next fastest growing teacher cadres—the pace was just two-thirds as fast as Sub-Saharan Africa's.[4]

The expansion of teacher recruitment has altered the composition of the teacher workforce. The share of women teachers, for example, is a common measure of this change. Global patterns suggest that women tend to dominate the teaching profession as systems expand; their share of the global teaching workforce in 2014 averaged 64 percent in primary education (up from 59 percent in 1999) and 53 percent in secondary education (about the same as in 1999) (table 4.2).

Sub-Saharan Africa's patterns are unique in two ways: (a) the share of women teachers was still relatively modest in 2014, at less than 50 percent in primary education and less than 30 percent at the secondary level; and (b) the trend

Table 4.1 Size and Growth of Teacher Cadres in Primary and Secondary Education, World and Selected Regions, 1999 and 2014

	Primary education				Secondary education			
	1999	2014		Annual growth	1999	2014		Annual growth
Region	Millions		% change	rate(%)	Millions		% change	rate(%)
Sub-Saharan Africa	2.0	3.6	82.1	4.08	0.8	2.2	159.6	6.57
World	24.6	30.2	23.0	1.39	24.8	32.1	29.5	1.74
Arab states	1.5	2.2	43.0	2.41	1.3	2.0	49.3	2.71
East Asia and Pacific	9.3	10.3	11.0	0.70	7.7	10.0	30.4	1.78
Latin America and the Caribbean	2.7	3.0	12.2	0.77	3.1	3.9	25.7	1.54
South and West Asia	4.0	5.9	48.9	2.69	3.0	5.5	83.0	4.11

Source: Data from the UNESCO Institute for Statistics (UIS.Stat) database (accessed November 27, 2016), http://data.uis.unesco.org.
Note: The percentage change refers to the change between 1999 and 2014. The annual growth rate is computed based on data for all years in the period from 1999 to 2014. Not shown are the data for Central and Eastern Europe and for Central Asia, two regions with low and declining numbers of teachers. Regions are as defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Table 4.2 Percentage of Female Teachers in Primary and Secondary Schools, World and Selected Regions, 1999 and 2014

	Primary education			Secondary education		
Region	1999	2014	Change (ppts)	1999	2014	Change (ppts)
Sub-Saharan Africa	42.5	44.0	1.6	30.6	29.1	–1.6
World	59.2	63.6	4.4	52.2	52.9	0.7
Arab states	52.5	59.7	7.2	43.1	46.4	3.3
East Asia and Pacific	54.7	64.3	9.6	45.4	52.0	6.6
Latin America and the Caribbean	77.6	77.5	–0.1	63.5	58.4	–5.2
South and West Asia	37.8	49.5	11.7	34.1	42.4	8.3

Source: Data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics database (accessed November 27, 2016), http://data.uis.unesco.org.
Note: ppts = percentage points. Not shown are the data for Central and Eastern Europe and for Central Asia, two regions with low and declining numbers of teachers. Regions are as defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

since 1999 has been relatively flat. By contrast, in all other predominantly low- and middle-income regions except for Latin American and the Caribbean (where initial shares in 1999 were already very high), women are a growing presence in the teacher workforce at both levels of education. If these trends are any guide, they suggest that the continued growth of Sub-Saharan Africa's teaching workforce should begin to shift the gender balance in favor of women in the coming years.

Teacher Cadres in Sub-Saharan Africa: Diversity of Size and Growth across Countries

Sub-Saharan Africa is a diverse continent with significant differences across countries in the pattern of teacher recruitment. Below we consider two specific dimensions: the scale of expansion of the teacher cadres, and the evolution of staffing ratios and trends in the employment of nonpermanent teachers.

Doubling of Teacher Workforces in Many African Countries

Figure 4.2 shows the absolute sizes of the 2013 teacher workforces in primary and secondary education, by country, and the factor by which they grew between approximately 2000 and 2013. Countries in the figure are arranged in the four country groups described in chapter 1 and summarized in the figure 4.2 note.

Consider, first, primary education. The teacher cadre expanded in all Sub-Saharan African countries, the magnitude of each country's increase being broadly consistent with its distance from universal coverage and retention

Figure 4.2 Size and Growth of Teacher Cadres in Primary and Secondary Education, Sub-Saharan African Countries, by Group, 2000–13

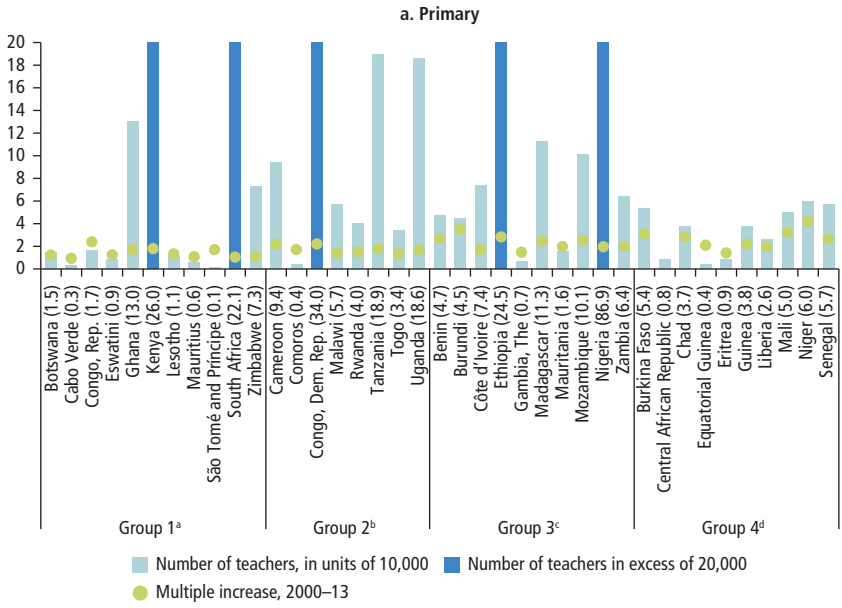


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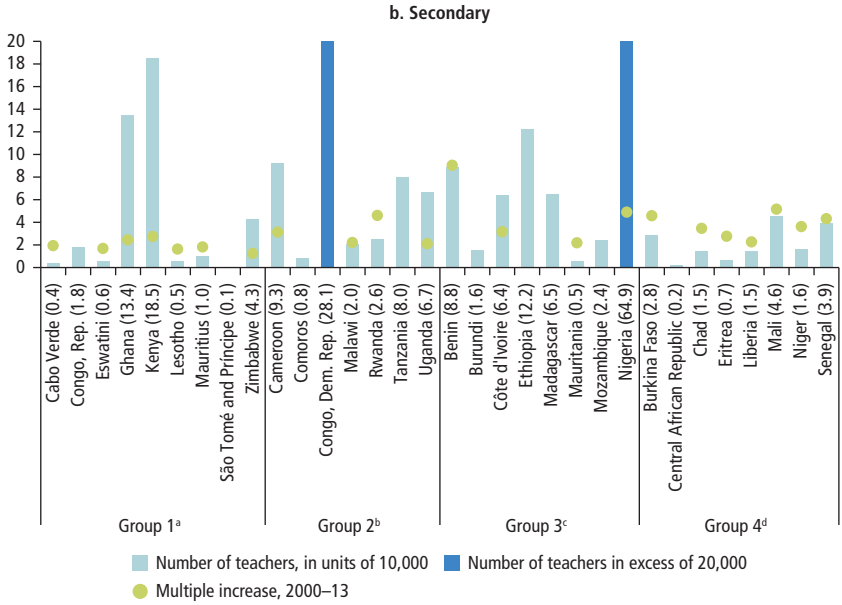
Figure 4.2 (continued)



Source: Analysis of microdata from the UNESCO Institute for Statistics (UIS.Stat) database (accessed February 23, 2016), http://data.uis.unesco.org/.
Note: The bars represent the number of teachers in 2013 (the number in parentheses next to each country name indicating the size of the teacher workforce, in thousands). The green dots represent the number of teachers in 2013 as a multiple of the number in 2000. Absence of a dot means that data were unavailable for a comparison. Not shown are countries with missing data: Angola, Gabon, Guinea-Bissau, Namibia, and Sudan for primary education; and Angola, Botswana, Equatorial Guinea, Gabon, The Gambia, Guinea, Guinea-Bissau, Namibia, South Africa, Sudan, Togo, and, Zambia for secondary education.
a. Group 1 ("established") countries had high gross enrollment ratios (GERs) in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. Group 2 ("Emerged") countries had high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. Group 3 ("emerging") countries had low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. Group 4 ("delayed") countries had low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

at the start of the period—meaning that Groups 1 and 2 had smaller increases than Groups 3 and 4 because Groups 1 and 2 had greater coverage and retention to begin with. Thus, whereas no country in Groups 1 and 2 (except Cameroon, the Republic of Congo, and the Democratic Republic of Congo) saw its teacher cadre double in size between 2003 and 2013, all the countries in Groups 3 and 4 (except Côte d'Ivoire, Eritrea, and The Gambia) increased

their teacher cadres at least twofold, and a few countries (Burkina Faso, Burundi, Ethiopia, Mali, and Niger) at least tripled the size of their teacher cadres (figure 4.2, panel a).

Countries with the largest teacher cadres at the primary level are found in the first three country groups: around 200,000 in South Africa, Tanzania, and Uganda; 250,000–340,000 in the Democratic Republic of Congo, Ethiopia, and Kenya; and more than 870,000 in Nigeria. The sheer size of their cadres adds to these countries' challenge of teacher management.

In secondary education, data are available for fewer countries. The pattern is one of generally faster expansion of the teacher workforce than at the primary level during the same period. Across all country groups, all but four countries (Eswatini, Lesotho, Mauritius, and Zimbabwe, all from Group 1) more than doubled their teacher populations (figure 4.2, panel b). Several countries increased their teaching force at an even faster rate: In Rwanda (Group 2), the number of secondary teachers grew by a factor of four, compared with an increase of just 1.5 times for primary teachers. Benin (Group 3) recorded an eightfold increase, the highest of any country across the continent. And Nigeria (Group 3), Burkina Faso, and Mali (Group 4) each experienced fourfold to fivefold increases between 2000 and 2013.

Expansion of the teacher cadre has enabled Sub-Saharan African countries to cope with rising enrollments and to improve staffing ratios. In primary education, where time series data are available for many countries, the dominant pattern across all four country groups is a decline in the student-teacher ratio during the circa 2003–13 period (see online appendix D.1, figure D.1.1).[5] In secondary education, the trend is similar, but data are available for fewer countries.

The Sizable, Rising Share of Nonpermanent Teachers in Some African Countries

To cope with burgeoning enrollments over the past few decades, Sub-Saharan African countries have recruited nonpermanent teachers, especially since the 1990s, in the push to universalize primary education (Dembélé, Chudgar, and Ndow 2016). This category of teachers is highly diverse in composition: community teachers, volunteers, teaching assistants, parents, and parateachers as well as retired former teachers and inexperienced and untrained local youth. The variety of labels reflects differences in country circumstances, policies, and approaches.

Pathways for transitioning from nonpermanent to permanent status vary,[6] as does the scope of communities' authority to fill vacant positions at local schools with teachers they appoint.[7] Fyfe (2007) suggests that, as a shorthand description, nonpermanent or contract teachers may be considered an education system's cadre of low-cost teachers with two things in common: lower

educational attainment (typically lower-secondary education or less) and less favorable terms of employment than regular teachers (for example, limited-duration contracts; lower pay; and limited access to paid leave, pension, and health insurance).

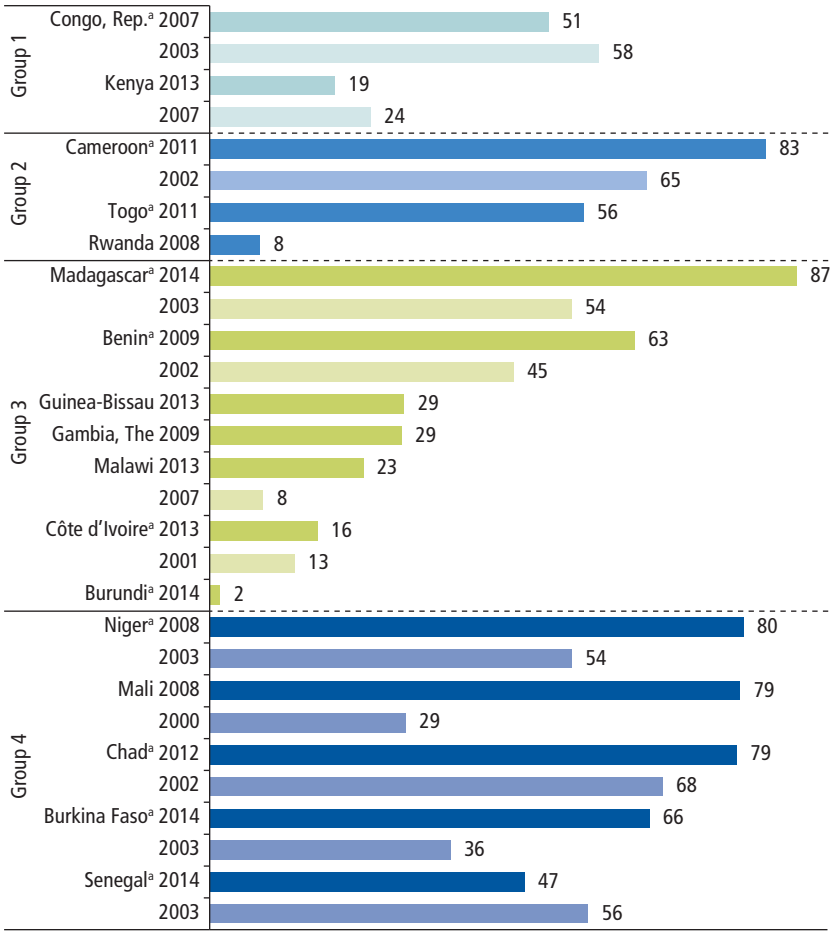
Cross-country data on nonpermanent teachers relate mostly to primary education (figure 4.3).[8] Focusing first on the more recent data (2007–14), nonpermanent teachers make up especially large shares of the teacher workforce in francophone Sub-Saharan Africa, irrespective of country group. Their share is around 80 percent or more in Cameroon (Group 2); Madagascar (Group 3); and Chad, Mali, and Niger (Group 4); and it ranges from 50 to 70 percent in the Republic of Congo (Group 1); Benin and Togo (Group 2); and Burkina Faso and Senegal (Group 4). Interestingly, some countries with a francophone legacy have modest shares of nonpermanent teachers: 8 percent in Rwanda (Group 2) and 2 percent in Burundi and 16 percent in Côte d'Ivoire (Group 3).

Since the early 2000s, the shares of nonpermanent teachers have grown in most countries in the sample: by 50 percentage points in Mali;[9] by about 30 percentage points in Burkina Faso, Madagascar, and Niger; and by about 20 percentage points in Benin. In a few countries—the Republic of Congo, Côte d'Ivoire, and Senegal—the share either declined modestly or remained relatively unchanged.

The dominance of nonpermanent teachers in the workforces of the francophone Sub-Saharan African countries reflects a confluence of factors: countries' ambition to universalize education coverage; teacher shortages, which typically lead to overcrowded classrooms; difficulty of staffing schools in rural areas; high salaries of civil service teachers in relation to the per capita gross domestic product (GDP);[10] and insufficient public spending on education and modest shares allocated to primary education (Duthilleul 2005). Allowing communities to hire their own teachers, creating nonpermanent categories of teacher employment in government, and encouraging private provision of education—all of which reduce the burden on the public purse—are some of the strategies used by countries to expand education coverage with limited budgets.

Employing contract teachers on the scale of some of the francophone Sub-Saharan African countries creates many challenges in teacher management. (See box 4.1 on the experiences of Cameroon and Madagascar.) The heterogeneity of the teacher workforce is a source of tension because resentments simmer over differences between permanent and contract teachers in pay, benefits, and access to training and instructional support; a lack of transparency in recruitment and pathways to regularization of employment; and the perception of lower social status for contract teachers (Duthilleul 2005). The complaints of contract teachers are even more understandable in light of recent research findings. An analysis of the countries participating in

Figure 4.3 **Percentage of Nonpermanent Teachers in Public Primary Schools, Sub-Saharan African Countries, by Group, Early 2000s versus Latest Available Year**



Sources: Data for 2003 or earlier from Mingat 2004; data for 2007 or later from databases of Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ) III and IV (Kenya and Malawi); Programme d'analyse du systèmes éducatif de la CONFEMEN (PASEC) 2014 (Burkina Faso, Burundi, and Senegal); World Bank 2017 (Madagascar); and UNESCO International Institute for Educational Planning (IIEP) Pôle de Dakar Indicator Database, version 19, downloaded August 2016 (all other countries).
Note: For each named country, the darker bar shows the share of nonpermanent teachers for the latest available year, while the lighter bar immediately below it, the share for an earlier year for the same country. "Nonpermanent teachers" include teachers who are not on the civil service payroll. (In Madagascar, for example, they include *enseignants contractuels* hired by the Ministry of Education as well as *enseignants communautaires/parentaux* hired and paid by the local community, some with government subsidies and others without.)
For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
a. Francophone countries

BOX 4.1

Hiring and Management of Contract Teachers in Cameroon and Madagascar

The Contract Teacher Program in Cameroon

Cameroon has a long history, going back to the 1980s, of hiring contract teachers, and the policy continues to undergo periodic reforms. As the economic crisis of the 1990s deepened, the government slashed the state budget and capped teacher recruitment. Predictably, the student-teacher ratios rose sharply.

The government responded by introducing the Contract Teacher Program (CTP) in 2006, while communities began hiring teachers at their own expense. As a result, a three-part teacher corps emerged that persists today: (a) civil servant teachers, (b) temporary teachers (*enseignants vacataires*) paid by government, and (c) community teachers (*maîtres des parents*) paid by parents. The arrangement helped ease the pressure on teacher recruitment, but it was poorly planned and executed, leading to inequitable deployment, high attrition, and uneven performance.

Since the CTP's introduction, the government has been revamping it to enhance its effectiveness. Key changes included the specification of qualifications requirements, salary scales, and benefits as well as a career path for contract teachers. The CTP hired contract teachers who had qualifications similar to civil service teachers; recruited teachers centrally for posts attached to specific locations, based on a formula; required the teachers to remain at their assigned posts for five years before becoming eligible for transfers (unless a matching swap with another teacher exists); and allowed contract teachers to compete for civil service positions that open up.

In the 2010s, the recruitment and deployment of CTP teachers were decentralized to the regions, along with other changes in teacher policy: (a) ensuring a minimum of three civil service teachers on staff in all primary schools; (b) offering housing for teachers deployed to certain priority locations; (c) improving the quality of preservice training in teacher training institutes; (d) reducing the number of teacher training institutions to assure quality; and (e) stemming the loss of teachers leaving for jobs elsewhere in government or in the private sector. The reforms benefited from significant donor support that enabled 9,000 new CTP teachers to be recruited during 2012–17.

Salary and Recruitment Reforms in Madagascar

In Madagascar, the share of community teachers in the teacher workforce in primary education swelled 4.5 times between 2000 and 2014, in a context of deep economic and political crisis. In 2002, the government started subsidizing the salaries of some of the community teachers (equating to about a third of the lowest salary of civil service teachers), initially for 9 months and later for 12 months. This move created two groups of community teachers, one subsidized and the other unsubsidized.

(continued next page)

Box 4.1 (continued)

The disparity proved untenable, leading to a decision in 2014 to subsidize all community teachers, followed a year later by a decision to integrate all community teachers into the public service as contract teachers. However, communities continued hiring teachers, making it impossible to eliminate unsubsidized community teachers from the workforce. At the same time, the pace of integrating community teachers into the public service was constrained by the annual quotas set by the Ministry of Education in light of its budget envelope.

Bringing recruitment under the purview of the Ministry of Education is an important first step toward improving the profile and performance of the teacher workforce. Basic selection criteria have been articulated, including academic qualifications, age range, and required minimum years of teaching experience. Applying the criteria is proving to be a challenge, however, because of the ministry's limited capacity and because community hiring of teachers has traditionally had little regulation from the ministry. Further, the provision under current law that entitles a contract teacher, once integrated into the public service, to request conversion to civil service status after just six years makes it urgent now to rationalize the new recruitment criteria and procedures. Addressing this structural issue is critical to improving management of the teacher workforce.

Sources: Based on World Bank 2012a, 2013 (Cameroon); World Bank 2017 (Madagascar); and other World Bank inputs.

the Service Delivery Indicators (SDI) assessment showed that contract teachers had content or pedagogy knowledge comparable to that of regular teachers and lower rates of absenteeism in the classroom (Bold et al. 2017).[11] A summary of findings from randomized controlled trials found the addition of contract teachers to reduce the student-teacher ratio to be among the more effective interventions for improving student learning (Kremer, Brannen, and Glennerster 2013).

Issues surrounding contract teachers and their working conditions were central to a pivotal meeting in 2004 hosted by the Association for the Development of Education in Africa (ADEA), the World Bank, and Brussels-based Education International for representatives of teachers' unions; parent-teacher associations; and ministries of education, civil service, and finance from 11 francophone Sub-Saharan African countries. The meeting produced the 2004 Bamako Consensus, which led to the articulation of detailed policy frameworks on recruitment, training, professional development, and employment conditions (ADEA 2011). And at the 2016 International Conference on the Use of Contract Teachers, Sub-Saharan African policy makers acknowledged that

these teachers are essential to their ability to reconcile the ambition of universal basic education with the reality of constrained budgets (UNESCO 2016). Countries are navigating their way forward with different approaches, including the reintegration of contract teachers into the public service (such as in Madagascar and Mali) (Dembélé, Chudgar, and Ndow 2016; World Bank 2017). Documenting and distilling lessons from these trends warrant close attention in the coming years.

Profiles of Teachers and Their Jobs from Country Survey Data

Almost all teachers at the primary and secondary levels are nationals recruited from within the country. Analyses of labor market and household surveys in 16 Sub-Saharan African countries therefore provide insight into the profile of teachers and their compensation relative to educated workers in nonteaching jobs (table 4.3). The data for these countries contain occupational codes in

Table 4.3 Incidence of Household and Labor Force Surveys for Comparative Analysis of Teachers and Nonteachers in Sub-Saharan African Countries, by Group and Challenge Category

Country group[a]	Challenges in mid-1990s[b]	Country	Year of survey	
1	Few	Ghana	2005	2012/13
	Some	Namibia	—	2013
	Many	South Africa	2005	2016
2	Some	Tanzania	2006	2014
	Many	Congo, Dem. Rep.	2005	2012/13
		Rwanda	2005	2011/12
		Uganda	2002	2013/14
3	Some	Côte d'Ivoire	—	2013/14
		Gambia, The	—	2009/10
		Sierra Leone	—	2014/15
		Zambia	2008	2014
	Many	Mozambique	2007	2014/15
		Nigeria	—	2012/13
4	Some	Burkina Faso	—	2013/14
		Senegal	2003	2010
	Many	Liberia	—	2014

Note: — = not available.
a. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
b. Countries were categorized based on the number of challenges faced in the early to mid-1990s into baseline education challenge categories—"few," "some," or "many"—as detailed in chapter 1. The seven challenges areas were large total population, rapid growth of the school-age population, low or stagnant growth of GDP per capita, high income inequality, high poverty levels, high linguistic diversity, and frequent incidence of conflict.

sufficient detail to distinguish teachers from other workers; for nine of the countries, the data were available for two years.[12] The sample represents all four country groups in this study. (For additional details on the surveys, see online appendix D.2, table D.2.1.)

The discussion below highlights findings on such questions as the following:

- Does teaching attract educated labor more than other professions?
- Is the compensation package for teaching attractive compared with the packages for other types of work employing educated workers?
- Is teaching more attractive to particular demographic groups (such as women or younger people) than other professions that rely on educated labor?

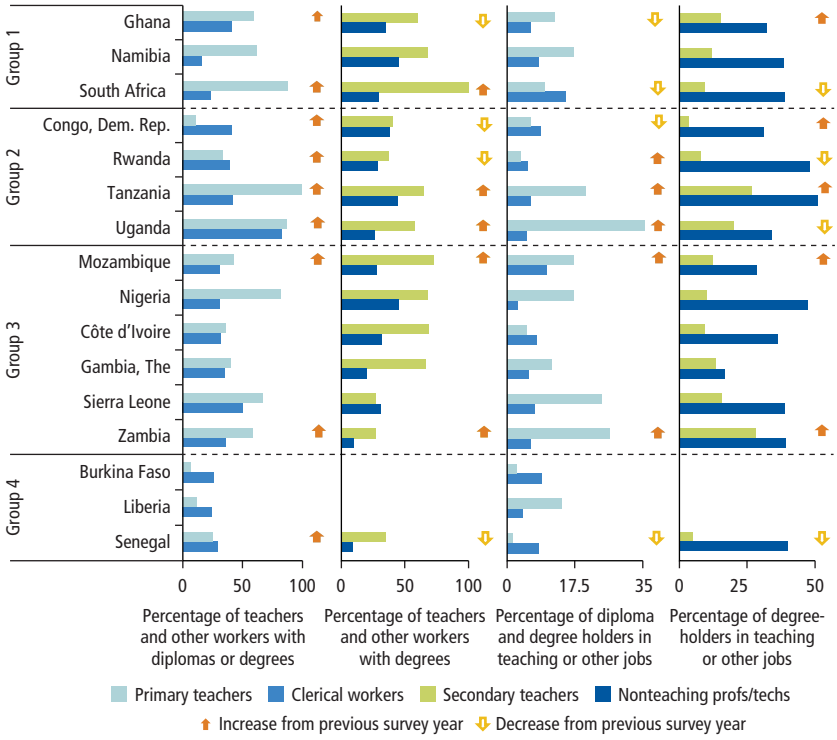
Because the available datasets were not specifically designed to provide extensive detail on teaching as an occupation, the light they shed is admittedly limited and only suggestive at this stage, and therefore useful mainly to enrich dialogue toward policy development.

Are teachers better educated than other white-collar workers? Consider first the two leftmost columns in figure 4.4, which compare the educational attainment of teachers with that of other well-educated workers. A greater share of primary school teachers than clerical workers have tertiary education in 11 of the 16 sample countries, the five exceptions being the Democratic Republic of Congo and Rwanda (Group 2) and Burkina Faso, Liberia, and Senegal (Group 4).[13] Among these 11 countries, the advantage of tertiary education is especially large in four countries: Namibia and South Africa (Group 1), Tanzania (Group 2), and Nigeria (Group 3). In all nine countries for which time series data are available, the share of primary teachers who have tertiary education has grown over time.

Among secondary school teachers, the share of degree holders in all 16 countries in the sample is at least as high as that among nonteaching professionals and technicians; in 10 of these countries, the share is in fact larger and noticeably so in the following seven: South Africa (Group 1); Uganda (Group 2); Côte d'Ivoire, The Gambia, Mozambique, and Zambia (Group 3); and Senegal (Group 4). Trends in the share of degree holders vary by country, however; the share rose in four of nine countries with time series data, but it fell in the rest.

Consider next the data in the last two columns of figure 4.4. Individuals with tertiary education are more likely to work as primary school teachers than in clerical jobs in all but six of the 16 countries in the sample; these exceptions include South Africa (Group 1), the Democratic Republic of

Figure 4.4 Educational Attainment of Teachers and Other Educated Workers in Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s



Sources: Analysis of country household or labor force survey data.
Note: In each column, the definition of "teachers," "other workers," and "other jobs" is specified in the legend. Analysis of the most recent survey is shown in Table 4.3. The arrows denote changes from the previous survey year for the countries with such time series data. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.

Congo and Rwanda (Group 2), Côte d'Ivoire (Group 3), and Burkina Faso and Senegal (Group 4).

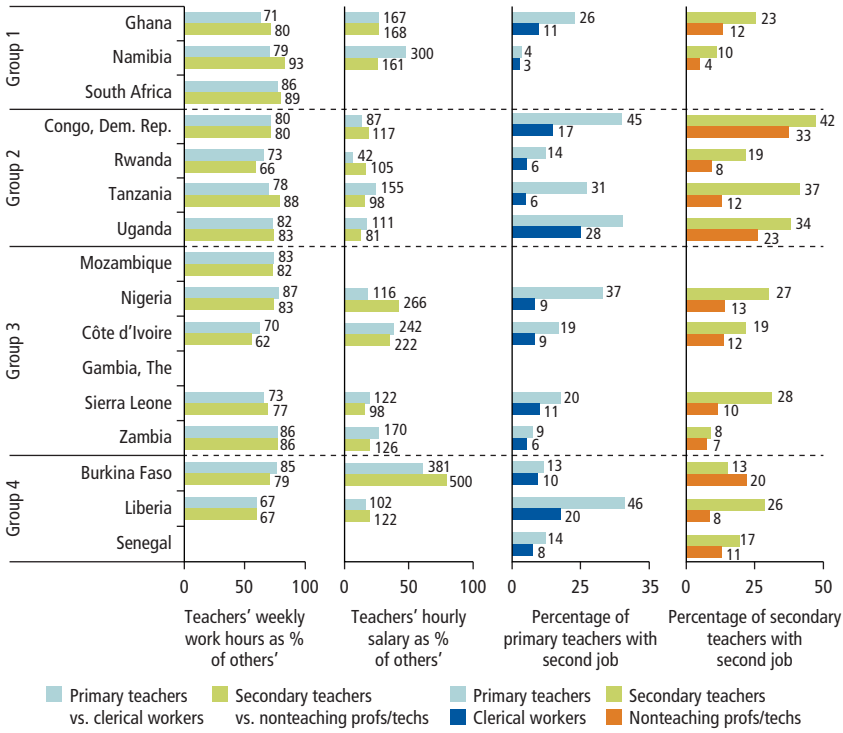
Among those with university degrees, the share working as secondary school teachers also varies widely, from just 3.6 percent in the Democratic Republic of Congo and 4.8 percent in Senegal to around 25 percent in Tanzania and Zambia. Notably, in all of the sample countries except Sierra Leone, the share of secondary school teachers with university degrees is much higher than the corresponding share among professionals or technicians.

For countries with data for multiple years, no particular trend is discernible in the share of teachers among all workers with tertiary education: countries

with already high initial shares of diploma or degree holders in teaching jobs (for example, among primary teachers in Uganda and Zambia and among secondary teachers in Tanzania and Zambia) did not necessarily see the shares decline.

Do teachers differ from other white-collar workers in hours, pay, or second jobs? The household and labor force surveys also throw light on important aspects of teachers' employment: work hours, wages, and second jobs (figure 4.5). Uniquely, they enable comparisons between teachers and other well-educated workers in nonteaching professions, thus providing a more realistic basis for assessing the compensation packages of teaching jobs than the common approach of relating teacher wages to the per capita GDP.

Figure 4.5 Work Hours, Wages, and Second Jobs of Teachers Relative to Other Well-Educated Workers in Selected Sub-Saharan African Countries, by Group, Early to Mid-2010s



Source: Analysis of country household labor force survey data.
Note: Analysis of the most recent survey s shown in Table 4.3. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.

Consider first the data on the number of work hours per week (leftmost data column of figure 4.5). Compared with comparably educated workers in nonteaching jobs, teachers have work weeks that are shorter by between 7 percent (Namibia) and 38 percent (Côte d'Ivoire).

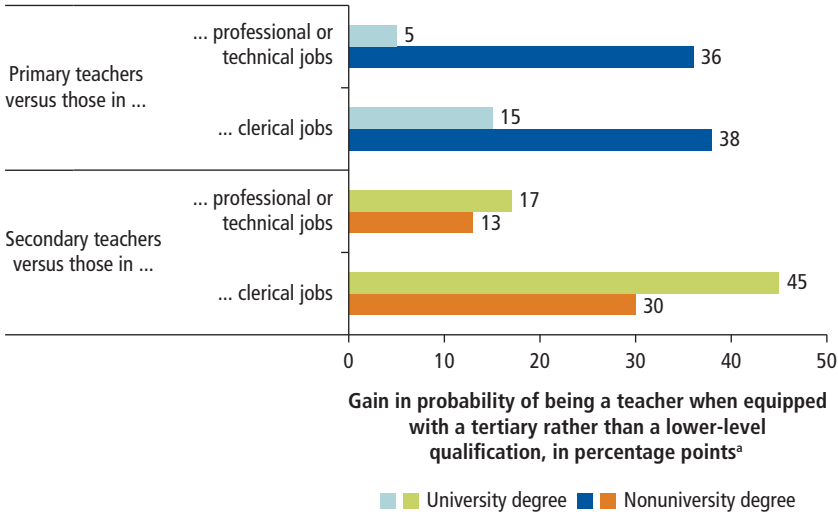
The remuneration of teachers and nonteachers is compared in the second data column of figure 4.5.[14] The hourly pay of teachers in both primary and secondary schools generally exceeds that of their peers in nonteaching jobs. The pay advantage is especially wide in some countries: for primary teachers in Burkina Faso, Côte d'Ivoire, and Namibia and for secondary teachers in Burkina Faso, Côte d'Ivoire, and Nigeria. In a few countries, teachers' hourly wages are lower, including primary teachers in the Democratic of Congo and Rwanda and secondary teachers in Uganda. The pay disadvantage is especially striking in Rwanda, where primary teachers earn just 42 percent of what clerical workers make per hour.

The two rightmost columns of figure 4.5 show the prevalence of second jobs among teachers and nonteachers. Most of these second jobs are in agriculture (such as tending to their own farms, raising chickens, and so on) and may include work undertaken during the school holidays when teachers are not required to teach).[15] In every country, at both levels of education, teachers are far more likely than their peers in nonteaching professions to have a second job. Among primary school teachers, for example, between a quarter and nearly half have second jobs in such countries such as Ghana (Group 1); the Democratic Republic of Congo, Tanzania, and Uganda (Group 2); Nigeria (Group 3); and Liberia (Group 4). By contrast, in Rwanda, only 14 percent of the primary teachers have second jobs—a somewhat surprising finding in view of the relatively modest pay of Rwandan teachers.

How do individual characteristics correlate with teaching and other white-collar jobs? Regression analysis offers two ways to refine the comparisons presented above: It controls for differences in multiple dimensions of individuals' backgrounds, simultaneously rather than one facet at a time. It also enables the pooling of individual-level data from all the available country datasets, thus enlarging the sample size to improve the robustness of the analytical results.[16]

Finding 1: Tertiary education correlates with working as a teacher. The regression results, summarized in figure 4.6, portray a remarkable pattern: possession of a tertiary education is, by far, the most important factor that differentiates teachers—at both the primary and secondary levels—from other educated workers.[17] Stated differently, after controlling for educational attainment, gender and age lose their power to predict who becomes a teacher, be it at the primary or secondary level. For example, controlling for other characteristics, diploma holders are 36 percentage points and degree holders are 5 percentage

Figure 4.6 Likelihood of Individuals with Tertiary Education to Work as Teachers Instead of in Other White-Collar Jobs in Selected Sub-Saharan African Countries, Early to Mid-2010s



Source: Regression analysis of country household and labor force survey data.
Note: Data are for 13 of the 16 Sub-Saharan African countries listed in table 4.3; data for Burkina Faso and Liberia were excluded for lack of information to distinguish between degree and diploma holders as well as for Rwanda for lack of information on place of residence. For countries with data for multiple years, the sample for the latest year was used. For all four comparisons in this figure, the samples were adjusted as follows: For the comparisons for primary school teachers, secondary school teachers were excluded (and vice versa). Clerical workers were excluded from the professional and technician group and vice versa. For full regression results, see online appendix D.3, table D.3.1.
a. The percentage point gains correspond to coefficient estimates on the educational attainment variables in the relevant regressions; all the regression models shown here control for locality of residence, gender, age, and country fixed effects; the solid colored bars denote that the coefficient estimates are all statistically significant at the 95 percent confidence level.

points more likely than those without tertiary education to be a primary teacher rather than a nonteaching professional or technician; the corresponding values for secondary school teachers compared with professionals and technicians are, respectively, 13 and 17 percentage points.

Also noteworthy in the results is that a diploma increases the likelihood of teaching in a primary school instead of working in either a clerical job or in a professional or technical job by 36 and 38 percentage points, respectively. A degree also raises the likelihood of being a primary teacher relative to these types of jobs, but the increase is much smaller: just 15 percentage points when primary teaching is compared with clerical jobs, and a mere 5 percentage points when compared with professional and technical jobs. This sharp drop-off (between diploma holders' and degree holders' likelihood of teaching at the primary level) also characterizes similar comparisons of secondary school teaching. One plausible explanation for the stability in the attraction of primary

school teaching for diploma holders is that diploma-level programs in Sub-Saharan African countries are often designed as funnels into primary-school teaching jobs. Degree-level teacher preparation programs also exist, but more of their graduates enter nonteaching jobs, possibly reflecting the greater diversity of career options for these individuals.

Finding 2: Being a primary teacher correlates with lower earnings, by an estimated 9 percent. Figure 4.7 summarizes regressions on the earnings of teachers relative to comparably educated workers in nonteaching jobs.[18] On the correlates of hourly pay, the results show that, with the fullest set of controls (rural/urban, gender, age, university and other tertiary education, and public/private sector of employment), primary school teachers earn, on average, an estimated 9 percent less per hour than clerical workers and other nonteaching professionals or technicians—a statistically significant gap (figure 4.7, panel a). However, for secondary school teachers, the difference is not statistically significant, implying that their hourly pay is competitive.

Notably, women consistently earn less than men, by a statistically significant estimate of 35 percent, all else being the same.[19] Thus, a female primary school teacher would earn 44 percent less than a man in a nonteaching job who had the same personal and educational profile. These estimates show that

Figure 4.7 Correlates of Hourly and Annual Pay among Teachers and Other Workers with Tertiary Education in 13 Sub-Saharan African Countries, 2010–16

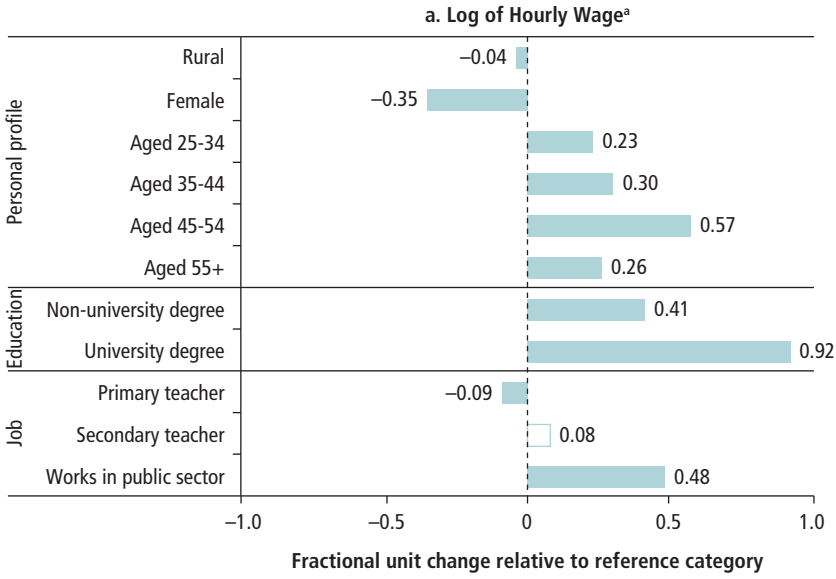


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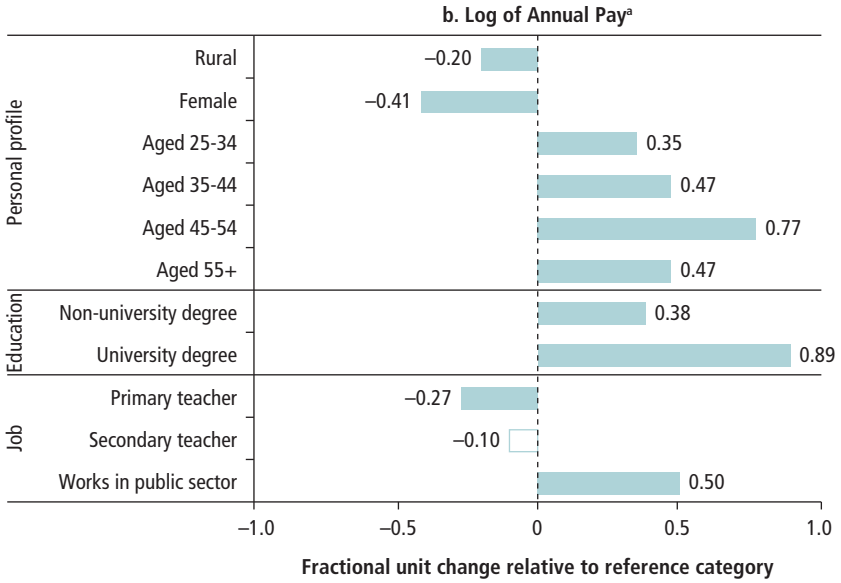
Figure 4.7 (continued)



Source: Regression analysis of country household and labor force survey data.
Note: Data are for 13 of the 16 Sub-Saharan African countries listed in table 4.3. (Excluded are Burkina Faso and Liberia, which lacked data to differentiate between diploma and degree holders, and Rwanda, which lacked data on urban or rural place of residence.)
a. The dependent variable in panel a is the log of hourly wage, and in panel b, it is the log of annual pay; both regressions include country fixed effects; the coefficient estimates are denominated in units of percentage change. Solid-colored bars denote coefficient estimates that are statistically significant at the 95 percent confidence level or higher, while unfilled ones denote a lack of statistical significance. See online appendix D.3, tables D.3.2 and D.3.3, for full regression specifications and results, including the reference categories for the categorical variables.

gender—not occupation as a teacher—is far and away the main reason for the shortfall in earnings. In other words, the pay gap is a problem that affects all working women, not just women working as teachers.

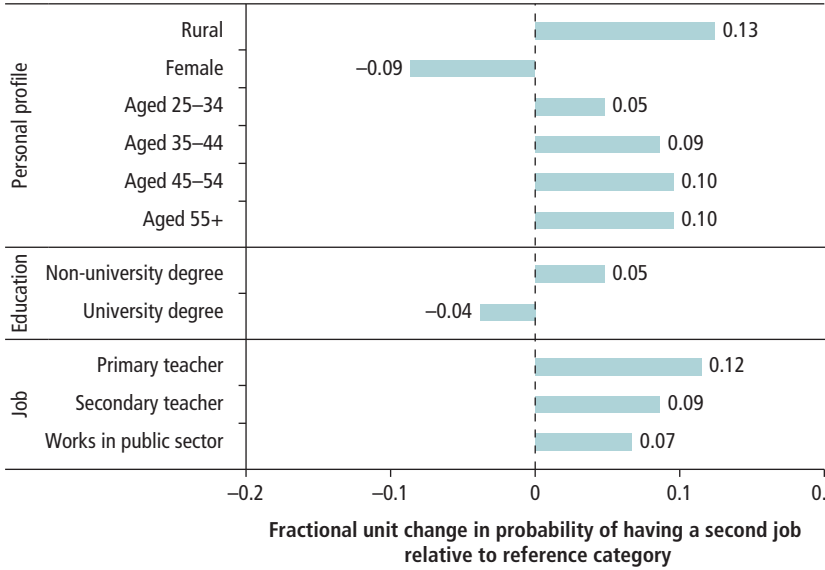
Among other highlights, the regression results show an age-related wage gap that represents a fairly typical earnings trajectory over a working lifetime: relative to workers of ages 15–24 years, workers in all other age groups earn more by statistically significant margins; the gap grows until age 54, after which it narrows (but does not disappear). Hourly earnings also correlate strongly with education and public sector employment: degree holders earn nearly twice as much as those with no more than a secondary education, and diploma holders earn more than 40 percent more; public sector employees earn nearly 50 percent more than their private sector counterparts.

Similar patterns are shown in the regression results when the dependent variable is the annual wage (figure 4.7, panel b)—a less precise measure than the

hourly wage of the value placed on teachers' work because of incomplete or missing data on the length of the workweek (which is typically shorter for teachers) and the length of paid holidays (which coincide with school holidays for teachers, who typically get longer paid leave than workers in nonteaching jobs). As before, secondary school teachers' annual wages are not statistically different from the wages of other educated workers (figure 4.7, panel b). By contrast, the shortfall in annual earnings widens to 27 percent for primary school teachers, owing to their fewer work hours.

Finding 3: Being a teacher correlates with a greater likelihood of having a second job. Primary school teachers are 12 percentage points more likely, and secondary school teachers 9 percentage points more likely, than nonteaching professionals, technicians, or clerical workers to hold a second job, controlling for individuals' rural/urban location, gender, age, and educational attainment and whether or not they are working in the public sector (figure 4.8).

Figure 4.8 Correlates of Having a Second Job among Teachers and Other Workers with Tertiary Education in Selected Sub-Saharan African Countries, Early to Mid-2010s



Source: Regression analysis of household and labor force survey data.
Note: Data are for 13 of the 16 sub-Saharan African countries listed in table 4.3. (Excluded are Burkina Faso and Liberia, which lacked data to differentiate between diploma and degree holders, and Rwanda, which lacked on urban or rural place of residence.) The dependent variable is whether or not the respondent has a second job. The regression includes country fixed effects, and the coefficient estimates are denominated in fractional units denoting the change in probability of having a second job. Solid colored bars denote coefficient estimates that are statistically significant at the 95 percent confidence level. See online appendix D.3, table D.3.4, for full regression specifications and results, including the reference categories for the categorical variables.

These findings raise broader issues: The literature draws attention to the potential for corruption—for example, when the second job compromises teachers' devotion to their teaching responsibilities or creates opportunities for teachers to extract fees from their students in exchange for access to information, materials, or other resources withheld during regular classes (Bray 2013). Yet, where teacher pay is low, allowing teachers to take a second job may be part of their implicit compensation package. If so, second jobs need to be regulated rather than banned outright to minimize the potential for abuse.

Summary and Policy Implications of Teacher Workforce Characteristics

Sub-Saharan Africa's teacher workforce grew rapidly between 1999 and 2014, at rates far exceeding those of other regions of low- and middle-income countries. The region's staffing ratios, reflected in the average student-teacher ratio, remain the least generous among world regions—an unsurprising characteristic in a context of high poverty and budget constraints on recruitment. In many countries, particularly the francophone ones, nonpermanent teachers make up a large share of the teacher workforce, although recent trends show movement in the opposite direction in some of these countries.

In the coming years, teacher recruitment is likely to continue at a rapid pace as countries push toward the goal of universal basic education with quality. This prospect presents many difficult policy challenges regarding teachers. Because countries in the region are already recruiting the better-educated individuals in national labor pools, limited scope exists for improving the quality of teachers simply by raising recruitment standards. Yet, as the following sections show, teacher cadres in most Sub-Saharan African countries are weak in content knowledge and pedagogical skills (as revealed by dedicated surveys and tests administered to teachers) and low on motivation (as signaled by pervasive teacher absenteeism). Addressing these serious impediments to learning is at the crux of teacher management challenges in the region.

Progress will require action on multiple fronts. One area for attention is quality assurance of teacher training—whether for initial preparation or for continuing professional development—to ensure not only alignment between training content, the school curriculum, and the actual contexts in which teachers work but also effectiveness in boosting student learning.

A second major area for attention is teacher compensation. The issues here are complex, in part because they require intricate negotiations typically involving teachers unions and multiple parties in government, including ministries of education and of finance. (See box 4.2 regarding teacher pay negotiations in Kenya.) If wholesale increases in teacher salaries are not feasible, a narrower focus on selected increases may still help to relieve debilitating bottlenecks (for example,

BOX 4.2

Collective Bargaining to Standardize Teacher Pay and Benefits in Kenya

On May 15, 1968, the Teachers Service Commission (TSC) signed an agreement with the Kenya National Union of Teachers (KNUT), recognizing it as the sole trade union representing the interests of teachers in Kenya. On June 2, 2010, the TSC signed a second recognition agreement with the Kenya Union of Post Primary Education Teachers (KUPPET), which draws its membership from postprimary institutions.

Until recently, teachers' remuneration in Kenya had been reviewed by unstructured, ad hoc committees created to respond to specific demands by the unions. Often, the demands would snowball into a strike that the parties resolved by hurriedly signing a return-to-work formula. A major weakness of this arrangement was that it got teachers back into the classrooms without providing a sustainable and durable solution for industrial harmony.

In 2010, the situation began to change with the reestablishment of the TSC under Article 237 of the Constitution, giving it, under Article 41, a constitutional mandate as the sole employer of teachers to negotiate directly with the unions. Currently, the TSC is operationally and functionally autonomous and gets funds directly from the exchequer.

In 2016, following two strikes lasting a total of 49 days the preceding year,[a] President Uhuru Kenyatta urged both the TSC and the teachers' unions (KNUT and KUPPET) to commence negotiations on all disputes to attain peace in the teaching subsector. This resulted in the teaching service's first collective bargaining agreement (CBA). Covering the period from July 1, 2013, to June 30, 2017, the CBA was signed in October 2016 and registered with the Employment and Labour Relations Court, as required by law. The agreement consolidated previous salary awards negotiated by ad hoc remuneration committees. It also provided for commencement of new negotiations to cover July 1, 2017, to June 30, 2021.

Process of the Dialogue

Negotiations were preceded by a job evaluation exercise conducted by the Salaries and Remuneration Commission pursuant to its constitutional mandate, in consultation with the TSC. The parties (TSC, KNUT, and KUPPET) agreed to withdraw all court cases involving them relating to terms and conditions of service. To facilitate the process, the parties appointed negotiating committees assisted by a joint technical team. They acted with sincerity and in good faith, which created a conducive environment for the talks.

The unions presented their separate memorandums of demands, to which the TSC responded with a consolidated counterproposal and an offer. In making the offer, the TSC emphasized the principle of *equal pay for equal work, the relative worth of every job, and quality teaching standards through performance evaluation*.

(continued next page)

Box 4.2 (continued)

Key Outcomes of the CBA

The CBA has expanded the grading structure, effectively creating career paths for teachers in public service. It also provides for standardized basic pay and benefits for every job and has institutionalized annual teacher performance management and evaluation. Accordingly, the TSC is rolling out a teacher performance and appraisal tool to all schools. Implementing the CBA is expected to increase the wage bill by an estimated K Sh 54 billion (US$520 million) over four years between July 1, 2017, and June 30, 2021.

Source: Teachers Service Commission of Kenya, pers. comm.
a. There had also been strikes in 2009, 2010, 2011, 2012, and 2013.

by staffing hard-to-fill positions, as in remote schools) and to improve incentives for teacher performance. Even in countries where teacher salaries are competitive, dialogue with teachers and other stakeholders can help tighten the link between compensation and expectations about the work of teachers and its impact on student learning. Such dialogue, when based on credible data and analysis, can also help correct misperceptions and dispel unfounded dissatisfaction about low salaries, which can undermine teacher motivation.[20]

Teacher Deployment and Presence in School and at Work

A critical action for education managers is to deploy teachers in relation to enrollments and to ensure that teachers are present and teaching effectively. This may appear simple in theory. However, many Sub-Saharan African countries cannot reach even this minimum benchmark.

The problem may stem partly from the fact that education systems are relatively young and lack the institutional capacity to cope with the region's unprecedented increases in teacher recruitment over the past decade. The discussion in this section shows that some countries have nonetheless improved, including some where conditions are not necessarily the most favorable, suggesting that improvements are possible in the context of Sub-Saharan Africa.

The Pattern of Teacher Deployment across Schools

Majgaard and Mingat (2012) analyzed teacher allocation in 25 Sub-Saharan African countries using data for 2000–08, finding that, on average, 28 percent of the variation in teacher allocation cannot be attributed to variation in the size of enrollments in schools. Mulkeen (2010) examined the variations between and within districts, using data for six Sub-Saharan African countries: Eritrea, The Gambia, Lesotho, Uganda,

Zambia, and Zanzibar. The study reveals substantial variations *within* districts that in some cases exceed the variations *between* districts; yet these patterns lie hidden when official statistical bulletins report only district-level student-teacher ratios.

Below we add results from more recent data, including those for countries with data for multiple years:[21]

- Data for 11 Sub-Saharan African countries with education management information system (EMIS) datasets for primary education and for 8 countries with EMIS datasets for secondary education
- The 2014 SDI data for Tanzania
- The 2014 Programme d'analyse du systèmes éducatif de la CONFEMEN (PASEC) data for 10 countries
- The 2007 Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) data for 14 countries

Because these datasets vary in quality and coverage—as with other datasets—their depictions of teacher allocation, and the consequent policy implications, need to be interpreted with care.

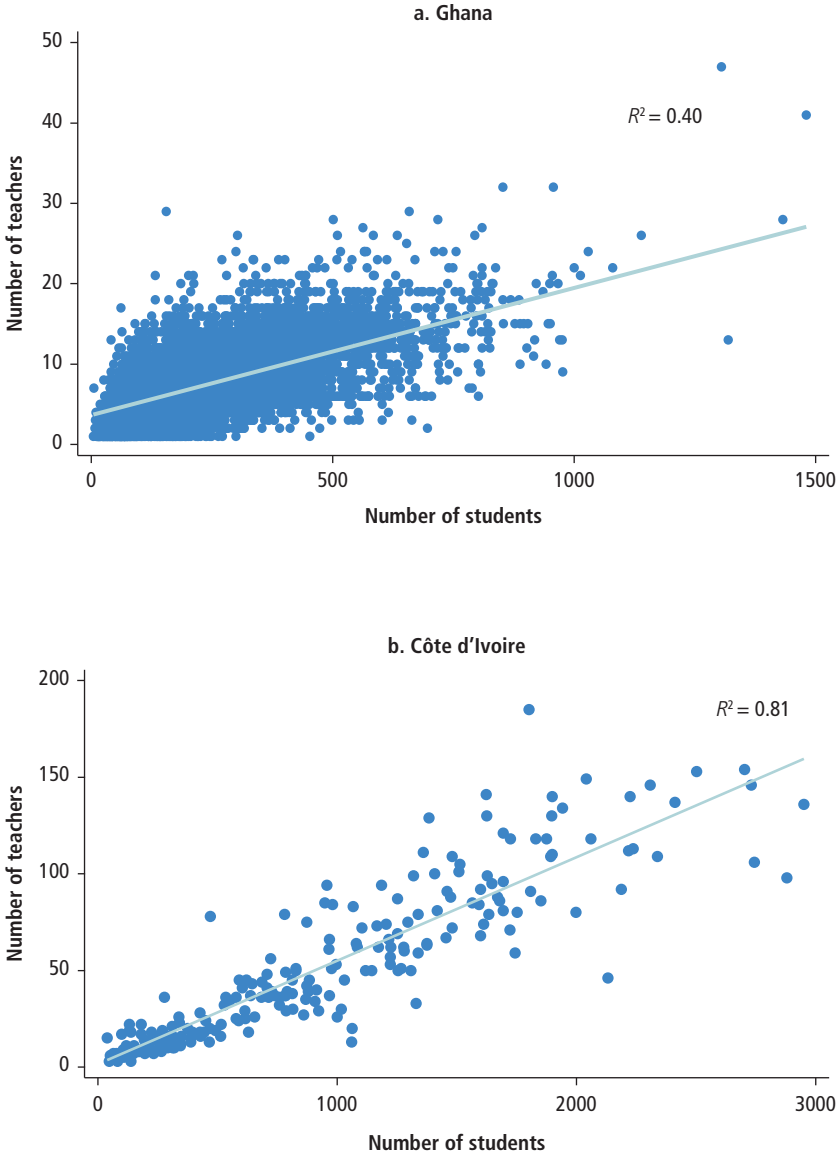
Exemplifying the Teacher Allocation Problem: Ghana and Côte d'Ivoire

To illustrate, figure 4.9 visualizes the diversity of teacher allocation across public primary schools in Ghana and across public secondary schools in Côte d'Ivoire. In Ghana, the relation between the staffing complement and the number of students is quite loose: a primary school with, say, 500 students may have fewer than 5 teachers or more than 20. It is tighter in Côte d'Ivoire, but room for improvement nonetheless remains.

The straight line in both figures corresponds to a linear regression relating the two variables, and the regression R^2 offers a measure of the share of variation in teacher allocation across schools explained by variation in enrollments. Ghana's smaller value (0.40) than Côte d'Ivoire's (0.81) accords with the visual impression of greater variability in teacher allocation across schools in the former. Conversely, $1-R^2$ provides a measure of the inconsistency of teacher allocation; it is estimated at 0.60 and 0.19, respectively, for Ghana and Côte d'Ivoire in this example. Below, we use this statistic as a measure of the randomness in teacher allocation across schools.

Because randomness in teacher allocation across schools is the combined result of inconsistent decision making at the national or subnational levels, we use district dummy variables in the regression equation when computing the $1-R^2$ statistic to tease out the underlying patterns.[22] These regressions purge the district-level influences, giving a so-called "fixed effects" index that captures within-district randomness in teacher allocation. For Ghana, its value of 0.37, compared with the non-fixed-effect index of 0.60, implies that about one-third of the haphazardness in teacher allocation arises from

Figure 4.9 **Relation between Numbers of Teachers and Students across Schools in Ghana and Côte d'Ivoire**



Source: Analysis of education management information system (EMIS) data for public sector schools only.
Note: R^2 represents the share of variation in teacher allocation across schools that is explained by variation in enrollments. The straight line corresponds to a linear regression relating the two variables: number of teachers and number of students.

inconsistencies of allocation between district, and two-thirds arises from inconsistencies within districts. There is therefore significant scope for progress within districts in Ghana.[23]

Consistency of Teacher Allocation with Enrollments across Primary Schools

Figure 4.10 shows estimates of the index of randomness in teacher allocation across countries as well as trends in the index for some of the countries. The data are presented by country group as well as the extent of countries' challenges in the early 1990s. Surprisingly, countries with "some" or "many" contextual challenges, such as Zimbabwe and Mozambique, achieve better results than others with "few" challenges, such as Ghana. To elaborate on the results, the following observations are noteworthy.

Figure 4.10 Degree of Randomness in Teacher Allocation across Primary Schools in Selected Sub-Saharan African Countries, by Group and Baseline Challenge Category, 2006–16

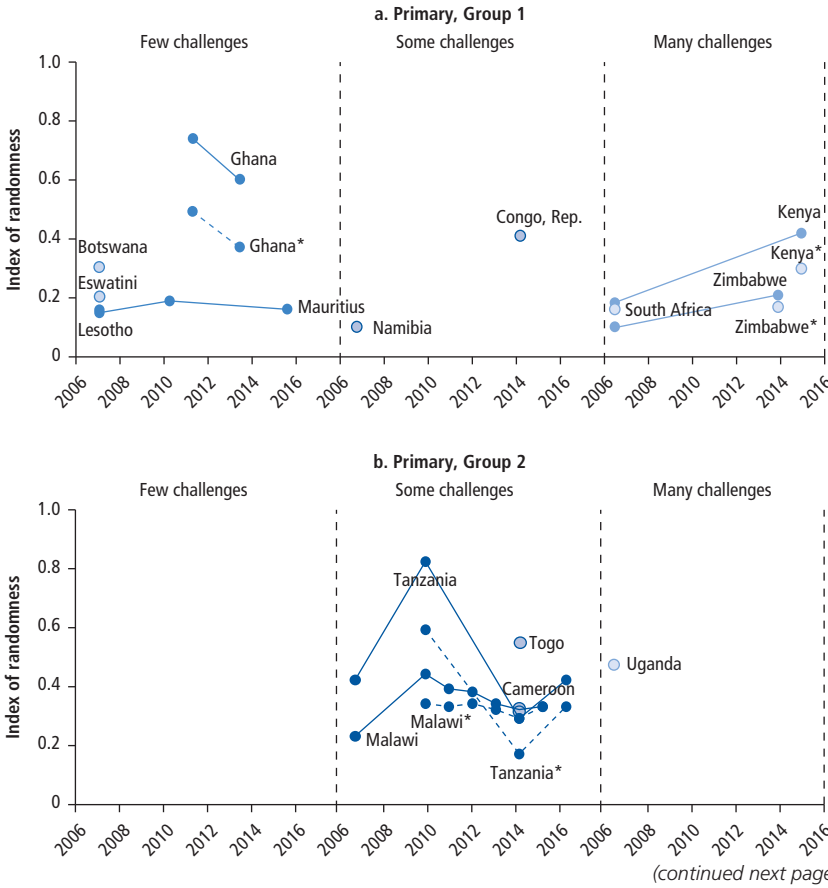


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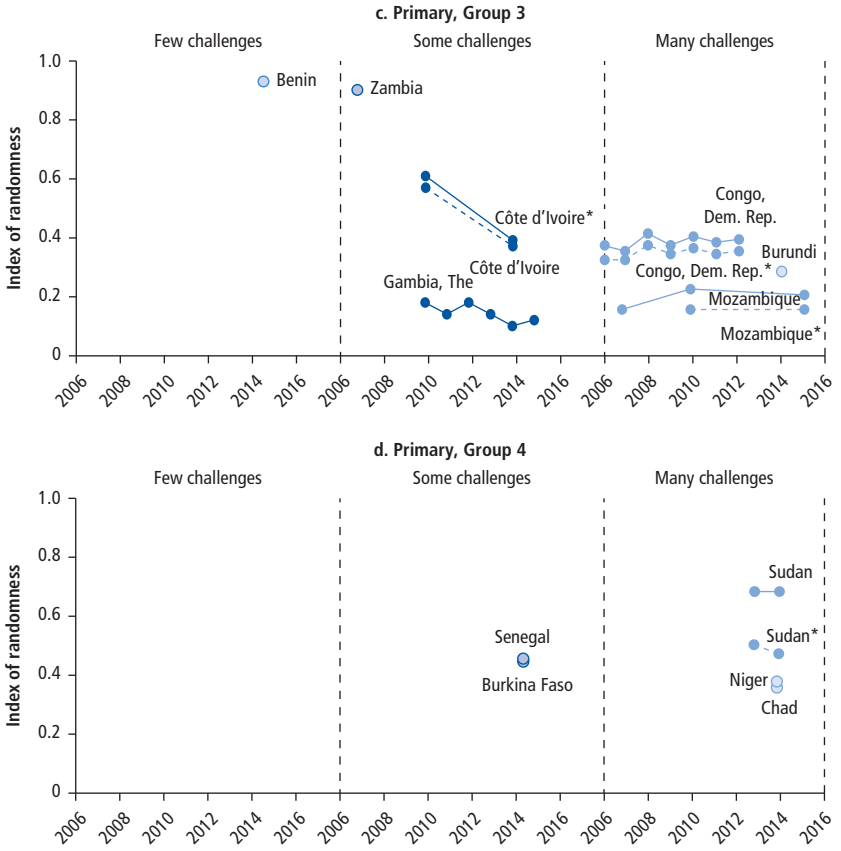
Figure 4.10 (continued)



Source: Analysis of education information management system (EMIS) data for public sector schools.
Note: See the text regarding computation of the randomness index. Countries are grouped in the four groups used throughout this report (see chapter 1 or figure 4.2). In each panel, the vertical axis is the randomness index, and the horizontal axis shows the year of the data. Each dot represents an estimate of the randomness index. Country names followed by an asterisk designate "fixed effect" indexes (that is, those computed with district (or other subnational) dummy variables in the regression equation). Pale dots denote countries with single-year estimates; dark dots, countries with multiyear estimates. A solid line links indexes that are estimated using regressions without district dummy variables; a dotted line links estimates based on regression with district dummy variables. Countries were categorized based on the number of challenges faced in the early to mid-1990s into baseline education challenge categories—"few," "some," or "many"—as detailed in chapter 1. The seven challenges areas were large total population, rapid growth of the school-age population, low or stagnant growth of GDP per capita, high income inequality, high poverty levels, high linguistic diversity, and frequent incidence of conflict.

Countries with good results in primary teacher allocation These countries include those with a low index of randomness for teacher allocation. Such countries reveal what is possible for other Sub-Saharan African countries: their indexes rise no higher than 0.20. This group includes Eswatini, Lesotho, Mauritius, Namibia, South Africa, and Zimbabwe (Group 1); and The Gambia and Mozambique

(Group 3). Some of these countries (such as Mauritius and Zimbabwe) have sustained tight management of teacher allocation for at least five years, suggesting systematic use of criteria-based allocation procedures.

Most of the good performers are countries with small or mature systems, relatively modest increases in the size of teacher cadres, and few initial contextual challenges. Yet Mozambique's experience is instructive: the country faced many baseline challenges in its context, the number of teachers in public primary schools increased by more than 40 percent between 2010 and 2015, and the out-of-school rate among youth of primary school age remains high. Nonetheless, the country kept the randomness index for teacher allocation at less than 0.20 over the five-year period; moreover, little of the variation stems from between-district variation in the pattern of allocation.

Countries with relatively poor results in primary teacher allocation In these countries, the challenges take many forms: high absolute values in the randomness index, albeit with declines over time; high levels of randomness both between and within districts; inconsistent improvements over time; or stagnancy. Benin and Zambia (Group 3) are the obvious outliers, with indexes that exceed 85 percent. Most of the other countries cluster in the 0.30–0.50 range, including Ghana and Kenya (Group 1); Cameroon, the Democratic Republic of Congo, Malawi, Togo, and Uganda (Group 2); the Republic of Congo and Côte d'Ivoire (Group 3); and Burkina Faso, Chad, Senegal, and Sudan (Group 4).

Ghana and Côte d'Ivoire both saw the consistency of teacher allocation improve over time, but the latter did so in a context with more challenges; the country has also practically eliminated between-district inconsistencies in teacher allocation, whereas the gap remains large in Ghana. As in Côte d'Ivoire, the between-district inconsistencies in teacher allocation are also modest in the Democratic Republic of Congo and Malawi. However, in all three countries, within-district randomness in teacher allocation remains high, and, in the case of the Democratic Republic of Congo, more or less stagnant for about 7 years.

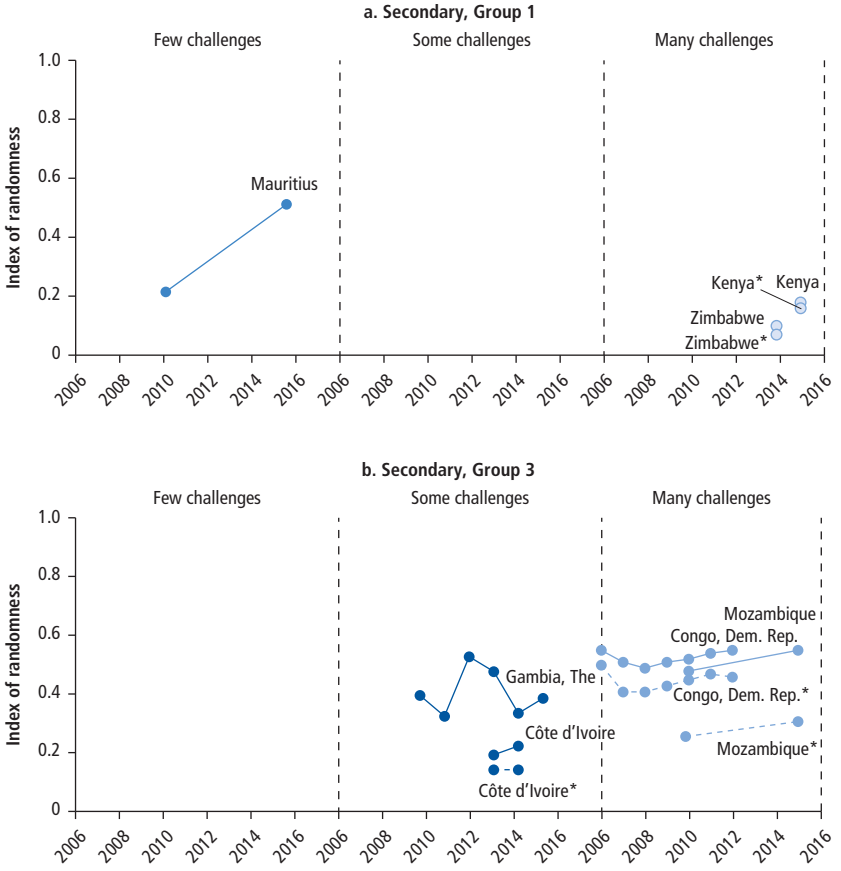
Trends in Kenya and Zimbabwe (Group 1) and in Tanzania (Group 2) give cause for concern—in Kenya because the index of randomness doubled over 10 years, from a low of 0.20; in Zimbabwe because the index also doubled over 9 years, although it was still modest, at 0.21, in 2014; and in Tanzania because of the volatility and high level of the index.

Consistency of Teacher Allocation with Enrollments across Secondary Schools

The available data are even sparser for secondary education. Fortunately, several of the countries overlap with the sample for primary education, permitting comparisons across levels of education; for a few countries, the results pertain to multiple years (figure 4.11).

Countries with good results in secondary teacher allocation The randomness indexes for Kenya and Zimbabwe (Group 1) of 0.16 and 0.07, respectively, reflect well

Figure 4.11 Indexes of Randomness in Teacher Allocation across Secondary Schools in Selected Sub-Saharan African Countries, by Group and Baseline Challenge Category, 2006–16



Source: Analysis of education information management system (EMIS) data for public sector schools.
Note: See the text regarding computation of the randomness index. Countries are grouped in the four groups used throughout this report (see chapter 1 or figure 4.2). To save space, only countries in Groups 1 and 3 are shown; in Group 2, only Tanzania had data, and in Group 4, no country had data. For Tanzania, the index of randomness in 2016 is estimated to be 0.28 and 0.47, respectively, for the regression models with and without regional dummies. In each panel, the vertical axis measures the randomness index, and the horizontal axis shows the year of the data. Each dot represents an estimate of the randomness index; country names followed by an asterisk designate "fixed-effect" indexes (that is, those computed with dummy variables in the regression equation). Pale dots denote countries with single-year estimates; dark dots, countries with multiyear estimates. A solid line links indexes that are estimated using regressions without district dummy variables; a dotted line links estimates that are based on regression with district dummy variables. Countries were categorized based on the number of challenges faced in the early to mid-1990s into baseline education challenge categories—"few," "some," or "many"—as detailed in chapter 1. The seven challenges areas were large total population, rapid growth of the school-age population, low or stagnant growth of GDP per capita, high income inequality, high poverty levels, high linguistic diversity, and frequent incidence of conflict.

on these countries' systems for managing the allocation of secondary school teachers. In both countries, the inconsistency between districts is largely absent, which perhaps is a result of the application of criteria-based allocation arrangements across districts. The randomness index is also lower than at the primary level. This result is remarkable because secondary education typically requires more specialized teachers to deliver the curriculum, which makes it harder to manage teacher allocation.

Zimbabwe's results are especially noteworthy: its exceptionally low randomness index, at just 0.07, makes it a case study for further research. One other country—Côte d'Ivoire (Group 3)—is arguably also a good performer, albeit not in the same space as Kenya and Zimbabwe. Its index is modest, at 0.23, and in the fixed-effects model, the index shrinks to 0.16.

Countries with relatively poor results in secondary teacher allocation Countries in the sample face different challenges. In three countries—the Democratic Republic of Congo, Mauritius, and Mozambique—the randomness index rose over time, signifying increasing inconsistency in teacher allocation. The increase in Mauritius was steeper than in the other two countries; the index is also much higher than at the primary level in that country.

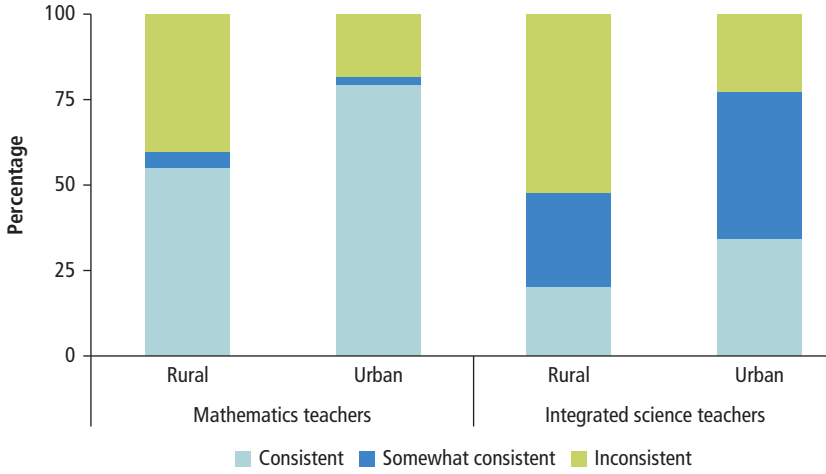
In Tanzania (Group 2)[24] and Mozambique (Group 3), the gap is relatively large between the fixed-effects and non-fixed-effects indexes, signifying inconsistent decision making regarding teacher allocation both across and within districts. In The Gambia, the index shows no clear pattern of shrinking over time; and the index for 2015, the latest year for which data are available, is relatively high, at 0.39, far above the 0.12 for primary education.

The Effect of Subject Specialization on Consistency of Teacher Allocation across Schools

Specialized curricula create staffing difficulties, particularly for small schools, if specialist teachers are required to deliver the intended curricula. This issue is less problematic in primary education, where teachers are typically expected to teach most subjects. This does not mean that teachers feel adequate to deliver their lessons across all subject areas; in the 2007 SACMEQ III survey (which sampled primary schools only), for example, significant shares of the teachers reported that they were untrained to teach mathematics, science, and social studies in such countries as Eswatini, Namibia, South Africa (Group 1); Tanzania (Group 2); and Mozambique (Group 3).

In secondary education, mismatches between training and teaching assignment pose a greater problem. The depth of material to be taught makes it difficult to avoid specialization in the design of the curriculum. Often, schools accommodate the lack of specialist teachers by assigning the teachers they have on hand to teach, even if they have no background in the subject. The extent of the problem across Sub-Saharan African countries is unclear, however. If Zimbabwe's experience is any guide, mismatches are significant, especially in rural schools and in science subjects (figure 4.12). Better wages and working

Figure 4.12 Relationship of Secondary Teachers' Field of Training to Mathematics and Science Teaching Assignments, by Location Type, in Zimbabwe, 2014



Source: Nguyen 2016.

conditions in other countries—many of which also experience shortages of mathematics and science teachers—fuel migration of specialized teachers and exacerbate the problem (Mulkeen et al. 2007; Ndlovu, Phiri, and Mutale 2014; Sinyolo 2007).

Teacher Absenteeism from School and from Class

An even greater challenge for education administrators is to ensure that teachers are present and teaching in schools. This is especially difficult given the remoteness of many schools, the difficulties of transportation, and the isolation of teachers. Surveys in 21 countries between 2004 and 2011 estimated absenteeism of 10–30 percent among primary school teachers (Patrinos 2013). The loss of work time not only exacts an economic cost,[25] but perhaps more important, also reduces student learning. In Zambia, for example, a 5 percent increase in teacher absences reduces student test scores by an estimated 4–8 percent (Das et al. 2007).

This section documents the prevalence of teacher absenteeism in nine Sub-Saharan African countries, drawing on the World Bank's SDI surveys between 2010 and 2016.[26] It updates earlier work, such as that by Hungi and Thuku (2010), who reported absenteeism rates exceeding 16 percent in such countries as Malawi, Zambia, Zanzibar, and Zimbabwe.[27] The discussion below examines absenteeism at two levels of detail—absence from school and absence from class—to shed light on the locus of the problem. It briefly documents the reasons for teacher absenteeism,[28] assesses differences across

types of schools and teachers, and uses regression analysis to examine the correlates of absenteeism.

Teacher Absenteeism Rates in Primary Schools

Among the nine countries in the SDI surveyed between 2010 and 2016, absenteeism from school among primary school teachers ranged from an average of just 5 percent in Ethiopia to 43 percent in Mozambique (table 4.4). Scattered data from 2000–05—available for all but Ethiopia, Mozambique, and Togo—suggest that absenteeism has declined in Kenya, Senegal, and Tanzania; increased significantly in both Madagascar and Nigeria; and stagnated at an elevated level in Uganda.[29]

The rates of teacher absenteeism from class in all nine countries in the SDI surveys exceed the corresponding rates of absenteeism from school—by at least 20 percent and as much as 300–400 percent. The difference implies that in many countries, teachers may be reporting to school for work but are in fact not teaching in their classes. Even in Ethiopia, where teacher absenteeism from school is just 5 percent, the class absence rate averaged 22 percent, slightly higher than in Nigeria, which had the lowest rate, at 19 percent.

Table 4.4 also highlights differences in absenteeism by school location and type of teacher contract.[30] In Nigeria, Senegal, and Tanzania, absenteeism rates are similar in urban and rural schools, but in Mozambique, Togo, and Uganda, they are

Table 4.4 School Absenteeism Rates among Primary School Teachers in Selected Sub-Saharan African Countries, by Work Venue, Location Type, and Contract Type, Early to Mid-2010s

		Work venue		School location		Teacher's contract[b]	
Country[a]	Year	School	Class	Urban	Rural	Public	Private
Kenya	2013	0.15	0.43	0.13	0.16	0.17	0.13
Tanzania	2014	0.15	0.47	0.15	0.15	0.15	—
Togo	2013	0.21	0.36	0.12	0.25	0.24	0.15
Uganda	2013	0.24	0.53	0.16	0.28	0.27	0.14
Ethiopia	2014	0.05	0.22	0.05	0.05	0.05	0.00
Madagascar	2016	0.35	0.42	0.31	0.36	0.40	0.15
Mozambique	2014	0.43	0.55	0.31	0.46	0.4	—
Nigeria	2014	0.14	0.19	0.13	0.14	0.17	0.05
Senegal	2010	0.18	0.29	0.19	0.18	0.21	—

Source: Analysis of World Bank Service Delivery Indicators (SDI) surveys.
Note: — = not available. The data come from the second of two visits to the sample schools which, unlike the first visit, was unannounced.
a. Countries are listed in order of the country groups to which they are assigned throughout this study: Kenya (Group 1); Tanzania, Togo, and Uganda (Group 2); Ethiopia, Madagascar, Mozambique, and Nigeria (Group 3); and Senegal (Group 4). For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
b. Teachers on public contracts exclude those in public schools who are hired on school- or community-based contracts. Teachers on private contracts include only those working in nongovernment schools.

significantly higher in rural schools. The inaccessibility of rural schools may be a factor, but it is unclear why the problem is more serious in the latter three countries.

As for teachers' employment contracts, comparisons are possible only for countries where nongovernment teachers are well represented in the sample.[31] Teachers on government contracts are more likely to be absent than those on private contracts, a pattern consistent with the possibility that the latter teachers—most of them employed in private schools—are monitored more closely and thus face stronger incentives to be present at school.[32] The gaps are modest in Ethiopia and Kenya, but grow to significant margins in Togo and Uganda (Group 2) and in Madagascar and Nigeria (Group 3).

Reasons for and the Impact of Teacher Absenteeism

The SDI surveys gathered information on why teachers were absent on the day the enumerators visited the sample schools.[33] In most of the countries, teachers were absent from school for legitimate reasons: approved leave, illness or childbirth, and training-related activities (figure 4.13, panel a). Senegal is unique among the sample countries in that a sizable share of the teachers—almost 20 percent—were absent because they had gone to retrieve their salaries.

Unauthorized leave or unknown reasons were also important in some countries, accounting for between a quarter and a third of the reasons cited in Mozambique and Uganda, and for over 40 percent in Togo (because of a strike).

Figure 4.13 **Reasons for Teacher Absence from School and Incidence of "Orphaned" Classrooms in Selected Sub-Saharan African Countries, by Group, Mid-2010s**

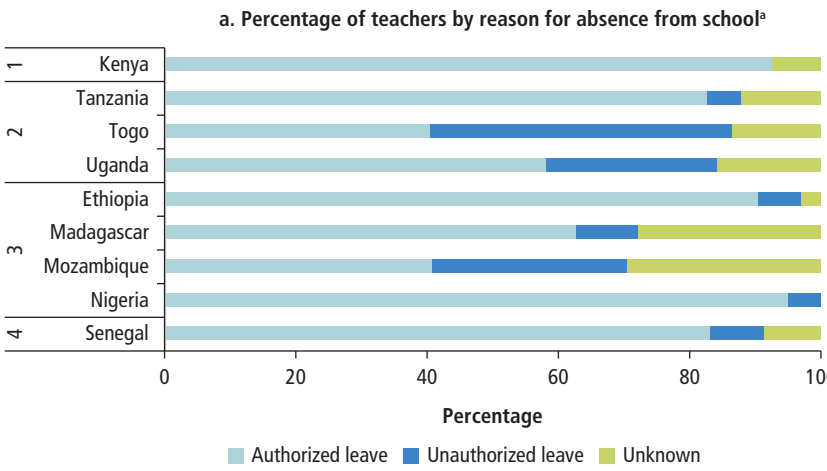


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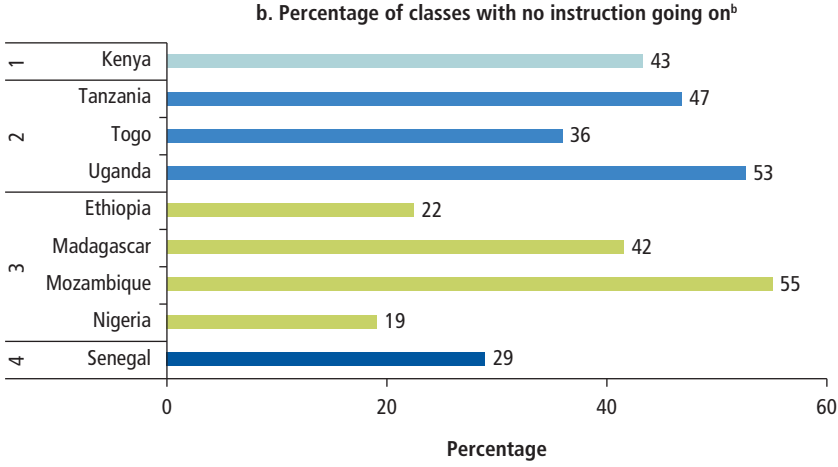
Figure 4.13 (continued)



Source: Analysis of SDI country datasets from 2014–16.
Note: Analysis is based on SDI data gathered on the second of two visits to the sampled schools which, unlike the first visit, was unannounced. For year of survey in each country, see table 4.4. Numbers in the left column of each panel indicate country Groups 1-4; for definitions of these groups, see chapter 1 or figure 4.2.
a. "Authorized leave" includes approved absence, training or field trip, sickness, maternity leave, or salary retrieval.
b. No instruction is going on for lack of a teacher, not because a teacher is in the class but not teaching.

These patterns point to a potential for reducing absenteeism by eliminating unauthorized leave or absences for which no reason is provided as well as by improving the scheduling of training activities and limiting approved leaves when school is in session.

Teacher absenteeism reduces instructional time for students in the absence of arrangements for substitute teaching. The SACMEQ surveys list possible measures to manage teacher absences of a week or longer and asked school heads to indicate how much they rely on each measure: "never," "sometimes," or "often." The four most prevalent measures—used "often"—were (a) assign another qualified teacher (37 percent, on average, for the sample countries); (b) send a qualified relief teacher (18 percent); (c) combine classes (17 percent); and (d) school head serves as the substitute teacher (14 percent). The picture appears to be one of making do with available personnel.

Yet, as indicated above, even when teachers are present in school and presumably able to step in for absent colleagues, they may skip class. The combined impact is a high prevalence of "orphaned" classes, where students are gathered with no teacher in class to provide instruction. Such classes account for an

astounding 55 percent of the classes surveyed in Mozambique and for no less than 19 percent of those in Nigeria (figure 4.13, panel b).

Between teacher absenteeism and orphaned classes, Molina and Martin (2015) estimate a loss of 30–60 percent of instructional time in Tanzania, Kenya, Madagascar, Mozambique, and Uganda. Combined with likely absences among students, these patterns highlight a fundamental weakness in teacher management at the school level. The significant loss of instructional time is a critical impediment to learning, regardless of conditions in the classroom and level of teacher knowledge (Abadzi 2006).

Summary and Policy Implications of Teacher Deployment and Presence

Systems that are small (those with relatively few schools) or mature (those with high levels of coverage sustained over many years) are generally more successful in ensuring that schools are staffed according to the size of their enrollments. In larger systems or in systems that are still growing, however, adherence to norm-based staffing allocations tends to weaken as the locus of decision making cascades to lower levels of administration.

Although some Sub-Saharan African countries have managed to improve the consistency of staffing decisions over time, the opposite trend also appears occasionally, suggesting possible difficulties in institutionalizing norm-based staffing procedures at all levels of decision making. Teacher absenteeism compounds the challenges of inconsistencies in staffing. Teachers not reporting for work at school is a problem, but more troublesome is the prevalence of teachers not turning up in class to teach even when they are present at school, and the consequent loss of instructional time.

Because teacher deployment and teacher work effort both involve the management of behaviors at multiple levels of decision making, the solutions to the problems highlighted above will inevitably require a combination of instruments. Better data are critical: in Madagascar in 2004, for example, the Ministry of Education used verified EMIS data to prioritize severely understaffed schools for the allocation of newly trained teachers, reducing the inconsistency of teacher allocation from 28 percent in 2004/05 to 19 percent in 2006/07 (Majgaard and Mingat 2012). Better data are often insufficient, however; Malawi's example (discussed in chapter 6, box 6.3) highlights the many stakeholders—ministry staff, elected officials, and village leaders—that exert influence over teacher allocation and assignments, undermining norm-based decisions. Stakeholder consultations based on uncontested data, agreed-on criteria, and appropriate incentives are thus often also essential for improving the deployment of teachers across schools.

As for teacher attendance at work, the school head is the critical link, but his or her authority to sanction absent teachers may be limited, for example, by systemwide rules governing authorized leave (for example, scheduling of

training or teachers' need to travel to collect pay), or by weak community involvement in the life of the school.

Teaching and Learning in the Classroom

A teacher's presence in the classroom is necessary but insufficient to foster student learning. Also critical are students' readiness to learn, the teacher's professional competence in delivering the lessons, and the conduciveness of the teaching and learning environment. We focus below on the latter two sets of variables.[34] Professional competence is understood here to encompass the teacher's knowledge of content and of pedagogy as well as practical teaching skills. On the conduciveness of the teaching environment, the key dimensions considered here are access to material resources (such as water, electricity, and learning materials) and the security and orderliness of the school environment (the "school climate")—variables that consistently affect learning outcomes.

The insights presented in this section are based on cross-country data from a variety of sources:[35]

- SACMEQ III surveys completed between 2006 and 2011 in 15 anglophone African countries
- PASEC 2014 surveys in 14 francophone African countries
- SDI surveys conducted in 9 Sub-Saharan countries as of this writing
- The 2008 Teacher Education and Development Study in Mathematics (TEDS-M) in Botswana, the only Sub-Saharan African country among the 17 participating countries
- The Skills Toward Employment and Productivity (STEP) surveys conducted during 2012–13 in Ghana and Kenya, the only Sub-Saharan African countries among the 12 participating countries to date

Teachers' Content Knowledge

Content (or subject matter) knowledge refers to the body of knowledge and information that teachers teach and that students are expected to learn in a subject area to progress in their education. It is defined by the official curriculum for the subject. Below, we consider evidence on teachers' content knowledge from four sources: SACMEQ III, SDI, STEP, and TEDS-M.

Evidence from SACMEQ III

SACMEQ III is the most recent available source of cross-country data on teachers' content knowledge.[36] Teachers of grade six students in the sample schools in 14 Sub-Saharan African countries were tested on a subset of the mathematics and reading items in the tests administered to their students.[37]

In reading, most teachers have the minimum content knowledge to teach (for the definition of the thresholds, see box 4.3). In mathematics, however, more than 10 percent of the teachers in four education systems—Malawi, South Africa, Zambia, and Zanzibar—fall below the minimum threshold of cognitive competence for teaching (figure 4.14). Among these countries, Zanzibar is an extreme outlier,

BOX 4.3

Definitions of Minimum Content Knowledge for Teachers

The Southern Africa Consortium for Monitoring Education Quality (SACMEQ) surveys define eight levels of cognitive achievement, setting Level 6 as the minimum threshold for a competent teacher. This level appears to be the equivalent of Level 3 on the World Bank's Skills Toward Employability and Productivity (STEP) adult literacy assessment, which scales the scores to the measure of cognitive ability used in the Programme for the International Assessment of Adult Competencies (PIAAC) surveys conducted by the Organisation for Economic Co-operation and Development (OECD).

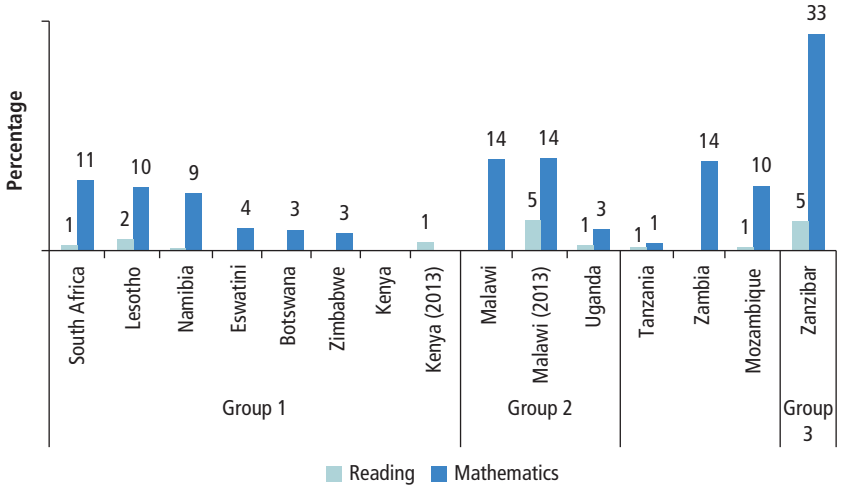
SACMEQ Level 6 (Inferential Reading): At this level of competency, a teacher is able to read through longer texts (narrative, document, or expository) and combine information from various parts of the text to infer the writer's purpose. To elaborate, the teacher is able to (a) interpret, and make inferences from, different types of texts by reading backward and forward to confirm links between widely separated information pieces; (b) extract information from a nontraditional (left to right) document; and (c) make judgments about an author's intentions or purpose beyond the text content.

SACMEQ Level 6 (Mathematically Skilled): At this level of competency, a teacher has the skills to (a) solve multiple-operation problems using the correct order of arithmetic operations involving fractions, ratios, and decimals; (b) translate verbal and graphic representation information into symbolic, algebraic, and equation form to solve a given mathematical problem; and (c) check and estimate answers using knowledge not provided with the problem. In other words, the teacher is able to perform complex and detailed mathematical tasks; use verbal or graphic prompts to identify the correct sequence of calculations; and convert, and operate on, units of measurement (time, distance, and weight).

STEP Literacy Level 3: At this level of competence, an adult is able to understand and use texts that are dense or lengthy, including those that appear as continuous, noncontinuous, or mixed formats or on multiple pages. Tasks require the survey respondent to identify, interpret, or evaluate one or more pieces of information and often require varying levels of inferencing. Many tasks require the respondent to construct meaning across larger chunks of text or perform multistep operations to identify and formulate responses. Often, tasks also demand that the respondent disregard irrelevant or inappropriate text content to answer accurately. Competing information is often present, but it is not more prominent than the correct information.

Sources: SACMEQ and STEP methodological guidelines.
Note: For additional details, see online appendix D.4, tables D.4.1 and D.4.2.

Figure 4.14 Percentage of Grade Six Teachers Lacking Minimum Competency in Reading and Mathematics, SACMEQ Countries, Latest Available Data



Source: Varly (2016) based on analysis of SACMEQ III (2007) data; SACMEQ IV (2013) data for Kenya and Malawi.
Note: Figure shows the percentage of teachers scoring below the minimum levels of competency in reading and mathematics. For definitions of these minimum competency levels, see box 4.3. SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. In some countries, less than 0.5 percent of the teachers scored below the minimum level of competency; in such cases, no bar for the relevant subject appears in the figure for the country. Mauritius, a country that participates in SACMEQ assessments, is excluded because the teacher tests were not administered there. For definitions of minimum knowledge levels in reading and mathematics, see box 4.3.

with an astonishing 33 percent of the teachers scoring below the minimum level; disappointingly, the latest data for 2013 show that the share has risen to 50 percent.

Teacher content knowledge improved in all SACMEQ countries between 2000 and 2007, with gains averaging about 0.5 standard deviation (Makuwa 2011). Bethell (2016) cautions, however, that the SACMEQ scores show only that most teachers have mastered the curriculum. Students' generally low test scores in the SACMEQ countries suggest that most teachers in these countries lack the deep knowledge required to impart true understanding to their students, particularly in mathematics.

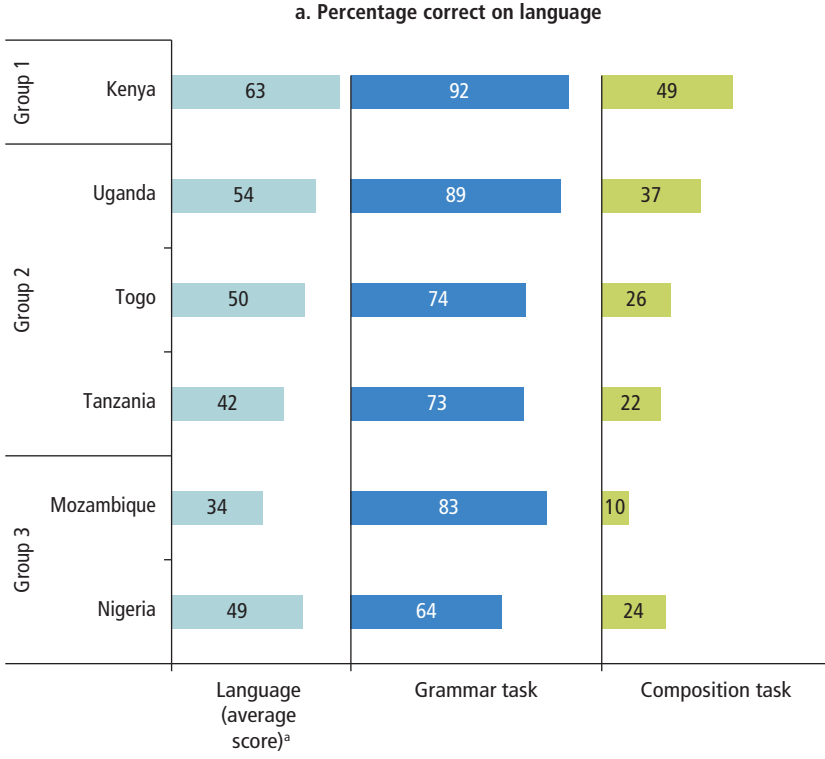
Bietenbeck, Piopiunik, and Wiederhold (2017) estimate, on the basis of the SACMEQ data, that (a) an increase of 1 standard deviation in teacher subject knowledge raises student performance by 0.03 standard deviation and (b) textbooks have a positive impact only for students taught by the higher-scoring teachers. In countries where teaching in a European language is official policy, Sub-Saharan Africa's teachers face additional challenges (as chapter 3 discusses in detail).

Evidence from SDI Surveys

Unlike the SACMEQ surveys, the SDI surveys rely on expert opinion to define the minimum threshold of 80 percent correct on both the language and mathematics tests administered to the teachers; they provide no information, however, on what this threshold means in terms of teachers' specific content knowledge.[38] Varly (2016) attempted to express the SDI results on the SACMEQ scale using the bookmark method;[39] unfortunately, the test items proved too dissimilar to be linked across the two surveys. Nonetheless, the SDI results are noteworthy.

According to data for six of the countries surveyed, grade four teachers answered only about half the questions correctly on both the language and mathematics tests administered to them (figure 4.15); and only 16 percent of the teachers reached the minimum level of competence.[40] These results are much more pessimistic than those based on the SACMEQ III surveys. In Mozambique, for example, the SDI data

Figure 4.15 **Average Grade Four Teacher Scores on SDI Assessments in Selected Sub-Saharan African Countries, by Group, 2012–16**



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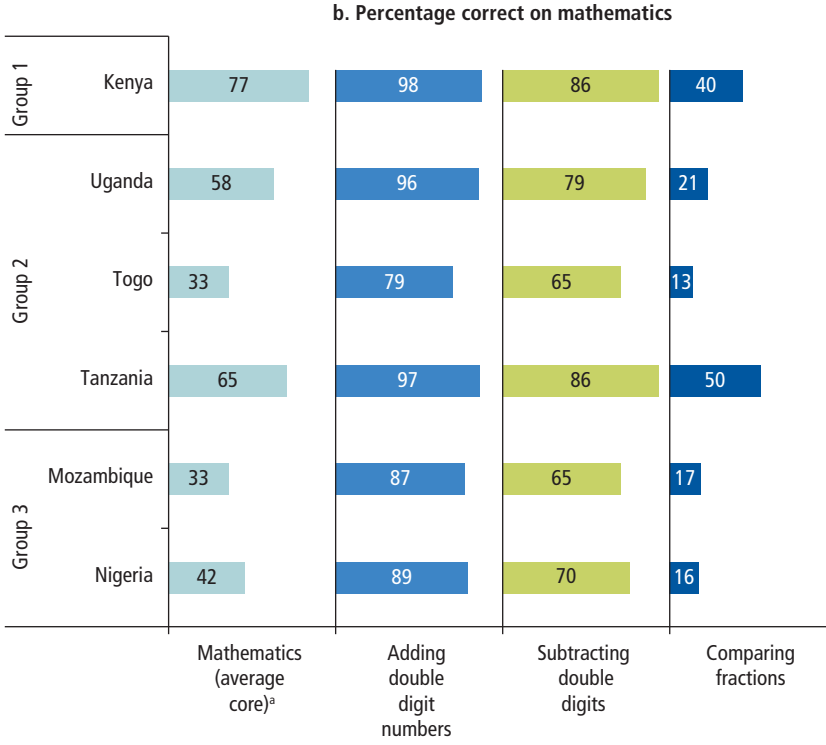


Source: Constructed from data in Molina and Martin 2015.
Note: SDI = Service Delivery Indicators. Data for Nigeria represent only the four states participating in the survey: Anambra, Bauchi, Ekiti, and Niger. For the SDI survey year in each country, see table 4.4. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
a. The share of grade four teachers who scored 80 percent on both the mathematics and language tests administered to them, as follows: Kenya (39 percent), Uganda (19 percent), Togo (3 percent), Tanzania (21 percent), Mozambique (1 percent), and Nigeria (4 percent), for an average of 16 percent for these six countries (Molina and Martin 2015).

show just 1 percent of the teachers reaching the minimum threshold of competence, while the SACMEQ data suggest that 99.4 percent reached the minimum level in reading and 90.1 percent in mathematics. The yardsticks used in the SDI and SACMEQ surveys clearly differ significantly. They converge, however, in the ranking of teachers' content knowledge by country: both surveys put Kenyan teachers ahead of their peers in Mozambique, Tanzania, and Uganda.

The SDI surveys reveal teachers' content knowledge by domain. Composition items in the language test pose a particular challenge: an average of only 32 percent gave correct responses. In mathematics, teachers generally score well on adding two-digit numbers, although an average of 8 percent of them still

get these test items wrong. The share of teachers with correct answers drops to an average of 77 percent for two-digit subtraction (which are rated in difficulty as grade two or grade three level items), and it falls further (to 54 percent and 28 percent, respectively) for items involving subtraction of numbers with decimal points and comparison of fractions. As in SACMEQ, Kenyan teachers outperform their peers in other SDI countries, while Mozambican teachers obtain the lowest scores; unlike SACMEQ, however, scores on the mathematics items are not always lower than the scores for reading.

Evidence from the STEP Surveys

The STEP surveys tested randomly selected urban adults ages 15–64 using items that allow benchmarking of the respondents' cognitive achievement against the scale used in the OECD's Programme for the International Assessment of Adult Competencies (PIAAC). Although not specifically designed to survey teachers, the samples typically include a small number of teachers. These data thus provide some useful insights, albeit based on a limited sample (which implies large standard errors in the estimates). For the two Sub-Saharan African countries that participated in the STEP surveys—Ghana and Kenya—two questions are particularly pertinent: What is the distribution of teachers' cognitive ability on the PIAAC scale?[41] And how do teachers compare with other workers in cognitive skill within each country?

Teachers' cognitive test scores The relevant data for the first question appear in table 4.5. In Ghana, only 20 percent and 36 percent, respectively, of the primary and secondary school teachers score at Level 3 or higher—this minimum threshold being, in our judgment, the equivalent of SACMEQ Level 6. These percentages are alarmingly modest, especially when considering that 89 percent of secondary school teachers have a tertiary education and that the STEP tests were administrated in local languages. Among primary school teachers, nearly a third of them score at Level 1 or lower—far below the minimum required for competent teaching. At both levels, about half the teachers are concentrated at Level 2.

In Kenya, the data do not allow a distinction between primary and secondary school teachers. They nonetheless paint a similar situation to Ghana's: only 28 percent of the teachers score at Level 3 or above (which is comparable to the share in Ghana for the combined samples of primary and secondary school teachers), and 10 percent of the teachers score below Level 1.

The results for Kenya are interesting because of the country's participation in the SACMEQ, SDI, and STEP surveys. Although the SACMEQ and SDI data yield dramatically different results, the SDI and STEP data are consistent. The SDI data show that an estimated 35 percent of Kenyan teachers possess the minimum content knowledge to teach, which is comparable to the 28 percent based on the STEP data. These results argue for refining the measurement of teacher content knowledge in future efforts to gather data on this issue.[42]

Table 4.5 Percentage Distribution of Teachers by PIAAC Proficiency Levels, Ghana and Kenya

	Ghana, 2012				Kenya, 2013	
	Primary teachers		Secondary teachers		All teachers[a]	
Proficiency level	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Below Level 1	8.0	4.3	1.7	3.1	10.2	4.0
Level 1	24.1	6.8	13.5	8.9	21.2	5.5
Level 2	47.6	9.4	48.6	11.1	40.1	7.2
Level 3[b]	19.7	7.2	34.5	9.7	22.9	6.3
Level 4 or 5	0.6	1.3	1.7	2.6	5.5	4.4
Total	100		100		100	
Number of observations	74		49		87	

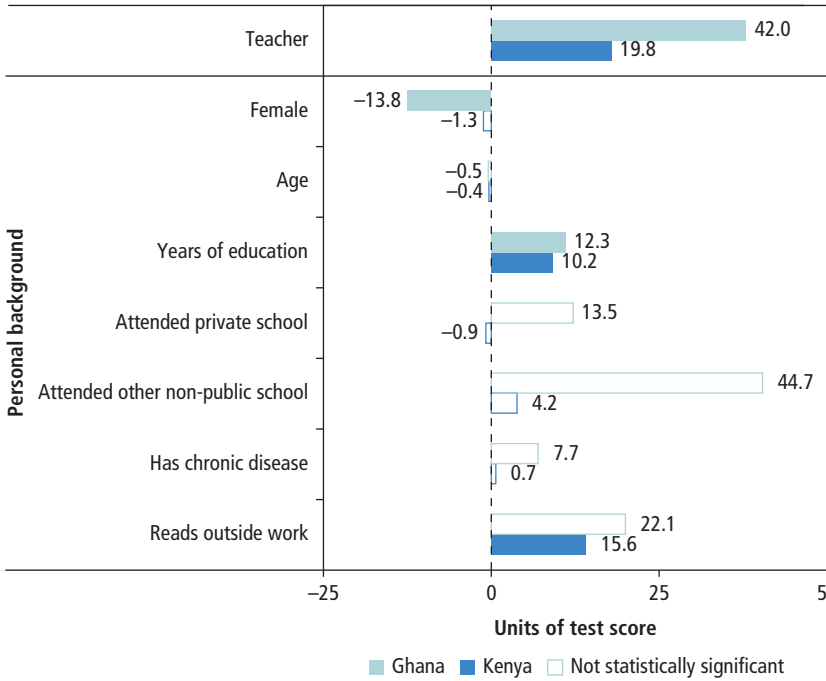
Source: Varly 2016, based on analysis of data from the STEP surveys in Ghana and Kenya.
Note: PIAAC = Programme for the International Assessment of Adult Competencies; SACMEQ = Southern and Eastern Africa Consortium for Monitoring Educational Quality; STEP = Skills Toward Employment and Productivity.
a. Excludes university faculty.
b. Equivalent in definition to Level 6 in SACMEQ III and thus the minimum level of competency for a teacher.

Cognitive skills of teachers relative to other service sector workers We use regression analysis to compare teachers' cognitive skills with those of other service sector workers.[43] The dependent variable is the score on the SDI literacy test, measured on the PIAAC scale, and the independent variables are whether or not the respondent is a teacher and a vector of personal background variables: age, gender, years of education, type of school attended (as a proxy for socioeconomic status of origin), chronic disease (as a proxy for health status), and reading habits outside of work.

The results show that all else being the same, Ghanaian teachers' literacy scores are 42.0 points higher than those of other service workers; the difference between primary and secondary teachers' scores is not significant (figure 4.16). In Kenya, teachers score 19.8 points higher, all else being the same. The higher scores of teachers may reflect selection bias or the impact of other plausible explanations, such as the following:

- Teachers are recruited among individuals with better skills.
- Teachers have improved their cognitive abilities over time (but had equal or lower cognitive skills than other workers at the time of their recruitment).
- Teachers are more practiced in reading (in and out of school) than other workers.[44]
- Teachers are more familiar with literacy tests than other workers.

Figure 4.16 Regression Analysis of the Literacy Scores of Teachers and Other Service Sector Workers in Ghana and Kenya, 2013



Source: Analysis of Skills Toward Employment and Productivity (STEP) survey data for adults aged 15–64 years in Ghana and Kenya.
Note: Bars in this figure correspond to the regression coefficient estimates (in units of test score point on the STEP scale), the top bar in each pair for the relevant regression variable showing the estimate for Ghana and the bottom bar, for Kenya; solid-colored bars denote statistical significance at the 95 percent confidence level or higher, while blank ones denote lack of statistical significance. For categorical variables, the size of the bars denotes the difference in test score between the group identified by the regression variable and the omitted category, all else being the same; for example, teachers in Ghana score 42.0 points higher than their service sector peers, controlling for gender, age, years of education, type of school attended, health, and reading habits. The omitted categories for each of the categorical variables are identified in online appendix D.5, table 5.1; the full regression results are also shown in this appendix table. Details of the STEP surveys can be found at http://microdata.worldbank.org/index.php/catalog/step/about.

Evidence from Admission Examinations for Tertiary Education in Kenya

Admission to teacher training and other programs in Kenya's tertiary institutions depends largely on results on the Kenya Certificate of Secondary Education (KCSE), a nationwide, curriculum-based examination administered by the Kenya National Examination Council (KNEC). The Kenya Universities and Colleges Central Placement Service (KUCCPS) determines applicants' course placements in public universities and colleges based on cutoff KCSE scores for admission to the various programs.[45]

The KNEC data enable assessment of the quality of future primary and secondary school teachers in Kenya. The available data pertain to the 2015 admission exercise; the dataset contains the KCSE scores of all students who sat for the examination but only the admission decisions for those admitted to the public tertiary institutions. About 12,000 and 85,000 candidates, respectively, were admitted to diploma-level and degree-level courses. About 17 percent of the new students were accepted into teacher training programs, 96 percent of them for degree-level courses, and 4 percent for diploma-level courses. The KCSE scores of those bound for degree-level teacher training programs (whose graduates qualify to teach in secondary schools) were generally higher, with grade point averages in the 51–84 range compared with the 32–77 range for those headed to diploma-level courses.

Regression analyses of the data show that among entrants to diploma-level courses, those admitted to teacher training scored higher on the KCSE than those admitted to other fields of study, by 5.6 grade points (or by about 10 percent)—an advantage that narrows by nearly 1 grade point among women admitted to such courses (table 4.6).[46] Among those admitted to degree-level courses, however, those placed in teacher training scored lower than those admitted to other programs, by 3.0 grade points (or by about 5 percent)—a shortfall that widens by 1.3 grade points among women admitted to such programs. The differences in scores are not large, however,

Table 4.6 Regression Analysis of Examination Scores of Students Admitted to Teacher Training Courses Relative to Courses in Other Fields, Kenya, 2015

	Diploma-level courses		Degree-level courses	
	(1)	(2)	(3)	(4)
Teacher training program	6.51***	5.57***	–2.46***	–2.96***
	(0.30)	(0.42)	(0.06)	(0.08)
Female	–2.81***	–2.92***	–2.24***	–2.45***
	(0.14)	(0.14)	(0.05)	(0.05)
Teacher training program x Female		1.95***		1.10***
		(0.60)		(0.12)
Constant	50.04***	50.10***	67.27***	67.36***
	(0.10)	(0.10)	(0.03)	(0.03)
Adjusted R^2	0.068	0.069	0.045	0.046
Number of observations	12,038	12,038	86,043	86,043

Source: Analysis of 2015 Kenya Certificate of Secondary Education (KCSE) results and admissions to public tertiary institutions.
Note: Standard errors are shown in parentheses.
Significance level: *** = 1 percent.

suggesting that teacher training programs in Kenya are still able to attract relatively well-qualified candidates from among the available pool of secondary school graduates.

Evidence from TEDS-M Survey on Prospective Teachers' Cognitive Knowledge

Botswana was the only Sub-Saharan African country among the 17 that participated in IEA's Teacher Education and Development Study in Mathematics (TEDS-M) project.[47] The survey administered tests of content and pedagogical knowledge in 2008 to future mathematics teachers at the end of their preservice training programs (as discussed further in box 4.4). These programs prepare the teachers for various teaching positions: as generalists or mathematics specialists in primary schools; as lower-secondary mathematics teachers; or as lower- *and* upper-secondary mathematics teachers. The survey also gathered data on each country's mechanisms for quality assurance, such as the assessment and accreditation of teacher education programs, the selection of candidates for such programs, and the certification of graduates who successfully complete the programs. The TEDS-M scale scores have a centerpoint of 500 and a standard deviation of 100; in addition, two levels of proficiency are reported (Tatto et al. 2012).

Two features in the cross-country TEDS-M data are noteworthy.[48] First, in countries with strong teacher-quality assurance mechanisms, as evaluated by the TEDS-M research team, prospective teachers scored higher on the tests of content knowledge—not a surprising result, as these countries also tended to have higher GDP per capita.[49] Botswana's quality assurance mechanisms were rated "moderately" strong, but its prospective mathematics teachers did not score quite as well as might have been expected. Second, the scores for content and pedagogical knowledge were closely related (with a regression R^2 value of 0.96), and the scores typically rose with educational attainment. In Botswana, however, the scores on content knowledge differed little among prospective teachers at the primary, lower-secondary, and upper-secondary levels; and the scores on pedagogical knowledge showed a counterintuitive pattern of decline with educational attainment.

To draw out the implications of the TEDS-M results, we relate them to the results on the 2011 Trends in International Mathematics and Science Study (TIMSS) for the sample of countries that participated in both studies (figure 4.17). Scores from the two surveys were highly correlated (with a regression R^2 of 0.73). Botswana's TEDS-M score exceeded those of Chile and Georgia (countries whose GDP per capita was higher by some 35–40 percent in 2016), but its TIMSS score was lower. The higher content knowledge of Botswana's prospective teachers is thus somehow not translating into better learning outcomes compared with the situation in Chile and Georgia.

BOX 4.4

Initial Training of Primary and Secondary Mathematics Teachers in Botswana: Findings from the TEDS-M Survey

Botswana has a classic mixed system of preservice teacher training: some teachers are prepared at the university, while others are enrolled in teacher training colleges without university status. To enroll, prospective primary teachers require a minimum qualification of the Botswana General Certificate of Secondary Education (BGCSE) with a credit in mathematics. For secondary teachers, all candidates for teacher education programs require a minimum of the BGCSE or an equivalent qualification. Prospective diploma-in-secondary-education students require an "A" grade in mathematics. A minimum of a first degree (with a lower second-class pass) is required for admission into the postgraduate diploma in education program at the University of Botswana. In recent years, concerns have been raised that mathematics teacher education programs are attracting weaker candidates, in that such programs tend to enroll students who did not qualify for the more demanding general bachelor of science programs (Garegae, Mzwinila, and Keitumetse 2008).

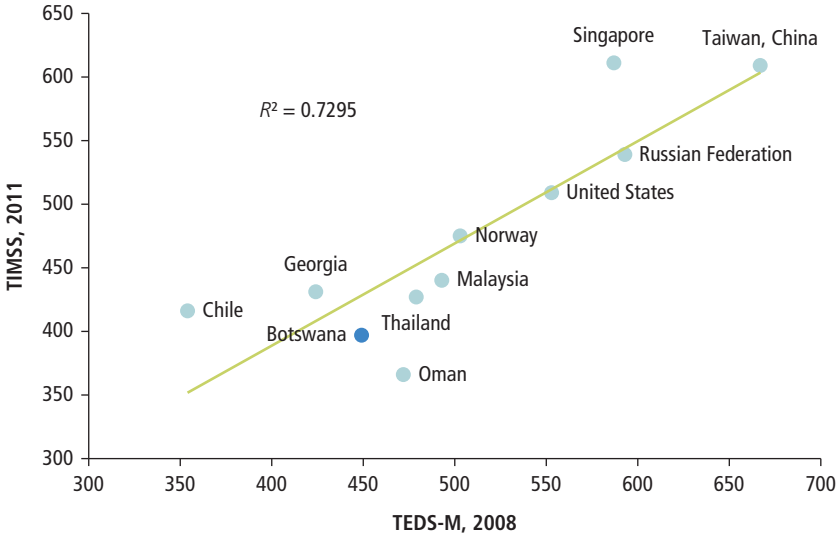
No test is administered at the end of preservice training to certify the new teachers, but the following qualifications are required for employment as a teacher: a diploma in primary education for primary school teachers, a diploma in secondary education or completion of training in the Colleges of Education for lower-secondary teachers, and a bachelor's degree in secondary education for upper-secondary school teachers. Primary teachers are expected to teach all subjects, but a new trend toward specialization is emerging in certain areas, such as primary education and mathematics or science.

Although Botswana is an upper-middle-income country, it faces the extraordinary challenges of low- to middle-income countries in general: heavy workloads, scarcity of teaching and learning resources, large class sizes, shortage of classrooms, and great diversity in student abilities and home languages. Also, because classes are overcrowded, with much heterogeneity in student achievement, teachers require extra time to provide needed remedial lessons. Teaching in junior secondary schools is complicated because most learners have limited fluency with English, the language of instruction for mathematics.

The national TEDS-M report for Botswana predicts that many of the new teachers will burn out, with adverse effects on the quality of the education system. Teachers tend to criticize teacher education institutions and their programs for not equipping them with the skills they need to manage mixed-ability and large classes. Moreover, for various reasons, the teaching profession in Botswana was once perceived more favorably than it is now, especially in terms of offering additional attractive incentives such as housing. Teachers tend to rely on teacher-centered methods of teaching, and the quality of their work, usually measured by student pass rates on external examinations, appears to have deteriorated.

Source: Ingvarson et al. 2013.

Figure 4.17 Relationship between 2008 TEDS-M and 2011 TIMSS Test Scores, Botswana and Other Selected Economies



Source: Varly 2016, based on data from Teacher Education and Development Study in Mathematics (TEDS-M) and Trends in International Mathematics and Science Study (TIMSS) reports.
Note: Grade eight students were tested in the 2011 TIMSS in all economies except Botswana, where grade nine students were tested.

This disconnection may have many causes, including the possibility that more of Botswana's prospective teachers take up nonteaching jobs after completing their preservice training, that conditions in its schools are less conducive environments to teachers' work, and so on.

More broadly, the relationship between the scores on the 2008 TEDS-M and 2011 TIMSS surveys is suggestive in its implications for teacher recruitment. Ghana, a middle-income Sub-Saharan African economy, did not take part in the TEDS-M survey but, like Botswana, took part in TIMSS 2011. It had the lowest TIMSS scores among the sample economies, with an average score of 331, almost 2 standard deviations below the international scale centerpoint (500). Based on the relationship between TIMSS and TEDS-M shown in figure 4.17, we can expect Ghana's TEDS-M score to be around 320, 2 standard deviations below the international scale centerpoint. Because test scores track GDP per capita closely (Hanushek and Woessmann 2012), most Sub-Saharan African economies (which tend to be poorer than either Botswana or Ghana) are likely to occupy the bottom part of the TEDS-M and TIMSS distributions of test scores, averaging well below the international scale centerpoint (probably 2 standard deviations away).

In most of Sub-Saharan Africa, the situation is thus ripe for a vicious cycle to develop: low cognitive attainment among prospective teachers hampers learning outcomes among their future students, which in turn makes it more difficult to improve the quality of the teacher recruitment pool in the coming decades.[50] Arresting this downward spiral poses many challenges and may call for minimum teacher recruitment standards—such as at least upper-secondary education for future primary school teachers—as part of the solution.

Adopting such a minimum standard as a practical rule of thumb (rather than testing all potential teacher recruits as a first filter) would make modest demands on the already-overstretched data collection and processing systems of most Sub-Saharan African countries. It also has a basis in Ross's (2009) estimate (cited in GPE 2012, 115) that a difference of 0.5 standard deviation in test scores is roughly equivalent of one year of schooling—implying that the gap in TEDS-M or TIMSS scores between Botswana and Ghana and higher-income nations effectively means a four-year schooling gap. Upper-secondary graduates in Sub-Saharan Africa, for example, would have roughly the same cognitive knowledge as those with a lower-secondary education in higher-income countries. This logic implies that for primary students in Sub-Saharan African countries to be taught by teachers with the same cognitive knowledge as teachers in higher-income nations, their teachers would need to have at least an upper-secondary education.

Like most rules of thumb, however, this minimum teacher recruitment standard must be adapted to the local context, taking into consideration such factors as its affordability and priority relative to other conditions required for schools to be conducive to teaching and learning. Importantly, if teachers' content knowledge and formal schooling are only weakly correlated, the rule of thumb for minimum teacher recruitment standards must be applied flexibly.

Teachers' Pedagogical Knowledge and Teaching Practice

Pedagogical knowledge pertains to a teacher's mastery of a particular subject as well as the most effective ways to teach it. It refers to the ability to (a) structure and represent academic content for direct instruction; (b) identify common conceptions, misconceptions, and difficulties encountered by students studying the subject; and (c) use appropriate methods to address students' specific learning challenges (Rowan et al. 2001).

Teaching practice refers to teacher actions that affect what happens in the classroom. Shulman (1986) highlights such skills as scheduling and planning lessons, managing classroom dynamics, using questioning techniques to engage students in learning, and so on. RTI International (2015) includes

additional dimensions, such as frequency of assessments and how they are used in instructional practice; sequencing of curricula; use of innovation in teaching; and teacher-specific attitudes and behaviors that shape teacher-student interactions.

These multifaceted aspects of teachers' pedagogical knowledge and professional practice are difficult to measure, and data are thus correspondingly scarce (Cohen and Goldhaber 2016). The SDI surveys conducted in various Sub-Saharan African countries from 2012 to 2016 are a rare exception; below, we present the available information from these surveys (Filmer, Molina, and Stacy 2016).

Teachers' Pedagogical Knowledge

The SDI surveys asked sample teachers to answer questions on pedagogical knowledge or to perform specific tasks (for example, prepare a lesson plan on a given topic using information provided for the task). The data were then scored to obtain an overall index of the teachers' pedagogical knowledge.

In the best-performing countries—Kenya and Tanzania—just slightly more than a third of the teachers answered the pedagogical questions correctly (figure 4.18). Although nearly 60 percent of Tanzanian teachers displayed knowledge of how to prepare lesson plans, less than 20 percent of Mozambican teachers did. Teachers who are able to assess students' abilities and academic progress—two essential areas of pedagogical knowledge—are a small minority among their colleagues; this share ranges from 6 percent to 33 percent across the sample countries.

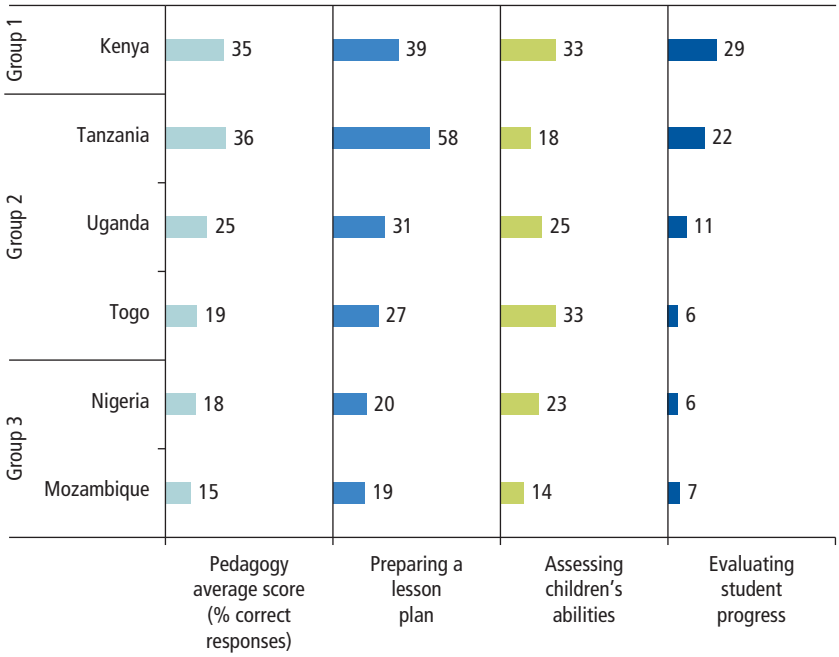
Scope of Teaching Practices and Skills

Managing interactions with students is at the heart of a teacher's classroom teaching practices.[51] The SDI survey enumerators collected information on such interactions using a standardized tool to observe teachers in the sampled classrooms during a specified period of time.

To assess the quality of these interactions, the findings of Westbrook et al. (2013)—based on extensive reviews of studies in low- and middle-income countries, many in Sub-Saharan Africa—are instructive: students fare better when taught by teachers who understand pedagogy primarily as a type of communication. Such teachers adapt their teaching to the profile and learning needs of their students; mobilize a variety of strategies to engage students (such as providing feedback, using local languages, posing open-ended questioning, and so on); and take steps to create conducive learning environments (for example, a safe and warm classroom atmosphere, student collaboration through group work, and so on).

Adapting from Darling-Hammond (2011), we create a four-level scale to characterize the quality of teacher-student interactions (figure 4.19,

Figure 4.18 Average Percentage of Correct Responses from Teachers on Test of Pedagogical Knowledge in SDI Countries, by Group, 2012–16

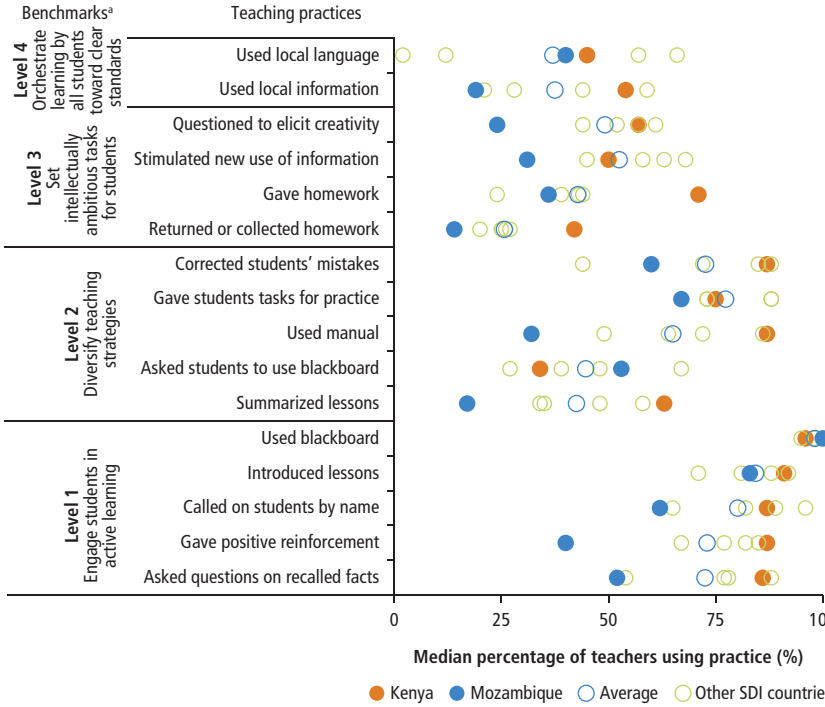


Source: Constructed from data in Molina and Martin 2015.
Note: SDI = Service Delivery Indicators. For definitions of country Groups 1–4, see chapter 1 or figure 4.2. For the SDI survey year in each country, see table 4.4.

"Benchmark" column).[52] Although not strictly linear, these levels correspond to teaching practices of increasing sophistication, intensity of effort, and probable impact.

The data from SDI surveys can be mapped to this four-level scale (figure 4.19, "Teaching practices" column).[53] The prevalence of each teaching practice in the SDI sample classrooms is shown as colored circles on the right-hand side. Two observations emerge from the data. First, most teachers in the SDI countries rely on Level 1 teaching practices: using the blackboard, introducing the lesson, and posing questions that require recall of memorized facts. Less common are Level 2 methods that require pedagogical skill or effort, such as summarizing the lesson and setting, collecting, or returning marked homework. Second, the variety of teaching practices thins out at Level 3 and Level 4 on the scale, and the share of teachers using any one of the practices listed also declines. Taken as

Figure 4.19 Quality-Teaching Benchmarks and Practices in Primary Schools, Selected Sub-Saharan African SDI Countries



Source: Constructed from SDI survey results.
Note: SDI = Service Delivery Indicators. The horizontal axis refers to the median percentage of sampled teachers observed by SDI survey enumerators during timed classroom visits using the teaching practice indicated in the middle column. In addition to Kenya and Mozambique, the "other SDI countries" included this figure (shown as gray circles) are Nigeria, Tanzania, Togo, and Uganda. For the SDI survey year in each country, see table 4.4.
a. Benchmarks, summarized by level ("1" being the lowest and "4" the highest), are adapted from Darling-Hammond (2011) and further described in endnote 51 of the chapter text.

a whole, the picture is one of diversity across countries as well as relative sparseness in teachers' repertoire of pedagogical practices relative to the benchmarks for good practice.[54]

The contrast between Kenya and Mozambique is instructive. In Kenya, where students scored higher on the SDI reading and mathematics tests than their peers in Mozambique, substantially more of the observed teachers gave their students homework and corrected and returned the homework; introduced and summarized their lessons; used the teacher manual (as did the students their textbooks); employed positive reinforcement

strategies; and gave students tasks to practice what was learned in the classroom. Regression analysis of the data for Mozambique, reported by Molina and Martin (2015), shows that some of these teachers' classroom practices mattered for student learning.

Initial Teacher Training and Continuing Professional Development

Preservice preparation and subsequent professional development are major avenues for equipping teachers with the knowledge and skills they require to do their work well. Most countries, therefore, require teachers to possess certain minimum paper qualifications. These thresholds provide a simple way to differentiate between qualified and unqualified teachers. Minimum qualifications say little, however, about the content, relevance, and impact of the training received by teachers. These latter dimensions are more important but also harder to define precisely for comparison across countries. The discussion below relies on the SACMEQ and PASEC surveys, which provide quantitative insights on some aspects of teacher preparation and development, as well as on ad hoc sources to enrich our understanding of the key issues for teacher preparation and development.

Official Minimum Qualifications for Primary and Secondary Teachers

The official minimum qualifications for civil service teaching positions in selected Sub-Saharan African countries appear in table 4.7. The minimum threshold is typically lower for primary than for secondary school teachers, with some noteworthy differences across countries. In Madagascar, Mozambique, and Uganda, for example, primary school teachers need only a lower-secondary education, followed by (in the latter two countries) up to two years of teacher training. By contrast, their peers in South Africa require a university degree. In Ghana and Nigeria, the minimum qualification for lower-secondary teachers is the same as for primary school teachers. In others, such as Mali and Kenya, the minimum is the same as for upper-secondary teachers—a university degree—while their peers in primary education require a lower qualification. In Benin and Niger, the minimum is also the same for teachers in both cycles of secondary education but is pitched at below a university degree.[55]

The reality on the ground often lags behind the official requirements, however, as countries relax entry requirements to cope with various constraints (Pontefract, Bonnet, and Vivekanandan 2013).[56] Figure 4.20 captures this reality for selected Sub-Saharan African countries. Although educational attainment may correlate weakly with teachers' subject matter mastery (Bonnet 2007), inadequate academic preparation can compromise the effectiveness of teacher training in equipping teachers with the skills they require for their jobs (see, for example, Duthilleul and Allen 2005). The academic profile of Sub-Saharan

Table 4.7 Official Minimum Qualifications for Civil Service Teaching Posts, by Level, in Selected Sub-Saharan African Countries, Early 2010s

Preservice education and training required	Level of teaching position		
	Primary school	Lower-secondary school	Upper-secondary school
Lower-secondary			
Plus no teacher training	Madagascar	None	None
Plus 1–2 years of teacher training	Mozambique; Uganda	None	None
Plus ≥ 3 years of teacher training	Congo, Dem. Rep.[a]	None	None
Upper-secondary			
Plus no teacher training	None	Madagascar	None
Plus 1–2 years of teacher training	Benin; Burkina Faso; Kenya; Malawi; Niger	Congo, Dem. Rep.	None
Plus ≥ 3 years of teacher training	Ghana; Mali; Nigeria	Benin; Ghana; Niger; Nigeria	Benin; Niger
University degree	South Africa	Kenya; Mali; South Africa	Congo, Dem. Rep.; Ghana; Kenya; Madagascar; Mali; Nigeria; South Africa; Uganda

Sources: Compiled from Kitchlu 2017a, 2017b; Nordstrum 2015; TISSA-Uganda 2014; UNESCO 2011; and World Bank resources.
a. Student teachers being prepared as primary school teachers in the Democratic Republic of Congo are tracked after two years of lower-secondary schooling into a four-year course in the Humanités Pédagogiques stream (Kitchlu 2017a).

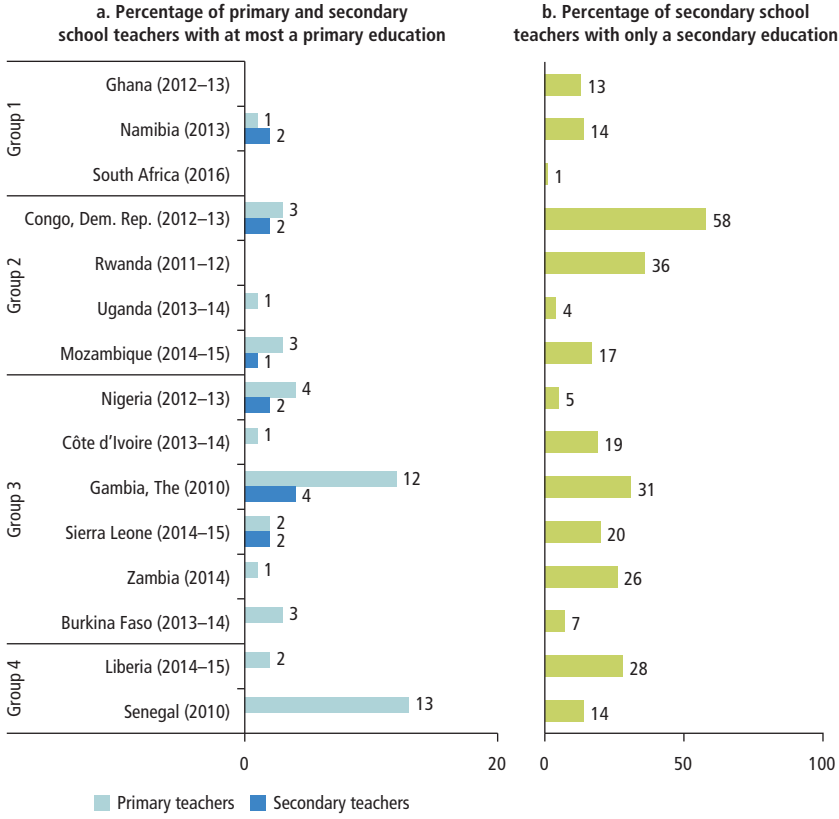
Africa's teachers shown in the figure provides highly relevant information to frame the discussion on preservice and in-service teacher training.

Pathways to Teacher Preparation and Development

In countries with mature systems of education, practically all new teachers go through an accredited preservice initial teacher education (ITE) program to gain the certification required to be hired as a schoolteacher.[57] Sub-Saharan African countries use this model of ITE to some extent but often also rely on in-service upgrading of unqualified or underqualified teachers.[58]

In the push to universalize primary education and expand opportunities in secondary education in the past 15 years, many countries have had to recruit large numbers of teachers rapidly, accepting as a stopgap measure even those lacking the minimum qualification required for their appointments, particularly those hired as contract teachers. In other countries where the initial rush to recruit has abated, governments have raised minimum conditions for teacher appointments, thus recategorizing as underqualified teachers who were previously qualified.

Figure 4.20 Percentage of Primary and Secondary Teachers Whose Own Attainment Does Not Exceed Their Teaching Level, Selected Sub-Saharan African Countries, by Group



Source: Analysis of country household and labor force survey data.
Note: For details of the survey data, see appendix D.2.

In-service upgrading programs provide a pathway for such teachers to meet the minimum qualifications, thus complementing the preservice programs (see box 4.5 for Ghana's example).[59] The qualifications earned through upgrading programs are often tied to tangible benefits, such as enabling successful completers to retain their teaching assignments, enhance their employment contracts (for example, conversion to a more permanent civil service position), or even help advance their careers (for example, teaching a higher, often better remunerated, grade, or moving to more desirable nonteaching jobs).

BOX 4.5

Pathways to Initial Teacher Qualification in Ghana

In 2015, the Diploma in Basic Education (DBE) replaced the Certificate "A" as the minimum qualification required to teach in the primary grades in Ghana. Prospective teachers enroll in three-year DBE programs in one of Ghana's 41 residential Colleges of Education (COEs), or through the Jackson Educational Complex, a private COE by distance learning affiliated with the University of Education, Winneba. Serving teachers with a Certificate "A" can upgrade to a DBE through two-year "sandwich" programs, while untrained teachers can obtain an Untrained Teacher's Diploma in Basic Education (UTDBE) through four-year "sandwich" programs (table B4.5.1).

UTDBE training is a key government initiative to improve teacher quality in Ghana's poorer, disadvantaged districts. It aims to improve teachers' pedagogical skills and also equip teachers to teach subjects at the primary and junior secondary levels. Between 2005 and 2010, some 30,000 untrained teachers had received the training (UNESCO 2012). In 2012, the government selected 8,000 young untrained teachers from poorer

Table B4.5.1 Pathways to Initial Teacher Qualifications in Basic Education in Ghana, circa 2013

Program type	Institutions involved	Duration (years)	Structure	Education or qualification	
				At entry	At exit
Preservice	COEs[a]	3	IN-IN-OUT[b] or distance	Upper-secondary	DBE
	UCC, UEW, CUCG, VVU	4	IN-IN-IN-OUT or IN-IN-IN-IN[b]	Upper-secondary	BEd
In-service upgrading	UCC through COEs	2	Sandwich[c]	Underqualified: Certificate "A"	DBE
	GES through COE	4	Sandwich[c]	Untrained	UTDBE[d]
	UCC, UEW	2	Sandwich[c]	DBE	Post-DBE Diploma

Source: Constructed from Asare and Nti (2014) and World Bank inputs.
Note: COE = College of Education; CUCG = Catholic University College of Ghana; DBE = Diploma in Basic Education; BEd = Bachelor of Education; GES = Ghana Education Service; UCC = University of Cape Coast; UEW = University of Education, Winneba; UTDBE = Untrained Teacher's Diploma of Basic Education; VVU = Valley View University.
a. Ghana has 41 COEs, 3 of them private; in addition, the Jackson Educational Complex, a private COE affiliated with UEW, offers courses by distance learning.
b. "IN-IN-OUT" refers to two years on campus and a one-year practicum. "IN-IN-IN-OUT" refers to three years on campus and a one-year practicum. "IN-IN-IN-IN" refers to four years on campus, with a semester-long practicum.
c. The "sandwich" structure involves self-study through distance learning and face-to-face training at COEs during the long school holidays.
d. UTDBE candidates who could not meet all requirements for the award exit the program after three years with a Certificate "A," a qualification being replaced by the DBE.

(continued next page)

Box 4.5 (continued)

districts in northern Ghana and financed their training under a Global Partnership for Education grant administered by the World Bank. Four years later, an impact evaluation showed the following (Namit 2017; Mikesell, Darvas, and Somji 2017):

- The UTDBE graduates' pedagogical skills (lesson planning and preparation, classroom methodology and delivery, class management and organization) were comparable to those of the graduates of the regular preservice program.
- The UTDBE program was 60 percent cheaper than the regular DBE program.
- The UTDBE graduates returned to their districts, thus helping to reduce the rich/poor gap in the share of untrained teachers. No assessment was available as of this writing on the impact of UTDBE on student learning.

For secondary education, the preservice pathways run through four-year programs, leading to bachelor's of education degrees conferred by various universities. The graduates can teach in basic schools (grades 1–9) and high schools (grades 10–12). Serving teachers already equipped with a DBE can upgrade to a post-DBE diploma through two-year programs run by the universities; the qualification is for teaching jobs in basic schools.

The legacy of ITE strategies to cope with the rapid increases in teacher recruitment appears in the profile of the current stock of teachers in Sub-Saharan African countries. Malawi, for example, has operated many models of teacher training over the past 30 years.[60] Primary teacher training was traditionally a two-year program—known as Initial Primary Teacher Education (IPTE)—in which trainees studied at the Teacher Training Centre for one year and practiced teaching in a school in the second year. In the 1990s, a three-year teacher training program—the Malawi Special Teacher Training Program (MASTEP)—was introduced, which combined distance training with short residential courses during the long school vacations. In 1997, the government created the Malawi Integrated In-Service Teacher Education Program (MIITEP) to upgrade untrained teachers through a program that combined residential training, self-study, and supervised teaching in primary schools.[61] Between 1997 and 2010, all training for teaching at the primary level in Malawi was offered through MIITEP. In 2010, the government reverted to IPTE for teacher training and also introduced an open and distance learning (ODL) program along the lines of MASTEP.

Malawi's various initiatives have had a predictable impact on the profile of the teacher workforce: EMIS data for 2013 show that 29 percent of its teachers had MASTEP training, 27 percent had MIITEP training, 17 percent were enrolled in in-service upgrading through the ODL course, and 27 percent were IPTE trainee

teachers. The disparities in training history raise potentially pertinent questions: Have the different types of training equipped teachers equally well for their work? And is the same type of posttraining support equally effective in helping the various cohorts of teachers grow their professional expertise?

ITE programs, whether preservice or in-service, lead to formal qualifications for teaching jobs. By contrast, continuing professional development (CPD) courses typically award only certificates of attendance (if at all) and are meant, in principle, for all teachers. Their goal is to enable teachers to keep abreast of developments in education and grow in their professional competence. They may take various forms:

- Workshops structured around specific objectives such as dissemination of important changes that affect teachers' work (for example, a new curriculum and related materials)
- Introduction of new programs, pedagogical methods, or technologies (for example, early-grade literacy or computer-assisted instruction)
- Personalized coaching, mentoring, in-class practice and support, and peer learning and professional networking (for example, conferences and meetings)—such activities possibly being well-structured and organized but also often being more idiosyncratic and ad hoc than in-service training provided to groups of teachers

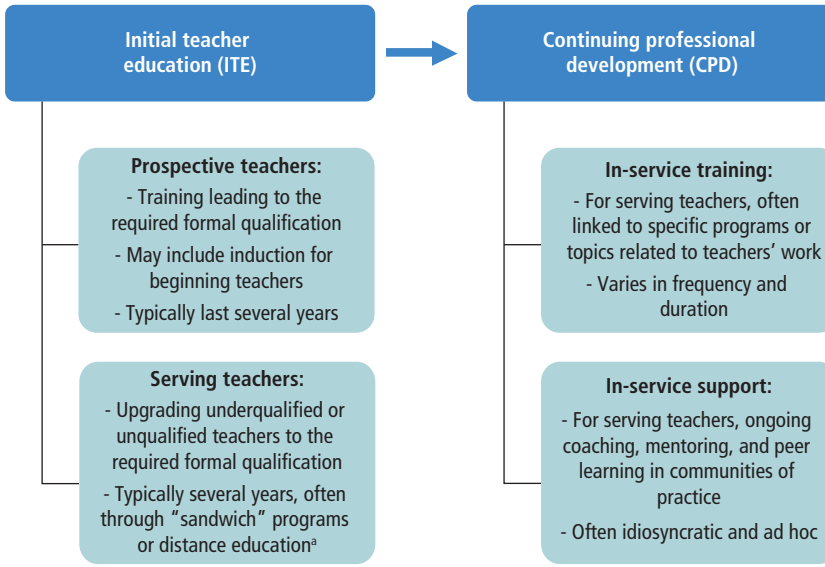
Figure 4.21 captures the structure of this complex landscape to help clarify discussions about teacher training programs in Sub-Saharan Africa. Although shown as separate pathways, ITE and CPD are best understood as parts of a continuum of interventions that must be adapted to the needs of teachers at different stages of their careers: beginning teachers will need coaching and mentoring in their first few years on the job, while more experienced teachers may need training in specific areas to gain mastery of their subject and deepen their professional competence.

Some Features of ITE in Sub-Saharan Africa

The SACMEQ and PASEC surveys offer systematic data on the duration of ITE among primary school teachers.[62] Evidence is fragmentary on other aspects of ITE programs, such as candidate intake, curricula, and teaching method.

Duration of preservice ITE Among all SACMEQ countries in the sample, at least 75 percent of students are taught by teachers with two or more years of preservice training (figure 4.22). By contrast, among the 10 PASEC countries, in only 4—the Republic of Congo (Group 1), Cameroon (Group 2), and Burundi and Côte d'Ivoire (Group 3)—does the corresponding share rise to 50–70 percent.

Figure 4.21 Stylized Pathways for Teacher Preparation and Development in Sub-Saharan Africa

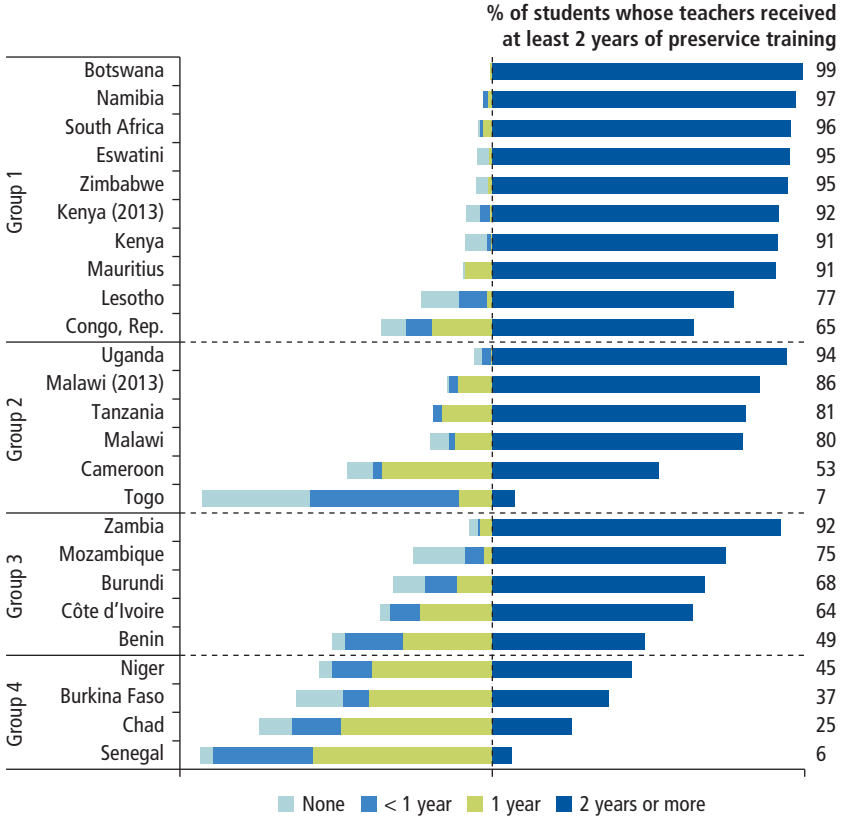


Note: ITE refers to preparation leading to the stipulated minimum initial qualification for teachers teaching at the primary and secondary levels.
a. In "sandwich" programs, serving teachers typically engage in self-study while on active teaching duty, sometimes supported through distance learning arrangements, and receive face-to-face instruction during school holidays.

Design of preservice ITE The aim of ITE is to equip prospective teachers to qualify for teaching jobs. Its design therefore typically includes classroom instruction as well as teaching practice. The former may cover such topics as theories of education and the psychology of learning, the content and pedagogical content knowledge of subject areas, and practical techniques for class management and teaching. The latter usually takes the form of practicums at schools, some of them attached to the teacher training institution. In many Sub-Saharan African countries, however, ITE programs do not consistently improve teacher skills and student learning outcomes (see, for example, Hungi 2011), suggesting possible weaknesses in their design.[63]

In a literature review of low- and middle-income countries, Westbrook et al. (2013) identify features of ITE programs that matter for teacher effectiveness. An important dimension is close alignment of the training program with the curriculum and the classroom realities that teachers face (such as large classes with few learning materials or smaller classes with textbooks for all; multigrade

Figure 4.22 **Percentage of Primary School Students, by Duration of Teachers' Preservice Training, in Selected Sub-Saharan African Countries, by Group**



Source: Analysis of 2007 SACMEQ III and 2013 SACMEQ IV (for Kenya and Malawi) and constructed from PASEC 2015 (table B4.57).
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. Numbers on the right-hand side refer to the percentage of students taught by teachers who received at least two years of teacher training. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.

teaching; specific types of learners; and so on). Successful programs are adapted to trainee teachers' existing knowledge, practices, and circumstances, thus ensuring that the content is pitched at the right level. Such programs provide teacher manuals and scripted lessons to guide teachers in applying their newly acquired skills, and they are taught by instructors who understand and model the promoted practices in their own teaching practice.

A more detailed study of six Sub-Saharan African countries—Ghana, Kenya, Mali, Senegal, Tanzania, and Uganda—illustrates the nature of gaps in ITE

practices in Sub-Saharan Africa (Akyeampong et al. 2011).[64] A key shortcoming is the misalignment of ITE programs with the trainees' future job requirements; the ITE curriculum lagged behind the school curriculum, emphasized content knowledge over teaching practice, and paid little attention to local language instruction (so that most new teachers were only confident to teach in English or French). Tutors also taught a single "correct approach" of prescribed teacher actions and neglected to teach the use of formative and diagnostic assessment to track learners' understanding and learning.[65] The ITE programs in all six countries in the study included practicums, but these exercises were typically short, poorly scheduled (for example, two months at the end of school year), and inadequately unsupervised, if at all, with little provision for critical reflection.[66]

For secondary school teaching, ITE programs face additional design challenges. Because secondary school teachers are subject specialists, their preparation must cover in greater depth all three domains of expertise identified by Shulman (1987): subject knowledge, instructional methods (pedagogical knowledge), and knowledge of how to relate the pedagogical knowledge to their subject (pedagogical content knowledge). In fields with teacher shortages, such as mathematics and science, finding the right balance in time allocation across the three domains can be difficult, in part because of ITE entrants' weak foundations in their subject areas. A key point arising from the literature is the need to strengthen trainees' subject knowledge (see, for example, Bainton, Barrett, and Tikly 2016); yet doing so inevitably means less time in the curriculum for trainees to acquire skills in teaching their subjects.

The challenges of ITE in Sub-Saharan African countries extend to broader systemic constraints, such as faculty at teacher training colleges who themselves lack the skills and experience for effective teaching (see, for example, Akyeampong 2017) and the sparse institutional capacity to experiment with and learn from promising ideas. The World Bank's Mathematics and Science in Sub-Saharan Africa (MS4SSA) initiative, launched in 2016, attempts to address these conundrums, centering on teacher training within a broader framework of building the capacity of regional and in-country institutions (as further discussed in box 4.6).

Quality assurance of ITE programs As discussed earlier, the TEDS-M study is a more formal assessment of the link between initial teacher preparation and teacher competence. The study tested future primary and secondary school teachers in 17 countries, including Botswana, on their knowledge of school mathematics and how to teach it (Tatto 2013). It also gathered information for rating these countries' policies on three key stages of teacher preparation: recruitment and selection into teacher education programs; accreditation of teacher education institutions and their programs; and entry into the profession (for example,

BOX 4.6

Strengthening Secondary Teachers' Preparation to Teach Mathematics and Science

Sub-Saharan African countries aspire to use science and technology to modernize their economies, fuel economic growth, and reduce poverty. However, the population's weak grasp of science, technology, engineering, and mathematics is an impediment. Beatty and Pritchett (2012) estimate that under a business-as-usual scenario, the region's countries could take as long as 130 years to reach the same learning levels as OECD countries today. They have thus prioritized efforts to improve mathematics and science instruction at all levels of education.

The World Bank launched the Mathematics and Science for Sub-Saharan Africa (MS4SSA) initiative in 2016 to support these efforts, focusing on secondary education. Success here can help break the vicious cycle of poor instruction that produces a weak pipeline of skilled workers—including teachers, technicians, engineers, and other professionals—which in turn perpetuates a situation where Sub-Saharan African countries cannot fully exploit the benefits of science and technology.

MS4SSA's Technical Model

MS4SSA's focus for improving mathematics and science integrates four elements critical for effective teaching and learning: teachers' content knowledge, pedagogical practice, teaching materials and tools (including information and communication technology [ICT] tools), and the institutional infrastructure that supports good teaching practices at the school level.

Operational models are currently being field-tested in such countries as The Gambia, Lesotho, Mauritius, and Rwanda. They involve the use of open-source scripted lessons—which are first aligned with the curricula and the examinations system of each country—with simple technology that engages all students in active learning during class and helps teachers take advantage of formative assessment during each lesson to guide his or her effort. As the linchpin in the process, the teacher receives sustained training and support on the new approach to teaching mathematics and science.

Central Role of Strong Institutions

To sustain progress in improving instruction in mathematics and science in Sub-Saharan Africa, three key areas receive close attention:

- *Leveraging global excellence through partnerships* to support African institutions to develop models adapted to national contexts
- *Building regional capacity through involvement of leading African partner institutions*—with the motivation, commitment, and competence to lead change—as partners of the international institutions
- *Fostering country ownership and implementation* based on effective buy-in and high-level commitment to this innovative approach.

(continued next page)

Box 4.6 (continued)

Each country's institutions and circumstances are unique, so it is necessary to customize solutions to meet local needs and conditions while providing support to teachers that encourage continuous improvement of resources and practices.

Systematic monitoring and evaluation of MS4SSA's impact is planned to guide its evolution in the coming years. Its success is critical if Africa's youth are to take advantage of science and technology to improve their own lives and that of their communities.

licensing, certification, or registration requirements). These carefully collected data are unique in making it possible to assess where policy makers might best place their emphasis among the three stages of teacher preparation.

Analysis of these data by Ingvarson and Rowley (2017) highlights the crucial role of quality assurance for teacher training programs and institutions. Countries rated more highly in this regard tend to produce future teachers who are better equipped with a sound knowledge of both the mathematics they will be expected to teach and the pedagogy they might use.[67] Of the three stages of teacher preparation, only recruitment and selection and accreditation of programs show consistently strong links to the two measures of teacher knowledge. For primary teacher programs, the link to accreditation is stronger than to recruitment, whereas for secondary programs, the links are equally strong for both stages of teacher preparation. Finally, the analysis shows that future mathematics teachers being prepared to teach at the higher grades, whether at the secondary or primary level, generally scored higher on knowledge of their subject as well as how to teach it than teachers being prepared to teach at the lower grades.

Continuing Professional Development

Like other professionals, teachers hone their competence through practice and support from supervisors and coaches, through organized professional learning events, and by exchanging ideas with and learning from peers through communities of practice at their school or in local or virtual networks. Here we piece together data from the SACMEQ and PASEC surveys to assess teachers' exposure to CPD and some aspects of the quality of the CPD they receive and also highlight recent examples of promising CPD models and their key characteristics.

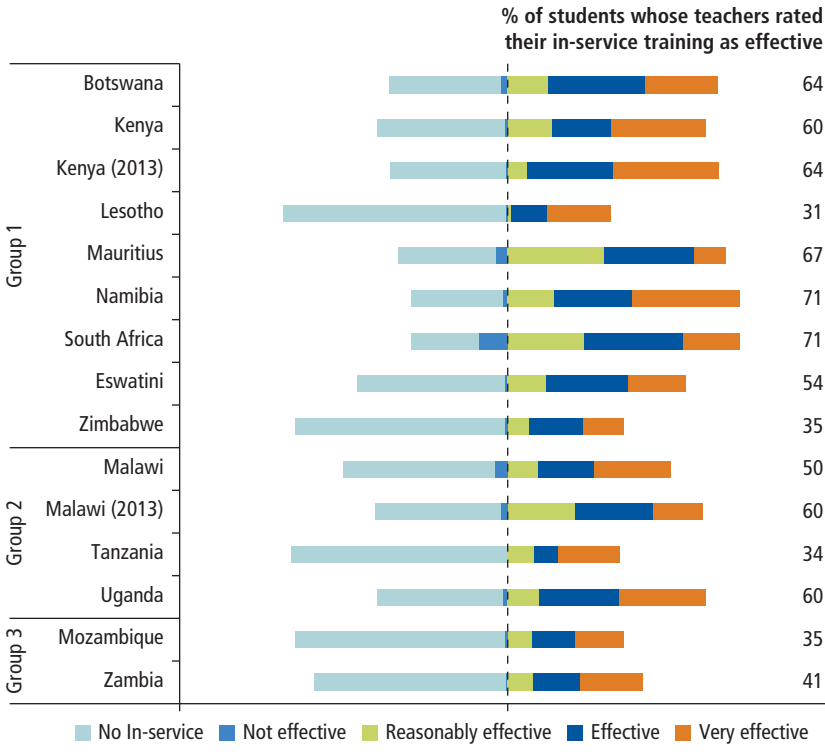
Teachers' Exposure to and Experience with In-Service Training The SACMEQ and PASEC data reveal strikingly divergent patterns in the share of students taught by teachers who received no in-service teacher training in recent years—the one

aspect for which similar information was collected from both datasets.[68] The share averaged 45 percent among SACMEQ countries, ranging from 21 percent in South Africa to nearly 70 percent in Lesotho (figure 4.23, panel a). By contrast, among the PASEC countries, the corresponding average was 17 percent, ranging from just 5 percent in Cameroon and Senegal to only about 42 percent in Burundi (light blue bars in figure 4.23, panel b).

The two datasets contain additional detail that differ between the SACMEQ and PASEC samples: for the former, teachers were asked to rate the quality of their in-service training; for the latter, teachers were asked about the duration of the in-service training. Among the SACMEQ countries, the share of students taught by teachers who gave a "very effective" rating ranged from less than 10 percent in Mauritius to about 33 percent in Namibia—both countries in

Figure 4.23 **Measures of Continuing Professional Development of Primary Teachers in Selected Sub-Saharan African Countries, by Group**

a. SACMEQ countries, 2007: Percentage of students by teachers' ratings of their in-service training[a]



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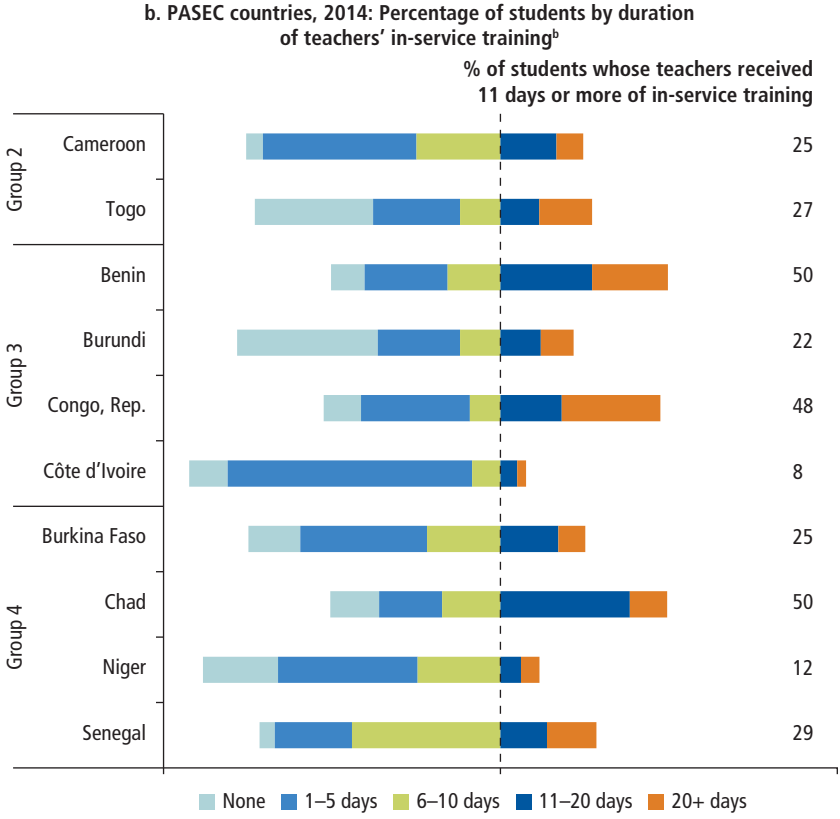


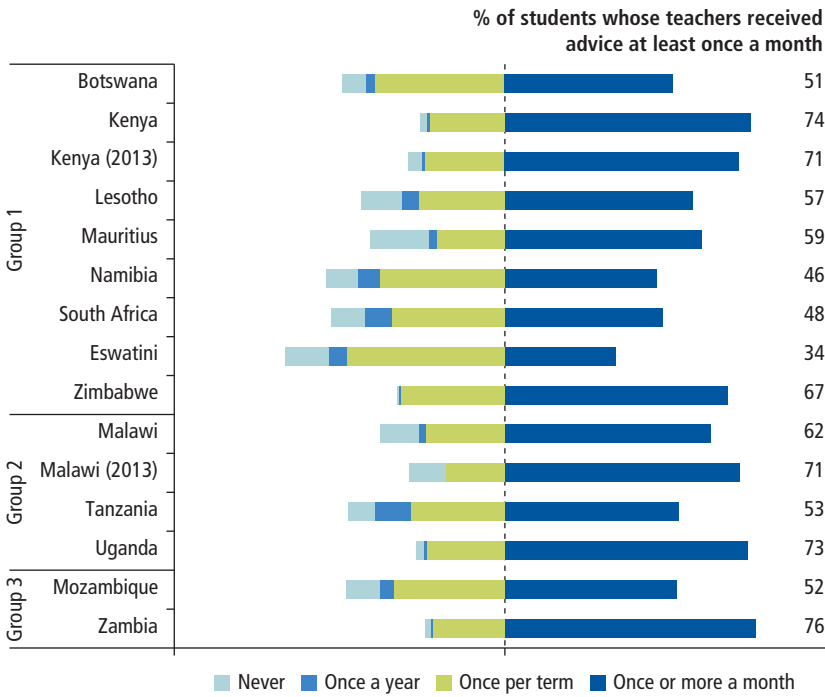
Source: Analysis of 2007 SACMEQ III and 2013 SACMEQ IV (for Kenya and Malawi) and constructed from PASEC 2015 (table B4.57).
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. Data refer to the percentages of students taught by teachers according to the in-service training received by the teachers. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
a. Numbers to the right of the bars in panel a refer to the percentage of students taught by teachers who rated their in-service training as "reasonably effective", "effective" or "very effective."
b. Numbers to the right of the bars in panel b refer to the percentage of students taught by teachers who received 11 days or more of in-service teacher training.

Group 1 (figure 4.23, panel a). Among the PASEC countries, some outliers are notable: in the Republic of Congo, nearly 30 percent of the students were taught by teachers who received 20 or more days of in-service training; this share falls to less than 3 percent in Côte d'Ivoire, where more than 70 percent of the students were taught by teachers who received only 1–5 days of in-service training (figure 4.23, panel b).

Coaching, mentoring, in-class practice, and other support for teachers Because more experienced colleagues are excellent sources of mentoring to gain practical teaching skills, teachers' interactions with their school heads are highly relevant in a discussion of in-service professional development.[69] Data are available for the SACMEQ countries on the share of students according to the frequency of interactions between their teachers and the school head on pedagogical matters (figure 4.24, panel a). In five countries—Kenya, Malawi, Uganda, Zambia and Zimbabwe—the share is relatively high, at between two-thirds and three-quarters. In the other countries, the interactions are infrequent if they occur at all, pointing to the limited role that school heads play in guiding and mentoring teachers on their staff.

Figure 4.24 **Frequency of Pedagogical Advice to Primary Teachers from School Heads in Selected Sub-Saharan African Countries, by Group**

a. SACMEQ countries, 2007: Frequency of pedagogical advice received from school head (%)[a]



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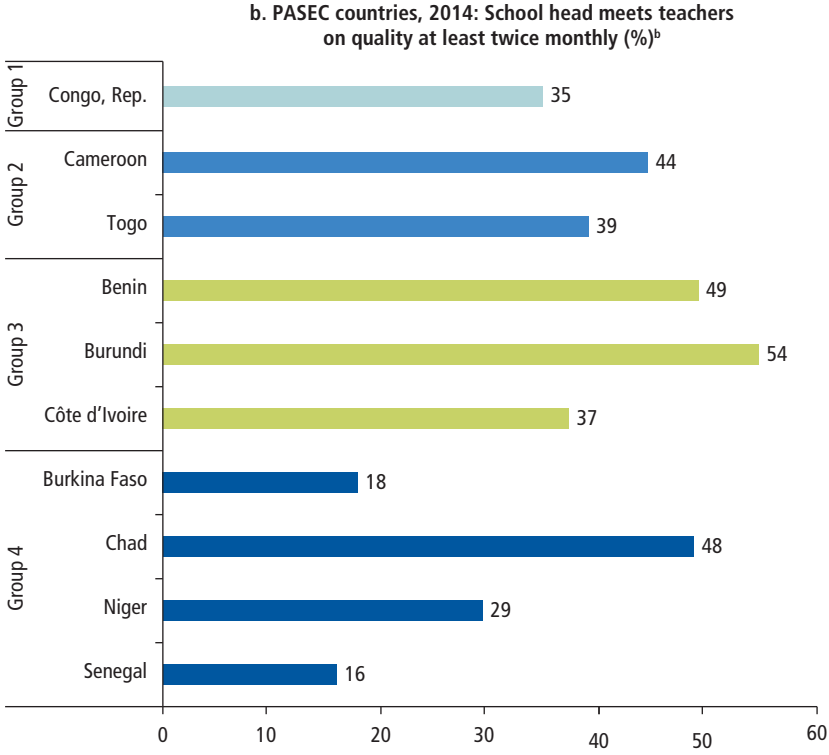

Source: Analysis of 2007 SACMEQ III, 2013 SACMEQ IV (for Kenya and Malawi), and 2014 PASEC data.
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. Data for SACMEQ and PASEC countries reflect, respectively, teacher and school director responses. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.
a. SACMEQ data refer to percentages of students, by frequency of pedagogical advice their teachers received from the school head. The data exclude heads with teaching assignments. Numbers to the right of the bars refer to the percentage whose teachers received advice at least once a month.
b. PASEC data refer to percentages of students, by frequency of the school head's meetings with their teachers on how to improve educational quality. Numbers to the right of the bars refer to the percentage whose teachers met with school heads at least twice a month.

Among the PASEC countries, the shares of students taught by teachers who had received various forms of on-site support are uniformly high, often exceeding 90 percent (and thus not shown in the figure); these include visits by an adviser to the class in the past 12 months, getting guidance from the adviser, and meeting with the school director and teaching staff on pedagogical matters at least once a trimester. The only indicator showing variation across countries is the share of students attending schools where the school director, presumably an able instructional leader, has a meeting with staff on education quality issues

at least twice monthly (figure 4.24, panel b). Benin, Burundi, and Chad are the only countries where the share reaches about 50 percent.

CPD features that matter Although most countries invest in CPD, systematic information is scarce on the specific components that are effective in raising teacher skills and boosting student learning outcomes. The fragmentary evidence reflects both the diversity of CPD programs and the idiosyncratic choices made by analysts when assessing their impact.

Popova, Evans, and Arancibia (2016) attempt to fill the gap by systematically characterizing the operational features of 26 evaluated teacher training programs in low- and middle-income countries and performing a meta-analysis on the resulting database.[70] Although few in number, the evaluations identify, with uneven levels of statistical confidence, the following promising features of in-service teacher training:

- Provision in conjunction with textbooks and other reading materials that were focused on specific subjects
- Face-to-face delivery in settings explicitly associated with learning (such as a university or training center)
- Integration with follow-up visits for review
- Teaching done by education practitioners
- Sufficient time for trainees to practice their skills with other teachers

Promising models of CPD that are under way in Kenya and Rwanda appear to incorporate many of these features (box 4.7).

A Science and Service Delivery Framework to Assess ITE and CPD Options

Because high-performing education systems prioritize ITE and continuous in-service training and professional development (see, for example, Lee et al. 2014), it is tempting to assume that just having teachers go through ITE and participate in CPD is sufficient to boost learning outcomes. Yet, as indicated above, the content of training and how it is implemented may matter more. Figure 4.25 uses the "science and service delivery" framework to highlight examples of where ITE and CPD can succeed and where they can also fail.

Where ITE and CPD can succeed (quadrant A) The basic ingredients are sound concepts—based on clear definitions of core teacher competencies and supported by the available evidence—that are well implemented with built-in mechanisms for continuous learning to improve system performance. Because teachers do not learn everything they need for their job in one go before stepping into the classroom, a key concept is to treat ITE and CPD as parts of a continuum.[71] Even though these parts may be delivered by different types of service providers, appropriate governance of their design and delivery (for example, regarding the type of faculty) can enhance the operational

BOX 4.7

Promising In-Service Teacher Training Models for Early-Grade Reading in Kenya and Rwanda

Tusome ("Let's Read") National Literacy Program in Kenya

Tusome ("Let's Read" in Kiswahili) aims to improve the reading skills of 5.4 million primary school children. Following a pilot phase that confirmed its technical underpinnings, Tusome was launched in 2015 with donor support as a nationwide initiative in nearly 24,000 primary schools, including 1,000 Alternative Provision of Basic Education and Training (APBET) institutions (low-cost private schools). An independent evaluation shows that, a year later, the program was already improving reading outcomes; an important success factor is thought to be the close attention to implementation of project activities, including in-service teacher training.

Tusome embeds its in-service teacher training activity in an ecosystem that integrates textbooks for students and guidebooks for teachers, multiple training sessions for teachers and others, continuous coaching and supervision at the school level, systematic feedback and monitoring, and broad policy support. Teachers receive training in direct instruction, which involves using straightforward, explicit techniques to impart reading skills. Tusome also trains head teachers on instructional leadership for their schools as well as curriculum support officers (CSOs) and instructional coaches on building teachers' pedagogical skills in critical technical areas (such as phonemic awareness, reading comprehension, lesson planning, and curriculum coverage). CSOs are responsible for teachers within a cluster or zone, and instructional coaches are responsible for teachers in APBET institutions.

More broadly, Tusome sensitizes senior decision makers on possible gaps in relevant laws, policies, strategies, and regulations that may impede early-grade reading, and it emphasizes the timely publication and diffusion of learner performance data. Tusome engages community effort through a Youth Fund to attract local youth groups to work with younger children to improve reading skills and a Partnership Fund to foster collaboration among local public and private sector groups on community reading projects.

Literacy Boost Program in Rwanda

Rigorous impact evaluation of Rwanda's Literacy Boost program, piloted during 2013–15 in one of the country's 30 districts, suggests that the program's teacher training component is improving teachers' knowledge of and beliefs about reading comprehension, teachers' classroom practices, and displays of print materials in the classroom. The program also shows promising results on grade progression and reading fluency and comprehension among students in grades one and two.

Adapted to Rwanda's context, Literacy Boost's teacher training program has several attractive operational features:

- It uses the government curriculum to train teachers in reading pedagogy, which helps teachers gain skills of direct relevance to their work.

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Box 4.7 (continued)

- It trains all teachers in the lower-primary grades in the project schools, thus creating a whole-school understanding of the training and its purpose.
- It follows a structured, content-rich agenda of nine monthly sessions, each lasting four to five hours.

The trainers equip teachers with content knowledge about the session topic (for example, reading fluency), demonstrate the pedagogy through a model lesson, explain how teachers can assess their success in teaching the skill, and lead teachers to create their own lesson plans and share these plans with peers, thus enabling each teacher to assemble a set of lessons for immediate use back in their classrooms. Delivery of the training relies on teams comprising Save the Children staff, Ministry of Education officials, school heads, and teachers selected by their peers as cotrainers. Between training sessions, teachers practice their new pedagogical skills and receive visits from trainers who provide on-site support as needed. These features help build local capacity to sustain the new approach.

Sources: Friedlandher et al. 2016; RTI International 2016; Save the Children 2012.

Figure 4.25 Science and Service Delivery Aspects of Teacher Preparation and Professional Development Programs in Sub-Saharan Africa

Science (which interventions improve education outcomes)	Service delivery: Effective implementation	Service delivery: Ineffective implementation
Effective interventions	**A** Coherent continuum of ITE and CPD, with content aligned to school curriculum, and functioning, ongoing support system for novice teachers to grow in competence; with M&E to guide system development	**B** Practicums, but in poorly chosen schools, with limited supervision of trainees or systematic postpracticum reflection
Ineffective interventions	**D** Poorly designed ITE for teacher upgrading with a low bar for selection and certification, which puts many through the program, and grants automatic access to higher salary grades.	**C** One-off teacher training workshops or other CPD actitivities, offered away from school, with few links to broader system or reforms and no follow-up arrangements

Note: CPD = continuing professional development; ITE = initial teacher education; M&E = monitoring and evaluation.

coherence of the two parts and set them both in a context where trainee teachers and newly qualified teachers receive sustained professional support and guidance to become effective as teachers. Critically, monitoring and evaluation create a dynamic feedback loop—which is so necessary, given the still-sparse evidence base—to inform course correction and scaling-up efforts to improve the whole system.

Where ITE and CPD can fail (quadrants B, C, and D) The difficulty stems from combinations of poor conceptual design and weak implementation. In quadrant B, an example is the inclusion of practicums in ITE programs when the country has too few schools operating under normal conditions where trainees may observe excellent teaching practice in action. Thus, although practicums are conceptually sound, they may in fact deliver disappointing results because assumptions about implementation conditions are not met.

In quadrant C, examples of failure include CPD programs that are implemented as stand-alone, off-site workshops with tenuous direct links to the actual context of teachers' work or to the broader policy context. Although such programs may be relatively cheap to run and expose participants to interesting ideas, they divert system capacity in ways that Sub-Saharan African education systems can ill afford.

Finally, quadrant D provides an example of an ineffective intervention: in-service ITE upgrading programs that (a) are poorly targeted or poorly adapted to trainees' profiles, and (b) pay little attention to trainee selection criteria or certification standards based on evidence that trainees have acquired the knowledge and pedagogical skills required for their teaching assignments. Perfect implementation of such an upgrading program ensures only one thing: a higher wage bill without commensurate impact on learning.

Summary and Policy Implications of Teacher Training and Professional Development

Evidence from multiple surveys, most of them of primary education, reveals that teachers in Sub-Saharan Africa generally know the content of the curriculum they are expected to teach[72] and are better educated and more knowledgeable than their peers in other service sector jobs.[73] But measured against international benchmarks, their modest cognitive knowledge becomes obvious: in Ghana and Kenya, for example, only between a fifth and a third of primary and secondary teachers possess the minimum cognitive knowledge considered necessary for competent teaching.

Serious gaps in teachers' repertoire of teaching practices also exist. Most students receive instruction passively, with teachers providing instruction rather than engaging in a two-way communication with their students and encouraging peer-to-peer interaction among the students.

Because teachers are already being recruited from among the better-educated candidates in national labor pools, further raising recruitment standards may warrant less attention than strengthening ITE and CPD programs. These programs must be revamped for greater effectiveness in boosting teacher knowledge and improving teaching practices.

In many Sub-Saharan African countries, ITE and other forms of training leading to certification must address the learning needs of diverse teacher trainees; in other words, entrants to teacher training programs with no prior teaching experience as well as incumbent teachers who are unqualified or underqualified. Because the profiles of trainees are so diverse, the content and methods of ITE programs must be adapted accordingly. They also need to be better coordinated with CPD programs (and vice versa) to foster synergy between them and create integrated pathways for teachers to accumulate the knowledge and skills required to do their work well.

Both ITE and CPD must focus on equipping teachers for students' learning priorities, which in most countries in the region mean early-grade foundational skills in reading and mathematics and upper-grade deepening of mathematics and science skills. Much also remains to be done to develop the organizational and institutional capabilities to enable school heads and other instructional leaders to provide in-class support and guidance to teachers. Importantly, all ITE and CPD programs can benefit from more systematic application of quality assurance measures to benchmark their relevance and effectiveness in equipping teachers to achieve greater impact on student learning.

Teachers' Workplace Conditions in Sub-Saharan Africa's Primary Schools

School and classroom conditions—both material and behavioral—matter for the work of teachers.[74] In overcrowded classes with few textbooks and learning materials, for example, even well-trained teachers may struggle to teach well. Gaps in basic amenities such as electricity and toilets as well as behavioral problems further undermine the conduciveness of the teaching and learning environment. The discussion here considers selected aspects of conditions in Africa's primary schools and classrooms. It defines a package of essential conditions, assesses its availability across schools in the region, and reflects on the policy implications of the findings.

Overcrowding, Textbook Scarcity, and Lack of Basic Services

Conditions are consistently worse in some countries than others across all three aspects of the physical environment, but the lack of electricity is pervasive except in Group 1 countries.[75]

Crowding and Student Grouping Arrangements in the Classroom

In most Sub-Saharan African countries, typical classes in primary schools have, on average, between 30 and 60 students (figure 4.26, panel a). Outliers include countries in all groups except Group 1. Conditions are worst in the Republic of Congo (Group 1); Malawi and Tanzania (Group 2); Democratic Republic of Congo (Group 3); and Chad (Group 4), where the average class size exceeds 60. In Malawi, the only country with time series data, classes have become steadily bigger since 2011, reaching an overall average of 90 students per class and 120 in single-grade classes.

Multigrade teaching compounds the challenges of large classes. The share of students in multigrade classes ranges between 10 percent and 20 percent in several Group 4 countries (Burkina Faso, Mali, Niger, and Senegal); rises to around 30 percent in the Republic of Congo (Group 1) and Madagascar (Group 3); and reaches an astonishing 50 percent in Chad (Group 4) (UNESCO 2012). Among these countries, the size of multigrade classes is especially high in Chad and Mali (averaging 60 students per class or more), suggesting possible issues in the organizational arrangements for instruction in schools.

Availability of Textbooks

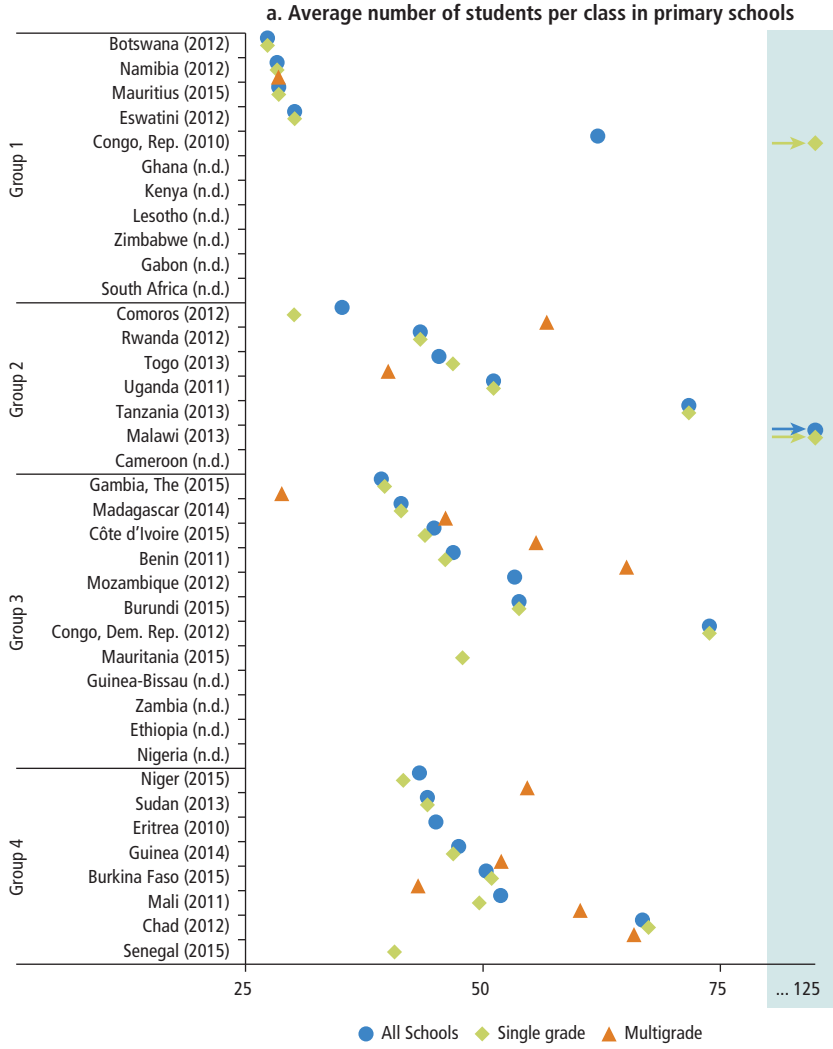
Cameroon (Group 2) has, by far, the worst indicators: each textbook in mathematics and reading is shared among 12–14 students (figure 4.26, panel b). By contrast, Rwanda, also in Group 2, has a ratio averaging fewer than two students per book, despite facing "many challenges" in its baseline (1990s) context, and Togo's relatively favorable ratios reflect steady improvement between 2010 and 2014.

Remarkably, most of the Group 4 countries manage to supply each student with a textbook for both mathematics and reading; in only Chad and Sudan do the ratios rise above two students per textbook. Sudan, despite facing many challenges in initial conditions, steadily improved its student-to-textbook ratio between 2012 and 2015. Among the Group 1 countries, the ratios are generally favorable, except for Namibia (in mathematics), where the high ratio reflects the impact of sustained deterioration over time.

Availability of Basic Services

For many Sub-Saharan African countries, data are available on three simple yet revealing indicators: toilets, potable water, and electricity (figure 4.27). The lack of toilets and potable water creates health hazards and inconveniences that can

Figure 4.26 Class Sizes and Student-Textbook Ratios in Primary Schools, Sub-Saharan African Countries, by Group, Early to Mid-2010s



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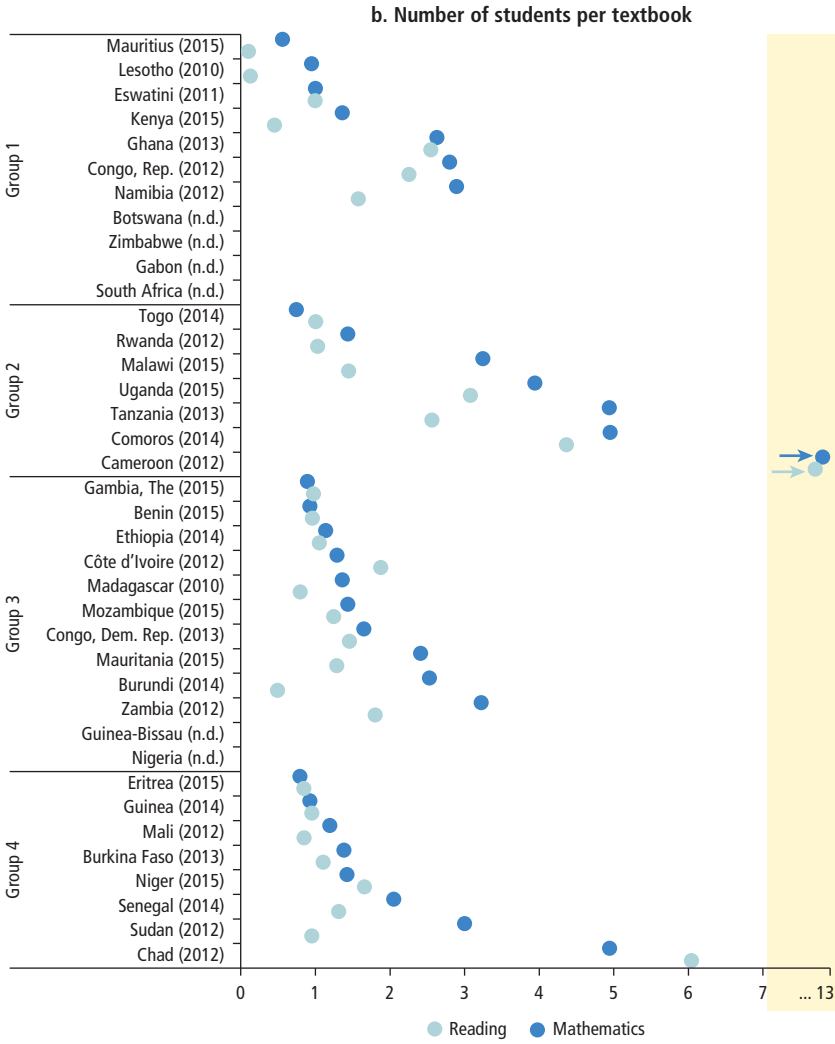


Source: UNESCO Institute for Statistics (UIS.Stat) database (accessed December 26, 2016), http://data.uis.unesco.org/.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 4.2. The data for the Republic of Congo and Malawi (panel a) and for Cameroon (panel b) exceed the maximum value on the horizontal scale.

undermine a teacher's productivity in the classroom (for example, delays in getting class activities organized or inattentive students who are sick or uncomfortable). Without electricity, students receive instruction in unlighted, poorly ventilated classrooms, and teachers are limited to only the most rudimentary educational technology (that is, the blackboard) to engage students in their lessons.

Across Sub-Saharan Africa, toilets are universally available in most of the Group 1 countries, where primary education has been long established (figure 4.27, panel a) but are a rarity in such countries as the Comoros (Group 2), Mauritania (Group 3), and Chad and Niger (Group 4). Compared with the other countries in the same groups, these countries faced more favorable initial contexts but could not provide more of their schools with toilets.

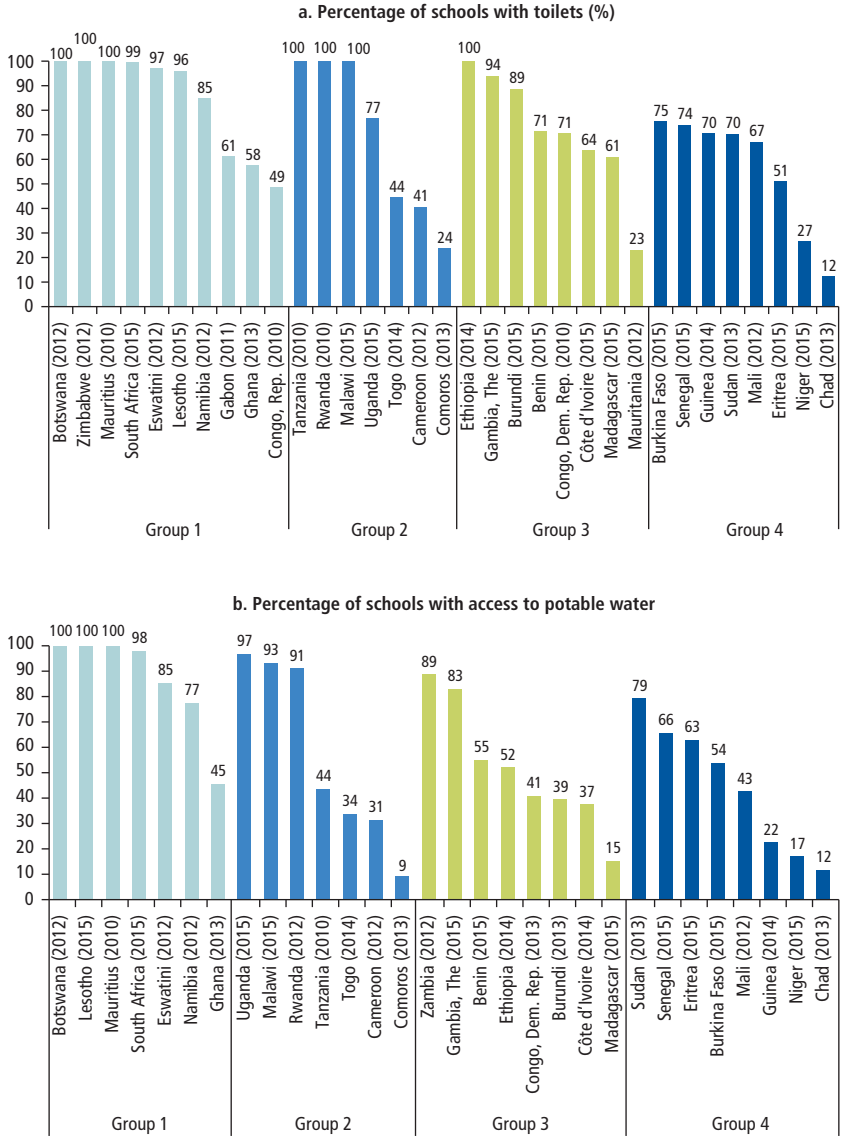
Potable water and electricity are less widely available than toilets in African primary schools. The exceptions are Eswatini, Mauritius, and South Africa (Group 1), where practically all primary schools offer these services; in Botswana, only 18 percent of the schools still lack electricity. Conditions are better in some countries than others. In Group 2, the share of Rwandan schools with potable water and electricity is more than twice the share in Tanzania, a country with a fewer contextual difficulties. In most countries, governments are planning to expand coverage of electricity, including through solar power. As these plans mature, schools could be prioritized for connections to enable experimentation with promising educational technologies to improve teaching and learning.

The School "Climate" for Student Safety and Well-Being

School "climate" refers to the psychological conditions in a school that affect learners' emotional well-being and readiness to learn. Physical abuse, mental stress, and sexual exploitation are quite common in schools in all parts of the world (UNESCO 2017), and according to survey data, teachers and fellow students are the most common source of physical violence at school (UNICEF 2014).[76] In Benin, the Central African Republic, The Gambia, and Senegal, more than half of the students in school are estimated to have been hit by their teachers (Antonowicz 2010).

In some countries, corporal punishment is a socially acceptable way for adults to correct young people (for poor academic performance, disrespect, disobedience, and so on). Some 90 countries worldwide have no laws against corporal punishment of children, among them Benin, the Central African Republic, Côte d'Ivoire, The Gambia, Ghana, Liberia, Mauritania, Niger, Nigeria, and Sierra Leone.[77]

Figure 4.27 **Toilets, Potable Water, and Electricity in Primary Schools in Sub-Saharan African Countries, by Group, Early to Mid-2010s**



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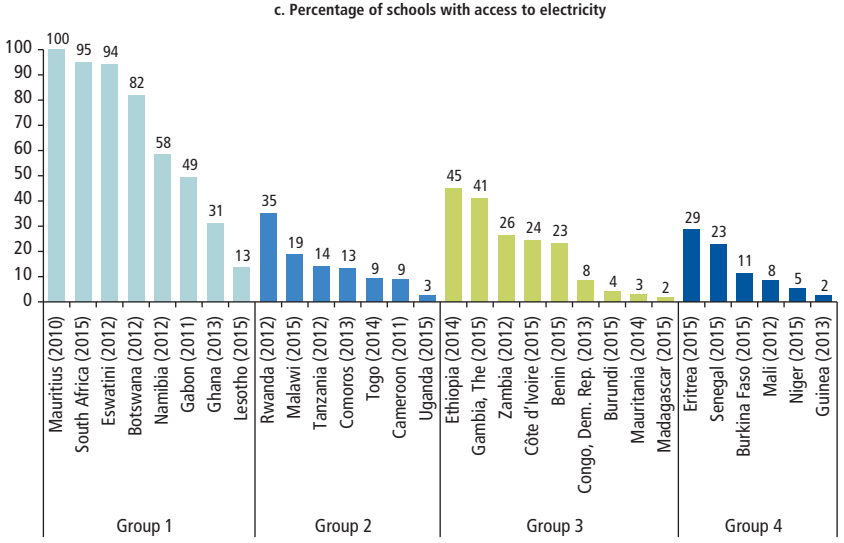
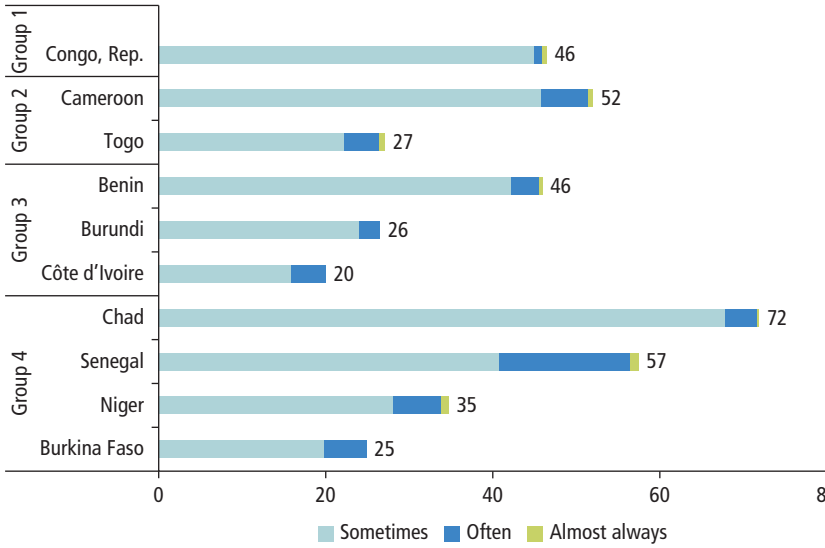


Source: UNESCO Institute for Statistics (UIS.Stat) database (accessed December 26, 2016), http://data.uis.unesco.org/.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 4.2. Numbers to the right of the bars refer to the percentage of primary schools with access to toilets (panel a), potable water (panel b), and electricity (panel c).

Systematic cross-country data on violence in schools were collected from teachers in the 2014 PASEC surveys covering 10 countries (figure 4.28). On average, 31 percent of the sampled teachers reported that they had sometimes used corporal punishment to discipline unruly students. Given that the data are self-reported, the true extent of corporal punishment may be higher.

Among the SACMEQ countries, the responses came from the heads of the sampled schools. The prevalence of teachers bullying students ranges from 22 percent of the schools in Mozambique to 47 percent in Uganda and 53 percent in Zimbabwe (figure 4.29); in Uganda, about a quarter of the school heads indicated that such behavior occurs often, not just occasionally.[78] The incidence of sexual harassment of students ranges from less than 5 percent in Botswana and Mauritius (both in Group 1) to 37 percent in Uganda (Group 2).

Figure 4.28 Percentage of Teachers Using Corporal Punishment on Students, Francophone Sub-Saharan African Countries, by Group, 2014



Source: Analysis of the 2014 Programme d'analyse du systèmes éducatif de la CONFEMEN (PASEC) survey data.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 4.2. Numbers to the right of the bars refer to the percentage share of teachers who use corporal punishment on their students.

Essential Minimum Conditions for Learning in Schools

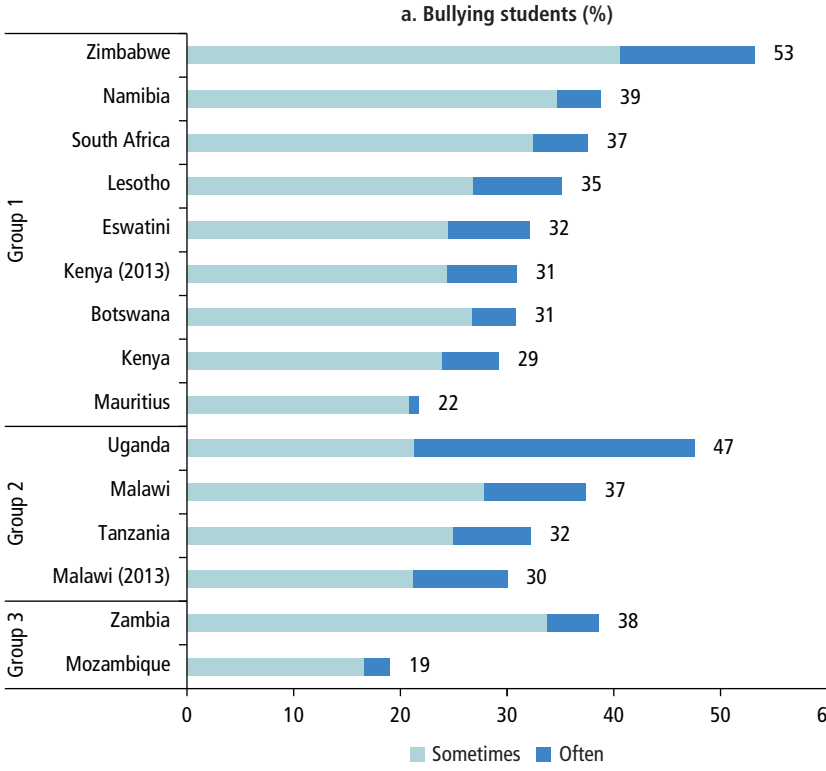
Although the country averages presented above—on overcrowding, textbooks scarcity, lack of basic services, and the prevalence of violence—are insightful, a more useful perspective considers them as part of an integrated set of conditions required by teachers to be productive at their workplace. Taking the school as the relevant unit of observation, this study identifies the following dimensions in a package of minimum conditions: reasonable physical, instructional, and psychological conditions. It uses data from the SACMEQ III (2007) and 2014 PASEC surveys to compute six indicators, two for each dimension—all of them chosen for simplicity and comparability across countries. The indicators provide a basis for evaluating the distribution of this integrated minimum package across primary schools in Sub-Saharan Africa (table 4.8).[79]

The first set of indicators, for physical conditions—"staffing ratio" and "toilets for girls"—are the simplest: the former relates to crowding, and the latter to

issues of health, sanitation, and basic services and infrastructure (albeit indirectly, and perhaps also partially). The minimum thresholds are defined, respectively, as (a) an average student-teacher ratio for the school that does not exceed 50 to 1, and (b) at least one toilet at the school for exclusive use by girls. More generous provisions would obviously be more comfortable, but the purpose here is simply to set minimum conditions.

The second set of indicators, for instructional conditions—"qualifications of teachers" and "learning materials"—requires some judgment to avoid setting thresholds that ignore the potential adverse impact on teacher effectiveness. Taking into account the discussion in earlier sections, the minimum for

Figure 4.29 **Percentage of School Heads Reporting Teacher Violence against Students, SACMEQ Countries, by Group, Latest Available Year**



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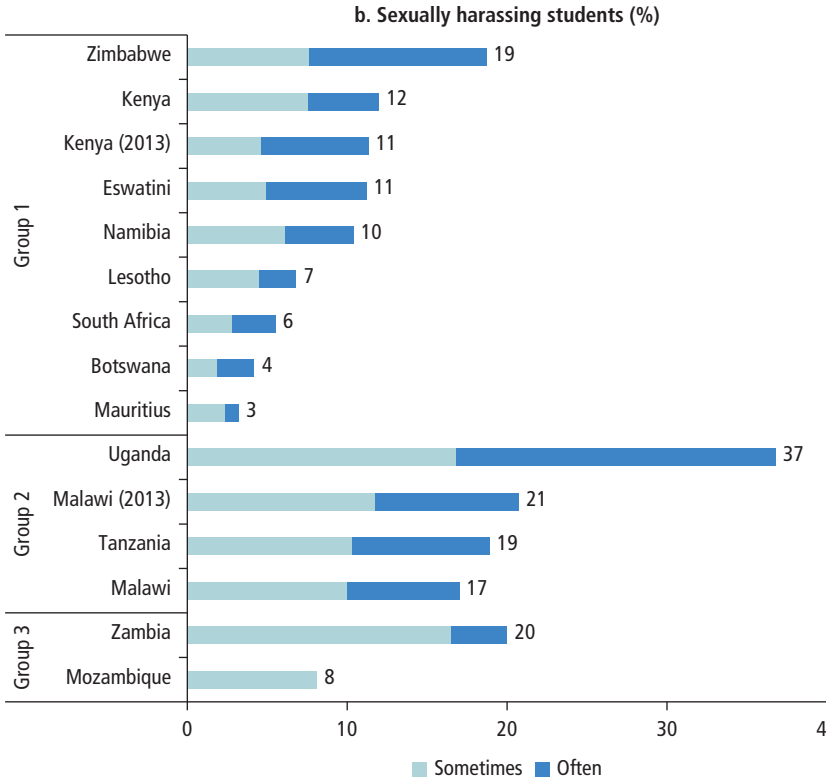


Source: Varly 2016, based on analysis of SACMEQ III (2007) data and SACMEQ IV (2013) data for Kenya and Malawi.
Note: SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. For definitions of country Groups 1–4, see chapter 1 or figure 4.2. Numbers to the right of the bars refer to the percentage share of school heads reporting teacher bullying of students (panel a) and sexual harassment of students (panel b).

teacher qualification is that all students in the upper-primary grades are taught by a teacher with at least an upper-secondary education.[80] For learning materials, the indicator is specified in terms of textbook availability for mathematics and reading. The minimum threshold is defined as follows: 90 percent of the students should have access to a textbook in each subject, either shared with others or used alone.

The third set of indicators, referring to behavioral conditions ("attendance" and "school climate"), is the most intricate. The relevant modules in the SACMEQ and PASEC questionnaires use slightly different wording. The

Table 4.8 Defining Minimum Essential Conditions for Teaching and Learning in the Context of Sub-Saharan Africa

Dimension	Indicator	Data sources	Definition
Physical	1. Staffing ratio	SACMEQ III, PASEC	The student-teacher ratio is no higher than 50 students per teacher, as computed by dividing total enrollments by the sum of permanent and nonpermanent teachers.[a]
	2. Toilets for girls	SACMEQ III, PASEC	There is at least one toilet for exclusive use by girls.
Instructional	3. Qualification of teachers	SACMEQ III, PASEC	Grade six teachers at the school have at least (a) upper-secondary education, or (b) lower-secondary education plus at least two years of teacher training.
	4. Learning materials	SACMEQ III, PASEC	At least 90 percent of sixth graders have textbooks for both mathematics and reading (either a personal or shared copy.
Behavioral	5. Attendance	SACMEQ III	"Often" is used not more than once by school heads to describe the frequency of any of (a) four student behavior problems (tardiness, absenteeism, skipping classes, and dropping out); or (b) three teacher behavior problems (the same as the first three for students).
		PASEC	"Rare" *or* "Never" is used by school director to describe the prevalence of teacher absenteeism or tardiness; and no more than 20 percent of students were absent on the day of survey, as reported by the teacher.
	6. School climate	SACMEQ III	"Often" is never used by the school head to describe the frequency of a long list of specific bad behaviors committed by either students or teachers.[b]
		PASEC	School heads report that teachers never humiliate unruly students by beating them or sending them to a corner, and teachers are not themselves the victims of harassment.

Source: Constructed from 2007 SACMEQ III and 2014 PASEC data.
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality.
a. For SACMEQ III, the indicator is based on school level data; for PASEC, it is based on teacher-level data.
b. The "bad behaviors" of students include classroom disturbance, cheating, use of abusive language, vandalism, theft, fights, intimidation or bullying, verbal abuse of teachers or school staff, physical injury to staff, sexual harassment (of students and of teachers), and possession and abuse of drugs and alcohol. "Bad behaviors" of teachers include intimidation or bullying, use of abusive language, sexual harassment (of students or of fellow teachers), and possession and abuse of drugs and alcohol.

SACMEQ survey asks multiple questions about absenteeism, to each of which the school head responds by choosing one of three options describing its frequency: "never," "sometimes," or "often." The minimum threshold for this indicator is defined as having "often" cited a cumulative total of no more than once, taking into account the behaviors of both teachers and students. The PASEC data are slightly different, and the minimum is defined as follows: the school

head indicates that teacher absenteeism is rare, and no more than 20 percent of the students were absent from class on the day of the survey.[81]

On "school climate"—an essential condition for learning (Berkowitz et al. 2017)—the indicator for the SACMEQ countries relates to the frequency of serious misbehaviors by students and teachers, any of which undermines trust and peace.[82] The minimum threshold is defined as having "often" cited not even once by the school head. For the PASEC countries, the data contain fewer details; the minimum threshold is defined as the absence of humiliating punishment of students by their teachers, such as beating or publicly shaming them) as well as teachers' freedom from harassment at the school.

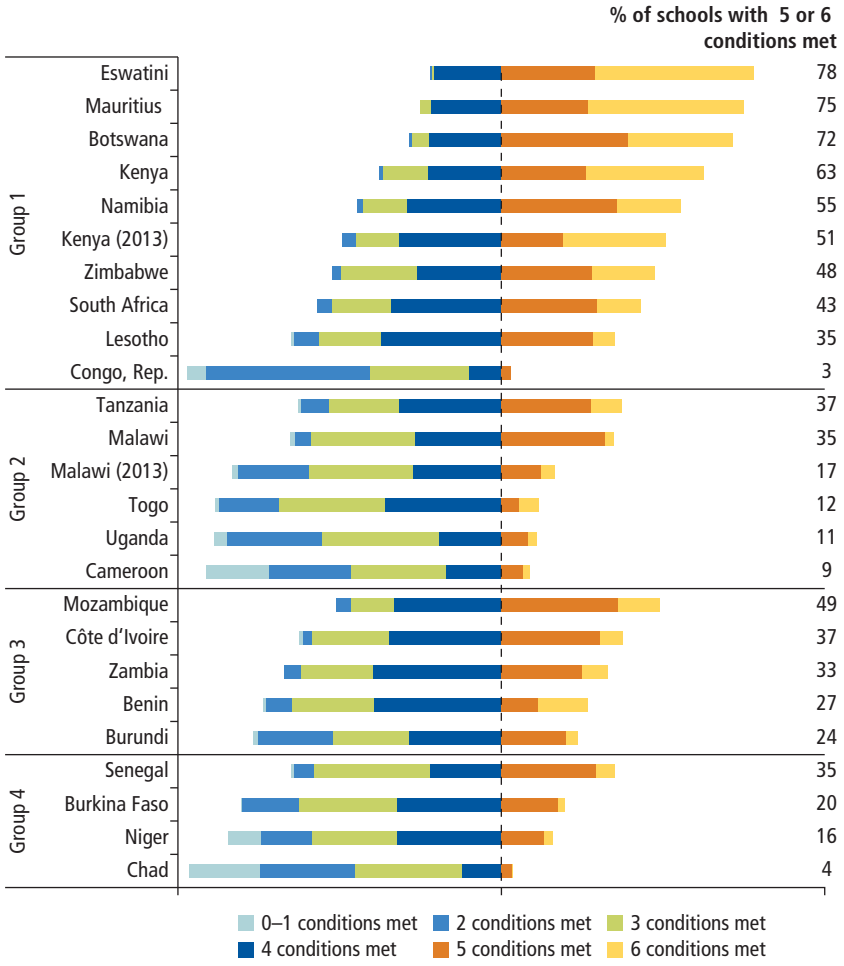
Share of Africa's Primary Schools Meeting the Essential Conditions

The premise of the minimum package is that most, if not all, of the six conditions are needed to enable teachers to work effectively. Sub-Saharan African countries are highly diverse in this regard (figure 4.30). Conditions are best in Group 1 countries, albeit not uniformly so. In Botswana, Eswatini, and Mauritius, more than 70 percent of the schools exceed the thresholds for at least five of the six conditions. In Kenya—where data from both the 2007 and 2013 SACMEQ surveys are available at this writing—the situation has deteriorated since 2007: the share of schools passing the minimum thresholds for at least five of the six conditions fell from two-thirds to half, while the share passing the thresholds for three or fewer of the six conditions has stagnated, at 17 percent in 2013 and 15 percent in 2007. Among the anglophone countries in Group 1, the situation is bleakest in Lesotho, where barely more than a third of the schools pass the thresholds for at least five of the six conditions.

In the remaining SACMEQ countries, in Groups 2 and 3, many schools are in dire straits. The share of schools that pass the threshold for at least five of the six conditions is highest in Mozambique, at 49 percent. In Malawi—the only other country with SACMEQ data for both 2007 and 2013 at this writing—the share of such schools fell by half, from 35 percent in 2007 to 17 percent in 2013. The situation is abysmal in Uganda and Zambia, where significant shares of schools pass the threshold for no more than two conditions: 33 percent and 25 percent, respectively.

In the PASEC sample of countries, based on more recent data for 2014, the situation is grim. In the Republic of Congo, a Group 1 country (with "Established" basic education coverage), nearly 60 percent of the primary schools met the minimum threshold for just two or fewer of the six essential conditions. In Cameroon, a Group 2 country (with "Emerged" basic education coverage), the schools' state of disrepair is comparable to that of Chad,

Figure 4.30 Availability of Essential Conditions for Effective Teaching in Primary Schools in Sub-Saharan African Countries, by Group



Source: Analysis of 2007 SACMEQ III, 2013 SACMEQ IV (for Kenya and Malawi), and 2014 PASEC survey data.
Note: PASEC = Programme d'analyse du systèmes éducatif de la CONFEMEN (Conference of Ministers of Education of French-Speaking Countries); SACMEQ = Southern and Eastern Africa Consortium for Monitoring Education Quality. Figures in the right-hand column denote the percentages of schools that meet at least five of the six conditions in the minimum package. The six conditions are (a) qualified teachers with content and pedagogical knowledge and skills; (b) ratio of no more than 50 students per teacher; (c) basic services such as toilets for girls and electricity; (d) access to textbooks for reading and mathematics; (e) regular class attendance by both teachers and students; and (f) a school climate free from abuse and violence. For further definition of the conditions, see table 4.8. For definitions of country Groups 1–4, see chapter 1 or figure 4.2.

a Group 4 ("Delayed") country whose per capita GDP is only about three-quarters as high. Conditions are slightly better in Niger and Togo—countries whose per capita GDPs are only 30–40 percent that of Cameroon's—where between one-fifth and one-quarter of the schools satisfy the thresholds for no more than three of the six essential conditions. Other countries in PASEC sample—such as Côte d'Ivoire and Senegal—fare better, with smaller shares of schools at the bottom end of the scale and between a quarter and more than a third exceeding the threshold for at least five of the six essential conditions.

Burundi's position seems anomalous: only 33 percent of its schools met the minimum thresholds for at least five of six essential conditions, and yet its students consistently achieve the best test results among the PASEC countries. Although most Burundi teachers have only lower-secondary education, all of them undergo two years of training (which this analysis treats as the equivalent of upper-secondary education), and few if any teachers are on a nonpermanent contract. Half of the teachers report receiving on-site instructional support, and in more than 80 percent of the schools in the survey, the staffing ratio averages no more than 50 students per teacher, compared with an average of just 40 percent of the schools in the other PASEC countries.[83] Among the other favorable factors for Burundi, all of the country's schools in the PASEC survey offered at least one toilet for the exclusive use of girls. These features set Burundi apart from the other PASEC countries.

For the other items in the essential package—textbook availability, absenteeism by teachers and students, and the school climate—the share of schools meeting the minimum thresholds in Burundi is comparable to those in the other PASEC countries. Overall, it appears that with its focus on teacher preparation, reasonable class sizes, provision of institutional support to teachers, and use of local language instruction, Burundi is able to achieve relatively more favorable student learning outcomes than the other PASEC countries.

Summary and Policy Implications of Teachers' Workplace Conditions

Managing teachers for results in student learning requires seeing teachers as part of a package of essential conditions that must be present at the school level. These conditions are defined, for the purpose here, in terms of six simple indicators whose minimum thresholds are set at intentionally modest levels consistent with Sub-Saharan Africa's low-income context. The results reveal great diversity across countries in the share of primary schools that meet the minimum standards for most of the package of essential conditions.

The pattern calls for nuanced strategies for boosting student learning. Each country must strike a pragmatic balance between improving conditions

in the teaching and learning environment and intensifying the focus on teacher knowledge and skills (for example, through teacher training). In schools where most if not all six minimum thresholds are met or exceeded, a greater focus on teacher effectiveness is as appropriate as it is feasible. In other schools where conditions are much less favorable (for example, only two or three of the essential conditions exceed the relevant minimum thresholds), prioritizing support to these schools to ensure minimally conducive conditions would remove overwhelming odds against the potential for effective teaching.

In assessing the way forward, it is useful to consider the gaps across the six essential conditions. (For details, see online appendix D.9, table D.9.1.) Almost all schools in the SACMEQ and PASEC countries are able to ensure that at least one toilet is available for the exclusive use of girls. The share of schools whose teachers have at least an upper-secondary education is also relatively high, averaging 90 percent in the SACMEQ countries and 75 percent in the PASEC countries. But big differences exist across countries in the share of schools that are adequately staffed. The Group 1 countries do relatively well: the student-teacher ratio is no higher than 50 to 1 in an average of 85 percent of the schools in these countries. By contrast, in the other three country groups, such schools represent, on average, a share of only between one-third and one-half. Conditions are worse in some countries than in others, but the overall picture suggests a need for adequate staffing to ensure manageable class sizes for teachers to deliver their lessons. As shown in earlier in this chapter, better allocation of teachers, based on staffing norms, could help address this issue.

As for the remaining essential conditions, the shares of schools passing the relevant minimum thresholds are relatively modest across all countries: In the SACMEQ sample, 64 percent, 60 percent, and 54 percent, respectively, meet the thresholds for textbooks, attendance, and school climate. In the PASEC sample, the corresponding shares are 40 percent, 67 percent, and 40 percent. Although the available data may be insufficient to fully reflect the precise extent and nature of the gaps in these areas, these initial results highlight issues for further attention.

Strategic Priorities for Improving Teacher Management

Sub-Saharan Africa's challenges in teacher management today are a legacy of the explosive growth of primary and secondary education since the 1990s. In the race to universalize primary education by 2015—a Millennium Development Goal—large numbers of teachers had to be recruited quickly to cope with the steep rise in primary school enrollments. The pressure on secondary education

built up with a lag, and soon countries were also having to recruit large numbers of secondary school teachers—at even faster rates, given the small initial size of the workforce at this level. Remarkably, teacher recruitment in most Sub-Saharan African countries over the past 25 years has kept pace with the expansion of enrollments—fast enough to keep the student-teacher ratio from rising, even if these ratios remain high today relative to those in other world regions.

The quality and effectiveness of the now-sizable and still growing teacher cadres are a pressing problem. Most Sub-Saharan African countries have tried numerous approaches to teacher training and support,[84] often with the support of external partners. The patchwork of approaches—perhaps unavoidable in rapidly growing systems with nascent capacity—has produced teacher cadres comprising members with disparate profiles of qualification, preparation, initiation into teaching, and subsequent professional growth.

These disparities notwithstanding, Sub-Saharan Africa's teaching workforce shares a few features with real impact on their work: weak subject matter knowledge, limited use of effective teaching methods, a lack of mentoring and support to gain teaching mastery, and low accountability for student learning outcomes. Too many teachers fail to turn up for work, and those who do work in overcrowded classrooms with few materials—a reflection of systemic weaknesses that perpetuate skewed allocations of teachers and other resources across schools.

An Action Agenda in Five Priority Areas

Conditions are highly diverse across and within Sub-Saharan African countries, so the measures appropriate to each country will vary as well. Nonetheless, the analysis in this chapter highlights five areas that warrant priority attention for developing and implementing policies to improve teacher management in the coming years:

- Teachers' professional knowledge and competence
- Managerial and instructional leadership of school heads and other leaders
- Conditions for teaching and learning in schools and the classroom
- Teacher deployment across schools and teachers' attendance at their workplace
- Accountability and incentives toward a more effective teacher workforce

The first two relate specifically to teacher preparation and development and are thus developed in greater detail below; the last three pertain to various aspects of managing the teacher workforce as a resource—to be deployed, supported, and engaged in ways that enable the delivery of effective schooling services. Some aspects of teacher management depend on

broader factors that are addressed more fully in chapters 5 and 6 (including budget processes, data systems, technical capacity, coordination, stakeholder engagement, and so on).

Teachers' Professional Knowledge and Competence

Focus on how teachers are prepared and developed Because most entrants to preservice teacher training in Sub-Saharan Africa are better educated than others in national labor pools, raising current recruitment standards is probably impractical. A more pressing priority is to ensure that prospective teachers receive initial preparation that equips them with adequate knowledge and skills for their work in school. Equally important is ensuring the quality and effectiveness of upgrading programs for the backlog of underqualified or unqualified teachers in many Sub-Saharan African countries. An important tool for this purpose is to benchmark initial teacher preparation programs—both preservice and in-service—to standards for relevance and impact on teacher competencies and teacher effectiveness.

Table 4.9 recommends specific steps for improving preservice training programs in the region. To be highlighted is the role of quality assurance, a mechanism that is not yet well developed in most Sub-Saharan African countries. Filling this gap focuses attention on expectations for the content, delivery, and impact of teacher training programs. The scope of this work is broad, covering the numerous aspects identified in table 4.9 as part of what is needed to deliver coherent, responsive, and effective programs for teacher preparation.

Such a holistic approach requires strategy based on a realistic assessment of goals and resources as well as coordinated action by multiple parties with responsibility for different parts of program implementation. Because many steps in implementation separate policy design from getting results on the ground—especially in a domain as multifaceted and complex as teacher management—it is critical to build capacity for continuous monitoring and evaluation. A dynamic and fit-for-purpose feedback loop at every level of implementation can foster learning from experience—within countries, across schools, as well as across countries—thereby helping to improve the effectiveness of teacher preparation programs in Sub-Saharan Africa.

Make teachers' mastery of their work a key goal of continuing professional development Most teachers in Sub-Saharan African countries know enough to deliver lessons, but their grasp of content and pedagogy is tenuous. Because mastery in both areas is essential for raising student learning, it must be the key goal of investment in teachers' continuing professional development. Typical tools for this purpose include induction programs for novices, mentoring of junior teachers by school heads and teacher advisers, in-service training courses, and peer learning. However, little systematic knowledge exists about

Table 4.9 Recommendations for Strengthening Initial Teacher Education, by Level, in Sub-Saharan Africa

Action area	Primary school teachers	Secondary school teachers
Credentials	At entry: At least lower-secondary education	At entry: At least upper-secondary education
	At exit: Equivalent to at least upper-secondary education[a]	At exit: Equivalent to at least tertiary diploma or bachelor's degree[a]
Curriculum focus	• Prioritize early-grade literacy and numeracy	• Strengthen content knowledge in mathematics and science
	• Promote local language instruction in the early grades	• Enhance English/French/Portuguese language skills
Content of program	Curriculum design	
	• Link ITE program curriculum to the school curriculum that graduates of the program will be teachings	
	• Reform training curriculum for relevance, quality, and flexibility (for example, modularized curriculum with a common core and options for context-specific elements; use of distance learning options)	
	• Treat ITE and CPD as part of the same continuum	
	• Train to equip trainee teachers for their work in class, using the textbooks, materials, assessment tools, and instructional methods that they are expected to use in class	
	• Encourage use of formative assessment to adapt teachers' pedagogy to learners' profiles and needs (for example, girls and special-needs students)	
	Practicum	
	• Create a digital platform for practitioners to share exemplary teaching practices	
	• Attach practicums to target schools using improved pedagogical models (such as via an innovation fund)	
	• Encourage use of educational television, radio, videos, and ICT to simulate and expose trainees to rich teaching experiences	
	Induction of new teachers	
	• Design sustainable induction models for new teachers	
	• Build the organizational structures for systematic induction of new teachers	
	• Ensure that all new teachers benefit from induction	
Quality assurance (QA)	• Articulate QA standards, results, sanctions and processes for providers of the training programs and institutions	
	• Ensure robust benchmarks to certify satisfactory completion of training	
	• Invest in staff development for faculty responsible for delivering the training	
	• Mobilize subject experts and practitioners to participate as guest faculty in delivery of the training	
	• Create incentives for innovation in design of the training program	
Monitoring and evaluation (M&E)	Foster capacity for systematic and continuous M&E, for course correction or scaling up, beginning with simple reporting and analysis of key data (such as numbers, costs, examination results for certification, use of teaching practices in class, and so on)	

Note: CPD = continuing professional development; ICT = information and communication technology; ITE = initial teacher education.
a. For example, lower-secondary education followed by two to three years of ITE would be equivalent to attainment of upper-secondary education.

these models of in-service training and support—and even less about their influence on teachers' growth in professional competence. Filling this knowledge gap is thus a necessary part of any effort toward better management of the teaching workforce.

Tables 4.10 and 4.11 recommend specific steps for improving training programs for existing teachers in the region. Like the recommendations for preservice teacher education, the agenda is large and complex because of the number and types of actors involved. But strengthening these programs and the institutional capacity to manage them politically, organizationally, and operationally is critical to improving the effectiveness of Sub-Saharan Africa's teachers.

Managerial and Instructional Leadership

Improve the management capacity and instructional leadership of school heads and other leaders A key function of school heads is to ensure that teachers are present in class and teaching, with appropriate, on-site supervision and guidance—an effort often complemented by that of off-site instructional

Table 4.10 Strengthening In-Service Teacher Education (Upgrading Programs) in Sub-Saharan Africa

Action area	Primary school teachers	Secondary school teachers
Teacher profile	Create and maintain a database of the teacher workforce in public schools, to be used for assessing training needs, informing the design of the training strategy, and assessing the cost implications	
Training menu for certification	• Offer pathways for contract teachers to qualify as regular staff • Offer pathways for underqualified teachers with potential to qualify for certification • Offer pathways to early reading and numeracy expert positions, to expand capacity for systemwide dissemination	• Offer pathways for underqualified teachers (those with only secondary education or who are teaching out-of-field) • Offer pathways to qualify as subject specialists in priority areas (such as mathematics, science, and international languages)
Trainee selection and follow-up	• Establish cutoff eligibility for upgrading (for example, baseline proficiency and education level of prospective trainees) • Use a rigorous process for trainee selection (for example, passing a qualifying test to ascertain fitness for the envisaged training) • Estimate the costs of the upgrading program and plan budget accordingly • Articulate phasing and batching arrangements to maximize the impact at school level (for example, focus on clusters of schools) • Monitor and track trainees' progress with view to minimizing attrition and successful placement following certification	
Content of program	As in table 4.9	
Quality assurance	As in table 4.9	
Monitoring and evaluation	As in table 4.9	

Table 4.11 Strengthening Continuous Professional Development (CPD) of Teachers in Sub-Saharan Africa

Action area	Primary and secondary school teachers
Teacher profile	As in table 4.10
CPD training menus for teachers and instructional leaders	• Prioritize thematic areas of focus (such as early-grade reading and numeracy, mathematics, and science) • Create thematically coherent menus of CPD programs for teachers • Offer dedicated training for school heads and instructional leaders (such as center-based curriculum advisers, inspectors, faculty at colleges of education, and others) • Include flagship professional learning events (for example, an annual thematic conference) as part of the menu
Content of program	• Ensure that focus and content of the training are designed to address identified gaps in trainees' competencies
Quality assurance (QA)	• Establish eligibility criteria to be a provider of CPD training • Articulate QA standards, results, sanctions and process for providers of the training programs and institutions
Delivery model	• Create the organizational infrastructure for school-based coaching and in-class support to improve teachers' instructional practice, replacing generic in-service training consisting mainly of workshops away from the school • Modernize and formalize the roles and responsibilities for instructional leaders, including school heads, center- or district-based staff (curriculum advisors, inspectors, and so on), and for mentors of new teachers being inducted into the profession • Create training and career advancement opportunities for the development of instructional leaders
Monitoring and evaluation	As in table 4.9

leaders and coaches. Strengthening the capacity of this team requires a multipronged effort. Equipping school heads with simple management tools can help improve their oversight of school operations (for example, tracking staff attendance and availability of materials and supplies, and fostering a conducive school climate).

Providing dedicated training as part of CPD enables incumbent or prospective school heads and instructional leaders to accumulate skills and gain mastery of their work. In particular, such training can deepen their capacity to encourage at each school a culture of continuous learning among the teachers as peers seeking to refine their pedagogical practice. It can also help them contribute more effectively to systemwide efforts to monitor and evaluate programs and policies to improve learning outcomes. Last but not least, hiring school heads and instructional leaders competitively addresses the problem at the source, by ensuring that these positions are staffed only by those with the relevant qualifications and competence.

Conditions for Teaching and Learning in Schools and the Classroom

Provide all teachers with minimally adequate classroom conditions to do their work Many teachers in Sub-Saharan Africa face rudimentary constraints at their workplace: excessively large classes, a lack of material resources, an absence of basic amenities, and low standards for personal behavior that tolerate disruption or abuse in school and in the classroom. Overcoming these basic barriers is a necessary first step toward better learning outcomes. Schools with the most serious gaps could be prioritized for additional support so that all schools are brought up to the minimum thresholds of material, instructional, and behavioral conditions described in this chapter. Because innovations in teaching and learning are more feasible in the better-endowed schools, such schools can serve as the entry point for testing promising practices and confirming their impact. Systematic dissemination of innovations with proven impact and the sharing of expertise from the better-performing schools provide potential pathways for lagging schools—as gaps in their material endowments are addressed—to get onto pathways toward better performance.

Teacher Deployment and Attendance

Improve teacher deployment across schools and teachers' attendance at their workplace In some education systems in Sub-Saharan Africa, even the most basic function of assigning teachers to schools according to the number of students enrolled appears to be poorly managed at present. The pattern highlights the need to establish enrollment-based criteria for teacher allocation and adhere to them during implementation.

Teacher absenteeism is also a problem in the region, leading to significant loss of instructional time in many countries. Preventing this loss could improve student learning, even if teachers had modest content knowledge and pedagogical skills and taught only the most basic lessons. Conversely, if teachers are absent and classes are not held at all, having better teachers and more learning materials would be futile for student learning. Addressing absenteeism requires interventions at both the school and system levels. School heads could be encouraged to work closely with the local community to tackle unauthorized teacher absences. Authorized absences—such as for personal leave, professional training, or official duties outside the school—are surprisingly prevalent in Sub-Saharan Africa. To minimize their occurrence requires intervention at the policy level—for example, to create and support a system of substitute teaching arrangements, if budgets permit.

Accountability and Incentives for an Effective Teacher Workforce

Strengthen accountability and incentives for managing the teacher workforce Progress in each of the preceding areas depends on the behaviors and actions of teachers—as well as others in managerial or support functions—and their alignment with the learning agenda. Thus, apart from

the technical and organizational capabilities required for policy and program implementation, accountability and incentive structures may matter just as much, if not more.

The loss of instructional time in Sub-Saharan Africa's public education systems due to teacher absences and the lack of effort in teaching, for example, exemplify an important breakdown in the accountability chain. The breakdown starts at the policy level; in the absence of regulations governing teacher leave (for example, on eligibility for leave when school is in session) and for substitute teaching when a teacher is on authorized leave, much of the loss in instructional time is already built into the system. Policy makers are responsible for designing the policies and regulations, while officials at the national, district, and school levels are responsible for implementation. Incentivizing ministries of education to make policy changes to reduce the loss of time should be a priority of ministries of finance in their role as holders of the public purse.

Getting teachers to use their time in class more effectively once they are in school draws attention to several impediments:

- Low motivation among individual teachers and heads
- Nonenforcement of rules (against teacher tardiness and lack of effort) by school heads and other supervisors up the administrative chain, partly because it is easier to ignore the problem than try to address it
- Absence of societal pressure to adhere to professional standards of behavior

Low motivation could result from low levels of pay, salary arrears, poor working conditions, and poor accessibility to schools. The policy options here appear relatively straightforward—pay salaries on time, provide subsidies to those working in remote areas, and so on—but are often difficult to implement without additional incentives for ministries of education and ministries of finance to join forces as equal partners to find a sustainable solution to the problem.

The second factor—nonenforcement of rules—reflects a broader administrative culture that tolerates lax professional standards of behavior and, indeed, possible collusion among teachers and their managers. Security of tenure and assured pay increases, which are often linked to civil service regulations, can often underpin this culture. Changing behaviors in such contexts is difficult without additional incentives, and introducing reforms in employment contracts—tenure, pay for performance, or competency-based pay—requires high levels of capacity for policy design and implementation. There are currently no good examples of large-scale interventions in these areas. Another route is to instill professional ethics as part of teacher preparation and professional development courses to raise the intrinsic motivation of teachers.

The third factor—the absence or weakness of societal pressure—stems from realities on the ground: low literacy levels, lack of empowerment of local communities, and the real possibility that a school would be left without any teachers if disciplinary action were taken (because of teacher shortages). Dissemination of information and a system of rapidly filling in teacher vacancies or allowing communities to hire temporary teachers against certain standards may be helpful.

In all the areas highlighted above of possible misalignment between accountability and incentive structures and the learning agenda, it is clear that teachers—a key implementation link separating policy from impact on the ground—must be engaged as key agents to remove the impediments to better results. In most Sub-Saharan African countries, teachers are represented by one or more strong unions; inattention or unresponsiveness to teacher grievances has often led unions to call for teacher strikes, with an obvious adverse impact on instructional time. Constructive negotiations with unions focusing not only enhancing teacher motivation (salaries, benefits, and working conditions) but also on teacher effort and performance to improve student learning are necessary. Building capacity in Sub-Saharan Africa's ministries of education and ministries of finance to undertake this task is as arduous as it is essential to make significant progress toward realizing each country's aspiration for universal basic education with quality.

Notes

1. To summarize the detailed description in chapter 1, the typology characterizes countries' divergent paths of education system expansion based on three criteria: their primary gross enrollment rates in 2000 and 2013, shares of children out of school relative to the primary-school-age population, and retention rates in primary education. From highest to lowest progress, countries are in either Group 1 ("Established"), Group 2 ("Emerged"), Group 3 ("Emerging"), or Group 4 ("Delayed"). Within each country grouping, countries are further distinguished by the extent of the contextual challenges ("many," "some," or "few") faced around 2000, the start of the period covered by this study.
2. The research on teachers is vast. Among the highlights relevant to our discussion in this chapter are the following on what matters for teacher quality and impact on student learning: First, teachers' knowledge and ability to operate in a specific cultural and educational context predicts teacher quality better than certification or time in the profession (Hanushek, Piopiunik, and Wiederhold 2014). Second, teacher subject matter mastery and subject-specific teaching skills appear essential to improve student learning (Eide, Goldhaber, and Brewer 2004; Kennedy 1990; Wayne and Youngs 2003). Third, pedagogical practice that fosters interactive engagement with students and uses formative assessment to ascertain students' progress in learning encourages more learning by students (Darling-Hammond 2011).

3. The knowledge gaps define an agenda for future research, highlighting the following: (a) the content knowledge and teaching skills of entrants to the teaching force; (b) the nature of continuing support required by teachers to be more effective in the classroom; and (c) for secondary education, the complexities of optimizing curriculum design, teacher specialization, and teaching workload, as well as the implications of school size on the allocation of teaching assignments.
4. All regional names are as defined by the United Nations Educational, Scientific, and Cultural Organization (UNESCO).
5. The appendixes for this book can be found here: https://openknowledge.worldbank.org/handle/10986/29377.
6. Transition pathways include the following three (Dembélé, Chudgar, and Ndow 2016): (a) competitive recruitment exams (in Benin, Burkina Faso, Kenya, Mali, and Togo); (b) degree-granting courses (in Eritrea, The Gambia, Niger, and Togo); and (c) legally specified periods of service as contract teachers (in Eritrea, Ethiopia, Mozambique, and Senegal).
7. See examples of Ghana and Uganda reported by Mulkeen et al. (2007).
8. Data on the shares of nonpermanent teachers at other levels are scarce. For Madagascar, World Bank (2017) provides the following data on the shares of community teachers (some subsidized by the government): 88 percent in preprimary, 41 percent in lower-secondary, and 25 percent in upper-secondary. These shares exclude contractual teachers hired directly by the Ministry of Education.
9. Dembélé, Chudgar, and Ndow (2016) report data for Mali showing a significant decline since 2010 in the numbers of contractual teachers and a concomitant rise in the number of civil service teachers, possibly returning the share of contractual teachers to the level in 2000.
10. Data from Mingat (2004) for 11 francophone Sub-Saharan African countries in the early 2000s show that the pay of civil service teachers in primary school averaged 5.6 times the per capita GDP, compared with 2.4 times for contract teachers hired by the state and 1.3 times for teachers hired by parents.
11. The nine SDI countries are Kenya, Madagascar, Mozambique, Niger, Nigeria, Senegal, Tanzania, Togo, and Uganda.
12. The data also identify teachers who work in the public sector; they do not, unfortunately, include information on *types* of contract held by the teachers (for example, permanent civil service or temporary positions).
13. In francophone countries, many teachers are nonpermanent contract employees who are typically less well educated than civil service teachers. The analysis here compares all teachers with clerical workers.
14. Differences in survey questionnaires complicate comparisons of pay. Some surveys gather data on weekly or monthly wages but not on the number of weeks or months for which wages are paid. Thus, hourly pay would be a more precise indicator for comparing the remuneration of teachers and nonteachers.
15. Little is known about government regulation of teachers' second jobs in Sub-Saharan African countries. In Asian countries, governments regulate private tutoring, a common second job for teachers, to varying degrees (Bray and Kwo 2014).
16. The approach is admittedly not flawless: wording differences in the survey questionnaires reduce the comparability of the data across countries and hence the

reliability of the results based on the pooled data. Respondents' responses to questions on income and other financial data are particularly prone to inaccuracy. These issues suggest that care should be exercised when evaluating the regression results. Note that in the regression analysis, the influence of country-specific factors—such as laws, organizational structure, or social norms—is accommodated using the standard approach of including country dummy variables in all the regression equations.

17. For the full regression results, see online appendix D.3, table D.3.1.
18. The results are stable across regression specifications; see online appendix D.3, tables D.3.2 and D.3.3.
19. It is unclear how big the sizable pay disadvantage of African women is in comparison to the situation for women elsewhere in the world. Also unclear is how much the gap has exacerbated the fact that women account for a smaller share of the teacher workforce in Africa than in other world regions (see table 4.2).
20. Teachers in Uganda "believe that their salary is low, whereas it is actually higher than for similarly graded civil service jobs" (TISSA-Uganda 2014, 22).
21. Where the EMIS data overlap with other data sources, we report results based on the EMIS data. Published estimates of the index of randomness extend our time series, and are sourced, for primary education, from Majgaard and Mingat (2012) for 2006 Malawi data and from World Bank country status reports for 1999 Côte d'Ivoire data, 2001 Democratic Republic of Congo data, 2009 The Gambia data, 2008 Ghana data, and 2008 Sudan data (World Bank 2005a, 2005b, 2010, 2011, 2012b); and for secondary education, from the World Bank country status report for 1999 Côte d'Ivoire data (World Bank 2005a).
22. Following standard practice, one dummy variable is added for each district except for the reference district.
23. For Côte d'Ivoire, the fixed and non-fixed-effects indexes of 0.14 and 0.19, respectively, suggests that about two-thirds of the inconsistencies arises between districts, and the remaining third, within districts.
24. To save space, figure 4.11 shows only Groups 1 and 3. In Group 2, date were available only for Tanzania. For this country, the index of randomness in teacher allocation is estimated at 0.28 and 0.47, respectively, for the regression models with and without fixed effects.
25. In rural India, for example, where the absenteeism rate reaches about 25 percent (Dundar et al. 2014), the loss of work time has been estimated at about US$1.5 billion a year (Chaudhury et al. 2006; Muralidharan et al. 2017).
26. SDI survey enumerators collect information on teachers' presence at school and in their classrooms through two unannounced visits to the sample schools. The sample covers only primary schools, leaving an unfortunate knowledge gap about absenteeism among secondary school teachers.
27. Because of possible differences in the treatment of authorized leave across surveys, some ambiguity exists in the trends in teacher absenteeism.
28. Lee et al. (2015) updates the literature on teacher absenteeism and the reasons for absenteeism (pay structure, management, working conditions, community conditions, and social and cultural responsibilities). For case studies, see also Ejere (2010) on Nigeria and Tao (2013) on Tanzania.

29. Data for earlier years come from Abadzi (2006) for Kenya and Senegal; Bennell and Mukyanuzi (2005) for Tanzania; Lee et al. (2015) for Uganda; TI (2013) for Nigeria; and World Bank (2017) for Madagascar.
30. Class absenteeism rates by location and type of employment contract, which are not shown here to save space, reveal similar patterns as those for school absenteeism rates.
31. Employment contracts are classified according to definitions in the SDI survey. Government teachers work in government schools and are classified as noncontract teachers paid by the central government; other categories of government school teachers include those who are either unpaid or paid directly by the school from its own funds or by the community. Private teachers work in private schools based on private contracts negotiated with their schools.
32. Absenteeism rates for public school teachers who are on school-based or community-based contracts differ little from the rates for teachers on government contracts, suggesting that their presence at work is probably managed in the same way as other teachers at the school.
33. Information was not collected on the reasons for each teacher's absence from class. The relation between understaffing and teacher absenteeism was explored in a regression analysis that included the numbers of teachers and of students among the right-hand-side variables. On neither of these variables was the coefficient statistically significant.
34. Improving students' readiness to learn requires consideration of policies beyond the scope of teacher management, and indeed, even beyond the scope of the education sector. It is thus not treated in detail in this volume.
35. The findings presented in this section are based on a commissioned background study by Varly (2016). For a description of the data sources used, see online appendix D.4, table D.4.2.
36. A more recent round of surveys, SACMEQ IV, was fielded in 2013. Unfortunately, SACMEQ IV data for only Kenya and Malawi were available as of this writing.
37. The teacher tests were not administered in Mauritius, which reduces the number of countries in the sample from 15 to 14.
38. Molina and Martin (2015) show that the percentage of teachers reaching the minimum level of competency in the SDI countries is sensitive to decisions on whether the cutoff percentage of correct answers is 70 percent, 80 percent, 90 percent, or 100 percent.
39. The bookmark method, which is used by the National Assessment of Education Progress in the United States among others, is a procedure for assessing the comparability of different tests, involving the following main steps: (a) form an expert group with relevant expertise in the relevant subject; (b) calculate the Rasch difficulty index of all test items; (c) rank the test items in ascending order of difficulty in the reference test (in this case, SACMEQ); (d) for each SACMEQ level, based on skills definition, ask each expert to identify test items where a borderline test taker has a two-thirds probability of answering correctly; (e) analyze and reconcile differences of judgment among members of the expert group; and (f) based on the results from the expert group, identify the corresponding SDI cut-scores for each level in the SACMEQ scale. For the purpose of the exercise here, which focused on mathematics, Varly (2016) formed a group of three experts (a mathematics teacher, a school head with

experience in teaching, and a senior psychometrician). All three experts found no item in the SDI test corresponding in difficulty to the items at the upper levels of the SACMEQ scale (Levels 7 and 8); and they difficulty to their judgments on the items at Level 6 (the minimum competency level for teaching). The bookmark method thus failed to identify a reasonable cutoff SDI score corresponding to SACMEQ's definition of the minimum competency thresholds for teachers of mathematics.

40. The minimum threshold of competence is defined as answering correctly 80 percent of the questions in both the language and mathematics tests administered to grade four teachers in the SDI survey. Molina and Martin (2015) report the following shares of teachers reaching this minimum: Kenya (39 percent), Uganda (19 percent), Togo (3 percent), Tanzania (21 percent), Mozambique (1 percent), and Nigeria (4 percent), for an average of 16 percent for these six countries.
41. For details on the PIAAC scale, see online appendix B.1, table B.1.1.
42. PASEC intends to administer tests to teachers in its next round of data collection.
43. The STEP surveys also gathered data on noncognitive or soft skills. They focus on key personality traits: openness, conscientiousness, extraversion, agreeableness, emotional stability, grit, hostile attribution bias, and decision making. The correlation between the literacy score and the score for soft skills is 0.17 in Ghana and 0.10 in Kenya. In Ghana, regression analysis of the correlates of the soft skills score shows a statistically insignificant coefficient on the teacher variable (that is, teachers do not have a higher soft-skills score than other workers in nonteaching service sector jobs). In Kenya, the teacher variable is positive and statistically significant. Notably, Kenya's soft-skills average score is well below that of the other countries (on all dimensions of the score); Kenya is also the only country in the STEP sample where the soft-skills score decreases with educational attainment.
44. Data show that almost all teachers read at work and that they read more at work and outside work than other individuals employed in the service sector.
45. Private universities and colleges may rely on a combination of KCSE cutoff scores, their own entry examinations, and interviews of prospective students in their admission process.
46. The interaction term in the regression analysis—"Teacher training program X Female"—makes it possible to refine the impact of gender on selection into teacher training programs. Consider, for example, the second regression in table 4.6, which pertains to diploma-level courses. The coefficients on "Teacher training program," "Female," and the interaction term are 5.57, −2.92, and 1.95, respectively. These results mean that, all else being the same, those admitted to diploma-level teacher training courses scored, on average, 5.57 points higher than those admitted to other diploma-level courses. However, for women admitted to diploma-level programs, the difference is adjusted by an amount computed by the sum of the coefficients on "Female" and the interaction term (that is, −2.92+1.95 or −0.82). The result in this case reduces by nearly 1 score point the scores of women admitted to teacher training and to nonteaching fields of studies at the diploma level.
47. For details on the TEDS-M survey, see Tatto (2013).
48. For cross-country results on prospective primary and secondary teachers' scores on the tests of content and pedagogical knowledge, see online appendix D.6, tables D.6.1 and D.6.2.

49. The correlation between the TEDS-M score on content knowledge for secondary prospective teachers and the GDP per capita is 0.47.
50. For examples of more detailed analyses of the relation between teacher cognitive knowledge and student learning outcomes, see Altinok (2013); Altinok, Antoninis, and Nguyen-Van (2017); and Metzler and Woessmann (2012).
51. For a summary of relevant research on this topic in Sub-Saharan African countries, including insights from surveys other than the SDI, see online appendix D.7.
52. At Level 1, the teaching practices aim simply to engage students in active learning. At Level 2, the teacher sets intellectually ambitious tasks for their students. At Level 3, the teacher diversifies and enriches teaching strategies beyond those in the previous two levels. At Level 4, the teacher uses the broadest repertoire of highly skilled practices, including (a) assessing student learning continuously and adapt teaching to student needs; (b) creating effective scaffolds and supports for all students; (d) providing clear standards, constant feedback, and opportunities for revising work; and (e) developing and effectively managing a collaborative classroom in which all students have membership.
53. Because the SDI observation rubric did not include all aspects of teacher-student interactions, the absence of a particular behavior may simply reflect its absence from the survey instrument, rather than from the teaching practices of the observed teachers.
54. The SDI also collected student experiences in the classrooms where their teachers were observed. They come across as passive learners: on average, fewer than half the students in these classrooms were called on by name or approached by their teacher, and less than a quarter were asked to work at the blackboard.
55. The diversity in minimum qualification limits the usefulness of the share of qualified teachers as a measure the quality of the teacher workforce in cross-country comparisons. Trends in this indicator mask the underlying dynamics, for example, when countries raise the minimum threshold (for example, Ghana, Nigeria, and South Africa) and create an immediate backlog of newly underqualified teachers.
56. Some francophone African countries have replaced longer, college-based training with shorter courses (for example, preservice education in Chad and Mauritania lasts less than a year, and in Togo, no longer than three months for most the new teachers). In other countries, entry requirements have sometimes been relaxed. (In Lesotho, an extreme example, 51 percent of sixth-grade teachers have only completed primary school themselves.)
57. The literature sometimes refers to concurrent and consecutive models of teacher training (for example, the World Bank's Systems Approach for Better Education Results [SABER] tool for teachers; see http://saber.worldbank.org/). The concurrent model is designed mainly for those who have already decided on becoming a teacher, and the programs are largely vocational in orientation. Consecutive models serve entrants who may not have decided on a teaching career; the programs teach subject knowledge first, usually leading to a tertiary education degree in a subject or discipline, followed by a second phase where pedagogic skills are taught, possibly along with additional subject-specific courses.
58. In Sub-Saharan Africa's context, the "initial" in ITE refers to the minimum initial qualification required of teachers, not to the timing of a teacher's professional preparation before starting his or her teaching job.

59. See Orr et al. (2013) for more information on strategies that low- and middle-income countries in Africa and elsewhere have used to upgrade the skills and effectiveness of untrained or undertrained teachers.
60. Information on preservice and inservice ITE comes from Kitchlu (2017a) for the Democratic Republic of Congo; Kitchlu (2017b) for Nigeria; Mulindwa (2017) for Malawi; and Nhampossa (2016) for Mozambique.
61. This system provided for one term in college, four terms in supervised teaching practice, and most of a term in college preparing for and taking final examinations.
62. The SACMEQ surveys sampled teachers in grade six, while the PASEC surveys sampled teachers in grades three and six.
63. Based on analysis of the 15 countries in the SACMEQ III sample, Hungi (2011) finds that students taught by teachers with more training or support did no better in reading and mathematics than those taught by teachers with less training. In the one or two counties where training did make a difference, the effect was either small or lacking in statistical robustness.
64. The study used data gathered by questionnaire, video recordings, and interviews to examine how early-grade teacher trainees were trained to teach mathematics and reading as well as how newly qualified teachers actually taught.
65. Ability to follow the prescribed formula—rather than success in boosting students' learning outcomes—was the lens for self-evaluation; it gave new teachers a false confidence in their professional skills and inclined them to ascribe their lack of learning to resource constraints or to students' slowness to learn.
66. In Tanzania, where demonstration primary schools were attached to each teacher training college, trainees' ability to engage in practice teaching was infrequent and erratic. In Ghana and Mali, where practicums last a year, trainee teachers received little systematic guidance and support from expert teachers at the host schools.
67. The highest rating for quality assurance was given to institutions and programs where the evaluation was carried out by an independent, external party.
68. For the SACMEQ sample, the reference period was the past three years, while for the PASEC sample, it was the past two years.
69. Support for teachers can take multiple forms: lesson modeling by teacher educators or mentors who offer constructive feedback; peer-to-peer interactions and collaboration through joint classroom observation, sharing of lesson plans, assessment practices, and other resources; and awareness and support of the head teacher and the colleagues for new methods of teaching.
70. Popova, Evans, and Arancibia (2016) used a template of 70 questions to systematize the collection of data on such aspects of in-service teacher training programs as the overarching policy context, program content, program delivery arrangements, and implementers' perceptions of program effectiveness. A preliminary test of the instrument confirmed that basic information was indeed missing (or simply not systematically documented) for many programs.
71. For more discussion on fostering synergy between ITE and CPD, see online appendix D.8.
72. As the SACMEQ surveys in 14 countries in East and Southern Africa suggest.
73. As the STEP surveys as well as household and labor market surveys indicate.
74. Because of data constraints, the focus is on primary schools.

75. UNESCO (2012) provides pertinent insights based on a 2011 data collection collaboration among the Pan African Institute of Education for Development (IPED), the Association for the Development of Education in Africa (ADEA), and the UNESCO Institute for Statistics (UIS).
76. Based on analysis of Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS) data, UNICEF (2014) reports the following shares of girls who cite teachers as the perpetrators of the violence they experienced at school: Uganda (48 percent), Kenya (42 percent), Nigeria (32 percent), Tanzania (28), Cameroon (16 percent), Zimbabwe (12 percent), the Democratic Republic of Congo (11 percent), and Zambia (10 percent). Among girls younger than 20 years of age, UNICEF (2014) estimates that in the 13 of the 18 Sub-Saharan African countries in its sample, about 10 percent globally have been sexually abused, and that 10 percent or more of these young girls in 13 of the 18 Sub-Saharan Asfrican countries have been the victim of forced sex.
77. In recent years, the following countries have enacted laws to outlaw the practice: Togo (2007), Kenya (2010), Congo (2010), South Sudan (2011), Cabo Verde (2014), and Benin (2015), according to a 2016 radio report on "Châtiments corporels à l'école" [Corporal Punishment in School], accessible at http://www.rfi.fr/emission/20160115-chatiments-corporels-ecole. Antonowicz (2010) notes that, among female students, gender-based violence could take the form of "sex for grade" or outright rape by their teachers. For updates on Liberia and Sierra Leone, respectively, see SFCG (2015a, 2015b).
78. Data for Zanzibar and mainland Tanzania were collected separately, providing stand-alone results for both places. The data for Zanzibar are not shown separately in figure 4.29, because no data are available on trends in enrollment coverage, size of the out-of-school population, and challenges in the initial country context (hence it is not assigned to a country group). In 2007, the incidence of teachers bullying students rose to 94 percent of the schools, pointing to what appears to be a pervasive culture of violence against students. Sexual harassment of students by teachers is also common in Zanzibar, with 89.6 percent of the school heads reporting that it occurs "sometimes" or "often." By contrast, no school head in the Seychelles reported it as either an occasional or routine problem.
79. The concept of essential conditions here differs from the Essential Learning Package (ELP) idea advanced by the United Nations Children's Fund (UNICEF) (UNGEI 2006; UNICEF 2008). Whereas the package discussed in this chapter focuses on conditions that enable the work of teachers, the ELP focuses on essential supplies and services for schools (for example, "infrastructure and equipment, classrooms and wells, separate toilets for boys and girls, desks and chairs, adequate numbers of trained teachers and communities that are fully engaged as partners for change"). The ELP initiative capitalizes on UNICEF's experience in encouraging rapid increases in enrollment through major campaigns supported by strong logistics and supply deliveries. The expectation is that the initiative would help build "viable national systems for delivering quality education through the massive procurement of supplies designed to ensure that more children enroll in school and complete their education" (UNGEI 2006). The ELP has been implemented in such countries as

Benin, Burkina Faso, Chad, the Democratic Republic of Congo, The Gambia, Guinea, Mali, Mauritania, Niger, Nigeria, Senegal, and Sierra Leone.

80. For all the SACMEQ countries except Kenya and Malawi, the data available at the time of writing pertain to 2007. Conditions may have improved since then.
81. Although defined differently, the SACMEQ and PASEC minimum thresholds are probably still comparable for the purpose of the analysis here.
82. For the list of bad behaviors, see table 4.8, note "b."
83. For shares of schools meeting the minimum threshold for each essential condition, see online appendix D.9, table D.9.1.
84. To meet recruitment targets, countries relied on various approaches, such as adjusting hiring criteria, shortening initial training, reducing or delaying the practical component of the training curricula, and leveraging distance learning to deliver the training. In most Sub-Saharan African countries, tight public budgets constrained the provision of teacher support services and in-service training and held back efforts to develop systemic structures for teacher supervision, monitoring, and evaluation. In some countries, the lack of funds meant that some teachers work under new types of contracts with reduced pay or benefits; some teachers even work under arrangements where they are paid not by the state but by parents of the students at the school.

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Chapter 5

Deploying the Budget to Improve Quality

Introduction

Appropriate policies yield results only if there are adequate resources and if they are well implemented. Earlier chapters have outlined the critical issues that need to be addressed to improve the quality of education and learning outcomes in basic education in Sub-Saharan Africa. These include unblocking the early-grade "traffic jam"; removing bottlenecks in the transition between upper-primary and lower-secondary education; addressing equity issues; and making fundamental reforms in teacher support and management.

The budget is one of the most important tools for implementing policies; it also poses one of the most significant constraints on choosing the right policies. Current public expenditure patterns in the education sector, dominated as they are by salary expenditures because of the labor-intensive nature of education provision, cannot be altered dramatically in the short run. For better or worse, they reflect past policy choices: in Sub-Saharan Africa, these policies were directed toward ensuring universal access and completion of primary education, which meant hiring more teachers and expanding the school network. For instance, the debt-rescheduling exercises pursued in 31 Sub-Saharan African countries since 1999—mainly through the multilateral Heavily Indebted Poor Country (HIPC) initiative—usually supported these priorities by linking debt relief to additional expenditures for basic education and basic health.

In countries where resources are increasing, owing mainly to economic growth or greater revenue generation, there is greater freedom to make changes at the margin—specifically, to devote incremental resources that can make the greatest difference in improving quality and increasing equitable access. In countries with limited resources, there is less room to maneuver.

Further, even as the focus on basic education has intensified, many Sub-Saharan African governments have also become concerned with not falling behind in accessing the economic opportunities afforded by global trade and

new technologies. The result has been a desire to expand the university sector and other areas of postsecondary education. Government leaders and officials have been influenced by the experiences of middle-income countries elsewhere. Economic success in many of these countries has been associated with expanding access to higher levels of education and, increasingly, with the quality of education.

Given the large unfinished business in ensuring universal access to basic education in many countries, the growth in the child population, and the poor learning environment in most of the region's schools, all Sub-Saharan African countries will require more resources. They will also need to use their budgetary resources more efficiently to maximize the benefits from these resources. This chapter addresses both these issues, structuring the discussion as follows:

- *"Overview of Education Financing and Spending in Sub-Saharan Africa"* is primarily, but not entirely, descriptive. It evaluates how much is spent on education in total; the sources of financing; the channels through which financing flows; how financing is spent functionally (between levels and types of education) and economically (on which inputs, such as teachers or facilities); whether resources are used efficiently and effectively; and the equity of financing overall and for inputs within levels of education.
- *"Getting Better Value for Money through Public Financial Management Reform"* reviews evidence about public financial management (PFM) processes that affect the efficiency of resource use. The findings of the first two sections are presented, where possible, according to the country groups discussed in chapter 1.[1]
- *"Decentralizing the Planning and Execution of Education Resources"* assesses the evidence regarding decentralization initiatives—which have become widespread in Sub-Saharan Africa—that alter the governance, financing, and management framework within which education is delivered and budgeting and spending decisions are made. The section reviews three types of decentralization: to subnational and local governments; more directly, to schools, through various forms of school grants; and, in a few cases, to nonstate actors such as private providers or nongovernmental organizations (NGOs).
- *"Using the Budget: Priority Areas for Improving Quality and Equity"* summarizes the findings and identifies the priority actions for using budgetary resources to improve quality in basic education.

The analysis in this chapter draws on several sources of data:

- The UIS.Stat database of the United Nations Educational, Scientific, and Cultural Organization's (UNESCO) Institute for Statistics (UIS) provides data on total government expenditures (TGEs) and government education expenditures (GEEs), which are self-reported by governments. GEEs by level

of education are not standardized by UIS, even though the duration of the cycles differs across countries. Countries provide budget data according to International Standard Classification of Education (ISCED) levels. For this study, public spending by level of education was estimated only for countries with comparable primary education cycles.

- UNESCO's Education for All Global Monitoring Reports (GMRs)—called the Global Education Monitoring (GEM) reports since 2016—and household surveys for selected countries are the source of data on household spending on education.
- The GMRs or GEM reports and the Development Co-operation Directorate (DAC) of the Organisation for Co-operation and Development (OECD) provide data on donor aid for education.
- Public Expenditure and Financial Accountability (PEFA) surveys are used for assessment of budgetary processes.
- World Bank Public Expenditure Surveys (PERs) of various countries also provide information on various issues covered in this chapter.

Overview of Education Financing and Spending in Sub-Saharan Africa

Sources and Shares of Total Education Financing

Governments, donors, and households finance education in Sub-Saharan Africa. Revenues collected by the central government dominate the public financing of education across the region, with local governments in decentralized systems contributing little. Government funding is supplemented to varying degrees by transfers of aid. Households are often an important and sometimes the dominant source of funding.

Government Education Expenditures[2]

Sub-Saharan Africa has posted impressive gains in government education expenditures (GEEs) as a share of GDP. The region's median GEEs as a share of GDP in 2014 (4.4 percent) were lower than in Latin America and the Caribbean (4.9 percent) but significantly higher than in South Asia (3.8 percent) and in East and Southeast Asia (3.9 percent) (table 5.1).

Notably, between 1999 and 2014, the annual rate of growth of real GEEs in Sub-Saharan Africa averaged 5.3 percent, higher than in the other regions of low- and middle-income countries except for Latin America. In 16 of the 22 countries for which trend data are available, GEEs also increased as a share of gross domestic product (GDP) between 1999 and 2014. Of the six countries where this was not the case, three had a 1999 population below

Table 5.1 Government Education Expenditure Trends in Sub-Saharan Africa and Other Selected Regions 1999–2014

	GEEs as share of GDP (%)		GEEs as share of TGE (%)		Real GEE annual growth (%)
Region	1999	2014	1999	2014	1999–2014
Sub-Saharan Africa	3.9	4.4	16.8	16.6	5.3
East and Southeast Asia	4.3	3.9	13.8	15.4	4.2
Latin America and the Caribbean	4.4	4.9	15.8	16.1	5.4
South Asia	2.8	3.8	16.6	15.3	4.5

Source: Constructed using data from UNESCO 2015 Online Statistical Tables, table 11 for year ending 1999, and UNESCO 2016 Online Statistical Tables, table 16 for year ending 2014.
Note: GEEs = government education expenditures; TGEs = total government expenditures. Real GEE annual growth estimated using constant US$. All regional values shown are medians. Data for Sub-Saharan Africa are for 22 countries.

1.3 million: The Gambia, Mauritius and the Seychelles). The remaining 26 countries for which either trend data are not available or no data are available may or may not show this positive pattern.

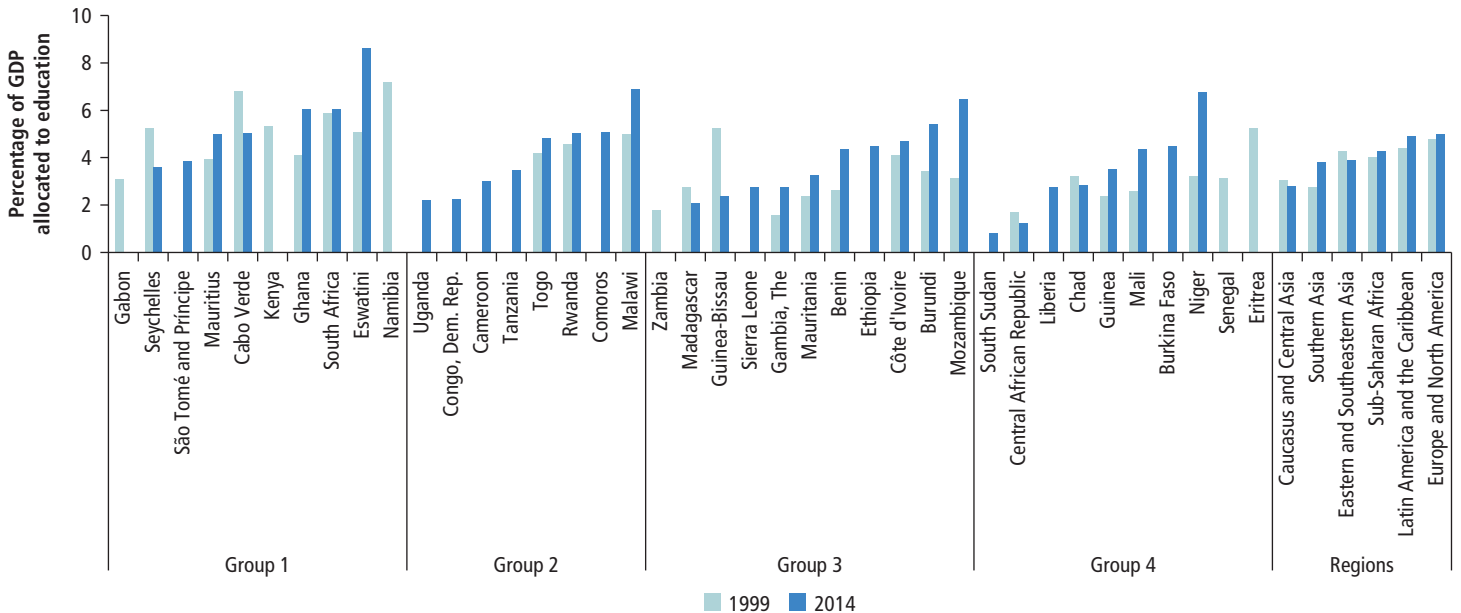
This relatively high level of GEEs across Sub-Saharan Africa conceals substantial differences between countries, with the situation in some countries being of major concern. In 2014, in the 33 of the 48 Sub-Saharan African countries that had available data, GEEs as a share of GDP varied from 8.6 percent in Eswatini to 0.8 in South Sudan. Six countries spent more than 6 percent of GDP on education, while 17 spent 3–6 percent (figure 5.1). The remaining 10 countries spent less than 3 percent of GDP—an extremely low share of national resources to allocate to education.

The governments of the remaining 15 countries could not make even this basic information available, which may indicate that GEEs in several of those countries (probably including Equatorial Guinea, Eritrea, Nigeria, and Somalia) are low as a share of GDP. Recent best estimates for Nigeria suggest that GEEs in 2013 were just 1.7 percent of GDP (World Bank 2015a).

In both 1999 and 2014, GEEs as a percentage of GDP were generally highest among the Group 1 countries. They were generally lower in the Group 2 countries and lower still in most of the countries in Groups 3 and 4. Countries in Groups 3 and 4 spent about the same average amount on education as a percentage of GDP in both 1999 and 2014. Notably, however, Niger and Mali—both Group 4 countries—increased their spending levels substantially, as did Burundi and Mozambique in Group 3 (figure 5.1).

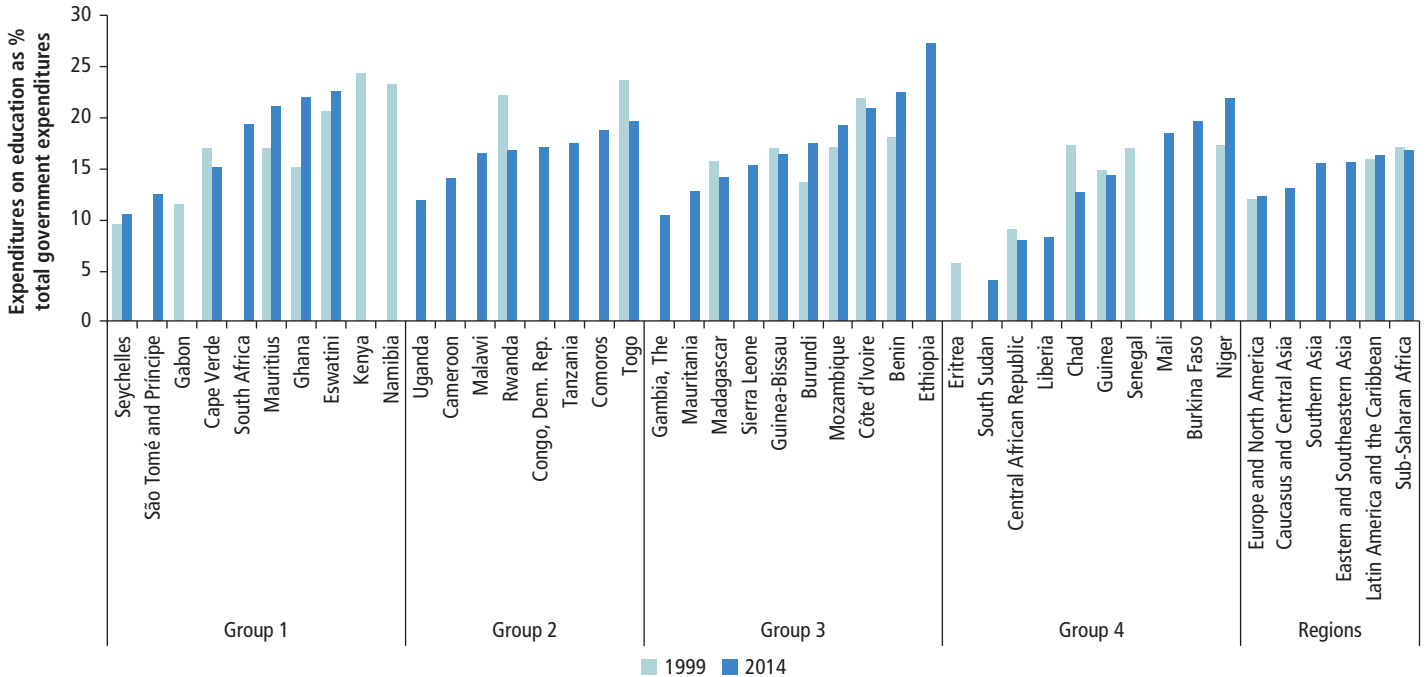
GEEs as a share of TGEs show similar, if not better, gains. The regional picture of GEEs as a share of TGEs—a direct measure of government commitment—is similar to, if not even more positive than, that for GDP (figure 5.2). Across the 33 countries with data, Sub-Saharan Africa countries

Figure 5.1 **Government Education Expenditures as a Percentage of GDP, World Regions and Sub-Saharan African Countries, by Group, 1999 and 2014**



Source: Constructed using data from UNESCO 2015 Online Statistical Tables, table 11 for year ending 1999, and UNESCO 2016 Online Statistical Tables, table 16 for year ending 2014.
a. Group 1 ("Established") countries had high gross enrollment ratios (GERs) in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. Group 2 ("Emerged") countries had high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. Group 3 ("Emerging") countries had low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. Group 4 ("Delayed") countries had low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

Figure 5.2 Government Education Expenditures as a Percentage of Total Government Expenditures, World Regions and Sub-Saharan African Countries, by Group, 1999 and 2014



Source: Constructed using data from UNESCO 2015 Online Statistical Tables, table 11 for year ending 1999, and UNESCO 2016 Online Statistical Tables, table 16 for year ending 2014.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

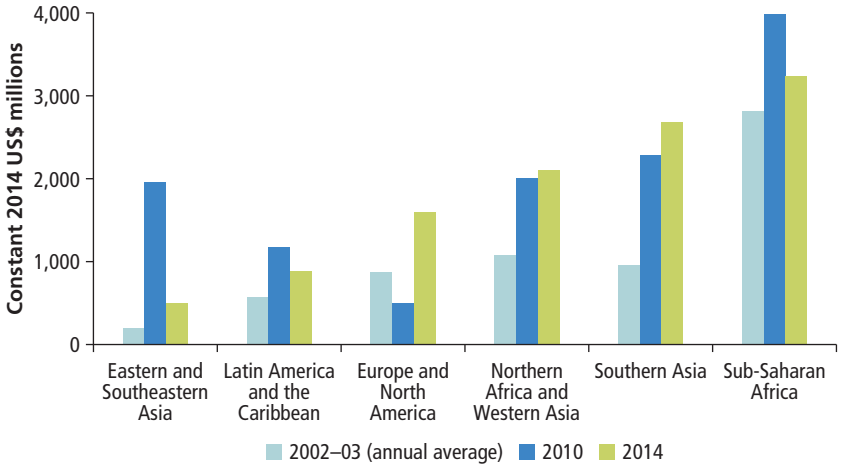
spent, on average, 16.6 percent of TGEs on education in 2014. This share was higher than that in any other low- and middle-income region (Latin America and the Caribbean, 16.1 percent; East and Southeast Asia, 13.2 percent; South Asia, 15.3 percent).

Many of the Group 1 countries (Eswatini, Ghana, Mauritius, and South Africa) show a high level of government commitment (around 20 percent of TGEs or higher in the latest available data year). Ethiopia in Group 3 stands out for the highest share (27 percent in 2014). Countries in Group 4 have, on average, GEEs that are a smaller percentage of TGEs in both 1999 and 2014 than the average for the other country groups for these two years. South Sudan has the lowest share, at 3.9 percent.

Donor Aid for Education

Aid has played an important part in funding education in Sub-Saharan Africa over the past 10–15 years. In absolute terms, aid to education rose from US$2.8 billion in 2002–03 to US$4.0 billion in 2010 and fell to US$3.2 billion in 2014. Despite the recent reductions, aid for education in Sub-Saharan Africa remains higher than in other regions (figure 5.3). For primary education, broadly defined, the totals were US$1.5 billion in 2002–03, US$1.9 billion in 2010, and US$1.5 billion in 2014.[3] These figures include aid to the education sector as well as general budget support that also partly supports education.

Figure 5.3 **Total Aid to Education, by Region, 2002–03, 2010, 2014**



Source: Constructed using data from UNESCO 2016 Aid Tables Supplement (Table 3 Recipients of Aid to Education for years 2002–03 and 2014) and UNESCO 2016 (Table 20.4 for year 2010).
Note: Total aid includes direct aid to the education sector as well as general budget support that partly supports education (estimated to be about 20 percent of general budget support).

However, aid for education is heavily concentrated in a few countries and is relatively small considering the size of the school-age population. Between 2002–03 and 2014, the six main recipients of aid for education were as follows (in 2015 dollars): Ethiopia (US$3.6 billion), Tanzania (US$2.7 billion), Mozambique (US$2.4 billion), Senegal (US$1.8 billion), Ghana (US$1.6 billion), and Uganda (US$1.6 billion).[4] These amounts include estimates of general budget support going to education. Focusing on direct aid to the education sector alone, Ethiopia was by far the largest recipient, receiving almost US$1.5 billion more than Tanzania between 2002 and 2014.

In 2014, the average annual aid to primary education per child enrolled across the region was estimated to be US$8. Of the 42 Sub-Saharan African countries with valid data, annual aid per child was at most US$20 in 35 of these countries, with 23 receiving less than US$10 (table 5.2). A significant number of the high-aid recipients (more than US$20 per child) are the Group 1 countries—possibly driven by their small population sizes. However, equally striking is the large number of Group 3 and Group 4 countries that receive relatively little aid, although they are still struggling to ensure universal coverage.

The reduction in donor aid to education since 2010 and the strong growth in government expenditures have reduced the importance of aid in TEEs in most Sub-Saharan African countries. Donor aid played an important role in advancing the expansion of primary education in the two decades prior to 2010. Data for 20 Sub-Saharan African countries show that donor aid as a share of TEEs in 2004 was at least 20 percent in 15 of those countries; by 2012, the number had fallen to just 6 (UNESCO 2015, figure 8.15).[5] Even so, aid remains important for many of the region's countries and was equal to at least 10 percent of TEEs in 15 of the 20 sampled countries.

Contrary to expectations, donor aid for education does not appear to be a priority in Sub-Saharan Africa. Across all regions globally, the share of total sector-allocable aid going to education averaged 10 percent in 2014; but in Sub-Saharan Africa, the average was only 8 percent—the lowest among the regions. That share had also fallen sharply from the annual average of 15 percent in 2002–03. It is not clear whether this reduction stems from changes in priorities among development partners or among recipient governments. However, that an increasing share of aid takes the form of general budget support that is nonallocable to specific sectors may explain the decline in education sector-specific aid.

Household Contributions to Education

Households contribute heavily to TEEs through expenditures on both public and private schools. The most recent global estimates of total household expenditures on education and their share in TEEs (from household surveys carried

Table 5.2 Total Donor Aid to Primary Education per Enrolled Child in Sub-Saharan African Countries, by Group, 2014
Current 2014 US$

Country group	$0–10	$11–20	$21+
Group 1	Congo, Rep. (<1)	Zimbabwe (15)	Eswatini (21)
	South Africa (1)		Seychelles (24)
	Kenya (6)		São Tomé and Príncipe (26)
	Lesotho (8)		Namibia (34)
	Mauritius (9)		Botswana (40)
	Ghana (10)		
Group 2	Togo (1)	Malawi (12)	None
	Cameroon (1)	Rwanda (14)	
	Uganda (3)		
	Congo, Dem. Rep. (4)		
	Comoros (8)		
	Tanzania (8)		
Group 3	Angola (2)	Zambia (14)	None
	Nigeria (2)	Mozambique (15)	
	Côte d'Ivoire (3)	Ethiopia (16)	
	Mauritania (3)	Gambia, The (18)	
	Benin (7)	Sierra Leone (19)	
	Burundi (7)		
	Madagascar (8)		
Group 4	Chad (3)	Guinea (11)	Senegal (31)
	Equatorial Guinea (3)	Niger (13)	Liberia (41)
	Eritrea (3)	Burkina Faso (16)	
	Sudan (6)	Mali (18)	

Sources: Compiled from aid data from Organisation for Economic Co-operation and Development (OECD) Creditor Reporting System (CRS) Aid Activity database (accessed October 12, 2017), https://stats.oecd.org/Index.aspx?DataSetCode=CRS1; and enrollment data from UNESCO 2016 (Table 2) except for Angola, Nigeria, and Sudan data from UNESCO Institute for Statistics (UIS.Stat) database (accessed October 12, 2017), http://data.uis.unesco.org.
Note: Spending ranges correspond to gross disbursements in current U.S. dollars of 2014. Figures in brackets indicate aid per child enrolled in primary education. Countries in each cell are ranked in ascending order by the amount of aid per child. Aid to primary education is estimated using direct aid to primary education (broadly defined) from OECD-CRS, as well as general budget support and aid unspecified by level that is estimated to go to primary education (using the proportion reflected in the UNESCO Aid tables). For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

out between 2005 and 2012) cover 50 countries, 18 of which are in Sub-Saharan Africa (UNESCO 2015, figure 8.9).

Across all 50 countries, the household share of TEEs averaged 31 percent, with higher shares in low-income countries. The average household share of TEEs in the 10 high-income countries was 13 percent, while it was close to 50 percent across the 14 low-income countries. The region with the largest share

of household contributions was South Asia, where households in Bangladesh, Pakistan, and Sri Lanka contribute around two-thirds of the total (UNESCO 2015, 261).

For the subset of 18 Sub-Saharan African countries, the average household share of TEEs was 35 percent, but with wide variations (table 5.3). In some countries, the share was much higher, apparently more than 80 percent in Uganda and Zimbabwe; more than 50 percent in Ethiopia, Rwanda, and Zambia; and slightly lower in Mauritania and Tanzania. Data are not available for most of the Group 4 countries.

The high share of household financing of education in Sub-Saharan African countries is borne out by special studies by UNESCO's International Institute for Education Planning (IIEP-UNESCO) and UIS (supported by the Global Partnership for Education), which use education national accounts to assemble the most detailed account of funding sources for education systems in low-income countries. In Côte d'Ivoire, one of the four country studies completed thus far, out of total expenditures per primary student of US$594, the government contributed US$415, or 70 percent (MoE Côte d'Ivoire and UIS-UNESCO 2016). Almost all of the remainder was funded by households. A recent World Bank study of Nigeria also confirms this pattern of dependence on household financing of education: households provide an estimated 40 percent; local governments, 25 percent; the federal government, 18 percent; and state governments, 13 percent (World Bank 2015a).

Despite the high share of household financing in TEEs, the burden on households, as shown by the share of education expenditures in total household expenditures, seems relatively small. This study conducted a disaggregated analysis of recent Sub-Saharan African household surveys administered between 2005 and 2015 in 12 countries.[6] Across the 12 countries, the average share of education spending in total household expenditures was 6.5 percent. Countries that had higher-than-average shares were Mozambique at 20.9 percent, Rwanda at 14.8

Table 5.3 Household Expenditures as a Percentage of Total Education Expenditures in Selected Sub-Saharan African Countries, by Group, Various Years in 2005–2012

Country group	0–20%	21–40%	41–60%	61–80%	81–100%
Group 1	Congo, Rep.; Botswana; Namibia	Ghana; South Africa	Eswatini	None	Zimbabwe
Group 2	None	Congo, Dem. Rep.	Rwanda; Tanzania	None	Uganda
Group 3	None	Burundi; Malawi	Ethiopia; Mauritania	Zambia	None
Group 4	Mali; Niger	None	None	None	None

Source: Constructed from UNESCO 2015, figure 8.9.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

percent, Uganda at 10.9 percent, and Ghana at 10 percent. The share was lowest in Malawi at 2.2 percent and Ethiopia at 1.8 percent.

Flow of Funding to Schools

Policies on fiscal decentralization and school autonomy, together with intergovernmental financing arrangements, define how education funding is channeled down to schools or generated at the school level. These policies define how much of education spending is discretionary at each level of government and at the school level and introduce a high degree of variability between countries in the extent of actual decentralization. For instance, the central government may allocate the education budget to local governments conditionally or unconditionally, based on a transparent methodology or based on negotiation. Schools may or may not have autonomy over their budgets. These policies could result in significant horizontal or vertical imbalances (as described in box 5.1).

The sources, levels, and management of education finance vary greatly across Sub-Saharan African countries. Some of the most highly populated countries have a federal or quasi-federal structure, with autonomous subnational administrative and political entities often responsible for delivering social services such as education and health. Ethiopia, Nigeria, South Africa, and Sudan are examples. In such countries, sources and levels of finance for lower levels of government are either guaranteed constitutionally or have gradually become a practice.

Most other countries are highly centralized administratively and in terms of the financing of government services. Among them, some have experimented with devolving some responsibilities for administering aspects of government, particularly the provision of social services, to lower levels of government. Where countries have devolved responsibilities, World Bank

BOX 5.1

Fiscal Imbalances

A *fiscal imbalance* is a mismatch between a government's revenue powers and its expenditure responsibilities. It can take the form of a horizontal imbalance, a vertical imbalance, or both.

A *horizontal fiscal imbalance* occurs when subnational governments are able to raise either more or less funds from their tax base than they need to cover the cost of providing services. Equalization transfers can help to mitigate horizontal imbalances.

A *vertical fiscal imbalance* describes the variance between a central government's revenue and expenditures against those of regional governments. It is a structural issue and thus needs to be corrected by reassignment of revenue and expenditure responsibilities between different levels of the government.

Public Expenditure Reviews (PERs) show that most financial transfers, when made, are tied or are for specific purposes. Further, governments differ in their funding approaches to household and community contributions for government schools; for community schools; and for private, for-profit schools.

Allocation of Funding by Function and Financing Source

Public Spending by Education Level

Sub-Saharan Africa's share of GEEs for the primary level is higher than in other regions, reflecting the region's greater challenges in universalizing primary education and its less-developed postprimary education system (table 5.4). The comparisons must be treated with caution because the duration of the cycles may differ across regions and because a significant share in other regions goes toward the "other" category (including preprimary, postsecondary nontertiary, and unassigned expenditures). The share going to secondary education (which combines lower- and upper-secondary education) is significantly lower in Sub-Saharan Africa than in other regions, while that going to tertiary education is similar (although the shares in other regions may be higher if postsecondary nontertiary education is included).

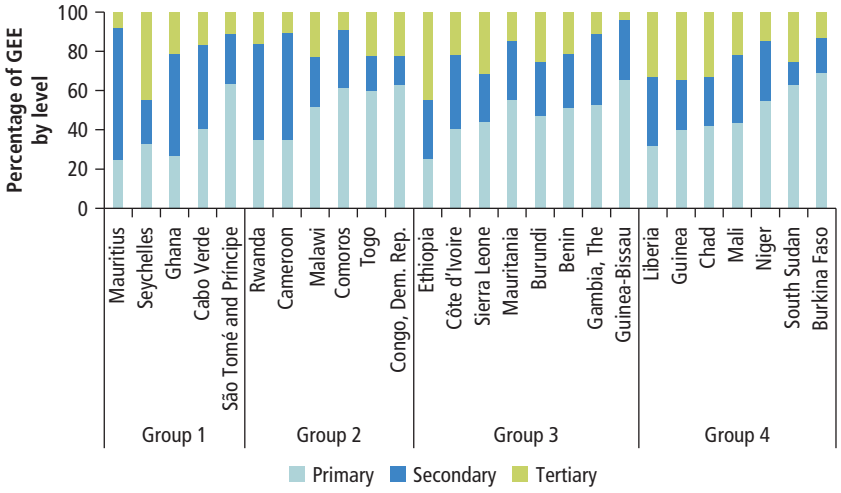
In particular, allocations for secondary education vary widely across countries with a six-year primary education cycle, with the highest shares being in Mauritius (around 67 percent), Cameroon (54 percent), Ghana (52 percent), and Rwanda (49 percent). The Democratic Republic of Congo spends only 15 percent, comparable to South Sudan (about 12 percent). The share for tertiary education also varies substantially. The clear outliers are Ethiopia and Seychelles, which devote over 40 percent of education spending to tertiary education, but several other

Table 5.4 Median Percentage of Government Education Budget, by Level, Selected Regions, circa 2014

Region	Primary	Secondary	Tertiary	Other
Sub-Saharan Africa[a]	46.4	28.5	19.8	5.3
Sub-Saharan Africa (countries with 6-year primary cycle)[b]	43.2	27.3	20.7	9.5
Latin America and the Caribbean	33.9	33.2	20.2	12.6
South Asia	29.6	39.1	21.1	10.2
East and Southeast Asia	32.7	34.1	16.7	16.5

Source: Constructed from UNESCO 2016 (statistical tables for year ending 2014, long version: Table 16. Domestic financial commitment to education: public spending).
Note: All regional values shown are medians. "Other" levels include allocation to preprimary and postsecondary nontertiary levels and also expenditures unassigned to any level.
a. Sub-Saharan African median allocation by level, estimated using data from the 33 countries that provided data.
b. Median values for 26 Sub-Saharan African countries with a six-year primary education cycle.

Figure 5.4 **Percentage of Government Education Expenditures, by Level, in Sub-Saharan African Countries by Group, circa 2014**



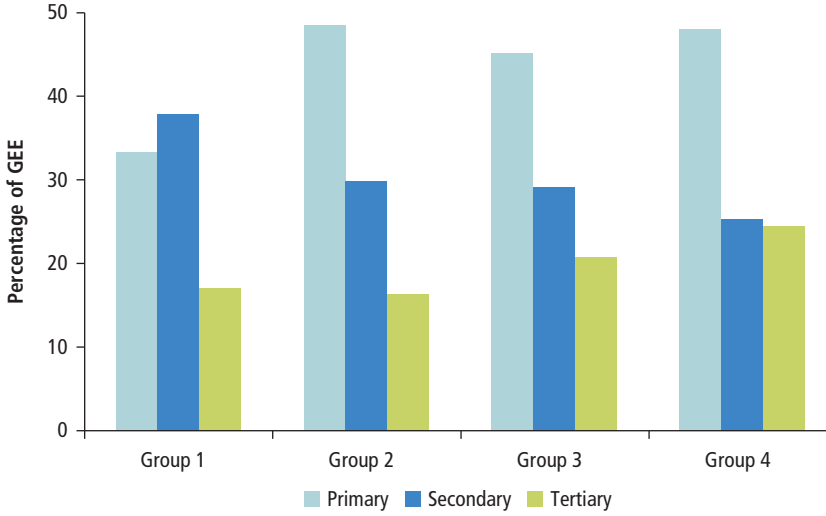
Source: Constructed from UNESCO 2016 (statistical tables for year ending 2014, long version: Table 16. Domestic financial commitment to education: public spending).
Note: Data are for 26 countries with a six-year primary education cycle. The percentages of GEE for primary, secondary, and tertiary levels are based on the total expenditures for these three levels only, excluding expenditures for "other." For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

countries also have relatively high shares (above 30 percent), including Chad, Guinea, Liberia, and Sierra Leone (figure 5.4).

The countries with the largest shares of GEEs for primary education tend to be relatively poor and have rather undeveloped education systems (figure 5.5). Countries in Groups 2–4 spent, on average, roughly the same amount on primary education (just under 50 percent). Not surprisingly, the Group 1 countries spent a smaller share on primary education than members of the other three groups and a larger share on secondary education, reflecting their relatively successful primary-school enrollment rates and the demand pressures that these rates place on secondary education. Strikingly, however, the Group 4 countries spent, on average, almost a quarter of their GEEs on tertiary education, about the same as they spend on secondary education.

Per-student annual public expenditures on primary education is far lower in Sub-Saharan Africa than in other regions and less than half that in South Asia (table 5.5). The median for the 28 Sub-Saharan African countries that provided data was US$208 (in constant 2013 U.S. dollars, purchasing power parity [PPP]). For countries with a comparable six-year primary cycle, it was US$213. But within these averages are wide variations across countries. The better-performing Sub-Saharan African countries, such as Mauritius and the Seychelles, which have six-year

Figure 5.5 Average Percentage of Government Education Expenditures in Sub-Saharan Africa by Education Level and Country Group, circa 2014



Source: Constructed from UNESCO 2016 (statistical tables for year ending 2014, long version: Table 16. Domestic financial commitment to education: public spending).
Note: GEEs = government education expenditures. Data are for 26 countries with a six-year primary education cycle. For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

Table 5.5 Government Expenditures per Student in Primary and Secondary Education, Selected Regions, 2014
Constant 2013 US$, purchasing power parity

Region	Primary	Secondary	Multiple of secondary to primary
Sub-Saharan Africa (all countries)[a]	208	412	1.98
Sub-Saharan Africa (countries with six-year primary cycle)[b]	213	409	1.92
Primary (six years), lower-secondary (three years)	366	817	2.23
Primary (six years), lower-secondary (four years)	202	294	1.46
East Asia	7,908	9,650	1.22
Latin America	1,385	1,582	1.14
South Asia	451	665	1.47

Source: Constructed from UNESCO 2016 (statistical tables for year ending 2014, long version: Table 16. Domestic financial commitment to education: public spending).
Note: Table reports median values for each group of countries in constant 2013 PPP (purchasing power parity) dollars.
a. "Sub-Saharan Africa (all countries)" comprises all countries with valid per-student expenditure data regardless of primary-cycle duration (28 countries with valid primary per-student expenditure data and 26 in secondary).
b. "Sub-Saharan Africa (countries with six-year primary cycle)" comprises only countries where primary education lasts six years (23 countries with per-student expenditure data in primary and 21 in secondary).

primary education cycles, have higher unit costs of US$2,476 and US$2,025, respectively. (South Africa is not included in the sample because it has a longer primary education cycle; its per-student expenditures are similar, about US$2,200). For nine countries in the sample, the unit cost ranged between US$200 and US$400; in another nine countries, it was below US$200.

An extreme case is that of the Democratic Republic of Congo, where per-student expenditures are reported to be about US$50. This reflects the poor quality of provision highlighted in earlier chapters: overcrowding in early grades, high student-teacher ratios, and substandard learning environments that make effective teaching difficult. Notably, the Democratic Republic of Congo is in Group 2—where access to primary education has greatly improved—but clearly this progress has been achieved at a very low cost, compromising quality.

In secondary education, the unit cost in Sub-Saharan Africa (US$412) is double that in primary education, but it is only two-thirds of that in South Asia. As in primary education, similar variations are observed across countries. Mauritius has exceptionally high per-student expenditures, exceeding US$5,000. (South Africa spent about US$2,500.) In 12 countries, per-student expenditures were below US$400.

Although low in absolute terms, the unit cost of secondary education is nearly twice that of primary education in Sub-Saharan Africa, against multiples of 1.1 to 1.5 in the other regions. This is probably influenced by the relatively higher wage bill at the secondary level, which in turn is driven by higher teacher salaries and lower student-teacher ratios, because of the need for more specialized subject teachers at the secondary level compared to the primary level.

Distribution of Donor Aid by Education Level

Among the 2014 aid allocations specified by education level across Sub-Saharan Africa, the share of aid for the primary education level, broadly defined, was far higher than for other levels of education.[7] However, the share for this level (excluding aid for which the level is "unspecified") declined to 43 percent in 2014 from 54 percent in 2002–03, while the share for secondary schooling climbed sharply to 24 percent in 2014 from 8 percent in 2002–03 (table 5.6).

The specified share of aid for postsecondary education was relatively high throughout the period: almost two-fifths in 2002–03 and still one-third in 2014. In both years, the shares going to postsecondary were much higher than for secondary education, and in 2014 the share going to secondary education in Sub-Saharan Africa was lower than in South Asia (24 percent versus 31 percent). It should be noted, however, that Sub-Saharan Africa's relatively high share of donor aid going to higher (postsecondary) education could be heavily influenced by the practice of some donors, such as France, that include the imputed

Table 5.6 Distribution of Direct Aid to Education in Sub-Saharan Africa and South Asia, 2002–03 and 2014
Constant 2014 US$, millions

Region	Primary[a]	Secondary	Postsecondary	Unspecified	Total
Sub-Saharan Africa					
2002–03	922	142	637	526	2,227
2014	821	454	617	943	2,835
South Asia					
2002–03	457	57	176	76	766
2014	945	655	505	551	2,656

Source: Data from UNESCO 2016 (Aid Tables Supplement, Table 3 Recipients of Aid to Education, 484–88).
Note: Total aid in this table refers only to direct aid to the education sector, excluding budget support, and therefore differs from the data presented in figure 5.3 and used in table 5.2. The "unspecified" level includes aid through education sector support programs that cannot be easily allocated across levels.
a. The primary level is broadly defined in the UNESCO Aid Tables, and includes primary education for children, early childhood education, life skills for youth, and primary equivalent nonformal education for adults.

costs of hosting foreign students at their own universities as part of their foreign aid.

From 2002–03 to 2014, overall aid for education rose much faster in South Asia (by 247 percent) than in Sub-Saharan Africa (by 27 percent), albeit from a much lower base. And although aid for basic education doubled in South Asia, aid for secondary education increased elevenfold. (The amount of unspecified aid also increased steeply.)

Distribution of Household Education Expenditures

Households spend mainly on nonsalary inputs, although they also contribute to salaries of non-civil-servant teachers in some cases. A study of household expenditures between 2001 and 2004 in primary schools in Malawi, Nigeria, Uganda, and Zambia revealed that the most prevalent expenditure items were, in order, uniforms; textbooks; parent-teacher associations; transportation, meals, and lodging; tuition and examination fees; and tutoring (UNESCO 2007, table 4.6). A 2012 analysis of household surveys for eight countries across the world reported that in Nigeria, Uganda, Tanzania, and South Africa, expenditures on books and supplies constituted 38 percent, 29 percent, 24 percent, and 7 percent, respectively, of household expenditures on primary education (UNESCO 2012, 71).

Table 5.7 presents the results of the analysis of household surveys for 12 countries, conducted for this study. The largest share of household education spending is on tuition and registration fees. The average for the 12 countries is 48 percent, with a range from 28 percent to 54 percent. Households in Burkina Faso, the Democratic Republic of Congo, Ghana, and Uganda spend between one-quarter to half of their expenditures on boarding and meals. Ethiopia is the

Table 5.7 Household Education Spending, by Category, Mid-2000s to Mid-2010s
Percentage of education spending

Country	Tuition/ registration fees	School uniform/ clothing	Boarding/ Meals	Learning materials	Transportation	Other
Burkina Faso	42.5	12.0	45.5	–	0.1	0.0
Côte d'Ivoire	44.8	6.2	11.8	14.7	7.3	15.3
Democratic Republic of Congo	41.0	15.1	39.1	–	4.8	–
Ethiopia	45.3	–	–	54.7	–	–
Ghana	30.4	3.3	24.7	7.8	4.6	29.1
Kenya	43.6	6.6	5.0	5.7	4.1	35
Malawi	54.0	8.9	8.2	9.8	4.1	15
Mozambique	49.1	14.4	–	17.5	18.9	–
Nigeria	44.6	5.6	11.9	16.7	10.2	11.0
Rwanda	39.8	6.4	5.2	10.1	5.7	32.9
Senegal	45.2	2.4	8.3	16.5	9.0	18.5
Uganda	27.7	3.1	50.3	4.1	6.5	8.4
Average 12 countries	48.4	10.3	16.3	9.8	4.7	10.5

Sources: Analysis of microdata from Living Standard Measurement Study (LSMS) surveys from Burkina Faso (2014), Côte d'Ivoire (2015), the Democratic Republic of Congo (2012), Ethiopia (2013), Ghana (2013), Kenya (2005), Malawi (2013), Mozambique (2009), Nigeria (2013), Rwanda (2013), Senegal (2010), and Uganda (2014).
Note: n.a. = not applicable. "Other" includes items such as payments for parent-teacher associations (which may include salaries of community-hired teachers) and tutoring. Percentages are estimated using average annual spending in each category divided by total average annual spending in education.

only country where learning materials absorb half of the total household expenditures on education. Of the 12 countries, 3 have especially large shares (about 30 percent or more) listed under "other," which could include items such as payments made to the parent-teacher associations and for uniforms and tutoring. Payments to parent-teacher associations can also cover the salaries of teachers hired by communities.

Composition of Public Education Expenditures

Teachers are the most important input to education, but they need physical facilities meeting minimum standards, textbooks, supplies, and appropriate content knowledge and pedagogical skills to teach effectively. While seeking to ensure access and completion of primary education, governments in Sub-Saharan Africa have focused on hiring teachers while paying insufficient attention to complementary inputs required to achieve quality education.

Detailed analyses of the economic composition of education expenditures for the countries of Southern and East Africa show that high shares of these countries' recurrent budgets go to teacher salaries (World Bank 2017a). Salaries crowd out important complementary inputs, such as textbooks and learning materials, teacher training, and maintenance of infrastructure. Zambia seems typical; in 2013, 89 percent of total spending on basic and secondary education was for salaries, 8.5 percent for infrastructure (mainly in secondary schools), and 2.5 percent for school grants. A negligible 0.2 percent of the total spending was for textbooks (World Bank 2016). In Ghana, salaries averaged around 97 percent of government expenditures on basic education (Darvas and Balwanz 2014).

Where data are available, the typical share of government expenditures on primary education in Africa for teaching and learning materials is 2–3 percent—equal, on average, to about US$5 a year per student. Some Sub-Saharan African countries use aid to augment spending on nonstaff recurrent expenditures such as teaching materials. In 2009, nonsalary expenditures as a share of TEEs in Ethiopia were 4 percent and 13 percent in primary and secondary schooling, respectively. The following year, after several development partners initiated a program focused on education materials and school improvement programs, the shares increased to 17 percent and 19 percent (World Bank 2015b).

Across Sub-Saharan Africa, capital budgets vary widely by country and year, depending in part on whether the country (a) is trying to complete its universal enrollment agenda for primary education, (b) is responding to demand pressures on secondary education that stem from higher primary completion rates, or (c) is expanding postsecondary opportunities as part of the country's economic development strategy.

Equitability of Education Financing Overall and across Levels

Education financing can be inequitable in either or both of two ways: in the allocation by level of education or by inputs within a level of education. In the first case, public expenditures can be biased, for example, in favor of wealthy households because these households are overrepresented in postprimary enrollments. In the second case, holding constant the level of education, inputs can be skewed in favor of schools that serve wealthier, urban families; for example, the most qualified teachers can be concentrated in such schools, the student-textbook ratios can be much better for urban schools than for rural ones, and so forth.

Wide Inequality of Public Education Spending across Income Groups

Benefit-incidence studies in education analyze the distribution of the benefits (allocations) of government expenditures across households with varying characteristics, the most common of which is income or wealth.

The key message of these studies across Sub-Saharan African countries is clear: distribution of public spending is highly unequal. A 2003 cross-country survey of these studies covering 10 Sub-Saharan African countries showed that households

in the poorest quintile benefited from just 12.8 percent of GEEs, compared with 32.7 percent for the richest fifth. Not surprisingly, the most unequal allocations were in tertiary education (a poorest-to-richest ratio of almost 1 to 10 across income groups), but they were also wide in secondary education (around 1 to 5). Only in primary education did the poorest households appear to benefit comparably with the richest households, partly because some of the latter attended private schools (Davoodi, Tiongson, and Asawanuchit 2003).

Recent country studies show similar results. In the Democratic Republic of Congo, the poorest quintile of households received 20 percent of the benefits from spending in primary schooling, against 18 percent by the wealthiest quintile. However, the shares were very different at higher levels of education—13 percent and 28 percent, respectively, of the upper-secondary spending benefits and just 2 percent and 63 percent, respectively, of postsecondary benefits (World Bank 2015d). Similarly, in Burundi, while households in the poorest quintile received 15 percent of total education spending benefits, those in the highest quintile received 29 percent, primarily because this group received almost 60 percent of the benefits from spending on tertiary education (Tsimpo and Wodon 2014).

As primary enrollment ratios have increased in Sub-Saharan Africa—and as primary-school fees have fallen or been removed altogether and replaced by school grants—education expenditures have tended to become more equal among the quintiles. However, this is not the case for all countries. In the Republic of Congo, for instance, the benefit of government spending on primary education for the poorest quintile actually decreased, from 24 percent in 2005 to 21 percent in 2011 (World Bank 2014b).

Inequalities are driven by the composition of the student body in upper-secondary and tertiary education. In the Republic of Congo, for example, in 2011, only 3.8 percent of upper-secondary and 0.3 percent of higher education students came from the poorest quintile, against 27.5 percent and 56.8 percent from the richest quintile (World Bank 2014b). The share of the poorest students in postsecondary education actually fell between 2005 and 2011.

Although current patterns of public spending are regressive, it is important to consider the counterfactual: absent public spending, schooling opportunities are likely to be even more unequal. Public spending can be used more effectively as a tool for improving equity by targeting basic education expenditures to poorer localities and schools, and targeting postbasic education expenditures to poorer households.

Wide Inequalities in Inputs across Schools

Reducing the inequalities in public spending on households by different levels of income requires increasing the proportions of children from poorer households in primary and postprimary schooling—a process that requires addressing demand-side economic constraints and cultural practices (in relation to girls, in particular)

and will therefore take time. Ensuring that the important inputs to education are equitably distributed across schools, however, is within the control of governments and can be achieved more easily. The primary inputs are the number and quality of teachers, learning materials, and the amount and quality of school infrastructure. The preceding chapters have already highlighted some of the critical inequalities in the supply of these inputs, which contribute to learning differentials, as in the examples highlighted below.

Unequal teacher deployment Teacher remuneration dominates expenditures in primary and secondary schooling. Differences in student-teacher ratios across schools are important determinants of differences in per-student expenditures across schools. When an unequal distribution of teachers across schools is coupled with differences in their experience and qualifications, and hence in their level of remuneration, the impact will be exaggerated. A wealth of information shows that the distribution of teachers in general—and of trained and experienced teachers in particular—is biased toward urban schools that serve wealthier households. For instance, in Ethiopia student-teacher ratios are below 40 to 1 in three relatively wealthy regions and over 60 to 1 in three poorer regions (World Bank 2015b). In Madagascar, the poorer the region, the higher the share of community teachers—who have lower levels of education (World Bank 2015c). In many countries, the inequalities are even starker, and the variations across secondary schools are wider than for primary schools.

Unequal distribution of teaching and learning materials In addition to overall low levels of teaching materials, there tend to be variations across rural versus urban localities and regions, with students in urban areas and wealthier provinces having better access to textbooks and other learning materials. Again, Ethiopia is an example: although almost all primary schools are reported to have a blackboard and marker, only 23 percent of rural schools have a teacher's desk, against 37 percent of urban schools. Books other than textbooks exist in 21 percent of urban schools and in 8 percent of rural schools (World Bank 2015b).

Unequal school infrastructure Apart from the amount of time that teachers can give to each child, and the amount and quality of instructional materials available to them, the learning environment is also influenced by the physical conditions of schooling. These include the school buildings and the provision of drinking water and basic sanitation. A recent analysis undertaken in Ethiopia suggests that classroom shortages are probably as binding a constraint as teacher shortages on uninterrupted student progression (World Bank 2015b). In Madagascar, the countrywide average number of students per classroom at the primary level is 53, but is above 80 in some regions (World Bank 2015c). Moreover, in many Sub-Saharan African countries, drinking water and basic

sanitation are not universally available in all schools. The variation in coverage among Sub-Saharan African countries is wide, as covered at length in chapters 3 and 4.[8]

Effects of Household Contributions and Fiscal Imbalances on Equity

Different households have different priorities and different abilities to pay education costs. Based on the analysis of household surveys of 12 countries done for this study, the average urban household spends nearly twice the share of income on education as the average rural household: 10.0 percent versus 5.1 percent, respectively. This share is particularly high for urban households in Mozambique (24.0 percent), Uganda (16.2 percent) and Ghana (13.2 percent).

These differences reflect the higher incomes of urban households and the greater proportion of urban children who attend postprimary education, which in turn may reflect differences in the economic returns that urban parents expect that education will have for their children. What is of note, in this sample of 12 countries, however, is that expenditures as a share of income rise *consistently* through the income levels in every case. At the extremes of the income distribution, households in the poorest decile spend on average 5.9 percent of their income on schooling, while those in the richest decile spend an average of 8.5 percent. High-income households in Mozambique, Uganda, and Kenya spend a far higher share than this average: 24.1 percent, 18.8 percent, and 15.7 percent, respectively.

In decentralized countries, horizontal imbalances in the public funding available for education compound inequities. Attempts to reduce inequalities in education often face formidable obstacles that stem from a country's broader political economy. Nigeria is a particularly important example, given that its GDP is equal to almost one-third of the total GDP across Sub-Saharan Africa, its population is almost one-fifth of the regional total, and roughly 20 percent of all school-age children in Sub-Saharan Africa not in primary or lower-secondary school in 2013 were Nigerian. Ninety-five percent of the 10.5 million out-of-school children in Nigeria in 2013 lived in the three northern zones. As described earlier, areas where access to schooling is lowest also usually experience relatively low levels of inputs. In Nigeria, the proportion of unqualified teachers in basic education in the northwest (where the primary gross enrollment rate is 66 percent) was 69 percent; in contrast, 7 percent of teachers were unqualified in the southwest, where the gross enrollment rate was 100 percent (World Bank 2015a).

Although Nigeria's federal government has adopted the objective of free universal basic education, legislated for its implementation, and provided funds to help achieve this objective, the body established to move the process further—the Universal Basic Education Commission—is highly constrained by the relationship between the federal and state governments. Many of the obstacles to the equitable development of basic education in Nigeria can be laid at the feet of financing arrangements and aspects of governance (further discussed in box 5.2).

BOX 5.2

Intergovernmental Relations and Equality's Effects on Education in Nigeria

Nigeria is a federal state, and the rights of the state governments are guaranteed by the Constitution. The states receive the bulk of their income from revenues accrued in the Federation Account, according to formulas that determine the distribution between the federal, state, and local governments and among the states. These formulas have changed little over the past 50 years, particularly the formula that governs distributions across states. Since 2004, as part of an effort to accelerate the achievement of universal basic education, three main institutions have been involved in the delivery of basic education:

- The State Universal Basic Education Boards (SUBEBs), which are subject to the decisions of the state governments that deliver basic education
- The Universal Basic Education Commission (UBEC), which is financed through a direct grant of 2 percent of the Consolidated Revenue Fund and mandated to pursue the universal basic education agenda within the constitutional bounds of the states and accountable to the federal government
- The Federal Ministry of Education, which is responsible for policy formulation and the setting of guidelines for quality assurance

Many challenges arise from the lack of alignment between the agencies' legally conferred responsibilities and their institutional authority to enforce these responsibilities. Chief among these is the fact that the federal government, through UBEC, must allocate most of its intervention funds equally across all states. This makes it difficult for those states with low access to basic education to expand; hence, paradoxically, "equal" treatment perpetuates inequalities across the states. Without changing the financial distribution to focus on the states with greatest needs, education inequalities are not likely to decrease.

Another area that suffers from overlapping mandates is monitoring and evaluation, which results in inconsistent and unreliable information on all aspects of the education system nationwide. Although the law mandates that UBEC monitor and evaluate basic education, it does not have the capacity and relies on state institutions, which often have weak data collection capacities, resulting in inconsistent and unreliable data. Nigeria is one of several countries in Sub-Saharan Africa that cannot provide UNESCO with sufficiently reliable information for its annual education publications.

Perhaps as a consequence of the legal and policy implementation environment, the amount of funding for education in Nigeria appears to be relatively low. The precise amount is not known because the major sources of funding for education are the state governments, and Nigeria lacks a functioning system for reporting detailed state government expenditures to the federal government. Studies of individual states over the

(continued next page)

Box 5.2 (continued)

past few years, plus accurate data on primary education teacher salaries paid from local government accounts and federal government expenditures, suggest that public spending at all levels of education accounts for 12.5 percent of total public spending and around 1.7 percent of GDP. Both of these measures are among the lowest in Sub-Saharan Africa.

Source: World Bank 2015a.

Sufficiency of Resources to Meet Future Education Challenges

For most countries in Sub-Saharan Africa, just to maintain current primary and secondary education enrollment rates at current unit costs will require annual increases in education expenditures of around 2 percent, as the population of the younger age cohorts is expected to grow at this rate. Further increases in education spending are required to universalize access and completion, especially of lower-secondary education, and to raise the quality of the inputs, such as teachers, textbooks, and learning materials.

Sub-Saharan Africa governments can manage the financial implications of these challenges in five ways, pursued individually or in some combination:

- Increase the share of public expenditures going to education
- Maintain the share of total government expenditures going to education, but increase total public revenues and expenditures
- Increase donor aid
- Shift larger shares of education expenditures to households
- Increase the value for money—that is, use available resources to increase completion and learning outcomes by managing inputs more efficiently and effectively

The first three options are considered in the next subsection, while the equity implications of the fourth option are reviewed in the following subsection. Increasing the value for money is examined in the next section of this chapter, "Getting Better Value for Money through Public Financial Management Reform."

Options for Increasing Public Resources for Education

Rates of economic growth across the region as a whole are not expected to return to the high levels recorded between 2004 and 2014. To maintain the growth of education expenditures in the context of slowing economic growth requires that education receive either a higher share of TGEs or that TGEs

increase as a share of GDP. As noted earlier, education in Sub-Saharan Africa already takes a share of TGEs higher than in any other region—a share that grew by almost 2 percentage points between 1999 and 2014. Across Sub-Saharan Africa in general, it is unlikely that this share will grow further.

Similarly, as noted earlier, donor aid for education has fallen in recent years. Although global education aid is expected to remain stable until 2019, there may well be a small rise for the lowest-income countries, with the largest increases in Sub-Saharan Africa likely to be for Ethiopia and Nigeria, but with reductions for some other countries, including Guinea and Niger (OECD 2016). It is unlikely that donor aid will plug the education funding gap.

Higher domestic resource mobilization is therefore critical to sustaining improvements in education access and quality. The average domestic revenue (minus grants) as a share of GDP is relatively low in the Sub-Saharan Africa region—17.4 percent in 2015, versus a world average of 25.3 percent. Countries where the share is below the regional average include the Central African Republic, Ethiopia, Madagascar, Nigeria, and Uganda. Fifteen out of the region's 24 countries that reported data have a revenue share of GDP that is below 20 percent. And public revenues as a share of GDP appear to be worsening: from a peak average of 23.2 percent in 2004–08, the share is forecast to fall to 17.8 percent in 2017 (IMF 2016, table SA10).

How feasible is it for countries with low total public expenditures relative to GDP to increase their revenues and thus their education expenditures?[9] Sub-Saharan Africa has a greater gap than other regions between education expenditures as a proportion of TGEs and as a proportion of GDP, which stems from its relatively low government expenditures and revenues as a share of GDP. A broad set of commentators has noted that, absent effective measures to increase domestic revenue, the delivery of basic services will be threatened across Sub-Saharan Africa (ActionAid 2015; Lagarde 2016; UNCTAD 2015).[10] In other words, the largely positive expenditure trends in Sub-Saharan Africa compared with those in other regions of low- and middle-income countries are unsustainable in the medium term without revenue reforms. Continuing the positive public education expenditure trends will require some or all countries to return to higher economic growth, to expand the number and size of sectors amenable to taxation, and to improve the efficiency of tax collection on citizens and foreigners.

The Risk of Increased Inequity from Shifting More Costs to Households

For countries with household expenditure data, even when household education expenditures represent a significant share of TEEs (as shown earlier, in table 5.3), they constitute a small share of total household expenditures (an average of 6.5 percent). However, shifting more costs to households must only be done after careful analyses of households' abilities to pay.

The low share may also reflect the fact that households, especially poor ones, do not enroll all their children in school. Hence, increasing the contribution of households to education spending without regard to families' abilities to pay will inevitably exacerbate existing educational inequalities between income groups. In countries without good data on household expenditures, households may already pay a much higher percentage of their total household expenditures on education than those in countries with good data.

Getting Better Value for Money through Public Financial Management Reform

Public Financial Management Framework

Available resources can be allocated to activities that are not aligned with the government's intended priorities, thus diverting resources away from its goals. Or resources can be allocated in line with government priorities, but the activities funded are not evaluated to determine whether they help the country progress toward its intended goals.

In either case, resources can be misallocated—often badly so. For instance, schools can be built without regard to the location and number of their intended beneficiaries. As shown in chapter 4, teacher deployment to schools is often not related to the number of students. Better-qualified teachers often cluster in wealthier urban schools, leaving rural schools and schools that serve poor families with suboptimal teaching forces. Teachers who are often absent from work continue to be paid, and there may be "ghost teachers" on the payroll. Textbooks can be procured without a structure of competitive bidding that minimizes their unit costs. Procured textbooks may be pilfered from distribution centers to be sold on the open market.

The three functions of a PFM system are fiscal discipline, strategic allocation of resources, and efficient service delivery. Efficient service delivery is the primary objective of PFM systems, with fiscal discipline and the strategic allocation of resources being the means to that end. Critical PFM processes include budget planning, timely budget release, funds flow, internal controls, and external scrutiny and audit. There are strong theoretical links between robust PFM processes and the effective delivery of education services, but empirical evaluations of these links are still in their infancy.

This section focuses on how well the education sector plans and budgets relative to its policy priorities and how well it executes and manages its budget. The first determines relevance: does the sector set clear priorities and plan its budget around these priorities? The second determines whether the budget is spent as intended. PFM processes provide an indication of how well a country can do this. The World Bank's Public Expenditure and Financial Accountability

(PEFA) framework undergirds the evaluations of the generic PFM processes described in box 5.3.[11]

The 2011 PEFA framework has 28 indicators in the six broad areas of activity (pillars) described therein. PEFA assessments have been carried out in many Sub-Saharan African countries and largely provide the basis for the analysis in this section, although they are supplemented with other evidence where available. In the absence of data specific to the education sector, the PEFA indicators provide insights into the PFM processes in different Sub-Saharan African countries. The underlying assumption is that the PFM processes within ministries of education could not be better than in the government as a whole (though, of course, they could be worse).

More detailed analysis of PFM processes in the education sector would require delineating the differential characteristics of critical "subsystems" in terms of fiduciary risks and potential impediments to efficient and effective service delivery. For instance, the supply of textbooks often requires a one-time bulk procurement followed by a logistics process of distributing books from the central level to schools and possible reuse and school storage of these books

BOX 5.3

Six Dimensions of PFM Evaluation in the 2011 PEFA Framework

1. *Credibility of the budget*. The budget is realistic and is implemented as intended.
2. *Comprehensiveness and transparency*. The budget and fiscal risk oversight are comprehensive, and fiscal and budget information is accessible to the public.
3. *Policy-based budgeting*. The budget is prepared with due regard to government policy.
4. *Predictability and control in budget execution*. The budget is implemented in an orderly and predictable manner, and there are arrangements for the exercise of control and stewardship in the use of public funds.
5. *Accounting, recording, and reporting*. Adequate records and information are produced, maintained, and disseminated to meet decision-making control, management, and reporting purposes.
6. *External scrutiny and audit*. Arrangements for scrutinizing public finances and follow-up by the executive are in place.

Source: PEFA Secretariat 2011.

over several years. By contrast, school grants do not require a bulk procurement or logistics related to physical assets. However, they require managing a long (and often complex) annual flow of funds from the central or provincial level to schools and reliance on local accountability mechanisms to ensure their effective use. The implications for these subsystems are discussed briefly in the concluding section of the chapter.

Capacity to Plan and Budget: Allocating Resources to Strategic Objectives

The quality of strategic planning and budgeting in Sub-Saharan African education systems is assessed in two ways in this study. The first is by analyzing the PEFA evaluations of the quality of strategic planning and budgeting, with the caveat that this applies to the entire government. A total of 38 countries had pertinent information covering 2010–16; 20 of them had data for 2012–014.[12] The second is by reviewing 20 education sector plans appraised for the Global Partnership for Education (GPE) before GPE's funding decisions.

Assessment of General Budget Practices Using PEFA Evaluations

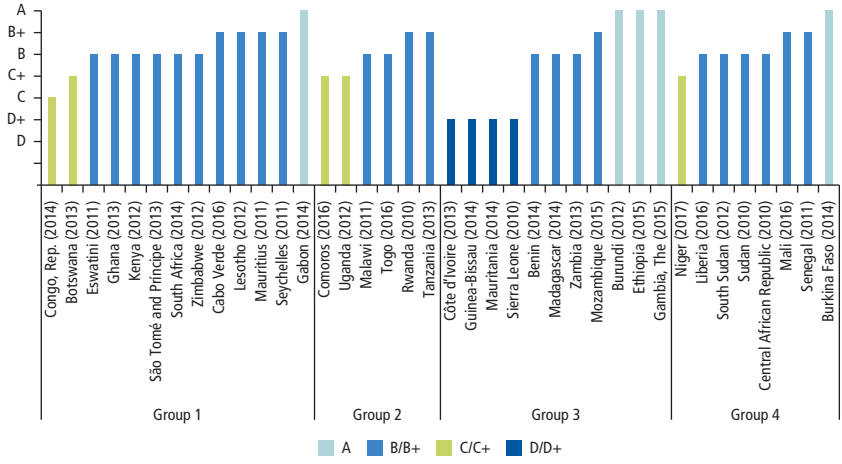
The PEFA indicators on policy-based budgeting and the comprehensiveness and transparency of the budget are used to assess the quality of planning and budgeting.

Policy-based budgeting The PEFA process examines country processes regarding policy-based budgeting under two headings: (a) orderliness and participation in the annual budget process,[13] and (b) a multiyear perspective in fiscal planning, expenditure policy, and budgeting. Government practices in these areas have been accorded measures from D (low) to A+ (high).

The results are very different for the two indicators. The orderliness and degree of participation in the annual budget process are judged positively (B and above) in 28 of the 38 countries (figure 5.6). Five countries received an A rating: Burkina Faso, Burundi, Ethiopia, Gabon, and The Gambia. Only five countries received a rating of C or below: the Republic of Congo, Côte d'Ivoire, Guinea-Bissau, Mauritania, and Sierra Leone.

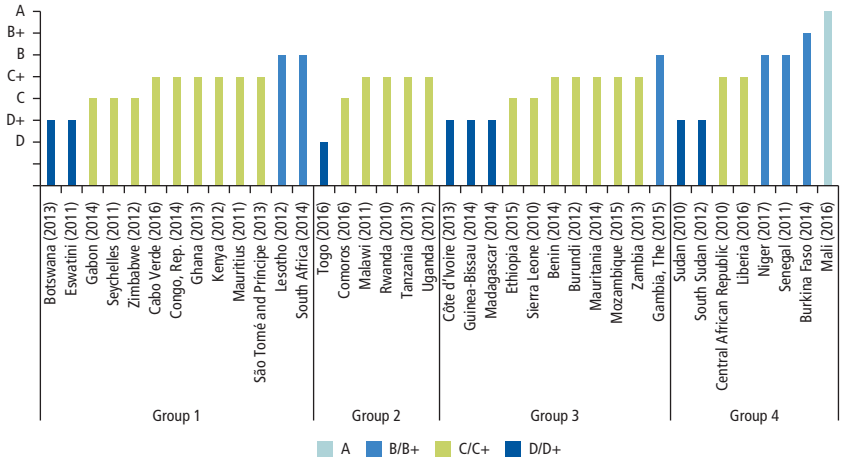
As for the more technically complex requirement of a multiyear perspective in fiscal planning, expenditure policy, and budgeting, the results are less positive (figure 5.7). Only seven countries received a B or higher rating, with Mali and Burkina Faso being rated highest. Of the remaining 31 countries, 16 countries received a C+ rating, while 15 countries received a rating of C or below (Botswana, the Central African Republic, the Comoros, Côte d'Ivoire, Eswatini, Ethiopia, Gabon, Guinea-Bissau, Madagascar, the Seychelles, Sierra Leone, South Sudan, Togo, and Zimbabwe). Six countries were rated B in both categories: Burkina Faso, Burundi, The Gambia, Mali, Senegal, and South Africa.

Figure 5.6 PEFA Ratings of Orderliness and Participation in the Annual Budget Process in Sub-Saharan African Countries, by Group, Early to Mid-2010s



Source: Constructed from Public Expenditure and Financial Accountability (PEFA) national assessment data file (as of June 30, 2017), https://pefa.org/sites/default/files/PEFA%20Scores-Jun17-N-Public-PEFA2011_0.xlsx.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

Figure 5.7 PEFA Ratings of Multiyear Perspective in Fiscal Planning, Expenditure Policy, and Budgeting in Sub-Saharan African Countries, by Group, Early to Mid-2010s



Source: Constructed from Public Expenditure and Financial Accountability (PEFA) national assessment data file (as of June 30, 2017), https://pefa.org/sites/default/files/PEFA%20Scores-Jun17-N-Public-PEFA2011_0.xlsx.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

Although the four country groups do not differ significantly in their performances on orderliness and participation in the annual budget process, a few countries within each group received the top rating. With respect to the second indicator, only Mali in Group 4 is the top performer, while all the others are clustered around the same value.

The weaknesses in this area have serious implications for Sub-Saharan African countries' ability to plan for the cost-effective expansion of basic education with a multiyear perspective.

Comprehensiveness and transparency of the budget The PEFA process judges six indicators under budget comprehensiveness and transparency. Reported here is the status of Sub-Saharan African countries on one indicator: the classification system used for the formulation, execution, and reporting of the central government's budget.[14] How governments classify the budget determines whether expenditures can be meaningfully tracked. Under this indicator, the PEFA evaluation determines whether the budget allows the tracking of spending by four categories: (a) the administrative unit that is doing the spending; (b) the economic category of spending, such as salaries or capital; (c) the functional categorization, such as the sector (education, for example) and subsector (such as tertiary education); and (d) the program, such as a cash transfer program to defray the costs to poor households of keeping their children in school.

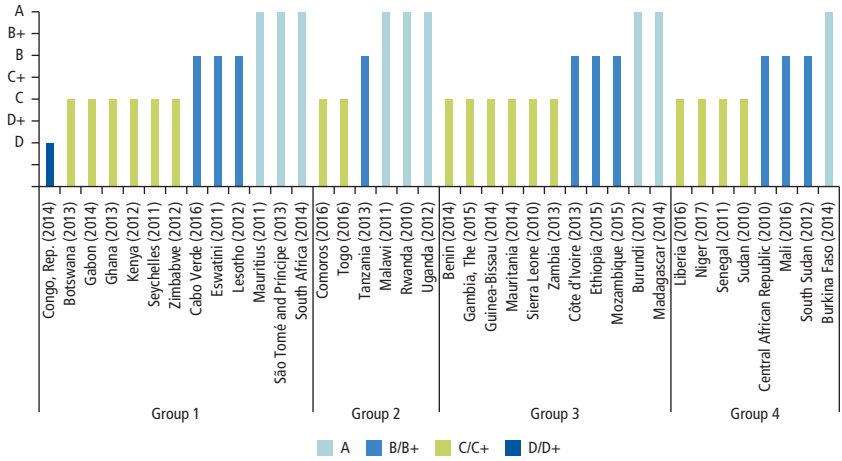
Overall, the assessments for classification of the budget are C+ and below in just over half of the Sub-Saharan African countries, including many in Group 1 (figure 5.8). Nine countries received an A rating, including Burundi and Madagascar in Group 3 and Burkina Faso in Group 4. The areas with very low ratings overall are unreported government operations and transparency in intergovernmental fiscal flows.

Assessment of Education Sector Plans Submitted for GPE Funding

This study also analyzed appraisal reports of 20 education sector plans submitted by Sub-Saharan African countries to secure funding from the GPE since 2010.[15] The appraisals found that, for financial management broadly defined, eight countries (40 percent) needed to improve significantly,[16] with Rwanda's sector plan being considered a positive model.

These appraisals also highlighted, in virtually all countries, ineffective collection, presentation, analysis, and use of data—in other words, problematic education management information systems (EMIS) and monitoring and evaluation (M&E) systems. Finally, these appraisals highlighted general capacity constraints (in Benin, The Gambia, and Nigeria); constraints in particular fields, such as financial management and data analysis (in Rwanda, Uganda, Zambia, and Zanzibar); and, in some cases, a total lack of consideration of capacity issues (in Eritrea, Niger, and South Sudan). Shortages of EMIS staff are reported for all countries.

Figure 5.8 PEFA Ratings of Budget Classification in Sub-Saharan African Countries, by Group, Early to Mid-2010s



Source: Constructed from Public Expenditure and Financial Accountability (PEFA) national assessment data file (as of June 30, 2017), https://pefa.org/sites/default/files/PEFA%20Scores-Jun17-N-Public-PEFA2011_0.xlsx.
Note: The PEFA budget classification ratings pertain to the classification system used for formulation, execution, and reporting of the central government's budget. For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

Several Sub-Saharan African countries seem to have improved their data collection and analysis over the past two decades, with UIS and the development partners supporting training and providing computing support. But wide lacunae remain: even the most basic information on enrollments, teachers, and expenditures is often not readily available. This missing information (also needed for day-to-day management) might be found through extensive searches of raw data in the education or other ministries. However, such data are de facto not accessible to those who need them. These gaps in basic sectoral data strongly suggest that many countries face major problems in preparing sector plans.

The skills of the planners are as important as the data. The range of technical skills required to produce education sector plans is broad, including statistical analysis; reporting and writing; use of simulation models; program design and monitoring; costing, budgeting and financing; and the preparation of logical frameworks for monitoring. Robust analytical work underpinning sector plans can also help to improve the dialogue with ministries of finance; for instance, investing in improving internal efficiency and learning in early grades can reduce the fiscal costs of hiring additional teachers or building more classrooms. Such skills are lacking in most ministries of education in Sub-Saharan Africa, and therefore many countries hire consultancy firms and individuals to lead the

development of the sector plans; implementation, however, is not effective because the plans are not fully understood by the ministry.

In general, education sector plans also do not consider an important source of inefficiency and lack of coordination in many countries: having three or four (sometimes more) ministries of education and training, each dealing with different subsectors. This is especially true of francophone countries. Such fragmentation not only increases the resources spent on administration but also creates coordination problems concerning sector policies and plans and their implementation. In chapter 6, which discusses this problem further, box 6.2 presents the case of Côte d'Ivoire's three education sector ministries.

Moreover, in preparing education sector plans, few ministries consider the cost-effectiveness of new interventions. Although the data are still relatively sparse, the gradually accumulating body of evidence provides some guidance for evaluating new interventions that could be included in sector plans (as shown in box 5.4).

BOX 5.4

Cost-Effectiveness of Interventions to Boost Learning in Sub-Saharan Africa

How do various interventions compare in cost-effectiveness? And what would it cost to increase learning outcomes significantly—say, by 25 percent of 1 standard deviation? These questions have recently been addressed in a review that examines (a) the effectiveness of various interventions designed to boost learning, and (b) the incremental costs associated with these interventions (J-PAL, n.d.).

The review covered 29 different interventions, of which 15 were effective. The eight effective interventions in Sub-Saharan Africa included six in Kenya alone, three of which were different treatment arms from the same intervention. The only other Sub-Saharan African countries with effective interventions were Madagascar and Malawi.

The J-PAL (n.d.) review found the following:

- The reported *effect sizes* of many of these interventions in Sub-Saharan Africa were encouraging, with half having effect sizes greater than 0.10 of 1 standard deviation (SD); 0.10 SD is considered a small impact, and 0.25 SD is considered a large impact. Effects of more than 0.50 SD are extremely rare (table B5.4.1).
- *The total cost* of each effective intervention varied substantially, depending on the scale of the intervention and its marginal cost. In one case—the local hiring of contract teachers—the intervention generated cost savings.

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Box 5.4 (continued)

- *The cost-effectiveness* of the interventions also varied substantially. To generate an additional 0.25 SD in learning was estimated to cost from –US$83 (for locally hired contract teachers) to more than US$400 (for conditional cash transfers). Among the other interventions, information campaigns (about the returns to education) and tracking or streaming by ability were comparatively more cost-effective.

Table B5.4.1 Cost-Effectiveness of Effective Learning Interventions, by Type, in Sub-Saharan Africa

Intervention type	Study	Country	Effect size (SD)	Cost per additional 0.25 SD (US$)
Tracking by ability	Duflo, Dupas, and Kremer (2011)	Kenya	0.18	0.72
Extra teacher and tracking	Duflo, Dupas, and Kremer (2011)	Kenya	0.25	12.70
Contract teacher	Duflo, Dupas, and Kremer (2011)	Kenya	0.23	–83.38[a]
Girls' scholarships	Kremer, Miguel, and Thornton (2009)	Kenya	0.27	18.06
Teacher incentives	Glewwe, Ilias, and Kremer (2010)	Kenya	0.14	3.97
Textbooks for the top quintile of students	Glewwe, Kremer, and Moulin (2009)	Kenya	0.22	7.01
Conditional cash transfers	Baird, McIntosh, and Ozler (2011)	Malawi	0.20	416.86
Information	Nguyen (2008)	Madagascar	0.20	0.21

Source: Compiled from data and calculations by the Abdul Latif Jameel Poverty Action Lab (J-PAL), https://www.povertyactionlab.org/sites/default/files/documents/Test%20Scores%20-%20Full%20Workbook%202014.02.06.xlsx.
Note: SD = standard deviation.
a. Because locally hired contract teachers cost less than government teachers, but are more effective, this intervention, in principle, saves money and therefore may be considered infinitely cost-effective.

Capacity to Execute: Using Resources as Planned to Reach Intended Beneficiaries

General Budget Execution and Expenditure Controls

PEFA assessments evaluate budget execution through a variety of indicators. The results for various indicators are available for 32–38 Sub-Saharan African countries. This section reports on the predictability of the availability of funds that can be committed for expenditures, the effectiveness of payroll controls, and the effectiveness of controls for nonsalary expenditures.

Predictability of the availability of funds The predictability indicator measures the extent to which the central ministry of finance is able to forecast cash commitments and requirements and to provide reliable information on the availability of funds to budgetary units for service delivery (figure 5.9, panel a). Only 22 percent of the countries achieved a B rating for this indicator,

Figure 5.9 PEFA Ratings of Predictability and Control in Budget Execution in Sub-Saharan African Countries, by Group, Early to Mid-2010s

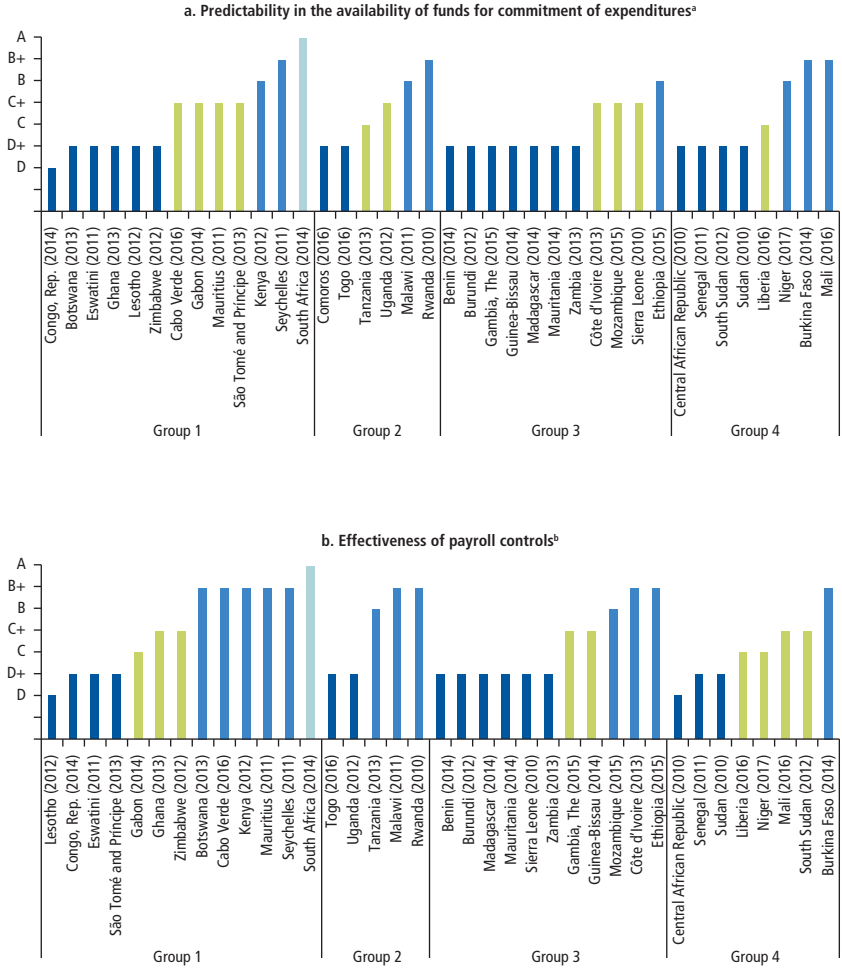

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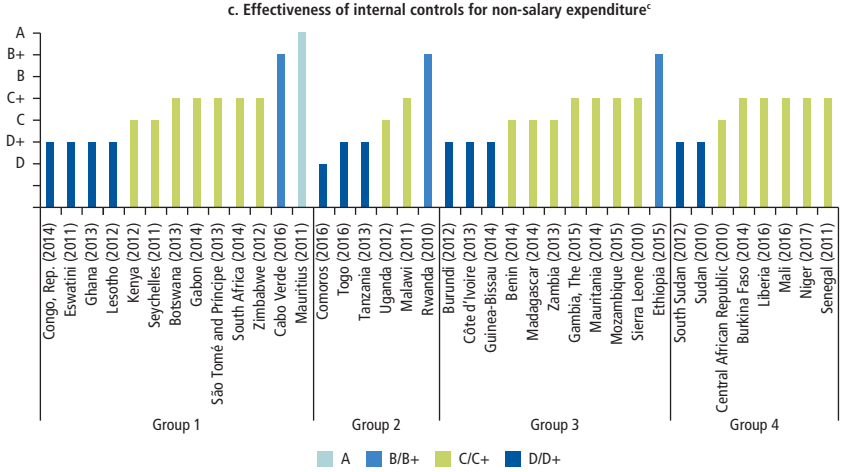
Figure 5.9 (continued)



Source: Constructed from Public Expenditure and Financial Accountability (PEFA) national assessment data file (as of June 30, 2017), https://pefa.org/sites/default/files/PEFA%20Scores-Jun17-N-Public-PEFA2011_0.xlsx.
Note: For definitions of country Groups 1–4, see chapter 1 or figure 5.1.
a. The predictability indicator measures the extent to which a ministry of finance can forecast cash commitments and requirements, enabling provision of reliable information on funding availability to budgetary units for service delivery.
b. The payroll control indicator measures (a) the degree of integration and reconciliation between personnel records and payroll data; (b) the timeliness and internal controls of changes to such records and data; and (c) the existence of payroll audits.
c. The nonsalary-item control indicator measures the extent to which controls (a) ensure against spending errors or fraud and (b) ensure the government's payment obligations remain within annual budget allocation limits and projected cash availability.

with 51 percent scoring at the lowest level of D. Clearly, performance problems on this variable undermine the abilities of budgetary units to implement planned activities in a timely way.

Effectiveness of payroll controls The indicator measures the degree of integration and reconciliation between personnel records and payroll data; the timeliness of changes to personnel records and the payroll; internal controls of changes to personnel records and the payroll; and the existence of payroll audits to identify control weaknesses and ghost workers (figure 5.9, panel b). Only 35 percent of the countries achieved a rating of A or B (mostly B), and 41 percent scored at the lowest level of D. Given that the wage bill is usually one of the biggest government expenditures, this is a worrying sign.

Effectiveness of controls for nonsalary items The indicator measures whether duties are properly segregated to prevent an employee or group of employees from being in a position both to perpetrate and to conceal errors or fraud in the normal course of their duties (figure 5.9, panel c). It assesses whether controls

are in place to ensure that the government's payment obligations remain within the limits of annual budget allocations (as revised) and within projected cash availability, thereby avoiding the creation of expenditure arrears. Only 11 percent of the countries achieved a rating of A or B (mostly B), and a third scored at the lowest level of D.

Surprisingly, the Group 1 countries do not perform consistently better than other groups on all three indicators. Across all indicators, the best performers were (in order) South Africa and Cabo Verde (Group 1), Rwanda (Group 2), Ethiopia (Group 3), and Burkina Faso (Group 4). This demonstrates that weaknesses in the overall budgetary execution processes affect the efficiency of the education sector in almost all Sub-Saharan African countries.

The World Bank's education Public Expenditure Reviews (PERs) for several Sub-Saharan African countries[17] provide additional evidence on these countries' rates of budgetary execution. Across almost all of the countries, these rates are much higher for salaries than for other budget categories (table 5.8).

Table 5.8 Education Budget Execution Rates, Budget Item, in Selected Sub-Saharan African Countries, Late 2000s to Early 2010s

Percentage of expenditures from budget allocation

Country and budget year(s)	Execution rate for capital budget	Execution rate for recurrent budget		
		Salary	Nonsalary recurrent	Transfers to subnational entities and schools
Malawi (2012–14)	No data	100	Textbooks: 50 Other: 70	70 (2012); 90 (2013); 66 (2014)
Niger (2008–10)	Declined from 67 to 35	95 (avg.)	76 (avg.)	96 (avg.)
Congo, Dem. Rep. (2013)	17 (avg., 2009–13)	100	8	22 (2013); 12 (avg., 2008–12)
Congo, Rep. (2008–12)	Increased for overall budget from 89.9 to 94.6			
Mali (since 2007)	Declined for overall budget since 2007 introduction of fiscal decentralization, because of weak subnational capacities and delays in transfers			
Zimbabwe (2014)	No data	Almost 100	Overall: 29 Special programs: 1	
Senegal (2011–13)	Varied for overall budget: 46 (2011); 80 (2012); 55 (2013)			
	Primary schools: 7 Rural middle schools: 25		Learning materials: 18	No data
Kenya (2013–14)	Declined overall to 84			
Ethiopia (2009–12)	Declined over period. Primary: 77 to 54 Secondary: 75 to 51 Tertiary: 92 to 81		No data	No data
Guinea (2012)	No data	Overall recurrent increased to 88 (from 74 in 2009); nonsalary recurrent: 42		

Sources: Government of Zimbabwe and World Bank 2017; World Bank 2013a, 2013b, 2014a, 2014b, 2015b, 2015d, 2015e, 2015f, 2017b.

Management of teachers' salaries and teacher-related allowances poses special problems because these items represent such a high proportion of the budget. Although, in general, there is a higher level of execution of salaries, the accumulation of salary arrears is also common. Apart from their fiscal cost, arrears directly affect service delivery because they can lead to teacher strikes and loss of instructional time.

Adequate monitoring of teacher allowances is also required; these include allowances for rural and hardship postings, which are often not removed if the teacher moves back to an urban or nonhardship posting. Travel allowances are significant in some countries. In Malawi, travel costs for all civil servants amount to 4–5 percent of GDP, 12–14 percent of total expenditures, and about half of total expenditures on goods and services; for Uganda and Tanzania, they account for 2 percent and 1.6 percent of GDP, respectively (World Bank 2013a). Because teachers account for 40 percent of civil servants in Malawi, a significant share of these allowances accrues to teachers; it also implies that teacher remuneration, when allowances are included, may be a higher share of government spending on education than is reported (Ravishankar et al. 2016). Factors accounting for the extraordinarily high level of allowances—including billing for unnecessary travel, collection of multiple per diems for a single day, and other abuses—indicate a breakdown in the controls over payments.

The failure to ensure timely release of funds to the levels and entities that need to use them has an important bearing on whether spending is effective. This affects in particular the procurement of learning materials, teacher training, and construction of classrooms. As indicated in box 5.7, relating to the school construction program in Uganda, such delays led to work stoppages, increases in costs, and failure to complete classrooms.

PFM Reforms Despite Interest Group Resistance

Several countries in Sub-Saharan Africa have improved their PFM systems. For example, the Republic of Congo recently reformed its procurement code and PFM processes, including decentralizing budget execution and using a computerized budget process. These reforms are showing good results, with an increase in the consolidated execution rate from 89.9 percent in 2008, and to 94.6 percent in 2012. During that same period, the investment expenditure execution rate increased from 39 percent to 83.4 percent (World Bank 2014b, 46).

In Guinea, the government set education objectives in 2007 that were to be reached by 2015. However, the budget was not aligned with these goals, with many—from decentralization to increased access for disadvantaged children—being absent from budgeting decisions. A review of three administrative practices (budget planning, budget execution, and resource management) found weak links between resource management in the education sector and its

policy goals. Poor information systems, conflicting jurisdictional controls over budget planning, and a lack of communication and coordination between program staff (including those in central and decentralized administrations) were producing poorly planned and executed budgets that in turn drove inefficiencies, inequities, and shortages in funding. In response, PFM reforms are being focused on three areas: the lack of alignment between programs and finance, the inability to track programmatic allocations, and the low capacity to execute budgets.

In Zambia, a three-year, medium-term expenditure framework and output-based budget were introduced in 2015, with the Ministry of Education as one of the pilots. Under this system, the educational outputs or targets were identified, and expenditures were aligned with each of the targets. Although it was difficult to identify the education level at which some of the activities belonged (such as expenditures on ministry headquarters), this transition to output-based budgeting enabled planners to allocate resources to different subsectors of education and to see the links between the budget and the outputs.

In Senegal, the World Bank's education Public Expenditure Review, conducted in 2010, identified five major shortcomings in the preparation and execution of the education budget (World Bank 2015f):

- Personnel recruitment was not based on the projections underlying the preparation of the budget; in particular, the Ministry of Education recruited more teachers than estimated by the sectoral plan.
- There was an absence of clear and transparent criteria for decentralizing resources to the school level.
- Implementing agencies could not execute the investment budget.
- Allocation of the investment budget across universities was inconsistent with projected changes in enrollment.
- Consistent underbudgeting of even the expected costs of universities, especially of scholarships, forced the Ministry of Finance to provide extra resources between September and December each year to keep the universities operating and prevent student unrest.

In response, since 2012, the government has changed its budgeting for teachers and its processes for financial transfers. The Ministry of Education developed an information technology (IT) application for the recruitment and placement of teachers, new criteria for allocating recurrent resources to regional and district education authorities, and formula-based allocations to schools in the 2014 and 2015 budgets. Since 2014, schools have been allowed to manage public funds.

However, the Senegal case also illustrates how political interests can compromise efforts to reform PFM processes. Several bureaucratic stratagems are often

used to slow down the implementation of the investment budget in subsectors that are not highly visible or politically protected, in order to finance, for instance, required expenditures on higher education. This situation negatively affects the overall credibility of the budget (World Bank 2015f).

In Mozambique, PFM reforms in the education sector have improved the procurement of textbooks and workbooks, helping to reduce the government's unit costs for materials it provides free of charge to the primary grades (box 5.5).

Donor Use and Reinforcement of PFM Systems

The behavior of donors, particularly toward those countries for which aid provides a significant share of total public education spending, affects the ability of governments to effectively manage the allocation of overall public resources. More than a decade after the Paris Declaration on Aid Effectiveness, there has been some limited progress toward aid harmonization, alignment, and coordination in

BOX 5.5

Improving Procurement of Learning Materials in Mozambique

The government of Mozambique provides learning materials free of charge to the country's more than 5.5 million children: grades one and two receive workbooks for language and mathematics, and grades three through seven receive textbooks for all core subjects of the official curriculum, including science and social studies. Since 2011, the government has been reforming the procedures by which around 8 million textbooks and 5 million workbooks for primary education are produced and distributed, free, each year to schools.

Before 2011, workbooks for grades one and two were bought from publishers through annual price negotiations, resulting in problems in forecasting costs and planning budgets. That year, the Ministry of Education and Human Development negotiated for the licenses to enable them to reprint the workbooks, against royalties, contracting out the printing through international competitive bidding (ICB). As a result, the unit cost of the workbooks fell by 17 percent between 2011 and 2015.

In 2012, the ministry also changed the procedures for procuring textbooks for grades three through seven, adopting a price-adjustment formula for reordering, based on overheads and independently verifiable indicators of increases in labor costs and in materials. Direct contracting is being replaced by ICB, and the first ICB for grade-three textbooks and teacher guides was issued in January 2016 for book deliveries in 2018.

Source: De Guzman 2016.

Sub-Saharan African countries. However, the development partners have been slow to adopt the practices to which they committed under the Paris Declaration. Even sector-wide approach programs (SWAPs) are often funded by annual commitments, thus limiting the predictability of resources. In many countries, aid continues to be received in a fragmented manner, resulting in high transaction costs and substantial efficiency losses. The lack of alignment can also result in resources being off-budget and off-treasury, making it difficult for governments to know the overall resource envelope and to plan accordingly.

PEFA assessments provide ratings of donor practices pertaining to all aid. The first measure is "predictability of direct budget support," and the results are not reassuring for the 26 Sub-Saharan African countries covered (figure 5.10, panel a). Donor behavior received an A rating only in Rwanda and Tanzania and a B or B+ in Cabo Verde and Mozambique. Donor practices in 20 countries received the lowest possible rating of D. Donor behavior shows little improvement over the past decade on this indicator.

The second measure is "financial information provided by donors for budgeting and reporting on project and program aid." Thirty-five countries were covered, and again, the results were disappointing (figure 5.10, panel b): Only donors operating in Mauritius and Zimbabwe received A ratings, and only those in the Republic of Congo received a B rating. Twenty-four countries received a rating of D or D+.

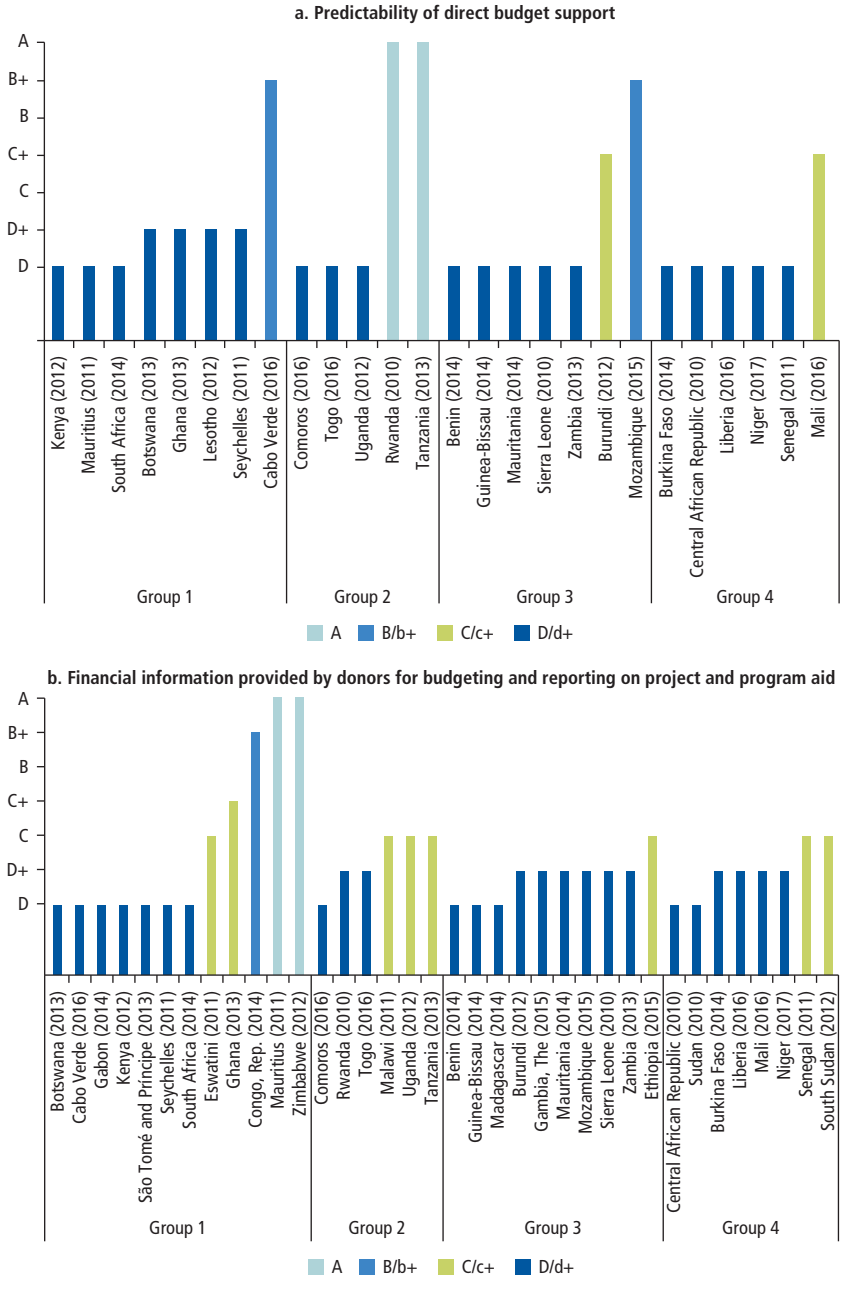
The third measure is the "proportion of aid managed by use of national procedures," which also shows surprisingly poor ratings (figure 5.10, panel c): out of 37 countries, in only 8 did donors receive a rating above D. Donor practices in Botswana, Ethiopia, Ghana, Malawi, Mali and the Seychelles all received C ratings; those in Mauritius and Tanzania received B ratings.

In Kenya, trend data were available for PEFA ratings of donors' behaviors in 2006, 2008, and 2012—allowing a check on whether behaviors improved with time (World Bank 2014a). No improvement was recorded over this period, and ratings remained at or around the lowest possible level. Because one-third of development spending in Kenya is provided through aid, this lack of harmonization and alignment may have negative consequences on efforts to plan comprehensively.

Use of Decentralization to Improve the Planning and Execution of Education Resources

In recent decades, governments in low-, middle-, and high-income countries have conducted an array of reforms to decentralize the delivery of schooling to lower levels of government and, in a limited manner, to schools. The expectations are that if planning and expenditure decisions are "closer" to those affected, the decisions will better reflect the wishes of the people that decision

Figure 5.10 PEFA Ratings of Donor Practices in Sub-Saharan African Countries, by Group, Early to Mid-2010s



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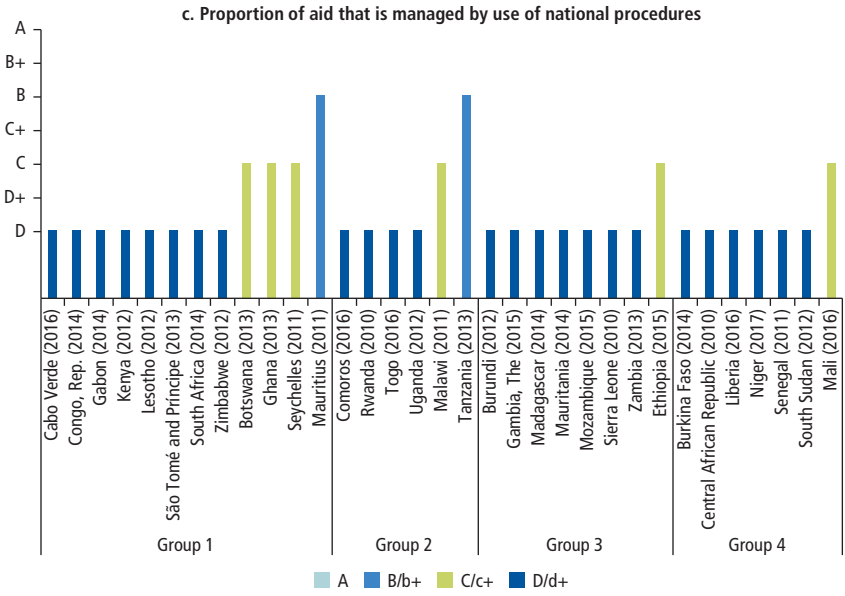

Source: Constructed from Public Expenditure and Financial Accountability (PEFA) national assessment data file (as of June 30, 2017), https://pefa.org/sites/default/files/PEFA%20Scores-Jun17-N-Public-PEFA2011_0.xlsx.
Note: Countries shown are those for which PEFA assessments were available on the measure indicated. For definitions of country Groups 1–4, see chapter 1 or figure 5.1.

makers represent or serve and resources will be more apt to reach their intended beneficiaries. Decentralization is also expected to improve budget execution through greater accountability, faster processing, and reduced leakage. This section assesses available evaluations of Sub-Saharan African countries' decentralization of education service delivery to subnational and local governments, to schools, and, in a few cases, to nonstate actors such as the private sector and NGOs.

In high-income countries such as England, New Zealand, the United States, and Wales, decentralization reforms have mainly focused on increasing the autonomy of schools, encouraging nontraditional providers, and reducing the influence of local governments. This section focuses on whether the decentralization approaches that have been attempted in the low- and middle-income countries of Sub-Saharan Africa have paid off. Some have involved the transfer of funds and decision making to lower levels of government, while others have transferred funds directly to schools or school councils under the rubric of school-based management (SBM).

Decentralization to Subnational and Local Governments

The most comprehensive global review of arrangements for education system management covered 184 countries and was done by UNESCO's International Bureau of Education, with data compiled from several sources, circa 2006/07 (UNESCO 2008). At the time of that review, central governments strongly retained control over most functions in the approximately 30 Sub-Saharan African countries for which data were collected. These functions included curriculum and learning materials, teacher training, management and employment, infrastructure, supervision and inspection, financing, and administration and management. A few functions had been delegated to subnational and local governments as well as to nonstate entities such as NGOs and community groups (for capital expenditures). No functions had been delegated to schools.

Two evaluations of education decentralization in Sub-Saharan Africa were undertaken in the 2000s. The first, by Gershberg and Winkler (2004), used mainly case studies to examine decentralization from central to regional governments (in Ethiopia, Nigeria, and South Africa) and from regional to local governments (in Tanzania and Uganda). It concluded that the formal accountability mechanisms and definitions of the roles of local governments were weak, the designs of financial transfer mechanisms were inefficient and inequitable, and the restructuring of central ministries that is required under decentralization had rarely occurred. The second evaluation, by Conyers (2007), concluded that the several years of decentralization experience had failed to have a positive impact on service delivery.

Evaluations of decentralization in Latin America and South Asia echo the findings for the Sub-Saharan Africa region. The effects relative to the expectations for decentralization were disappointing in Latin America. Bossuyt (2009) concluded that "most research does not show an automatic correlation between decentralization and improvement of the quality, access and equity of public services." In fact, decentralization may accentuate inequities between richer and poorer areas, reflecting varying levels of administrative capacity and the ability to raise local resources. The findings suggest that, to work, decentralization requires the political commitment of central and subnational actors, mobilization of poorer households, strong participation and accountability mechanisms, transfer of enough financial resources, and a reasonably high level of technical and managerial capacity on the part of local governments.

In South Asia, India, Pakistan, and Sri Lanka have constitutional mandates to decentralize education, but a recent survey concluded that regional efforts suffer from "policy uncertainty and inconsistency, inadequate resources, weak political buy-in and political interference, weak local capacity, ineffective

community engagement, low ownership of reforms, and poor information systems" (Dundar et al. 2014, 358).

A subtext of the lukewarm evaluations of decentralization in the Sub-Saharan African, Latin American, and South Asian regions is the failure to get the necessary conditions for success in place. Box 5.6 briefly reviews the decentralization experiences of four Sub-Saharan African countries, highlighting some

BOX 5.6

Where Has Decentralization Worked and Not Worked in Sub-Saharan Africa?

Devolution to Counties in Kenya

Devolution in Kenya aims to address regional disparities and to equalize opportunities for all. The County Governments Act of 2012 created 47 newly established counties, each with its own government and administrative structures. During the first year after devolution (2013/14), counties accounted for 20 percent of all public expenditures, funded mainly through unconditional grants. (This percentage is similar to those in Tanzania and Uganda but below those in Mozambique and South Africa.)

The rate of budget execution was just 63 percent, the main gap occurring in the capital development budget with an execution rate of 22 percent. In contrast, administrative spending built up quickly, and wages and salaries consumed 50 percent of the budget. County spending on service delivery and other equity-promoting areas was well below predevolution spending, with significant variances across counties that may signal the worrisome emergence of inequities.

Mismatch between Decentralized Funding and Subnational Capacity in Guinea

Even though more than 80 percent of Guinea's education budget is allocated to decentralized regional and prefectural governments, the latter have no real access to these funds. Effectively, they are still executed by the central government.

The problem at the regional and local government levels is the lack of resource management capacity, which is further exacerbated by the lack of an operational manual and budget preparation software. Even when spending authority is delegated, local education officials have little control because local budget offices do not report to the Ministry of Education.

Decentralized Education Delivery Struggles in Mali

Education delivery in Mali began decentralizing in 2000, when some administrative tasks were transferred to subnational units, including the regions, the *cercles* (administrative units representing a group of communes and the second level of administration

(continued next page)

Box 5.6 (continued)

under the regions), and the communes. Hiring and managing contractual teachers was devolved to the subnational units. Some fiscal decentralization to the regional level followed in 2007.

A survey of five communes, conducted for a PER, found a lack of alignment between the responsibilities transferred and those executed. The highest number of delegated functions that were implemented was 13 out of 19. Although all five communes were involved in school construction, none had become responsible for improving teaching quality. According to the PER, there is little communication and interaction between the different decentralized levels.

Positive Impacts from Two Decades of Decentralization in Ethiopia

Since 1991, Ethiopia has moved from being a highly centralized country to one in which local governments have significant responsibility. The first phase (1991–94) devolved powers to the regions; the country has nine regional states and two special-status cities. The second wave, begun in 2002, pushed responsibility for delivering programs in education, health, agriculture, water, and rural roads down to the local governments (almost 800 woredas, or districts).

Since 2006, the Promotion of Basic Services Program has provided (untied) block grants to *woredas* to fund these programs. These grants are calculated based on the local population weight, expenditure needs, and revenue potential. Under this program, the central government provided significant political support; made real efforts to increase communities' involvement in monitoring *woreda* activities; and ensured that programs were in place to improve the technical and managerial skills of *woreda* staff. The program is financed—US$1 billion a year—equally by the central government and donors, with most of the funding being channeled to the *woredas*.

Empirical research on outcomes in primary schooling, primary health, and agriculture paint a positive picture of these delivery programs' impact (Khan et al. 2014b). In education, they point to significant increases in primary school enrollments and reductions in the student-teacher ratios. Nationally, an increase of US$1 per capita across *woredas* is associated with an increase of 3.7 percent in the net primary enrollment rate. Greater equalization of enrollment rates has occurred between *woredas*. Spending patterns have benefited poorer household quintiles more than richer ones; between 2006 and 2013, the poorest 40 percent of the population received 56 percent of expenditures, while the richest quintile had 13 percent. The *woredas*' per capita education expenditures were 2.5 times as high for the bottom quintile as for the top quintile.

The results of more recent statistical analyses (Khan et al. 2014a) suggest that decentralization per se has had an independent statistically significant effect (emphasis added): "Our interpretation of the results is that it is *decentralized expenditures* that are driving improvements in Ethiopia's enrollment rates, as distinct from education expenditure more generally."

Sources: World Bank 2014a, 2015e, 2017b.

conditions that have to be met for decentralization to work. While not an unadulterated success, the Ethiopia example shows that decentralization begins to meet expectations when at least some conditions for success are in place.

Decentralization to the School Level

Partly in response to the problems associated with decentralizing the delivery of education to subnational and local governments, some countries have tried a school-based management (SBM) model, giving schools some limited powers and funding. The intention is to empower stakeholders to manage their own schools through better monitoring and accountability of service providers.

The main characteristics of a SBM model are the establishment and training of a school management committee, the development of school development plans, and management of some form of capitation grant. SBM has been introduced in various forms across many regions. A survey of this movement across low- and middle-income countries worldwide found that the main functions for which responsibilities had been transferred to the school level were the employment and remuneration of teachers and administrative staff, maintenance of school facilities, budget allocations, procurement of education materials, training, and monitoring and evaluation (Barrera-Osorio et al. 2009).

In contrast to some other regions, Sub-Saharan Africa has few examples where critical functions were transferred to schools, such as the management of teaching staff (including hiring and firing), the choice of learning materials, and the power to set the school calendar.

Table 5.9 describes some of the specific responsibilities transferred to the school level in nine Sub-Saharan African countries. Across these countries, three types of activities adhered formally to the standard SBM model: the establishment and training of school committees, the management of capitation grants, and the development of school improvement programs. There are significant differences, however, in the extent to which the school committees have responsibilities for hiring teachers and supervising teachers in general. Of the school committees in the nine countries, virtually all are allowed to oversee the school budgets and to purchase school materials and spend the grant on maintaining school infrastructure. However, in only three countries are they allowed to select some of the textbooks that they purchase; in only two can they supervise, evaluate, hire, and fire staff; and in only one do they have the power to set the school calendar. Thus far, SBM in Sub-Saharan Africa has focused on the development of school improvement programs and the allocation of grants as the centerpiece.

School grants were often introduced in conjunction with fee-free primary education policies, partly to compensate schools for the loss of school fee revenues and partly in the hope that these grants could be used to help increase

Table 5.9 Summary of School-Based Management Reforms in Sub-Saharan African Countries

Country	Date first implemented	Recent programs
Ghana	1995	The focus is on "whole school development." Initially school management, in-service training, and monitoring and evaluation were decentralized to the school, but the functions of overseeing expenditures from capitation grants for school supplies and hiring additional contract teachers were subsequently added.
Mozambique	1997	School management committees (SMCs) manage expenditures from capitation grants for basic classroom inputs and teaching materials. They are required to make student achievement data public and to report on expenditures.
Madagascar	2002	School committees prepare annual school improvement plans. They receive grants based on enrollment with adjustment for location and can spend them on learning materials and the school environment. School committees can hire community teachers with partial government subsidies.
Niger	2002	School committees allocate school grants, supervise and evaluate teachers, consult with the school on the hiring of teachers, and hire and fire contract teachers.
Kenya	2003	School committees make suggestions to education officials on teacher promotions and transfers, oversee expenditures from capitation grants, and participate in the design and implementation of school development plans.
Rwanda	2005	School councils oversee the use of capitation grants to purchase school supplies, allocate teacher bonuses, and support the full costs of fixed-term teachers.
Benin	2006	School councils have control over school budgets, personnel management, pedagogy, and fund-raising. They are trained via mass media and empowered in financial management.
Gambia, The	2008	SMC programs raise awareness of the factors affecting students' learning and increase coordination across the school administration, the students' parents, and other stakeholders. SMCs oversee expenditures financed out of capitation grants.
Senegal	2008	Teachers and parents are required to develop school improvement plans appraised by the local education office and to spend the capitation grant solely on learning materials and teacher training.

Source: Adapted from Barrera-Osorio et al. 2009.

access, equity, and quality. Research by IIEP-UNESCO between 2010 and 2012 on schools in Ethiopia, Kenya, Lesotho, Malawi, and Uganda illustrates the variety of programs (Kayabwe et al. 2014; Kelil et al. 2014; Lefoka et al. 2014; Nampota et al. 2014; Njihia et al. 2014). The studies found that in all cases grants were introduced with limited stakeholder consultation, guidelines for use, and head teacher training. The grants used a variety of funding formulas: per-student allocations in Ethiopia, Kenya, and Lesotho; per-student plus other criteria in Uganda; and per-school allocations based on school size ("enrollment bands") in Malawi. In Malawi, for example, the allocations based on enrollment bands appeared to favor smaller schools. Grants were distributed directly to schools in Kenya and Lesotho and via district-level administrations in the other three countries. To receive the grants, schools needed to fulfill requirements,

such as having a bank account, providing information on students, filing financial reports, and, in some cases, developing school plans.

The size of the school grants varied by country.[18] In almost all cases, school grants were not the only source of financial resources. The importance of these grants to individual schools largely depends on the additional revenue that parents contribute, fee-free policies notwithstanding. Across the schools surveyed in Ethiopia, grants provided 14–74 percent of total school revenue, while household contributions constituted 0–46 percent of total revenue at the school level. In Uganda, school grants provided a higher share of revenue for schools surveyed in rural areas than in municipalities—58 percent versus 19 percent.

In almost all cases, head teachers plus a mixture of management committees, parents, and teachers decide how to spend the grants, usually subject to certain restrictions. In Ethiopia, for example, grants cannot be used for additional classrooms or for teacher salaries. Several countries require schools to make information available to the community. In all countries, district-level officials are expected to monitor the process.

Within most of the schools and communities surveyed, school grants contribute to increasing access to education, often for poorer children. However, they are not capable of overcoming socioeconomic disparities, given that schools differ significantly in their abilities to generate additional income and that some compulsory payments, such as for feeding, remain. The perceived effect of the grants on school quality was more varied, and views were mixed regarding whether grants stimulated increased community participation. Restrictions on the use of the grants were seen to limit school autonomy. The IIEP-UNESCO research team concluded that, as part of financial decentralization and wider plans for fee-free schooling, school grant policies can play a positive role. However, their design and implementation processes require careful planning and monitoring.

Box 5.7 describes the difficulties in implementing school construction in Uganda in the context of weak SBM, procurement, and PFM processes.

Efforts to evaluate and compare instances of SBM face challenges in terms of differences in the design of the decision-making functions transferred, the degree of power devolved to the school level, the persons or groups given the authority, and the distribution of decision-making powers across the different stakeholders. However, several recent studies of the impact of particular SBM reforms in Sub-Saharan African countries have used experimental and randomization techniques. As discussed in chapter 2, SBM is positively correlated with learning in high-income countries but negatively correlated with learning in middle-income countries. The overall effect size for SBM interventions in Sub-Saharan Africa is negative across the studies. The results of some of these interventions are reviewed in box 5.8.

BOX 5.7

Effects of SBM, Procurement, and PFM Weaknesses on School Infrastructure Project Implementation in Uganda

In 2007, Uganda became the first Sub-Saharan African country to introduce universal secondary education (USE). However, there were large gaps in school infrastructure. The country had only 15,000 classrooms in secondary schools, many of which were unfinished classrooms built by communities. One secondary school per subcounty was selected to be a USE school, where additional classrooms would be provided along with other inputs. In 2009, the government began implementing the Universal Post Primary Education and Training (UPPET) program with financial support from the World Bank. Construction absorbed almost two-thirds of the project cost.

Against a target of 3,968 new classrooms and 1,335 unfinished classrooms and other facilities to be built over a three-year period, 3,163 new classrooms were built, 576 unfinished classrooms were completed, and 60–75 percent of other planned facilities were constructed after a two-year extension of the project. The choice of the school-based implementation modality and weaknesses in procurement and PFM processes affected the efficiency of implementation and resource use. Modalities that were appropriate for the earlier highly successful primary school construction program turned out to be ineffective for secondary schools.

Implementation Modality: Local Government versus School-Based Management

Uganda is organized in five levels of local governments, from the first level (LG 1, comprising 66,000 villages) to the fifth level (LG V, comprising 111 districts) as of 2010. The key pillars of the Uganda local government system are the districts and the city councils, which delegate authority to the lower tiers. However, the implementation modalities for school construction have changed from time to time.

After 1999, the local governments delegated the responsibility of building classrooms using the School Facility Grant set up by the central Ministry of Education and Sports (MoES) to the school management committees (SMCs). In parallel, the local governments continued to build primary schools directly through a Local Development Fund financed by donors (including the World Bank) and the government. In 2007, the MoES shifted the management of the funds for school construction from SMCs to local governments.

Nonetheless, the UPPET project relied on the SMC modality adopted for construction of primary classrooms, not recognizing the significant differences for construction of facilities in secondary schools. The project expected to use the Board of Governors of secondary schools and set up three additional committees—for procurement, contracts, and construction management.

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Box 5.7 (continued)

Owing to the large number of classrooms awarded to individual schools, the contract amounts were very high (in the range of US$120,000–US$160,000), in contrast to the contracts of other community- or SMC-managed projects (usually less than US$50,000). The Board of Governors had no experience in school construction and had hitherto managed only small amounts of recurrent expenditures.

The training of head teachers and members of the Board of Governors and other committees was too general and not focused on specific issues, such as how to monitor construction quality; how to review claims; and how to manage contracts and terminate them, in the case of serious defaults.

Procurement Issues

Although the contracts were relatively large, in the initial phase, the bidders were restricted to the district or municipality where the schools were located, as had been the practice under the primary school construction program. The actual financial and technical capacity of local contractors was lower than required. Contractors often could not execute the work, leading to immense delays and contract terminations.

By 2011, the MoES felt that the SMCs could not administer the construction program and hired four large consultant firms to carry out the technical supervision. Their performance was also poor because they lacked experience in supervising school projects dispersed across the country. The project's completion report concluded that individual consultants should have been hired at the local level.

The inclusion of furniture supply in the contracts, which had been done to ensure timely delivery, further delayed execution because many of the contractors could not supply this.

Problems with Construction-Specific PFM Processes

- Drawings, specifications, and bills of quantity did not reflect actual site conditions, leading to mistakes in contract amounts.
- Penalties for noncompliance were not always incorporated into the contracts. School committees could not identify quality problems with some of the buildings, which should have led to termination of contracts after due process.
- The contracts allowed a 50 percent advance, which was appropriate, but delays in these payments led to cash-flow problems for contractors, work stoppages, and higher costs due to inflation.

Source: Theunynck 2015.

BOX 5.8

Randomized Trials of SBM Initiatives in Kenya, The Gambia, Mali, Niger, and Senegal

School-based management (SBM) interventions in Sub-Saharan Africa focus on the management of small grants and the management of contract teachers. Snilstveit et al. (2016) conducted a meta-analysis of methodologically rigorous assessments of SBM in 12 countries across three regions, including three countries in Sub-Saharan Africa: The Gambia, Niger, and Senegal. In general, the impact of SBM in these countries was insignificant. SBM programs do not appear to improve student's school participation (enrollment, completion, and dropout) in these countries.

SBM interventions also did not boost student learning outcomes in most of the countries, but there is a large amount of variability in effects across contexts. In the Philippines, for example, SBM boosted student learning in math and language by more than 0.13 standard deviation, while SBM interventions in three Sub-Saharan African countries showed zero or even negative effects on outcomes in these areas. One conclusion was that, to succeed, SBM approaches require a relatively highly schooled general population around the school, particularly parents and teachers. Differences between small grants programs and management of contract teachers were not discussed.

Small Grants: Little or No Impact on Learning

The Gambia. Blimpo, Evans, and Lahire (2015) evaluated an SBM program in The Gambia that offered a training program for school committee members in addition to a grant and the distribution of management manuals covering school leadership and management, community participation, curriculum management, teacher professional development, teaching and learning resources, and school environment. The program reduced student and teacher absenteeism but had no impact overall on learning outcomes.

Niger. Beasley and Huillery (2017) evaluated the school grant program in Niger, implemented by the Ministry of Education in partnership with the World Bank. The program allocated grants to school committees that had been trained in school management and that had produced school improvement plans with the aim of increasing parental involvement. The results indicated that although parents' involvement in the management of the schools increased, language arts and mathematics scores in SBM schools were the same or lower than in comparison schools.

Senegal. Carneiro et al. (2015) assessed the impact on learning outcomes of school grants spent on school materials or on teacher training programs according to school plans prepared by parents, teachers, and local officials in Senegal. The program increased the learning scores of girls in grade three after one year, with sustained gains after two years of the program. The program had no effect on the learning of boys in grade three or on students in grade five.

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Box 5.8 (continued)

Teacher Management

Kenya. Duflo, Dupas, and Kremer (2015) compared the impact of two interventions implemented in randomly selected schools in Kenya between 2005 and 2007. The first intervention was an Extra Teacher Program (ETP) that provided funds to school committees of randomly selected schools to hire a contract teacher to reduce the class size in grade one. In a random subset of these schools, a second intervention was added: a 90-minute SBM training program to empower the local community, including parents of students. Within each school, students were randomly assigned to the class of the new contract teacher or the class of the existing government teacher. Comparison schools received neither intervention. The ETP with SBM program improved student scores by 20 percent of 1 standard deviation. The ETP program alone led to improvements in test scores only when students were assigned to contract teachers.

Mali. Dedehouanou and Berthe (2013) examined the effect of differences in the institutional arrangements for SBM (parent-teacher associations [PTAs] and boards of management [BoMs]) in Mali with school average learning outcomes: grade six repetition rates and success rates on primary school completion examinations. Both PTAs and BoMs had considerable influence over teacher management in community schools but little in government public schools, private schools, or madrassas. No significant effects of SBM through PTAs or BoMs were found, either for examination success rates or for repetition.

Using the Budget: Priority Areas for Improving Quality and Equity

Summary

For a new minister taking the helm of the Ministry of Education in a Sub-Saharan African country, the budget currently is not an effective tool for implementing appropriate policies for improving students' learning and expanding their equitable participation and progression through the system. This is partly because there are severe resource constraints and partly because the budgetary processes are inefficient and do not consider the specific requirements of the education sector. Further, because current expenditure patterns are relatively inflexible, the only changes that can be made are usually at the margin and with incremental resources.

The findings of this chapter reinforce the conclusions of previous chapters in many respects. The analysis of current expenditure patterns shows that they reflect the policy choices made in the past. First, governments have devoted sizable and increasing resources to increase access to primary education, in particular. This is commendable, especially given the multiple challenges that

many Sub-Saharan African countries faced in the 1990s, including relatively low economic growth and high population growth. Government education expenditures increased at a faster rate in Sub-Saharan Africa than in other regions, and a significant share of the region's public spending is on education. Governments, along with donors and households—the other two important financiers of education—have by and large prioritized primary education. The share going to primary education has, understandably, declined in the Group 1 countries, where universal coverage and completion of primary education had been established by the early 2000s.

Second, despite these increases, almost all government spending on education is absorbed by teachers' salaries, with little spent on complementary inputs that are critical to improving quality. De facto, governments tend to see their recurrent financing responsibilities as beginning and ending with paying teachers and nonteaching staff. Across Sub-Saharan Africa, capital budgets vary widely by country and year, depending primarily on the sector's and the country's policy agendas.

Third, the inequality in learning levels and in student progression through the basic education cycle demonstrated in earlier chapters is mirrored in the inequality in education spending. Public spending on education is distributed highly unequally among household income quintiles because almost no students from the lowest quintiles attain upper-secondary or tertiary education. Within each level of education, the distribution of teachers and textbooks and other learning materials is biased toward urban schools that serve wealthier households.

More resources are required to finance the expansion of the basic education system, both to ensure equitable access, especially at the lower-secondary level, and to improve the quality of provision. This will require greater attention to domestic revenue generation. Sub-Saharan African countries are already devoting relatively high shares of their current public spending to education. The other two sources of financing for education, donors and households, also have their limits. Donor aid has declined and is projected to be constant; it is also heavily concentrated in a few countries, and not necessarily those with the greatest educational needs. Shifting more costs to households risks increasing inequalities.

As the chapter has shown, government spending is marred by serious deficiencies in PFM processes. Governments can definitely get more value from the same resources if these deficiencies are addressed, and in the context of resource constraints, this is a priority. Although data are not specifically available for the education sector, the PEFA indicators for government planning and budgeting mechanisms used in this study highlight some of the processes that could improve the efficacy and efficiency of public spending in education.

Interestingly, weaknesses in PFM processes affect most Sub-Saharan African countries, including in the highest-performing countries in Group 1. The two broad areas considered are (a) the capacity to plan and allocate the budget to meet strategic objectives, and (b) the capacity to execute, using the resources as planned for the intended beneficiaries, which is directly related to the quality of implementation.

The PEFA assessments found that Sub-Saharan African countries have the highest performance in the orderliness and degree of participation in the annual budget process, which is part of the first area. For the more technically complex requirement of a multiyear perspective in fiscal planning, expenditure policy, and budgeting, the results are less positive. Over half of the governments do not classify the budget in such a way that expenditures can be meaningfully tracked. The areas with very low ratings are unreported government operations and transparency in intergovernmental fiscal flows.

In addition to using the PEFA indicators, the capacity to plan in the education sector was also assessed by the relevance and quality of the education sector plans prepared by Sub-Saharan African countries seeking GPE funding. The appraisal of these plans found that, for financial management broadly defined, at least eight countries (40 percent) needed to improve significantly. These appraisals also highlighted, in virtually all countries, ineffective collection, presentation, analysis, and use of data and of the EMIS and M&E systems in general.

Besides the ability to plan, the ability to implement the budgeted expenditures as originally planned is an important factor in supporting the government's ability to deliver public services for the year, as expressed in policy statements, output commitments, and work plans. The predictability of funds is important for ministries of education and other budgetary units to implement planned activities in a timely way. Less than a quarter of the countries achieved a positive rating on predictability, and over half received the lowest rating. This reflects the inability of the central ministries of finance to forecast cash commitments and provide reliable information so that education and other services can be delivered.

Equally worrying are the weaknesses in the effectiveness of controls on payroll spending, which are especially germane for sectors as labor-intensive as the education sector. Only 35 percent of the countries achieved a positive rating, and 41 percent scored at the lowest level. Findings from the World Bank's PERs show that, in some cases, the sector exceeds the salary ceilings prescribed by finance ministries, executing the salary line at over 100 percent.

The weaknesses in controls over nonsalary expenditures are even more alarming. These indicators try to assess whether measures are in place to ensure that the government's payment obligations do not exceed budget allocations and to prevent corruption. Only 11 percent of the countries achieved a positive rating, and a third scored at the lowest level.

Moreover, donor practices do not encourage governments to improve the efficiency of their spending. On measures such as the "predictability of direct budget support," "financial information provided by donors for budgeting and reporting on project and program aid," and "the proportion of aid managed by use of national procedures," most donors got less-than-positive or the lowest ratings.

This chapter also discussed whether decentralization to subnational units or the use of SBM has improved service delivery in the education sector. The findings suggest that decentralizing to subnational and local governments or using an SBM framework are not silver bullets for improving either participation in education or learning outcomes. How the decentralization strategy is designed and implemented powerfully affects the chances of achieving better outcomes, and both design and implementation requirements for success are demanding. Ultimately, it is the quality and timeliness of the inputs, especially of teachers, at the school and classroom level that matter. Countries should use whatever is the most equitable, efficient, and effective governance, financing, and management framework—in their own specific context—for getting these inputs in place. Such frameworks may or may not involve elements of decentralization.

Priorities for Improving the Use of Budgetary Resources

Sub-Saharan African countries are at different stages of education development, and identifying the priority actions will largely depend on the medium-term goals of each country as well as the country's context. For instance, countries with the greatest educational challenges are also the ones with the greatest contextual challenges, with limited domestic revenue generation ability, and with the weakest capacity to plan for the utilization of resources and execute those plans.

Nevertheless, four broad areas of action are recommended for all countries in the region: spending incremental resources to improve learning, reducing disparities in participation and learning, improving the efficiency of public spending, and strengthening projections of multiyear resource requirements.

Spend Incremental Resources to Improve Learning

Increase and protect the budget for quality-enhancing, non-teacher-related inputs, and strengthen the PFM processes for execution of these budget lines Currently, not only are the absolute levels of resources low, but these budget lines are also the first to be cut when there are expenditure cutbacks, increases in salary expenditures, and other macroeconomic shocks. They include most critical inputs such as textbooks, learning materials, and formative assessment, as well as teacher training and classroom-based support. Special attention should be paid to the materials for promoting early literacy and numeracy. At the secondary level, these would also encompass materials and equipment for teaching science.

As a norm, Sub-Saharan African countries should move toward spending 20 percent of their recurrent budgets on nonsalary inputs. The average for OECD or European Union countries is about 23–25 percent at the primary and secondary levels (OECD 2016). However, budgeting for these inputs is not sufficient if the PFM processes are not strengthened to address bottlenecks in execution and especially in accountability. As stated at the outset, and emphasized later in this section, the PFM processes are not the same for the delivery of textbooks, the construction of classrooms, and the delivery of school grants. Ministries of education, which are responsible for service delivery, need to pay attention to these processes because they affect whether the inputs are delivered at the right time to the schools and classroom. If some or all of these expenditures are devolved to lower levels of administration, it is necessary to be able to track them. Further, if teacher allowances are included under nonsalary expenditure budget lines, they should be tracked separately to monitor expenditures on inputs that complement teaching inputs.

Focus recruitment of additional teachers on improving learning gaps in specific parts of the basic education cycle This study has highlighted the need to focus on recruiting early-grade teachers with the requisite skills to teach early literacy and numeracy, teachers with language competencies in students' mother tongue and the subsequent language of instruction, and subject teachers in lower-secondary education (in mathematics and science, in particular). The question is not only one of projecting quantitative requirements but also of planning for the entire chain from training to recruitment and deployment, which requires coordination among different units of the ministries of education. Further, new teachers require support upon induction as well as ongoing support, and these expenditures would need to be included in the nonsalary budget lines.

Consider substitute teachers as a method for reducing loss of instructional time due to authorized teacher absenteeism, but such an option requires careful planning and implementation because of potential impact on fiscal costs Planning the requirements for substitute teachers, based on estimated authorized leave of the teaching force, may be a relatively easy technical exercise. However, it is challenging to develop a policy (the standards for substitute teachers and the processes for using them) and even more challenging to implement it. The potential for abuse, in the context of weak controls, is high. Further, substitute teachers may not improve learning unless there is sufficiently strong leadership at the school level to ensure continuity in teaching. The priority should be to focus on replacements for long-term absences such as maternity leave, which can affect children's learning.

Reduce Disparities in Standards of Education Service Provision

Define and implement minimum standards for each school (infrastructure, teachers, and learning inputs) An important reason for the large disparities in school

provision between rural and urban areas, or schools serving rich and poor communities, is the failure to define and implement the minimum facilities using standardized norms. A minimum package includes an appropriate class size (student-classroom ratio); functional toilets and drinking water facilities for students and teachers; classroom desks and benches; good-quality blackboards; all core-subject textbooks for all students; learning materials like pencils, chalk, and so on; and, if possible, additional learning and reading materials. At the lower-secondary level, materials and facilities for the teaching of science and information and communication technology (ICT) are also required.

Improve transfer programs to reduce inequalities, targeting lagging regions and population groups The mechanism for targeting poorer regions (for example, through grants) could be a formula that not only weights the number of students but also considers other indicators such as education-related underdevelopment and socioethnic, climatic, economic, and infrastructure vulnerabilities of regions. For targeting poor and vulnerable households, cash transfer programs can be potentially useful. Both measures require sophisticated tools as well as the ability to track and report expenditures that are currently weak in many Sub-Saharan African countries.

Improve the Efficiency of Public Spending

With 95 percent of public spending going toward salaries, ministries of education will improve the quality of their spending by focusing on the utilization of their teaching force. However, this is also one of the most difficult areas, because there are multiple, organized interests. In particular, discussion and negotiations with teachers' unions and other stakeholders are required, and there are good examples from Sub-Saharan Africa that can be studied and adapted. Reforms in these areas require high-level and sustained political commitment, combined with the capacity to execute them at the technical level, which may be done as part of the improvement of government PFM systems.

Deploy teachers more rationally across and within districts The misallocation of teachers may be the greatest source of inefficiency (and inequity) in education across Sub-Saharan African countries. Misallocation creates pressure to increase the number of teachers employed rather than to reallocate them to alleviate high student-teacher ratios. However, in principle, existing policies on class size and student-teacher ratios provide the basis for redeploying teachers. What is required is the administrative will and capacity (tools and procedures) to carry out these policies, as well as communication and outreach with stakeholders.

Pay teachers' salaries on time, and eliminate salary arrears Involving teachers in improving learning is essential, and the first step is to ensure that that they are paid on time and at their doorstep. This requires accurate budgeting and timely funds flow to be negotiated with the Ministry of Finance. The accumulation of

salary arrears is an important source of legitimate teacher grievances, leading to lengthy strikes, and their payment can pave the way for focusing discussions on improving teacher accountability and performance.

Improve controls on payroll and allowances Regarding payroll controls, priority should be given to eliminating payment to nonexistent teaching staff (ghost workers). Eliminating this problem requires payroll cleaning, together with a program to verify teachers. Other common PFM measures include the integration of (and reconciliation between) personnel records and payroll data; making timely changes to personnel records and the payroll; internal controls of changes to personnel records and the payroll; and payroll audits to identify control weaknesses. Processes for leave registration and salary deductions, where appropriate, also need to be strengthened. A related issue is that of controls over spending on allowances, especially travel allowances, where these are significant expenditure items.

Institute accountability measures to reduce unauthorized teacher absenteeism Reducing unauthorized absenteeism from classrooms requires action at the school level by the head teacher or principal to motivate and monitor the teaching staff, while reducing unauthorized absenteeism from schools requires a combination of actions by the school as well as higher authorities (to take action on reports by school heads).

Improve the efficiency of nonsalary expenditures If ministries of education increase their expenditures on nonsalary inputs, as recommended, PFM systems will need to be considerably strengthened to ensure their effectiveness. Some common features are whether there are adequate controls in place to prevent corruption and fraud and to prevent the buildup of expenditure arrears that create future liabilities for the government.

However, it is important to recognize that the PFM processes are different across different types of inputs. Table 5.10 highlights key issues that have to be addressed for some of the most important inputs. One priority area is to enhance the capacity for procurement and contract management, which affects the delivery and quality of some of the most critical inputs in education service delivery: namely, textbooks, learning materials, equipment, and construction of school facilities.

Strengthen Projections of Multiyear Resource Requirements

Project multiyear resource requirements To expand the basic education system requires additional teachers, classrooms, and schools. These projections need to be based on evaluations of alternative options for structuring the education system; specifically, projections for lower-secondary education have significant implications for teacher requirements in aggregate and by specialization as well as for new schools, additional classrooms, equipment, and learning materials. Careful consideration needs to be given to the cost-effectiveness of new initiatives,

Table 5.10 PFM Implications of Delivery of Various Education Inputs

Input or area	PFM issues to be addressed
Teacher training	Selection criteria for teacher selection and deployment after training; payment of allowances; internal and external audit; evaluation of effectiveness of training
Textbooks	Estimating multiyear requirements by subject and grade; procurement and contract management, including quality control and dispute resolution; distribution to schools and within schools; monitoring school inventories and utilization in classrooms
Teaching aids, materials, and technology	Budget allocation and funds flow; procurement and availability for use
School construction	Multiyear planning; criteria for selection of sites, technical norms, and standardized school design; unit costs; procurement modalities; contract management
School maintenance and repairs	Funds allocation and budget execution processes
School grants	Funds flow; simplified fiduciary procedures suitable for the school grants; roles and responsibilities of school committees for funds allocation and utilization; citizen participation
Examinations and assessments	Financing of examination and assessments; ensuring transparency
Stipends or scholarships to students	Funds flow; selection of recipients; audit trail for payments
School supervision	Resource allocation for supervision; planning; risk-based selection of schools for specific types of supervision; follow-up activities such as recording absentee teachers in leave records and salary deductions
Incentives and recognition	Resource allocation; incentive calendar; announcing the criteria to the disbursement of awards

Source: Compiled from World Bank 2017a.
Note: PFM = public financial management.

particularly when planning to implement them on a national scale. The projections also need to consider implications for other subsectors—such as upper-secondary, higher education, and early childhood education—which will place additional resource requirements on the budget. The projections need to be built into a multiyear planning and budgeting framework.

Build the capacity of ministries of education for M&E and for the collection and use of data Multiyear planning and budgeting requires a set of specialized skills, including the ability to evaluate different interventions and the use of data from multiple sources.

Improving the planning and execution of the budget is a long-term process, but improvements can be made in critical areas in the short and medium runs. Not all countries will address the full gamut of issues. Countries that have the basic structures and processes in place should aim to improve the efficiency of spending and allocate incremental resources to spending that boosts learning. For countries that are still dealing with massive expansion under challenging circumstances, the focus should be on getting the basic inputs into

school—teachers, classrooms, textbooks, and learning materials—and ensuring that teaching and learning are occurring in the classrooms.

Although addressing the weaknesses in budget management will enhance the performance of the education system, doing so will require not only data systems, skills, and knowledge, but also the capacity to coordinate—not to mention considerable political will. Chapter 6 turns to these issues.

Notes

1. The country group typology, which chapter 1 discusses in detail, characterizes countries' divergent paths of education system expansion based on three criteria: their primary gross enrollment rates in 2000 and 2013, shares of children out of school relative to the primary-school-age population, and retention rates in primary education. From highest to lowest progress, countries are in either Group 1 ("Established"), Group 2 ("Emerged"), Group 3 ("Emerging"), or Group 4 ("Delayed"). Within each country grouping, countries are further distinguished by the extent of the contextual challenges ("many," "some," or "few") faced around 2000, the start of the period covered by this study.
2. The data in this chapter on government education expenditures (GEE) are taken from UIS, as UIS harmonizes data across countries with different education cycles and reporting formats in order to facilitate cross-country comparability. However, in some countries harmonized numbers may differ from official statistics reported by governments and national statistical offices. Specifically, in the case of Mauritius, there is a significant discrepancy between the GEE as a percentage of the GDP reported by UIS and the Ministry of Finance respectively. In 2016, according to UIS, GEE represented about 5% of the GDP in the Mauritius (UIS.Stat database, accessed June 6, 2018) while the Ministry of Finance for the 2016/2017 fiscal year estimated the corresponding figure in 3.4% (Digest of Education Statistics 2017. Vol. 34, page 9, Republic of Mauritius, Ministry of Finance and Economic Development, Statistics Mauritius, February 2018, available at http://statsmauritius.govmu.org/English/StatsbySubj/Documents/Digest/Education/Digest_Edu_Yr17.pdf).
3. The UNESCO tables on aid to education list aid to "basic education," which covers direct aid to primary education for children, early childhood education, basic life skills for youth, and nonformal primary education for adults as well as a part of the aid that is unspecified by level and a part of general budget support. Because the subsectors included under this definition of "basic education" do not correspond to the terminology of this book (in which "basic education" is primary education through lower-secondary education), this aid is treated as primary education, broadly defined.
4. Cumulative total aid to education for each of the listed countries was calculated by summing the direct aid to education and 20 percent of general budget support for each year between 2002 and 2014. Aid amounts are gross disbursements from all donors expressed in constant 2015 US dollars. Data on aid taken from the OECD-CRS database (accessed March 27–28, 2018), http://stats.oecd.org/Index.aspx?DataSetCode=CRS1#.

5. The six Sub-Saharan African countries where donor aid still amounted to at least 20 percent of TEEs in 2012 were the Central African Republic, Guinea, Senegal, Malawi, Sierra Leone, and São Tomé and Príncipe and (UNESCO 2015).
6. The surveys were administered in Burkina Faso (2014), Côte d'Ivoire (2015), the Democratic Republic of Congo (2012), Ethiopia (2013), Ghana (2013), Kenya (2005), Malawi (2013), Mozambique (2009), Nigeria (2013), Rwanda (2013), Senegal (2010), and Uganda (2014).
7. A large share of aid for education is recorded as "level unspecified" in the database of the OECD Credit Reporting System (OECD/CRS), which is the original source of the data reported in UNESCO 2016. In Sub-Saharan African countries, one-third of allocations are in this category. It is likely that most of this category of aid to basic and secondary education is through sector support programs. See the notes to tables for deriving estimates.
8. The countries with water and sanitation coverage of around 85 percent in at least one of these facilities are Cabo Verde, Djibouti, The Gambia, Liberia, Malawi, Rwanda, São Tomé and Príncipe, the Seychelles, South Africa, and Zambia. Those reporting a coverage of 25 percent or less are Angola, Chad, the Central African Republic, the Democratic Republic of Congo, Guinea, Guinea-Bissau, Kenya, Madagascar, Mali, Mauritania, Niger, Sierra Leone, Tanzania, and Uganda.
9. Eight Sub-Saharan African countries have particularly low shares of education spending relative to GDP, TGEs, or both—Angola, the Central African Republic, Chad, the Democratic Republic of Congo, Guinea, Madagascar, Nigeria, and Zimbabwe. In addition, there are no readily available expenditure data for another 14 countries, several of which may also have limited expenditures in the education sector, such as the Republic of Congo, Equatorial Guinea, Eritrea, Gabon, Somalia, and Zimbabwe.
10. In some countries, this would not be possible: the share of education in TGEs in Ethiopia climbed from 15 percent to 27 percent between 1999 and 2014; less dramatically, it rose in Burundi, from 13 percent to 17 percent.
11. The World Bank's 2011 PEFA framework (not the current 2016 framework) was used in the evaluations of the Sub-Saharan African PFM systems analyzed for this chapter.
12. Countries where assessments have *not* been made are Angola, Cameroon, Chad, the Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Guinea, Namibia, Nigeria, and Somalia.
13. Although a country's Ministry of Finance normally drives the preparation of the budget, the PEFA evaluation looks for participation in the budget formulation process by other ministries, departments, and agencies as well as political leaders to ensure that the budget reflects macroeconomic, fiscal, and sector policies. It assesses whether the budget preparation process engages all parties in an orderly and timely manner, in accordance with a predetermined budget formulation calendar.
14. The other five PEFA indicators of budget comprehensiveness and transparency are comprehensiveness of the information provided in the annual budget documentation (measured against a specified list of basic and additional elements); transparency of transfers from the central government to subnational governments with direct financial relationships to it; oversight of aggregate fiscal risk from other public sector entities; public access to key fiscal information; and extent of unreported government operations (PEFA Secretariat 2011).

15. As part of the process of requesting funds from the GPE, education sector plans prepared by countries have to undergo an external assessment, often by consultants, that is summarized in an appraisal report.
16. The eight countries needing significant improvement were Benin, The Gambia, Liberia, Nigeria, Togo, Uganda, Zambia, and Zanzibar.
17. The World Bank PERs are shown in the chapter reference list.
18. For instance, the per capita allocation in Ethiopia is an estimated US$2.20 for grades one through four and US$2.40 for grades five through eight. In Lesotho, the grant (which is mainly to be used for small-scale infrastructure) is around US$0.80 per student. The allocation in Kenya is US$12 per student. In Uganda, the allocation is US$40 per school per month plus a variable amount that depends on the availability of resources with central and local governments.

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Chapter 6

From Science to Service Delivery: Closing the Capacity Gap

Introduction

For most ministries of education, especially those still trying to ensure universal coverage in primary education, managing even the basic functions of the system is a challenge: they must effectively plan and manage the training, deployment, accountability, and payment of teachers; school location and construction processes; the procurement and timely delivery of textbooks and learning materials; and the collection, analysis, and use of data on a regular basis. Improving student learning in basic education (through lower-secondary) demands even more capacity than expanding enrollment at the primary level—and Sub-Saharan African ministries of education face both demands.

Further, education systems in Sub-Saharan African countries have become large and complex: the number of functions and stakeholders have increased, and system management is increasingly decentralized. The tasks range from legislative preparation and changing formal rules and regulations to negotiations with teachers' unions, private schools' associations, parents, and politicians.

This study's conceptual framework of "from science to service delivery" (as detailed in chapter 1) highlights three broad areas that affect learning:

- *The contextual factors* (social, cultural, economic, political, and security-related) that affect learning through their influence on the behavior and abilities of children, households, and governments
- *The science*, referring to the evidence-based choice of policies and programs that are expected to produce results
- *The service delivery*, referring to the effective implementation of these policies and programs at the school and classroom levels, where much of the formal learning occurs

Although the key "service delivery organization" is the school and the key "service delivery personnel" are teachers and school administrators (as noted in chapter 1), systemic interventions implemented through a network of supporting institutions must ensure that schools have the required teachers and school leaders as well as the facilities, teaching and learning materials, and tools to be effective. These institutions ensure the development of appropriate curricula, textbooks, and other learning materials; the preparation and professional development of teachers; the supply or distribution of schools, materials, and equipment; and the use of educational data and learning assessments. These institutions must not only exist but also focus on improving student learning and coordinate their actions.

The preceding chapters have revealed that the body of knowledge about what boosts learning is growing, both through the analysis of the correlates of learning and impact evaluations in Sub-Saharan Africa and similar analyses in other low- and middle-income countries. Whether an intervention, program, or policy that works in one context will work in another will depend, to a large extent, on the contextual factors as well as implementation capacity.

Further, the foregoing analysis has shown that Sub-Saharan African countries have made great efforts in building schools; hiring and deploying teachers; and providing some basic materials such as textbooks, blackboards, and so on. These efforts, focused mainly on primary education, have created a network of basic "service delivery" organizations and "service delivery personnel," and have contributed to the massive enrollment increase in primary education. Yet, as chapters 3, 4, and 5 show, major gaps in service delivery affect the progression of students from early grades through basic education, particularly affecting rural and poor children who are disproportionately excluded from school. In lower-secondary education, even the network of schools and teachers to cover all children, especially those in rural areas, remains to be built.

Critical elements of effective service delivery are missing in many countries: the use of an appropriate language of instruction, schools with minimum conditions for learning, adequate teacher content knowledge and pedagogical skills, the correct deployment of teachers to schools, sufficient instructional time, and effective teaching in the classroom. The budget could potentially be an important tool to improve quality and equity, but it is often ineffective because of deficiencies in budget management processes, affecting the delivery of services.

In short, good ideas alone are not enough to improve student learning. Capable individuals and institutions are also required to navigate the complex process of implementing both ongoing "regular" programs and new

interventions and approaches. However, the core technical staff in the ministries of education of most Sub-Saharan African countries comprise too few individuals, who are often not well-organized in functioning teams, to institute, direct, and implement the needed efforts. In countries where there are relevant institutions, however nascent, the task is to strengthen them, particularly in ensuring their alignment and coordination to improve student learning. In many countries, these institutions need to be built or reorganized. Moreover, ministries of education need to develop broader capacities to understand and overcome political economy constraints on implementation as well as to strengthen the focus on results and develop a culture of "learning by doing."

This chapter reviews five areas of capacity that are important in strengthening the link between science and service delivery:

- *Generation and use of data* for better planning and monitoring of countries' education systems
- *Technical capacity* in areas linked to improving quality at the system level
- *Coordination* of institutions to align resources and inputs for successful classroom outcomes
- *Accountability and incentives* encompassing both central administration and frontline service providers, especially at the teacher and school levels
- *Negotiation and consensus building with stakeholders* that influence the implementation of decisions, especially those involving major policy reforms

The first two areas encompass competencies that can be defined relatively easily. However, less tangible factors—such as commitment, coordination, and cooperation—help ensure that rules and resources lead to desired outcomes, and incentives, interests, and systems in turn shape these factors (World Bank 2017b). The chapter concludes with a section outlining an approach toward capacity building that takes into account the experiences in the education sector and in other sectors.

Generating and Using Data for Better Planning and Monitoring

A ministry of education's capacity to *establish* and *use* data systems that help to monitor the education sector and take action to improve its performance is an indirect indicator of its implementation capacity. This capacity also helps the ministry of education to negotiate with the ministry of finance and to use budgetary resources effectively. Common sense, professional judgment, and lessons from the past are also of value, but they should supplement, not supplant,

evidence-based policy and decision making. This section assesses how well Sub-Saharan African countries are building and using such data in their decision making. It draws on data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute of Statistics (UIS)[1] and supplements it with an informal survey of 26 countries obtained from World Bank sources.[2] Although this survey is not exhaustive, it provides insights into the quality of the region's education data. Other sources of information are datasets compiling information on exams and assessments conducted in Sub-Saharan African countries, World Bank loan documents, government websites, and other available reports.

Several Sub-Saharan African countries seem to have improved their data collection and analysis over the past two decades, with the UIS and the development partners supporting training and providing computing support. The average number of countries reporting information in selected indicators for at least one year in each of the periods of reference reported in this section has steadily increased, from about 28 countries in the 2000–04 period to 37 countries in the 2010–14 period. But wide lacunae remain; even the most basic information on enrollments, teachers, and expenditures is often not readily available. Although the raw data may be available, it is not in a form that can be used by planners and managers. Hence, many countries face major problems in preparing realistic sector plans, including projections and financial cost estimates, as well as in monitoring their implementation.

Incomplete Data on Basic Indicators

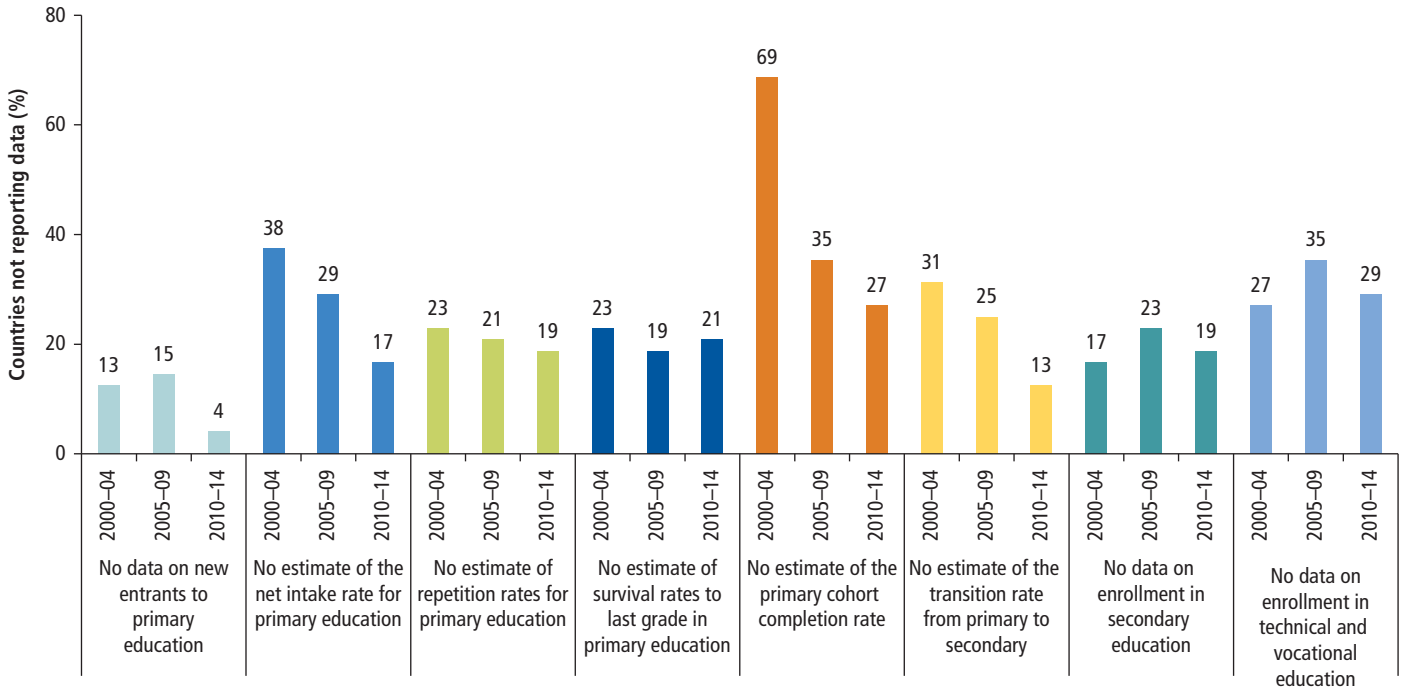
Globally, most education systems gather information about students, educational inputs (infrastructure, human resources, budgets), and learning outcomes. Many systems maintain high levels of confidentiality at the student level but report national data in aggregated form. Although data collection on education has expanded enormously in Sub-Saharan Africa, few countries have robust data systems and even fewer are exploiting their data to improve their education systems.

Many Sub-Saharan African countries have established education management information systems (EMIS), often supported by donor-financed projects. EMIS collect various types of data with, ideally, each type of data responding to a different management purpose: a first set of data relates to students; a second set to the inputs to the school system, including the teaching force, school infrastructure, and other inputs, as well as school finance; and a third set to measures of student learning.

Data on Students

The reporting of data on student indicators to the UIS improved considerably from 2000 to 2014 (figure 6.1). Even so, about one-fifth of the Sub-Saharan

Figure 6.1 **Percentage of Sub-Saharan African Countries Not Reporting Data on Essential Student Indicators, 2000–14**



Source: Analysis of UNESCO Institute for Statistics (UIS.Stat) data (accessed August 13, 2017), http://data.uis.unesco.org/.
Note: Percentages are calculated by dividing the number of Sub-Saharan African countries with no data for the indicator by the total number of countries in Sub-Saharan Africa (48). To avoid fluctuations due to the idiosyncrasies in the reporting of data in a given year, a five-year period is used to assess whether a country reported the indicator during that period. The three periods of five years each are 2000–04, 2005–09, and 2010–14.

African countries still do not report data on such critical variables as the net intake rate for primary education, the primary repetition rate, the survival rate to the last grade in primary education, the primary cohort completion rate, and even simple data on postprimary education.

Only about half of the region's countries are considered to have good data on student participation, based on the informal survey of 26 countries obtained from World Bank sources. Out of the 26 countries, only 14 are considered to have an "effective" basic EMIS producing timely information, of acceptable quality, related to student participation in the education sector. This includes such information as rates of student enrollment, repetition, dropout, grade promotion, transfers among schools, and graduation. The remaining 12 countries are assessed as still facing data reliability issues or delays affecting the timely collection and publication of data.

Student data coverage varies quite substantially. Among the 14 countries with an "effective" student-level EMIS, only half have an EMIS that is comprehensive, covering all subsectors including higher education;[3] the remaining reportedly collect data on primary and secondary education only. Four of these seven countries with comprehensive systems fully cover both public and private schools (Burkina Faso, Ghana, South Africa, and Tanzania), nine partially cover both public and private schools, and one (Zimbabwe) does not collect information on private schools at all. Similar differences in coverage appear among countries that still lack an effective basic EMIS.

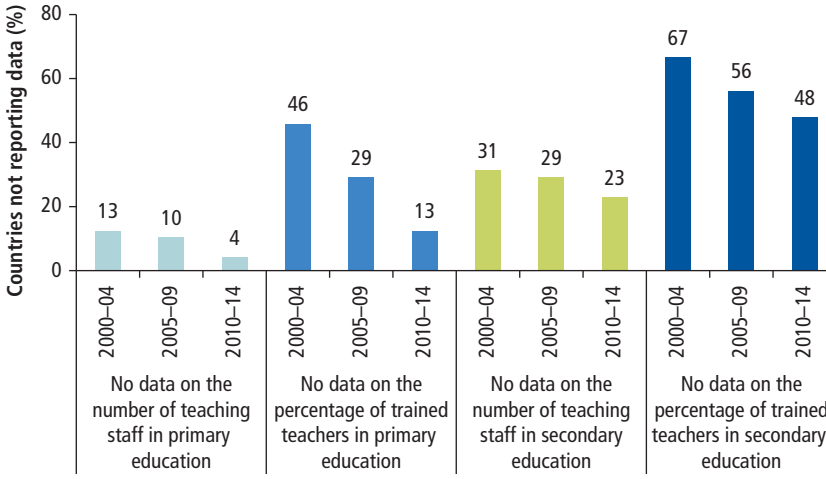
In almost all cases covered by the informal review, the data permit measurement of enrollment by grade, age, and gender and by school and region. Efficiency measures can be calculated, such as repetition rates (except in countries adopting an automatic promotion policy, such as Ghana), dropout rates, and transition rates to secondary school.

Data on School System Inputs: Teachers, Infrastructure, Finances

A significant proportion of countries do not collect even basic data on the number of teachers at the secondary level and on the proportion of trained teachers at either the primary and secondary levels, according to UIS data (figure 6.2). The absence of data on the most critical input for achieving sector priorities reflects a significant gap in capacity and most likely the inability of ministries of education to coordinate with ministries of finance (which pay the teachers) and ministries that manage the civil service. Many ministries of education have no system for collecting data on teachers who have upgraded their qualifications while in service.

Collection of data on basic inputs is widespread, with reportedly varying degrees of comprehensiveness and reliability. The informal survey of 26 countries from World Bank sources showed that countries under review

Figure 6.2 Percentage of Sub-Saharan African Countries Not Reporting Data on Basic Teacher Indicators, 2000–14

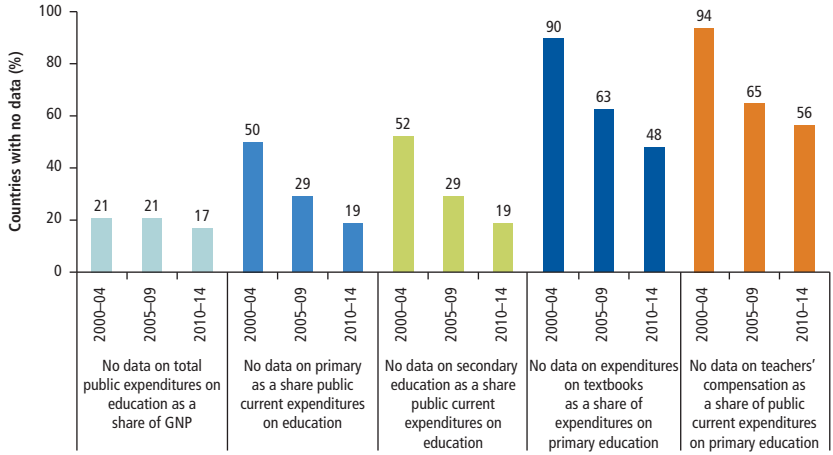


Source: Analysis of UNESCO Institute for Statistics (UIS.Stat) data (accessed August 13, 2017), http://data.uis.unesco.org/.
Note: Percentages are calculated by dividing the number of Sub-Saharan African countries with no data for the indicator by the total number of countries in Sub-Saharan Africa (48). To avoid fluctuations due to the idiosyncrasies in the reporting of data in a given year, a five-year period is used to assess whether a country reported the indicator during that period. The three periods of five years each are 2000–04, 2005–09, and 2010–14.

appear to collect data on school infrastructure. It also confirms the UIS information that data on numbers of teachers are generally available. However, other important data on qualifications, compensation, and deployment are often missing. Fourteen countries reportedly collect these data reliably.

Data on public spending on education are surprisingly uneven—even though ministries of finance must have such data. UIS data show that one-fifth of the countries do not have readily available data on overall government education expenditures (GEEs), or spending on primary or secondary education specifically, as a proportion of gross domestic product (GDP) (figure 6.3). About half of the countries cannot report the share of GEEs spent on teachers' salaries and textbooks. The informal review of 26 countries confirms these gaps in data; many countries collect financial data on education, but only 12 countries were reported to provide data on expenditures by level of education, and only 11 collect data on school-level finance.

Figure 6.3 Percentage of Sub-Saharan African Countries Not Reporting Data on Government Education Expenditure Indicators



Source: Analysis of UNESCO Institute for Statistics (UIS.Stat) data (accessed August 13, 2017), http://data.uis.unesco.org/.
Note: Percentages are calculated by dividing the number of Sub-Saharan African countries with no data for the indicator by the total number of countries in Sub-Saharan Africa (48). To avoid fluctuations due to the idiosyncrasies in the reporting of data in a given year, a five-year period is used to assess whether a country reported the indicator during that period. The three periods of five years each are 2000–04, 2005–09, and 2010–14.

Challenges to Collection and Coordination of Data

Relatively few countries can reportedly link data on students with data on school inputs. Based on the informal survey, this number may not exceed six. This inability shows the failure in most Sub-Saharan African countries to coordinate across data collection entities.

Questionnaires that schools complete for the EMIS tend to be long and complicated in most countries. Those that use a short and simple questionnaire are more frequently found among those countries that have a more effective EMIS. The case of Kenya is instructive: after almost eight years of not producing any education statistics, the simplification of the questionnaire filled out by schools led to the timely publication of education statistics.

The onerous nature of data collection and the burden it puts on schools also affect the quality of the data. Almost no country reportedly relies on independent, third-party validation to check the reliability of data. The only exceptions are Mozambique and Tanzania, where adoption of this

independent verification process is linked to results-based disbursement under World Bank loans; the focus is therefore on the specific indicators that are of interest.

The mode of dissemination of education data commonly adopted by Sub-Saharan African countries is the publication of an annual booklet, with the addition (in The Gambia, South Africa, and Zambia—all three countries with an effective basic EMIS) of the publication of school report cards. In Burkina Faso, The Gambia, Ghana, Mozambique, and South Africa, education statistics are also accessible on the government's website.

One last observation, based on the informal survey, is that—for several countries that now have a basic EMIS producing timely and good-quality data to monitor progress toward universal participation at the primary level and increasing participation at higher levels—the process may have been long and the buildup progressive. For 5 out of the 14 successful countries, even timely collection and good data quality are quite recent achievements—dating from 2010 for The Gambia and Mozambique, 2014 for Kenya, and 2016 for Malawi and Tanzania. Achievements in these countries as well as in most others have also been made with substantial donor support. Only South Africa and Zimbabwe have not received regular donor support; Burundi and Zambia have received only modest support. Even so, donor-financed systems may entail their own problems, as noted below.

Challenges Involving Donor-Financed Data Systems

A distinguishing feature of most Sub-Saharan African countries is that their EMIS have been set up and operated through financing provided by donors, often spurred by the need to monitor achievement of the Education for All (EFA) goals and targets. The push for the preparation of "credible education sector plans" since the mid-2000s by the Global Partnership for Education (GPE, formerly the Fast Track Initiative) has also contributed to this trend. Despite this heavy investment, as noted in chapter 5, in virtually all 20 countries whose sector plans were appraised, the EMIS was problematic, leading to ineffective collection, presentation, analysis, and use of data.

One problem created by this process is the lack of coherence between various donor-financed projects, both multilateral and bilateral, resulting in mismatches of software and hardware, complicated and overlapping questionnaires, and so on. Another problem relates to sustainability—the lack of resources to finance the maintenance of the system (including updates) as well as critical human resources. Once donor financing ceases, the full recurrent costs of maintenance are rarely transferred to the domestic budget. That Kenya lacked basic EMIS data for almost eight years reflects a combination of these factors.

Limited Learning Achievement Data

All countries conduct examinations that certify completion of the primary and/or lower-secondary levels of schooling; these are typically used to manage progression to the subsequent level.[4] All countries also conduct examinations at the end of the secondary school cycle, in accordance with the education system (French, English, or Portuguese) they follow. Examinations are used primarily for selecting students to the next level and, in many cases, for allocating students to schools. But they are poor indicators of system-level performance because they are designed for a different purpose.

Many countries measure system-level performance through national, regional, or international assessments. As covered in chapter 2, around 25 countries regularly participate in international and regional assessments, such as the Programme d'analyse du systèmes éducatif de la CONFEMEN (PASEC), the Southern and Eastern Africa Consortium for Monitoring Education Quality (SACMEQ), and Trends in International Mathematics and Science Study (TIMSS). Twenty-nine countries have undertaken national assessments of student learning at various grades and levels, regularly or intermittently, for the past two decades (UNESCO 2015). Most of these countries regularly assess students at the primary level, and some countries have long histories of national assessments. In Zambia, for example, the first national assessment at the primary level was implemented in 1999, with periodic follow-up administrations (in 2001, 2003, 2006, 2008, and 2012).

A limited number of Sub-Saharan African countries (10) also conduct assessments based on samples of students in secondary education: The Gambia tests student learning in grade 8; Botswana, Ghana, Mauritius, Nigeria, South Africa, Uganda, Tanzania, and Zambia in grade 9; and Ethiopia in grades 4, 8, 10, and 12. The periodicity of these assessments varies across countries.[5]

Although many African countries now conduct national assessments or participate in international assessments, they still vary significantly in the extent to which they can monitor the quality of education over time and use this information for policy making. Many initiatives are relatively recent, and participation is not always systematic.

Overall, 14 Sub-Saharan African countries out of the 43 for which information is available conduct national assessments regularly (every year in a few countries and every two years in most others) and participate in international assessments. National assessment results in some countries are comparable over time and could be used to monitor progress.

Sixteen other countries participate in regional or international assessments but conduct no national assessments (as in Botswana and Chad), conduct only a pilot (as in Cameroon), or have conducted only one round (as in Burundi). Alternatively, countries may conduct regular national assessments

and either not participate in regional or international assessments (as in Ethiopia) or do so only once (as in the Democratic Republic of Congo and Mauritania).

Building Technical Capacity to Improve Education Quality

Effective instruction and learning in the classroom requires a range of technical capacities at the system level. The key areas are curriculum development including language policy; teacher recruitment, development, and support; textbook and materials development, production, and distribution; learning assessments; school leadership and school support; and school construction. In most countries, the broader institutional infrastructure to develop and nurture these system-level technical capacities that support student learning has not kept pace with the explosion in primary enrollment. In some countries, many critical institutions do not yet exist; in many others, they are not fully functional. Many of the poorer countries, as might be expected, rely heavily on donor-funded technical assistance in these areas.

The countries that have made the greatest progress in education (Group 1)[6] have created a network of supporting institutions with relatively clear mandates, roles, and responsibilities; these include Botswana, Mauritius, and South Africa. Even though they are still hampered by a lack of technical expertise and sometimes insufficient resources, these institutions enable these countries to revise curricula regularly, improve teacher training programs, prepare new textbooks and learning materials, and conduct regular national learning assessments.

Two other Group 1 countries that are trying to establish the required institutional infrastructure are Ghana and Kenya. In Ghana, the 2007 National Education Reform and the 2008 Education Act, which extended free and compulsory education to 11 years, established new bodies to improve quality: the National Inspectorate Board, the National Council on Curriculum and Assessment, and the National Teaching Council. As of 2017, these institutions were neither fully staffed nor adequately funded to meet their mandates. In Kenya, after the adoption of the new Constitution in 2010 and related acts, the mandates of existing institutions (such as the Teachers Service Commission) were clarified, and several new institutions were established. Among the latter are the Kenya Institute of Curriculum Development, the Education Standards and Quality Assurance Commission, the National Council for Nomadic Education in Kenya, the National Education Board, and county and school boards of management. Some of these play an accountability function as well. However, none of the new institutions is fully functional yet, lacking the required staffing and resources.

In several countries, considerable institutional proliferation has brought duplication of functions. Combined with underresourcing and a lack of effective leadership, the result is that there is little practical support for teachers and schools to improve learning. Nigeria has an impressive network of institutions for preparing teachers, ensuring quality assurance of teacher training institutions, and enhancing school quality (as discussed in box 6.1). The Federal Education Quality Assurance Service, for instance, has a broad mandate to improve school quality through inspections, provide capacity building, and enhance guidance to states and local government authorities. However, the number of school inspectors is inadequate, their selection and recruitment sometimes lack transparency, and resources are limited. School inspections are not standardized in practice and lack a focus on improving teaching and learning (Kotirde and Yunos 2015). Different institutions are apparently responsible for similar or overlapping functions; for instance, three institutions have the mandate to accredit teacher education programs. As a result, despite the existence of many institutions, the quality of service delivery continues to be poor and learning outcomes are low.

The inability to develop, produce, and distribute textbooks—often the only instructional material for students—is one of the great gaps in technical capacity in many Sub-Saharan African countries, which can and should be bridged (Fredriksen, Brar, and Trucano 2015). While other regions have been able to ensure textbook availability for every child, Sub-Saharan African countries face relatively high unit costs and tend not to finance them out of their own budgets, relying on donor finance. Another problem is the lack of quality-assurance mechanisms to guarantee that textbooks meet minimum standards for content as well as design.

The persistent absence of domestic capacity, combined with high unit costs, may reflect underlying political economy factors, both domestic and international. These factors need to be overcome if Sub-Saharan African countries are to advance their learning agenda. In fact, the competencies, organizational structures, and business processes required to produce and distribute textbooks are fairly standardized now, with several models that can be adapted to the context of Sub-Saharan African countries. Where it is not possible to develop textbooks in country, both development and printing services can be procured; nevertheless, the capacity to develop technical specifications and to manage contracts and copyright issues must be developed.

The area of learning assessment, on the other hand, exemplifies the challenges that Sub-Saharan African countries face in building a cadre of technical experts and the trade-offs that must be made. Most countries have well-developed organizations for constructing and administering examinations.

BOX 6.1

Institutions Involved in Improving the Quality of Basic Education in Nigeria

In Nigeria, many institutions—largely autonomous, parastatal organizations—are expected to play a role in improving the quality of teachers and instructional processes in schools. With insufficient resources and sometimes-overlapping functions, they are not yet sufficiently aligned to improve the overall system of learning. The most prominent of these organizations are the following:

- *National Commission for Colleges of Education:* The NCCE advises the Federal Ministry of Education, coordinates all aspects of subdegree teacher education in the country, and oversees the Colleges of Education (COEs). It lays down minimum standards for all programs of teacher education, reviews curricula of COEs, and accredits their programs once every five years.
- *National Universities Commission:* The NUC grants approval of the establishment of all higher educational institutions offering degree programs in Nigerian universities and accredits academic programs within universities, including teacher education programs at the degree level. It ensures quality assurance of these academic programs.
- *Teachers Registration Council of Nigeria:* The TRCN accredits, monitors, and supervises teacher training institutions to ensure they meet national and international minimum standards. These institutions include the COEs, the faculties and institutes of education in Nigerian universities, the schools of education in the polytechnics, and the National Teachers Institute. It handles the registration and licensing of qualified teachers and organizes internships for new graduates before licensing. It also executes the Mandatory Continuing Professional Education program to ensure that teachers' qualifications remain up to date. Teachers must renew their license every three years, which is partly dependent on completing professional development.
- *National Teachers Institute, Kaduna:* The NTI provides in-service teacher training programs through a distance learning system to help teachers in the system become certified or upgrade their qualifications remotely.
- *Department of Federal Education Quality Assurance Service:* FEQAS, within the Federal Ministry of Education, is responsible for inspections of schools below the tertiary level and for implementation of curriculum and pedagogy standards through whole-school evaluation, special evaluation, and accreditation. It collaborates with relevant agencies to evaluate the relevance of instructional materials; ensures that minimum and uniform standards are attained in education practices across the country; undertakes capacity building for inspectors, teachers, subject heads, head teachers, school principals, and others; develops and reviews instruments for monitoring the effectiveness of schools; and provides guidelines and support to states and local government education authorities to conduct evaluations.

Source: Analysis using information from Federal Ministry of Education of Nigeria website, http://www.education.gov.ng/.

However, the capacity to conduct learning assessments is still relatively limited, despite significant investment in this area by donors in many Sub-Saharan Africa countries. Among the most critical constraints are (a) the skills to develop valid and reliable tests, including those that can measure progress over time; (b) the appropriate software for test development; and (c) the capacity to report and use the data (Lockheed 2008).

Building capacity in this area requires long-term investments, continuous improvements, and inevitable trade-offs. In some circumstances, it may be more realistic to focus on helping teachers improve classroom teaching using formative assessments. Although progress in learning achievement is the ideal measure to assess the performance of an education system, other indicators that contribute to learning (such as actual, as opposed to official, instructional time) and are within the countries' technical and administrative capacity can be useful in improving quality.

Across the board, a set of common problems affects the functioning of these critical technical institutions: the lack of clear mandates (or sometimes overambitious mandates) and related definition of responsibilities; ineffective governance structures with insufficient autonomy and accountability; an inappropriate skills mix related to the recruitment and training systems in public institutions; inadequate physical resources; and inadequate and erratic financial resources. Investment also needs to be made in the continuous training of qualified staff so that they can keep abreast of developments in their field.

Because building technical institutions of repute that are capable of undertaking professional work of high quality is expensive, in terms of both financial and human resources, it is important to be strategic and focus on the most critical institutions. Revamping and strengthening the key institutions (or establishing new ones) should focus on reforming governance structures, accountability mechanisms, and policies for attracting and retaining skilled professionals. In countries where these objectives would be too expensive to carry out, using the expertise of cross-border institutions in Sub-Saharan Africa may be an option.

Coordination of Institutions to Align Resources and Inputs

Improving learning will require the capacity to coordinate and align different institutions that produce different resources and inputs and ensure that they are brought together in the classroom. For instance, institutions that provide preservice education and continuous professional development to teachers, those that supply textbooks and instructional materials, and those that conduct

examinations and assessments must coordinate their efforts to ensure that the content is aligned. This has proven difficult for ministries of education because of the significant demands on organizational capacity.

As mentioned earlier, the lack of adequate textbooks in Sub-Saharan African classrooms reflects a lack of technical capacity to manage their conceptualization, production, and distribution in a cost-effective manner. But even in countries that are committed to providing textbooks to every child, coordination failures result in delays and logistical problems in delivering the right quantities to each school. One important reason is the failure to coordinate between four primary entities functioning under the ministries of education: (a) the curriculum unit, which lays out the technical specifications and content areas; (b) the planning and budgeting unit, which estimates physical and financial requirements; (c) the deconcentrated administrative units and schools, which play a role in demand forecasting and distribution; and (d) the procurement department, which ensures the acquisition of books by launching bids and managing contracts.

One of the most challenging tasks in low-capacity environments is the revision of the curriculum and the downstream changes that are required in textbooks, teaching and learning materials, assessment methods, teacher training, and teacher support. Reviews of recent curriculum changes in a number of Sub-Saharan African countries show that there were no concurrent changes to the teacher education curriculum, including in regard to the use of national languages in classrooms (Pryor et al. 2012). This reflects the lack of horizontal coordination mechanisms between the Ministry of Education and providers of teacher education to ensure that preservice teacher education programs are aligned with new curricula. The problem is especially severe in the case of secondary teachers' training programs, which are offered by universities or tertiary institutions that are typically autonomous.

Partly because of these difficulties in coordination, many countries that adopted universal basic education in principle some years ago have made little progress on the ground. As the momentum builds to reach the Sustainable Development Goals (SDGs) by 2030, the coordination challenges involved in rolling out basic education reform will become pressing. Achieving the education SDG targets will require detailed planning and sequencing of the various elements contributing to the educational process, involving multiple institutions with different capacities. In turn, strong political and technical leadership, together with the creation of flexible organizational structures to facilitate collaboration and decision making, is required to overcome these challenges.

What will *not* serve the purpose is a bureaucratic process of coordination, involving the proliferation of structures that are paralyzed by an inability to

BOX 6.2

Bureaucratized Education Coordination Efforts in Côte d'Ivoire

Côte d'Ivoire has three education sector ministries: School Education, Technical Education and Vocational Training, and Higher Education and Scientific Research. To facilitate coordination among these ministries, the Inter-Ministerial Coordination Committee (IMCC) was established, but it has been largely ineffective. Created by Prime Ministerial Decree to monitor implementation of education programs, the IMCC consists of the president, the prime minister, the ministers responsible for planning and finance, and the three education ministers. It is expected to meet once a quarter or whenever needed.

Although the presence of the president and finance minister on the IMCC was designed to facilitate decision making, their presence, in practice, makes it difficult for the committee to function. A task force was created under the collective leadership of the three education sector ministers to support the committee's work. It is supported by the three chiefs of staff of the ministers and is led by a coordinator and two deputy coordinators. This task force does not have its own budget to undertake any coordination activities but rather relies on the ministries themselves. As a result, it is largely ineffective, owing to limited human and financial capacity as well as a lack of proper mandate for enforcement or follow-up of decisions.

Source: World Bank 2017a.

make decisions. In particular, top-heavy "coordination committees" are rarely effective in creating coordination. Box 6.2 illustrates an example of poor coordination mechanisms involving three ministries of education in Côte d'Ivoire.

Coordination activities, especially with lower levels of government or administration, are more difficult in the absence of limited road networks, communication structures (telephone), electricity, and other types of infrastructure. Even a relatively simple task, such as the distribution of textbooks, requires high-level leadership and commitment. In such constrained environments, limiting reforms and tasks to those that are most essential for improving instruction and learning in the classroom is a useful guideline to follow.

Accountability and Incentives to Strengthen Performance and Outcomes

The failure to provide schools with the required inputs for teaching and learning, the high levels of teacher absences from schools and classrooms, and poor learning outcomes across Sub-Saharan Africa have focused attention on

weaknesses in the overall accountability framework between the central administration and frontline service providers on the one hand, and the state and the broader society, on the other. The influence of rent seeking and patronage in public administration as a whole also has deleterious effects on the education sector.

These concerns have led to the introduction of initiatives to improve accountability and enhance incentives, especially at the teacher and school levels. Rigorous impact evaluations of such interventions in low- and middle-income countries are relatively few, as discussed in chapter 2.

Teacher incentives produced relatively small impacts on teacher performance and student outcomes in the 10 studies reviewed by Snilstveit et al. (2016). Only one of these studies was in Sub-Saharan Africa (Kenya). In the nine studies that focused on community-based monitoring, the impacts on enrollment and learning are mixed (again, only one study was carried out, in Kenya). Similarly, school-based management has had limited effects, as discussed in chapter 5.

Another recent review of incentives and accountability in education also found that the specific design of the teacher incentive programs plays a critical role (Arcia 2014). Specifically, incentives targeted to individual teachers can create perverse incentives, undermining collaboration between teachers in a school, which is required for improving learning. Providing information to parents and communities can be useful, but success depends on whether schools and teachers can actually change their practices to improve learning (Bruns, Filmer, and Patrinos 2011).

Government performance in the delivery of education and other public services, as well as its responsiveness to civil society interventions, depends more broadly on the nature of the political process, specifically on whether political competition is based on clientelism or on programmatic interventions (Devarajan, Khemani, and Walton 2014). The former can lead to patronage, as manifested in high-level government positions as well as jobs and contracts in the public sector being given as rewards for electoral or political support. In such contexts, the delivery of public goods, such as education, is not the main objective; rather, the provision and expansion of education may provide additional sources of patronage. Social-accountability initiatives and citizen engagement can complement formal and bureaucratic mechanisms for accountability (such as auditing and financial controls) to reduce clientelism and corruption, but these require investing in the training and education of communities and civil-society groups.

Whether communities can play an effective role in monitoring and enforcing accountability also depends on the complexity of the task and the additional training and support that communities require, given the relatively low educational attainment in most countries. Community management of school

construction has often proven cost-effective, provided there is modest investment in training and preparation of simple tools and procedures, together with technical supervision. The construction of a classroom is relatively simple and easily understood by communities, whereas monitoring of student learning or teacher instructional practices is more difficult.

Fredriksen, Brar, and Trucano (2015) contend that allowing schools to choose textbooks is impractical, given teachers' limited content knowledge, and is generally not cost-effective because multiple titles with low print runs raise the cost of provision. On the other hand, communities can play an effective role in monitoring textbook deliveries and inventories at the school level, provided that information is used for improving logistical planning at the higher levels of administration.

Given the limited capacity in most Sub-Saharan African countries, the design and implementation of innovative incentive and accountability programs has largely been undertaken in donor-funded projects or externally funded research projects. These pilots are often not sustained and are rarely expanded to a national scale (sometimes for lack of financing but mostly for lack of technical and administrative capacity, apart from a lack of political will). An intervention that does not touch broad stakeholder interests can be successful at the local level but fail when it is taken to scale without broader consultation and consensus building. For example, one government effort to scale up a pilot intervention financed by an external donor, involving the hiring of contract teachers in Kenya, had to be abandoned because of resistance from teacher unions (Bold et al. 2013).

Consultation and Negotiation with Stakeholders to Build a Consensus

Education systems have become increasingly complex and involve a variety of stakeholders. These include elected representatives at the national and local levels, parents' associations, and associations of private schools and teachers' unions, among others. Reflecting varying interests and power, these stakeholders can affect the implementation of decisions, and especially of major policy reforms.

As earlier chapters have stressed, ensuring the deployment of teachers according to student enrollment and improving teacher attendance should be priorities for governments, because both measures improve learning time for students. Yet implementing policies on rule-based deployment is constrained by many factors. Box 6.3 illustrates the role of formal and informal power structures at the local level that affect teacher deployment decisions in Malawi,

BOX 6.3

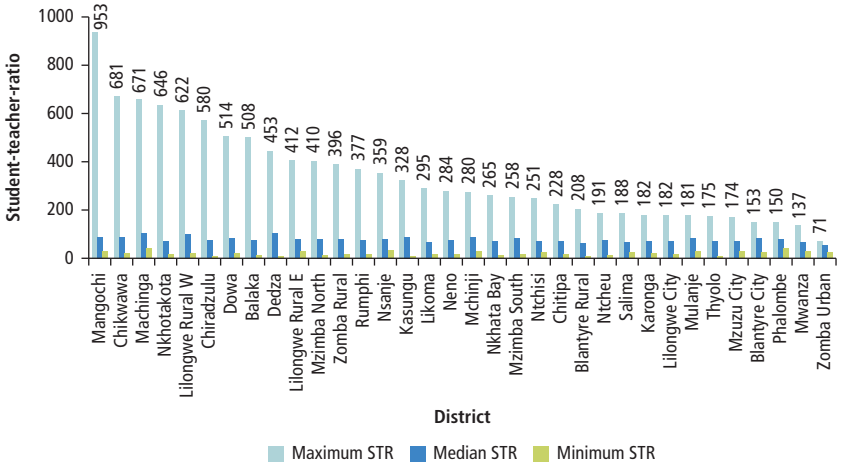
Effects of Local Stakeholders on Teacher Deployment in Malawi

Wide disparities in the student-teacher ratio reflect a long-standing issue in teacher deployment in Malawi, partly because of the difficulties of attracting teachers to live in remote, rural areas (figure B6.3.1). Past efforts to resolve this problem have yielded few results. In 2012, for example, the government introduced a targeted hardship allowance for teaching posts in remote, rural areas, targeting 20 percent of the teachers. However, in the absence of objective criteria for identifying the "hardship" posts, pressure from the teachers' unions eventually forced the government to extend the allowance to all teachers in all rural government schools, leading to a rise in public spending without reducing disparities.

Various actors are involved in decisions regarding teacher allocation to specific schools:

- *District education managers (DEMs)*, under the central Ministry of Education, Science, and Technology (MOEST), are responsible for the day-to-day school operations. They fill established positions that fall vacant in their districts and may move teachers between schools to do so; movements across districts require formal approval by MOEST.

Figure B6.3.1 Student-Teacher Ratios in Primary Education, by District, in Malawi, 2016



Source: Asim et al. 2017.
Note: STR = student-teacher ratio.

(continued next page)

Box 6.3 (continued)

- *Primary education advisers (PEAs)* are MOEST officers working at the subdistrict level who advise DEMs on teacher placement but in practice often decide on their behalf.
- *Elected officials* comprise members of parliament (MPs) and ward councilors for the country's 34 districts. Along with district commissioners, they oversee provision of services, including education.
- *District commissioners (DCs)*, along with elected officials, have a limited official role in the allocation of teachers. Informally, however, through teachers' personal connections with these actors, DCs were identified as exercising significant pressure, either directly on DEMs or through MOEST on MPs.
- *Area and village development committees* (chaired by village chieftains representing traditional authority, who also have ex officio membership on district councils) represent forms of authority closest to the school level. These actors can potentially provide a useful avenue through which communities can exert countervailing pressure to ensure that teachers do not move from understaffed schools.

Although the DEMs are ostensibly the decision makers regarding teacher allocations, they are subject to influence "from above" and "from below." Following rules and official norms is difficult in this context.

Fragmented and inconsistent data systems are part of the problem, and incentives exist for various actors to perpetuate this situation. In Malawi, two data systems pertain to teachers: (a) a record of teacher information collected by the DEM offices and centrally collated by MOEST into the EMIS database; and (b) payroll records maintained by the Department of Human Resources Management and Development (DHRMD) within the Office of the President that has ultimate control of all civil service staff. The two data systems are not consistent because of differences in the timing of data collection and omissions or errors in record keeping. Importantly, they lack common identifiers to link the records. It is therefore difficult to identify the specific school in which a teacher is working.

At the same time, the National Statistical Office maintains a surprisingly robust database of the geospatial coordinates of all public schools in Malawi as well as the location of subdistrict town markets. This information could help in identifying objective, transparent criteria for determining the relative hardship status of each primary school. Using accurate, up-to-date data on the current posting of teachers and the relative hardship status of schools, district officials could follow a rules-based allocation system, thus strengthening the possibility of consensus building among different stakeholders to ensure that students get the teachers they need. MOEST has recently launched an initiative to undertake this exercise.

Source: Based on Asim et al. 2017.

leading to a dysfunctional system that is reinforced by fragmented data systems and perpetuates high disparities between districts in the student-teacher ratio.

Teachers' unions constitute an important group of stakeholders in the education sector, and the ability to negotiate a consensus with them is critical to making progress on the learning agenda. The number, membership, and capacity of teachers' unions varies across Sub-Saharan African countries. Their role in competitive electoral politics differs from country to country; it is also influenced by the nature of the political process—that is, whether the process is largely programmatic or based on clientelism. In countries where there is a large proportion of contractual or community teachers, the issues have become more complex as these groups of teachers have become organized politically to secure better salary and working conditions (such as benefits and longer-term contracts). Lacking a well-thought-out and costed strategy as well as negotiating capacity, particularly when constrained by electoral cycles, governments respond to the exigencies of the moment for short-term political gains. In these countries, which face the greatest challenges in access and learning, there is a possibility that large numbers of teachers lacking the basic education level and competencies to teach can be inducted into the civil service, which will undermine the efforts to improve quality.

For many ministries of education that are struggling to deliver basic inputs, developing a strategic dialogue with teachers' unions is likely not high on the list of priorities. However, the possibilities for education reform to improve learning depend crucially on the inclusion of teachers in implementing the reform.

Toward an Approach to Capacity Building in Ministries of Education

Sub-Saharan African countries are gearing up to reach the SDG 4 target of achieving basic education for all young people.[7] Attaining this goal will be much more capacity-demanding than achieving the goal of universal primary enrollment. Although various policy papers of international organizations have emphasized the importance of learning, in practice (partly because of priorities set by the international community) the focus has been on enrollments. Sub-Saharan African countries have also diverged significantly in their educational progress, and hence in the capacities they have developed.

The availability of new knowledge and innovations will not make a significant difference if ministries of education—still the largest providers of basic education—do not know how to evaluate these innovations, adapt the most promising ones to local conditions for implementation, and assess the

implementation progress. This effort requires not only technical expertise in a range of areas but also the capacity to coordinate, manage political economy challenges, build a consensus, and generate and use data.

Capacity Building: Demand and Supply

Indeed, many ministries of education recognize capacity constraints as often *the* binding constraint for effective implementation of programs. Such constraints are often seen as primarily relating to the lack of individual technical skills. Many ministries are staffed with teachers or education officers who have been promoted within the education administration system, without additional training. This is, in turn, the result of civil service regulations, which may prevent hiring of staff with specialized skills, and of the unavailability of a pool of specialists trained in specific domains required for improving education quality.

The expressed demand for "capacity building" by ministries of education is therefore limited in its scope (confined to the competencies of individuals) and does not reflect the capacity needs of the sector as a whole. There is only limited recognition that the broader organizational and political economy challenges can also be addressed through appropriate capacity development. Hence, capacity *needs* are rarely translated into *effective demand* (Fredriksen 2016). Further, the time horizon of political leaders engaged in competitive politics can be limited by electoral cycles, whereas capacity building in the education sector requires sustained commitment. Nevertheless, unless there is demand from the ministries of education, capacity-building efforts will not be sustained.

The supply of capacity-building efforts, which are largely financed by individual development partners in Sub-Saharan African countries, has also been fragmented. These efforts are typically provided on a project-by-project basis, and the primary goal is to ensure implementation success of the project. In some cases, the project is directly executed by the development partner, building little capacity in the system. Even when projects and their capacity-building components are implemented by governments, as in projects financed by the World Bank, they tend to be focused on delivering the project-financed activities.

Components related to "institutional development" in World Bank projects usually finance training of staff (including external training), equipment, study tours, and studies (Fredriksen 2016). As documented by the World Bank's Independent Evaluation Group, training in Bank-supported projects has not resulted in "substantial changes to workplace behavior or enhanced development capacity" (IEG 2008). They are often not sustained and do not have lasting impact overall. The experience of decades of "capacity building" in textbook management and EMIS, for instance, in which considerable financial investment has been made by multiple donors, vividly demonstrates this failure.

Some of the failures in coordination and in the accountability and incentive framework are being addressed through new results-based financing approaches in externally financed education sector projects. However, these approaches also place a heavy burden on data collection, including external verification (with associated high costs), which may not be sustained after the close of the project. There is also a tendency for these approaches to be adopted where multiple donors are aligned with the approach, leaving out many of the poorer countries. Finally, while addressing some of the failures in implementation capacity, results-based approaches do not eliminate the need for underlying technical capacity—that is, the knowledge and expertise about how to improve learning in the specific context of the country. Many development partners, including the World Bank, have therefore deemed it necessary to supplement the results-based financing approach with a traditional investment component that finances "capacity-building" in specific technical areas.

The supply of capacity building has also taken the form of multicountry initiatives, as in the following examples:

- *The Pôle de Dakar* (now the African branch of UNESCO'S International Institute of Education Planning [IIEP], initially funded by the Agence Française de Développement) has provided considerable technical assistance to ministries of education to analyze education statistics as inputs into their planning process.
- *UNESCO's Capacity Development for Education (CapED) program*, which started in 2003, focuses on strengthening capacities in three priority areas—sectorwide policy and planning, skills for life and work, and teachers—through training, workshops, and other technical assistance.
- *Early Grade Reading Assessments*, largely spearheaded by the U.S. Agency for International Development (USAID), have helped to focus attention on early-grade learning. More broadly, capacity building around learning assessments has been undertaken for almost 25 years.

Although useful in many areas, these efforts nevertheless highlight the fragmented nature of capacity-building activities—leaving the burden on ministries of education, with relatively little capacity and pressing implementation challenges, to assimilate and apply the lessons from different interventions.

Unfortunately, there is greater experience of what does *not* work than what *does* work in the area of capacity building. However, negative experiences are useful as countries embark on closing capacity gaps. What does *not* seem to work for long-term capacity building are the following types of assistance: (a) project-financed technical assistance that ends at the close of the project; (b) individual consultants' services, to transfer knowledge to technical staff of ministries of education; and (c) isolated training of individual staff members

of ministries. This, of course, does not imply that such technical assistance may not be useful for the purposes of the project or contribute to broader objectives of capacity building; it means that exclusive reliance on these forms of technical assistance will not yield results.

The broader literature on public sector management also suggests that translating "best practices" from Organisation for Economic Co-operation and Development (OECD) countries—or, in this case, high-performing education systems—does not work, because preexisting administrative capacity matters (Blum 2014). Indeed, "best practices" are derived from continuous learning from implementation in a specific context, and where this culture does not exist, new practices cannot be easily adopted. Functional reviews and reorganizations of sectoral ministries without addressing the broader issues of results orientation, accountability, and administrative culture also tend not be successful.

Models from Financial and Disaster Management Programs

The experience of building capacity in the region's national financial institutions and in disaster risk management through long-term technical assistance programs provides some guidance for the education sector (box 6.4). In the financial sector, two prominent long-term efforts (establishment of technical assistance centers and the Financial Sector Reform and Strengthening Initiative) have sought to build capacity in financial institutions in low- and middle-income countries through technical assistance, knowledge sharing, and institution building. In the area of disaster risk management, the Global Facility for

BOX 6.4

Capacity Development for the Financial Sector and Disaster Risk Management

Financial Sector Management

The differences in economic performance across Sub-Saharan African countries can be related to a macroeconomic and institutional framework that has been more or less favorable to growth and to resilience against shocks. Although the 2008–09 global crisis resulted in a shrinking fiscal space for all countries, the quality of economic management—as reflected in monetary, fiscal, exchange rate, and debt policies—has made a difference and benefited the countries that have registered high growth. This did not occur fortuitously.

Over the past couple of decades, central economic and financial institutions have benefited from effective, well-managed, and sustained external technical and

(continued next page)

Box 6.4 (continued)

knowledge support for capacity development. This support, which likely contributed to the progress made by these institutions, holds lessons for the education sector. Two examples illustrate the case: (a) establishment of regional technical assistance centers for economic and financial institutions, and (b) the multidonor Financial Sector Reform and Strengthening Initiative (FIRST).

Regional technical assistance centers. Nine such centers have been established, including five in Africa between 2002 and 2013, as part of a special initiative to improve the performance of economic and financial institutions. The centers are managed by the International Monetary Fund (IMF) and funded by a number of donors, the IMF, and host and beneficiary countries. The first African center, in Tanzania and covering seven East African countries, focuses on developing the capacity of finance ministries, central banks, revenue authorities, and statistical agencies. It had a budget of about US$10 million in 2015 and a proposed budget of US$53.5 million over the next five years. The latest external evaluation done in 2013 includes many useful lessons (East AFRITAC 2013).

Financial Sector Reform and Strengthening Initiative. FIRST was launched in 2002 after the East Asian financial crisis to promote financial sector reforms. It committed US$16.8 million for this purpose in fiscal year (FY) 2015, of which 43 percent benefited Sub-Saharan Africa as a priority region. FIRST is funded by five bilateral donors, the World Bank, and the IMF and is managed by the World Bank. Since its inception, FIRST has provided US$135 million for technical assistance (TA) for capacity development in the financial sector in 115 countries. According to the 2014 external evaluation, with TA financed by FIRST, "executing agencies were able to . . . produce development strategies, draft new laws and regulations, (obtain) institutional assistance, and run crisis simulation exercises" (DPMG 2014).

Disaster Risk Management

The area of natural disasters is another example of a global approach to building capacity in low- and middle-income countries, in particular to reduce and manage risks arising from them. The Global Facility for Disaster Reduction and Recovery (GFDRR) is a global partnership that helps such countries better understand and reduce their vulnerabilities to natural hazards and adapt to climate change. Working with more than 400 local, national, regional, and international partners, GFDRR provides grant financing for TA, training, and knowledge sharing in mainstream disaster and climate-risk management policies and strategies. In FY 2015, its support totaled US$70 million for activities in more than 89 countries. GFDRR is supported by 34 countries and 9 international agencies.

In Africa, GFDRR helps countries develop disaster risk management capacities at the regional, national, and local levels. The TA covers many sectors; in the education sector, one example is GFDRR's the Global Program for Safer Schools, which aims to make students and schools safer through better construction practices (World Bank 2012, 2015).

Source: Adapted from Fredriksen 2016.

Disaster Reduction and Recovery (GFDRR) enables countries to reduce their vulnerability to natural disasters and adapt to climate change. These two cases exemplify high-quality capacity development approaches reflecting long-term, sustained political and financial commitment on the part of donors; a coordinated approach among donors; expressed demand by recipient countries; and technical assistance that is tailor-made to country contexts.

At the country level and especially at the global level, there is increasing recognition of the learning crisis in basic education. This crisis, however, does not carry the same weight as other issues like climate change, pandemics, natural disasters, and financial crises. The global public good of mitigating these risks is more obvious than the public good of mitigating the risk of children failing to acquire the basic competencies for adult life. Capacity building to handle risks in the financial sector and in disaster management has therefore been financed as a public good, in a coordinated and sustained manner. Similar efforts are required to build these capacities in the ministries of education in Sub-Saharan Africa, without which it is unlikely that rapid progress can be made toward ensuring that all children complete a high-quality basic education.

Attaining the objective of learning for all children through lower-secondary education will produce significant external benefits. There is, therefore, a global public-good aspect to building capacity in ministries of education to better manage their education systems. For various reasons, governments, even when they recognize capacity constraints, are unwilling to spend their own scarce resources or to borrow for capacity building. Although it would be ideal for governments to pay for technical assistance using their own budgets (as this would also ensure country ownership), ministries of finance find it difficult to prioritize one sector over another and to justify spending for such requirements when there are many pressing requirements (such as building schools). Further, the inability of ministries of education to clearly articulate their capacity building needs also poses an obstacle.

Strategic Priorities for Capacity Building in Education

What could capacity building in the education sector look like? Although an exhaustive elaboration is beyond the scope of this book, some key elements are presented here.

Invest in Technical Expertise at the Local Level

Create a pool of education specialists in-country through targeted university programs The pool would include specialists in the areas of curriculum, materials development, teacher educators, assessments, monitoring and evaluation specialists, and economists. Doctoral programs in psychometrics and other specialized areas could be begun in a several of the larger countries, with twinning arrangements between domestic and international institutions to ensure that countries have access to the latest developments. Specialized technical and

analytical skills that are required for education policy development and program design should also be developed. The graduates of these programs could be used by ministries of education, while the universities and research institutions could also serve as centers for undertaking specialized research and providing policy advice.

Improve Data Systems and Promote their Use
Three steps are recommended:

Focus on developing a simple, high-quality data system A simple but reliable data system that is regularly updated and focuses on students and teachers (because teacher deployment and management are critical for improving quality) should be the necessary and obligatory first step. Investment of domestic resources in building this capacity is critical to improving internal efficiency and efficiency in the use of teachers (whose salaries represent the overwhelming share of public expenditures).

Improve the use of national learning assessments for monitoring progress and the quality of education Learning assessments need to be pegged to some standards to be useful for measuring progress. Further, countries should use the data to analyze differences in learning, especially for vulnerable populations.

Present regular, simplified, and relevant analysis to key stakeholders and actors in the system For instance, the analysis of learning assessment data should feed into revising preservice and in-service teacher training programs, textbook revision, and other processes linked to improving classroom teaching. The institutions and individuals involved in these tasks also need training on how to use assessment results. Overcoming coordination challenges will be essential to create an effective feedback loop, but this can be done incrementally, and the lessons of overcoming such challenges can be applied more broadly. The presentation of learning assessment data can also serve another purpose: accountability to parents and citizens.

Increase Coordination Capacity

Address capacity building in the education sector through broader governance initiatives These can be especially valuable in improving public financial management, reform of human resources policies, and coordination with decentralized administrative and government entities. Although these initiatives are more challenging because of the higher transaction costs of coordinating between multiple ministries, there is greater likelihood of sustainability if there is broad government ownership.

Use a regional, long-term approach to overcome the "market failure" in capacity building The rationale for this practice is to overcome the limitations of project-based capacity-building activities and the lack of effective demand by Sub-Saharan African countries. Further, many of the "soft" capacities of

leadership—coordination, changing the administrative culture, and consensus building with stakeholders—are better acquired through peer learning, exchange of implementation knowledge and experience, and cooperation between countries. An important aspect would be to ensure that there is indeed buy-in from participating countries.

In sum, knowing *what* to reform in an education system is only part of the solution. The bigger challenge is to find out *how* to introduce and sustain reforms in individual country contexts. Sub-Saharan African countries are themselves best positioned to push forward the agenda of capacity development in the education sector, using all available global knowledge and expertise.

Notes

1. The UNESCO-UIS online database, UIS.Stat (http://data.uis.unesco.org/), has been used for this purpose. Using a list of selected indicators in three domains (enrollment, teachers, and spending), individual online queries were conducted to download data series covering the years 2010–14 for all countries in Sub-Saharan Africa. For each of the series, we calculated the number of countries with valid data in each indicator.
2. Data were collected through questionnaires addressed to Bank staff working in different Sub-Saharan African countries. Information was obtained on 26 countries.
3. The seven countries with a comprehensive EMIS covering all education subsectors are Burkina Faso, Ghana, Malawi, Niger, Rwanda, South Africa, and Tanzania.
4. Such examination data are available for 43 Sub-Saharan African countries.
5. The assessment frequency information is based on the informal World Bank survey of 26 countries and online searches of websites of various organizations conducting learning assessments.
6. The country group typology, which chapter 1 discusses in detail, characterizes countries' divergent paths of education system expansion based on three criteria: their primary gross enrollment rates in 2000 and 2013, shares of children out of school relative to the primary-school-age population, and retention rates in primary education. From highest to lowest progress, countries are in either Group 1 ("established"), Group 2 ("Emerged"), Group 3 ("Emerging"), or Group 4 ("Delayed").
7. SDG 4 target 4.1: "By 2030, ensure that all girls and boys complete free, equitable, and quality primary and secondary education leading to relevant and effective learning outcomes" (UN Sustainable Development Knowledge Platform website, https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals).

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Chapter 7

Conclusions and Recommendations

Summary and Conclusions

The global pledge issued in Jomtien, Thailand, in 1990—to universalize primary education, emphasize learning, and increase adult literacy by the end of the decade—seemed a distant dream in Sub-Saharan Africa.[1] Most African countries were then in economic decline, largely because of rising debt burdens and falling commodity prices. Their governments could not afford to maintain adequate public services, including roads, water, education, and health services. In much of Sub-Saharan Africa, the per capita gross domestic product (GDP) in the early 1990s was 10–25 percent lower than it had been a decade earlier.

On the political side, few African countries in the early 1990s had democratically elected governments (Meredith 2005).[2] By the mid-1990s, more than half of the countries in Sub-Saharan Africa were suffering from wars, major civil disturbance, or complete government breakdown.[3] The region's three largest countries were in the grip of conflict: Nigeria, until the first democratic elections in 1999; Ethiopia, emerging from 15 years of civil war, and at war with Eritrea between 1998 and 2000; and the Democratic Republic of Congo (then Zaire), in a prolonged internal conflict that affected nine nearby countries. Although South Africa was transitioning peacefully to democracy after decades of apartheid, its hugely inequitable education system fueled discontent among youth. Further, in several countries, the human immunodeficiency virus and acquired immune deficiency syndrome (HIV/AIDS) epidemic had decimated the populations of several countries and created an overwhelming crisis for health and education systems, families, and communities. All told, attaining the Education for All (EFA) goals set at Jomtien could legitimately be considered a remote possibility for the 1990s.

The Crisis of Learning

In the 25 years since Jomtien (and 15 years after Dakar),[4] Sub-Saharan Africa's education systems have defied this grim prospect and expanded beyond recognition, enrolling tens of millions of first-generation learners in primary grades, extending access to secondary education, and employing millions of newly recruited and trained teachers. Economic and political conditions in many countries have also improved considerably, with significant increases in average per capita income since 1995 and appreciable declines in poverty rates. Violent conflict and open civil war also have subsided in many countries. Although the current short-term outlook has deteriorated, owing to global conditions, the prospects of economic diversification and transformation remain good for many countries in the region.

These favorable conditions make it all the more important for Sub-Saharan African countries to press on toward the goal of universalizing schooling for learning. Chapter 1 showed that even the increase in access and enrollment at the primary level over the past 25 years has expanded at uneven rates across these countries. They can be divided into four groups, depending on the progress they have made toward ensuring universal coverage and completion of primary education.[5] One group of countries (Group 1, "Established"), mainly in East and Southern Africa, has universalized primary enrollments and made major strides toward universalizing lower-secondary enrollments. At the other end is a group of countries (Group 4, "Delayed"), mainly bordering the Sahel region, which are still struggling to provide even six years of primary education for all children. Many of these countries continue to face severe contextual challenges.[6]

The levels of learning are perilously low by international standards throughout most of the region. After several years of primary schooling, large shares of students cannot read proficiently or do simple mathematics. This both jeopardizes their ability to progress through basic education (comprising the primary and lower-secondary levels) and compromises the region's knowledge capital.

Still, several countries have demonstrated modest improvements in student learning while progressing rapidly toward universalizing primary education. These examples are noteworthy because they show that there need be no trade-off between quantity and quality and because, in the case of some countries, such as Kenya and South Africa, progress has been made by overcoming the multiple contextual challenges they faced in the mid-1990s. Although Jomtien addressed the crisis in primary enrollment, Sub-Saharan African countries and the international community now must address the crisis in *learning* in basic education.

The crisis of learning is exacerbated by a crisis of inequality: the enormous variability in learning among the schools within most education systems in

the region. Between-school variability in learning is a widely used indicator of inequality, and Sub-Saharan African countries have much greater between-school variability in learning than international benchmarks suggest might be expected. Most of this variability is almost entirely accounted for by the average socioeconomic status of students attending the schools; disadvantaged students often attend disadvantaged schools. Schools with a high percentage of students from disadvantaged backgrounds typically have fewer school resources—principally teachers and instructional materials, but also physical facilities—than schools serving more-advantaged students. Thus, Sub-Saharan African countries must now also address the crisis of *inequality in learning* in basic education.

In tackling these crises, Sub-Saharan African countries now have access to a rich and growing body of knowledge, as documented in chapter 2, about what boosts learning in low- and middle-income countries, including those in the region. One of the most effective classroom interventions is structured pedagogy—a combination of teacher training, ongoing teacher support, resources for teachers, and classroom learning materials for students. Providing additional time for learning and offering remediation also significantly boost learning. Offering meals in school has also boosted learning in several Sub-Saharan African countries.

Other research has identified those student characteristics that are most correlated with higher levels of learning. These are familiarity with the language of instruction, socioeconomic status, urban or rural location, and gender. Of special concern are the wide gaps in learning between rich and poor children and between urban and rural children in almost all countries. Gender differences are less pronounced and vary by country.

The Unfinished Agenda and Ways Forward

This book has argued that good ideas, based on science, are not enough to improve student learning. Not all interventions work in low- and middle-income countries, each of which has its own set of challenges. And good ideas are not likely to improve learning unless they are implemented effectively in schools and classrooms.

Supporting institutions are essential to ensure that schools are safe and well provisioned with instructional materials, good teachers, and effective school leaders. In addition, these institutions are vital to the development of appropriate curricula, textbooks, and other learning materials; the preparation and professional development of teachers; the supply or distribution of schools, materials, and equipment; and the use of educational data and learning assessments. These institutions must not just exist but must make improving students' learning their central mission.

As chapters 3 and 4 showed, major gaps in service delivery currently affect the progression of students from early grades through basic education, disproportionately affecting rural and poor children, who often lack access to school. Chapter 3 highlighted the three interrelated factors that are leading to a "traffic jam" in the early grades: irregular school attendance; high levels of formal and informal grade repetition, which limit progression; and unconducive learning environments, including large classes and the use of a language of instruction that children are not familiar with. Another bottleneck affects the progression of students in basic education, with large numbers of children forced out by examinations or leaving school because of a lack of household income and other demand-side constraints. In many countries, the network of schools and teachers needed to cover all children remains to be built, especially in rural areas.

Of particular importance are deficiencies in the processes to recruit teachers, prepare them for teaching, deploy them where they are most needed, ensure they show up for class, and provide them with professional support. The current stock of teachers, who have low levels of content knowledge and limited pedagogical skills, need continuous support—which should be provided near or within the school—to improve their instructional effectiveness in reading, academic literacy, mathematics, and science. New entrants into the teaching force need to be trained through revamped preservice teacher education programs that emphasize mastery of content, practical teaching strategies, and continuous development. Redeployment to ensure reasonable student-teacher ratios requires a combination of planning, negotiations, incentives, and strict accountability. In many countries, existing schools do not provide the essential conditions for teaching and learning, such as a reasonable class size, availability of toilets for girls, teachers with appropriate qualifications, learning materials for students, adequate attendance, and absence of abuse. Except in the Group 1 countries, less than 10 percent of schools currently have the minimum environmental conditions conducive to teaching and learning.

Chapters 5 and 6 elaborate the budgetary and capacity needs for education systems to carry out the full spectrum of complex activities needed to close the gaps in access and learning documented in this book. More resources are undoubtedly required—and these will need to come mainly from domestic sources—but the capacity to plan and execute the budget to improve learning is equally important. For most ministries of education in Sub-Saharan Africa, especially those still trying to universalize primary education, managing even the basic functions of the school system is a challenge. They must effectively plan and manage (a) the training, deployment, accountability, and payment of teachers; (b) school location and construction processes; (c) the procurement and timely delivery of textbooks and learning materials; and (d) the institutions needed to collect, analyze, and use data—including data on student

learning—on a regular basis. To improve student learning in basic education demands even more capacity than to expand enrollment at the primary level—and the region's ministries of education face both demands.

Recommendations

Based on this book's analysis, we propose the following recommendations to boost student learning in basic education in Sub-Saharan Africa while expanding access and increasing the completion rate. These recommendations arise from the experience of countries in the region, but each country should assess the appropriateness of each recommendation for its own context and priorities.

Policies to Improve Learning

- Establish standards to ensure minimum conditions for learning across schools, and implement these standards.
- Improve the environment for early-grade learning, including adapting language of instruction policies to enable children to acquire foundational skills in reading and numeracy in a language familiar to them.
- Monitor learning and provide additional compensatory support and resources to schools and students that are falling behind.[7]
- Effectively implement evidence-based interventions known to improve learning elsewhere in Sub-Saharan Africa.
- At the lower-secondary level, revise and implement the curriculum to be more relevant for today's society and consider using technology to support the teaching of mathematics and science to address shortages of trained teachers.

Policies to Improve Progression from Grade One through Basic Education

- Implement measures to monitor and reduce irregular attendance and repetition in early grades, especially grade one; expand early childhood programs gradually.
- Bring basic schools closer to communities, sometimes through multigrade schools; better geolocation of new primary and lower-secondary schools; and the addition of lower-secondary sections to existing primary schools.[8]
- Consider double-shifting for lower-secondary schools in urban settings, where school crowding is an issue.

- Eliminate high-stakes primary school leaving examinations that impede access to lower-secondary schools.
- Leverage and effectively regulate the private sector for provision of additional lower-secondary schools.

Policies to Improve Girls' Participation in Lower-Secondary Education

- Provide lower-secondary educational opportunities within rural communities, so that parents can ensure that the school is safe and secure, and minimize reliance on boarding schools.[9]
- Equip schools with separate sanitary facilities for girls.
- Improve formal and nonformal education for girls to strengthen their literacy, numeracy, and life skills; offer safe spaces where girls can express themselves with appropriate mentors; and improve girls' access to job opportunities.
- As possible, offset the direct and indirect costs of schooling with targeted cash transfers to households with lower-secondary-age girls.

Policies to Improve Teacher Management and Support

- Ensure that prospective teachers receive an initial preparation that equips them with adequate knowledge and skills for their work in school.
- Make teachers' mastery of their work a key goal of continuing professional development.
- Ensure that teachers are present in class and teaching, with appropriate supervision and guidance.
- Provide all teachers with minimally adequate classroom conditions to do their work.
- Strengthen systems for managing teacher recruitment, deployment, and development.

Policies to Strengthen Key Budget Processes

- Spend incremental resources to improve learning by (a) focusing on instructional materials and related teacher training; (b) hiring teachers with expertise in early literacy, secondary science, and secondary mathematics; and (c) employing substitute teachers to cover authorized teacher absences.
- Reduce disparities in standards of provision to ensure minimum conditions for learning in all schools, targeting poor regions.

- Improve the efficiency of public spending on *salaries*, by improving teacher allocation policies, improving controls on payroll and allowances, and reducing teacher absenteeism.
- Improve the efficiency of public spending on *nonsalary inputs*, including better controls and enhancing capacity for procurement and contract management.
- Strengthen projections of multiyear resource requirements.

Policies to Close the Institutional Capacity Gap

- Improve data systems and promote their use by (a) focusing on developing a simple, high-quality data system; (b) using national learning assessments more effectively to monitor progress in learning and identify gaps for focused attention; and (c) presenting regular, simplified, and relevant analyses to key stakeholders and actors in the system.
- Create a pool of in-country education specialists through targeted university programs to build technical capacity in specific areas, such as curriculum, textbooks, teacher training, and assessments.
- Strengthen sectoral capacity building in the areas of coordination, accountability and incentives, and negotiation and consensus building with stakeholders—possibly linked to broader governance initiatives.
- Adopt a regional approach to building capacity through long-term technical assistance to overcome the "market failure" in capacity building and create networks for peer learning.

Notes

1. The pledge emerged from the 1990 Education for All (EFA) Conference in Jomtien, Thailand (WCEFA Inter-Agency Commission 1990).
2. Opposition parties were illegal in 32 of 50 Sub-Saharan African countries at the time.
3. The conflicts in Africa in the early to mid-1990s included the Rwandan Civil War, the Burundian Civil War, the insurgency of the Uganda National Rescue Front II, the First Liberian Civil War, the Tuareg rebellion in Mali and Niger, the Sierra Leone Civil War, the insurgency of the Lord's Resistance Army in the Great Lakes region, the First Congo War, the Mozambican Civil War followed by internal conflict, and the Angolan Civil War.
4. At the 2000 World Education Form in Dakar, the international community reaffirmed the World Declaration on Education for All (EFA) adopted 10 years earlier in Jomtien, Thailand. The result was the Dakar Framework for Action, "Education for All: Meeting Our Collective Commitments," which included six comprehensive EFA goals (World Education Forum 2000).

5. As developed in chapter 1, the country group typology characterizes countries' paths of education system expansion based on three criteria: primary gross enrollment rates in 2000 and 2013, shares of children out of school relative to the primary-school-age population, and retention rates in primary education. From highest to lowest progress, countries are in either Group 1 ("Established"), Group 2 ("Emerged"), Group 3 ("Emerging"), or Group 4 ("Delayed").
6. Seven contextual challenges—used to characterize countries as having few, some, or many challenges—are total population, child population growth, GDP per capita growth, economic inequality, poverty, linguistic diversity, and conflict.
7. This requires using the results of national, regional, and international assessments to identify pockets of poor learning and providing schools in these areas with additional compensatory support and resources, as well as paying greater attention to students who enter school with home disadvantages, such as unfamiliarity with the language of instruction or lack of home support for learning, and providing them with targeted compensatory support.
8. This may require changes in standards for lower-secondary schools regarding the numbers of laboratories (for example, one multipurpose laboratory instead of separate subject-specific laboratories) and libraries (for example, classroom libraries rather than a separate library room) required in standard school packages of facilities.
9. Boarding schools provide one option for children who live at great distances from a lower-secondary school, but the costs associated with boarding schools are high; some research indicates that they are not as cost-effective as regular day schools (for a further discussion, see chapter 3, box 3.4).

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Chapter 8

Coda: Looking Ahead

Introduction

This study began by grouping Sub-Saharan African countries according to (a) their progress on primary education coverage between 2000 and circa 2013, and (b) the baseline contextual challenges they faced in the early to mid-1990s.[1] The seven challenges—large population size, rapid growth in school-age population, slow or stagnant economic growth, high economic inequality, high poverty rates, frequent conflict, and high linguistic diversity—were selected because they are likely to shape the development of the education system. Not surprisingly, countries that faced relatively many challenges at the outset also made the least educational progress, while countries that faced relatively fewer challenges made the greatest progress.

This coda to this volume examines the challenges that lie ahead as the region's countries work to improve educational access and quality, as follows:

- *"Changes in Context: Past and Current Challenges"* compares the challenges that countries faced in the 1990s with those they face today, focusing on three current challenges having the greatest impact on education systems—child population growth, economic growth, and conflict—and highlighting the possibility that educational progress could stall or even be reversed in many countries.
- *"Managing Expansion with Quality"* presents projections of enrollment, teachers, and classrooms for selected countries in different country groups, and speculates about how expanding education systems to cover all children could affect average learning overall.

Changes in Context: Past and Current Challenges

To what extent have contexts changed for the better? Some conditions have improved, some have worsened, and others have shown little change between

the mid-1990s and the current period. (See online appendix E for details.)[2] Median gross domestic product (GDP) per capita growth rates have improved overall (from 0.5 percent to 2.5 percent); median poverty levels have declined (from 58.6 percent to 38 percent), and inequality has decreased slightly (median Gini coefficients have declined from 44.5 to 43). Overall, median country populations have nearly doubled (from 6.3 million to 11.6 million), while median population growth rates for children ages 0–14 have remained quite similar, around 2.5 percent, which is well above international levels. Regrettably, the median conflict measure has nearly doubled (from 2 events per million population to 3.6 events per million population).

Despite these changes, the relative position of countries remains quite similar overall, with the exception that a smaller percentage of countries is classified as having "many" challenges in the current period compared with the 1990s. About 80 percent of the countries classified as having "few" challenges and a similar proportion of the countries having "some" challenges in the baseline period have "few" or "some" challenges, respectively, in the current period. On the other hand, less than 60 percent of the countries classified as having "many" challenges at the baseline remained in this category. However, the level of challenges a country faces can change sharply as a result of unanticipated shocks, such as those from disease epidemics, weather events, or renewed conflict. Aside from shocks, high child population growth rates and slow economic growth rates present the largest challenges for the future.

Larger Cohorts of School-Age Children

Most African countries are at the "pre-demographic dividend"[3] stage, with total fertility rates (TFRs)[4] of 4 or more (Canning, Raja, and Yazbeck 2015). Moreover, the TFRs have either stalled or are declining too slowly; in some countries (Mozambique and Niger) they have even gone up. This means that each successive cohort of school age children is larger than the previous one. Further, there is considerable inequality: women in the poorest 20 percent of households have an average of seven children in many countries, even in countries where the average TFR has declined (Canning, Raja, and Yazbeck 2015).

This continued high growth rate of the school-age population is the single most important factor that can jeopardize educational progress. Many countries in Sub-Saharan Africa—like Alice in Wonderland—will have to keep running as fast as they can to stay in the same place. Table 8.1 cross-tabulates the country groups based on educational progress with the countries' current TFRs. The rows in table 8.1 are the four education progress Groups 1–4 as defined in chapter 1. Group 1 countries have lower fertility rates, although the Republic of Congo, Ghana, and Kenya will continue to face pressures from an ever-growing child population for some time. About 10 countries across Groups 2, 3, and 4 will also face these pressures, given their TFRs of about 4;

Table 8.1 Educational Progress since 1990s against Total Fertility Rates, 2010–15, in Sub-Saharan African Countries, by Group

Educational progress	TFR, 2010–15				
	1–1.99	2–2.99	3–3.99	4–4.99	5+
Group 1 (Established)[a]	Mauritius	Botswana; Cabo Verde; South Africa	Eswatini; Lesotho; Namibia	Congo, Rep.; Gabon; Ghana; Kenya; São Tomé and Príncipe; Zimbabwe	None
Group 2 (Emerged)[b]	None	None	None	Cameroon; Comoros; Malawi; Rwanda; Togo	Congo, Dem. Rep. (TFR 6.4); Tanzania; Uganda (TFR 6)
Group 3 (Emerging)[c]	None	None	None	Ethiopia; Guinea-Bissau; Madagascar; Mauritania; Sierra Leone	Angola (TFR 6); Benin; Burundi (TFR 6); Côte d'Ivoire; Gambia, The; Mozambique; Nigeria (TFR 5.7); Zambia
Group 4 (Delayed)[d]	None	None	None	Eritrea; Liberia; Sudan	Burkina Faso; Central African Republic; Chad (TFR 6.3); Equatorial Guinea; Guinea; Mali (TFR 6.3); Niger (TFR 7.4); Senegal

Source: UN DESA 2017.
Note: TFR = total fertility rate (the number of children born per woman during childbearing years if she bears children according to a current schedule of age-specific fertility rates). The period 2010–15 signifies that the fertility rate estimates are for the full period from July 1, 2010, to July 1, 2015.
a. Group 1 ("Established") countries had high gross enrollment ratios (GERs) in 2000; GERs of nearly 100 percent in 2013; low (below 20 percent) out-of-school rates in the latest available data year; and nearly 100 percent primary school retention rates in 2013.
b. Group 2 ("Emerged") countries had high (90 percent or higher) GERs in 2000 and 2013; low (below 20 percent) out-of-school rates in the latest available data year; and a low (below 80 percent) primary retention rates in 2013.
c. Group 3 ("Emerging") countries had low (below 90 percent) GERs in 2000; high (90 percent or higher) GERs in 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.
d. Group 4 ("Delayed") countries had low (below 90 percent) GERs in 2000 and 2013; high (20 percent or higher) out-of-school rates in the latest available data year; and low (below 80 percent) primary retention rates in 2013.

but because their TFRs are declining, they have the possibility of overcoming them with careful planning.

Of greatest concern are those in the final column in table 8.1—the countries that face a "demographic disaster" (TFRs of 5 or more). They include several that have made great educational progress since the 1990s but will find it difficult to sustain this progress (the Democratic Republic of Congo, Malawi, Tanzania, and Uganda, all with TFRs of 6) as well as many countries that still have a long way to go. Niger, with a TFR of 7, is in an extremely precarious situation.

The delayed demographic transition in Sub-Saharan Africa creates enormous obstacles for sustaining or moving toward universal coverage of basic education. At the same time, education—and especially education of girls up to

the secondary level—is a powerful lever to bring down the TFR by delaying the age of marriage and supporting women's empowerment. In particular, reducing the high fertility rate among poor women requires retention of girls from poor households in school through at least lower-secondary education. However difficult it may be to provide universal access to secondary education, the payoffs are significant.

Diverging Economic Performance

Average per capita income in Sub-Saharan Africa started rising in the mid-1990s. A striking feature of the period since then is that growth patterns have not been homogenous, both before and after the global financial crisis of 2008. The region is becoming more differentiated. Table 8.2 cross-tabulates the country groups based on educational progress with their economic growth.

Table 8.2 Educational Progress against Robustness of Economic Performance since the 1990s, Sub-Saharan African Countries, by Group

Educational progress	Robustness of economic performance, 1995–2016				
	Established[a]	Improved[b]	Average[c]	Slipping[d]	Falling behind[e]
Group 1 (Established)	None	Kenya	Congo, Rep.; Gabon; Ghana; Mauritius; Namibia; Seychelles; São Tomé and Príncipe	Botswana; Cabo Verde; South Africa	Eswatini; Lesotho; Zimbabwe
Group 2 (Emerged)	Rwanda; Tanzania	Cameroon; Congo, Dem. Rep.; Togo	Malawi; Uganda	None	Comoros
Group 3 (Emerging)	Ethiopia; Mozambique	Benin; Côte d'Ivoire	Guinea-Bissau; Mauritania; Zambia	Angola; Gambia, The; Madagascar; Nigeria; Sierra Leone	Burundi
Group 4 (Delayed)	Mali	Senegal	Burkina Faso; Central African Republic; Niger; Sudan	Chad; Equatorial Guinea; Liberia	Guinea

Source: Compiled using data from World Bank 2016.
Note: For definitions of educational progress Groups 1–4, see chapter 1 or table 8.1. The classification into the different categories of economic performance was based on the computed top and bottom terciles of the average annual growth rate of 45 Sub-Saharan African countries between 1995 and 2008 (5.4 percent and 3.5 percent, respectively).
a. "Established" economic performers: annual average growth rate that exceeded the top tercile of Sub-Saharan African countries in both periods (1995–2008 and 2014–16). The annual average GDP growth rate for these countries was 6.8 percent in 1995–2008 and 7.8 percent in 2014–16.
b. "Improved": annual average growth rate below the top tercile of countries in 1995–2008 and greater than the top tercile in 2014–16. The annual average GDP growth rate for these countries increased from 2.9 percent in 1995–2008 to 5.8 percent in 2014–16.
c. "Average": annual average growth rate in 2014–16 that exceeded the bottom tercile but was lower than the top tercile.
d. "Slipping": average annual growth rate in 1995–2008 that exceeded the bottom tercile but fell below the bottom tercile in 2014–16. The annual average GDP growth rate for these countries declined from 5.8 percent in 1995–2008 to 1.9 percent in 2014–16.
e. "Falling behind": GDP growth failed to surpass the bottom tercile in both periods. The average annual GDP growth rate of for these countries was 0.9 percent in 1995–2008 and 1.8 percent in 2014–16.

Based on their GDP growth during two periods, 1995–2008 and 2014–16, countries can be classified into five categories, as shown by the columns in table 8.2 (World Bank 2016). Surprisingly, the five countries that maintained the highest economic growth rates before and after the financial crisis (column 1) are drawn from educational progress Groups 2, 3, and 4. If they sustain these levels of GDP growth, they can continue to make significant educational progress, especially if they can also bring down their TFRs.

Another seven countries—Benin, Cameroon, the Democratic Republic of Congo, Côte d'Ivoire, Kenya, Senegal, and Togo—have also recently improved their economic growth (column 2). An encouraging feature of their trajectory is that the growth is occurring in multiple sectors, even though most of their populations continue to be employed in agriculture. Diversification of their exports over time has helped minimize their exposure to shocks. Together, the "established" and "improved" economic performers account for some 41 percent of Sub-Saharan Africa's population.

About one-fifth of the region's population lives in the 16 countries that can be considered "average" economic performers (column 3, referred to as "stuck in the middle" economic performers in World Bank 2016). This group includes the full range of education performance, including seven Group 1 countries. More significantly, almost one-third of Sub-Saharan Africa's population lives in countries where economic growth has decelerated (column 4), largely because of the decline in commodity prices. These include some countries from Group 1 and others from Groups 3 and 4. Most significant among these is Nigeria, which has the largest population. Countries that are falling behind others because of a consistently weak economic growth trajectory are among the smallest and account for less than 5 percent of the region's population. They include several Group 1 countries as well as Burundi (Group 3), which has made considerable educational progress over the past decade.

Higher economic growth creates opportunities for greater generation of domestic tax revenue, identified in chapter 5 as one of the important sources for financing education. Higher economic growth also often moves many households out of poverty, meaning that more children enter school prepared to learn. In addition, economic growth may create additional spillover effects because the higher-performing countries have a more effective public administration than others. Their domestic banking sectors have been able to support some expansion of the private sector, and they have invested more in improving their road networks, reliability of electricity supply, and, more generally, the quality of infrastructure. These qualitative aspects of diversified growth—as opposed to growth driven by natural resources—can facilitate the tasks of educational administration and management. They can also drive demand for higher levels of education and skills as young people and parents see the possibility of accessing jobs in the nonagricultural sector.

Conflict

Across the continent, conflict still looms large, affecting some countries in all groups. In particular, five countries in Group 1 (Eswatini, Gabon, Mauritius, South Africa, and Zimbabwe); one country in Group 3 (Mauritania); and three countries in Group 4 (the Central African Republic, Mali, and Sudan) experienced substantially more conflicts in 2010–15 than in the late 1990s. These increases in conflict could threaten the educational achievements of countries in Groups 1 and 2 and jeopardize the prospects for improvement in Groups 3 and 4.

Yet other countries have experienced less conflict in the current period than during the earlier period. Nine countries have experienced significantly fewer conflicts: the Republic of Congo and Lesotho (Group 1); Rwanda and Uganda (Group 2); Angola, Burundi, Guinea-Bissau, and Sierra Leone (Group 3); and Eritrea (Group 4). Declines in conflict provide windows of opportunity for improving basic education in these countries.

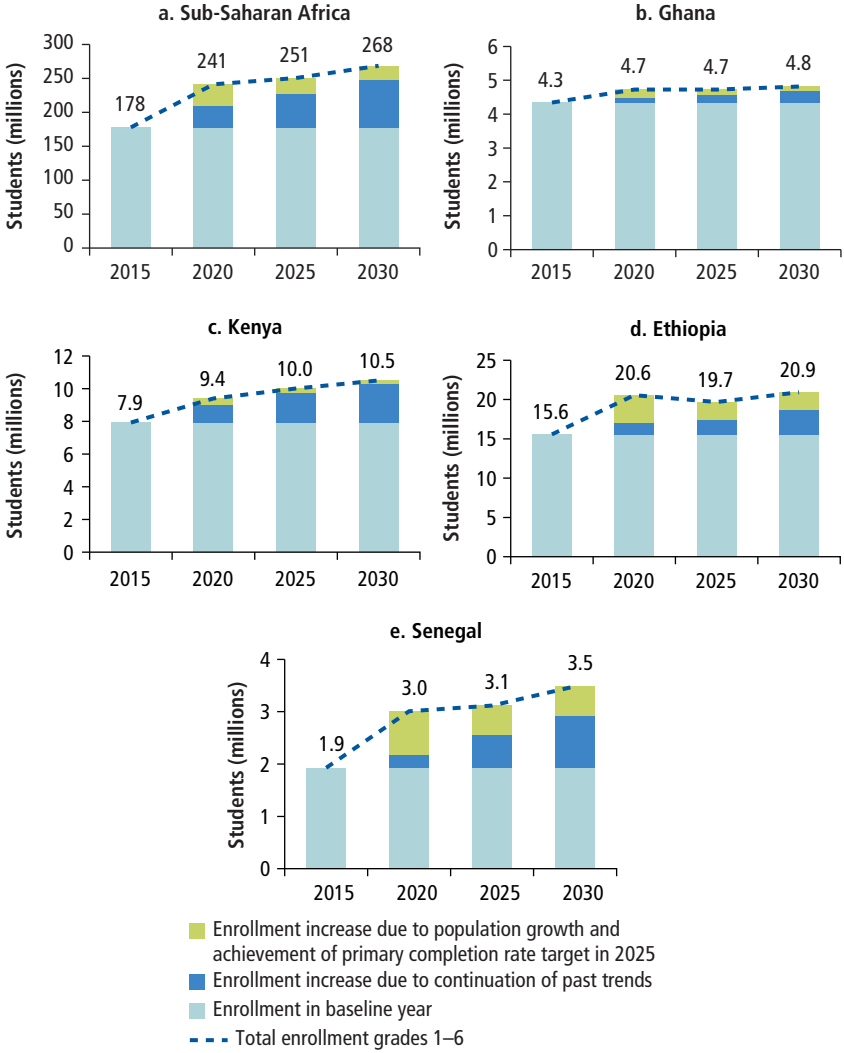
Managing Expansion with Quality

Population growth and improved student progression and completion from grade one to the end of the basic education cycle will lead to a tremendous expansion of enrollment. Projections undertaken for this analysis suggest that primary enrollments will grow from 178 million children in 2015 to about 268 million children in 2030—an increase of 50 percent in 15 years (figure 8.1, panel a). At the lower-secondary level, enrollments will more than double, from 53 million to 108 million over the same period (figure 8.2). These projection methods are described in box 8.1.

Because Sub-Saharan African countries have diverged significantly in their educational trajectories over the past 25 years, the pressures will differ across countries. As an illustration, projections have been done for four countries: Ghana and Kenya in Group 1, Ethiopia in Group 3, and Senegal in Group 4. Ghana and Kenya have achieved full universal access at the primary level and are close to universal access at the lower-secondary level. Ethiopia and Senegal have yet to ensure universal primary coverage and have low coverage in lower-secondary education.

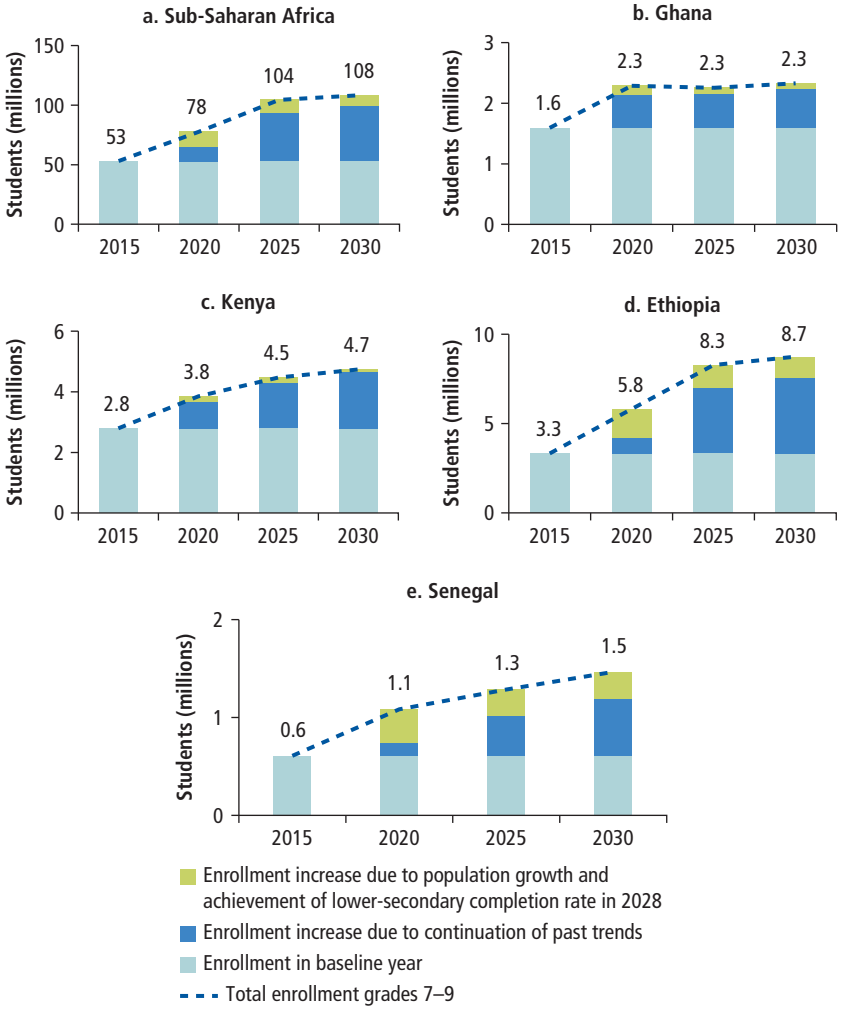
Primary enrollments will continue to increase in both Ghana and Kenya between 2015 and 2030, largely because of improvements in student progression and completion (figure 8.1, panels b and c). The increases are about 0.5 million students (12 percent) and 2.5 million students (33 percent), respectively. Lower-secondary enrollment, on the other hand, will increase by about 0.8 million students (44 percent) in Ghana and 3 million students (68 percent) in Kenya (figure 8.2, panels b and c).

Figure 8.1 **Primary School Enrollment Projections, by Cause, for Sub-Saharan African Region and Four Selected Countries, 2015–30**



Sources: Estimated from country Demographic and Health Survey (DHS); World Bank Living Standards Measurement Study (LSMS); and UNESCO Institute for Statistics (UIS.Stat) data.
Note: "Enrollment increase due to continuation of past trends" is estimated under the assumption that the recent pattern of student intake, promotion, repetition, and transition rates remains constant through the projection period.

Figure 8.2 **Lower-Secondary School Enrollment Projections, by Cause, for Sub-Saharan Africa Region and Four Selected Countries, 2015–30**



Source: Estimated from country Demographic and Health Survey (DHS); World Bank Living Standards Measurement Study (LSMS); and UNESCO Institute for Statistics (UIS.Stat) data.
Note: "Enrollment increase due to continuation of past trends" is estimated under the assumption that the recent pattern of student intake, promotion, repetition, and transition rates remains constant through the projection period.

BOX 8.1

Assumptions Used to Calculate Primary and Lower-Secondary Enrollment Projections

The projections employ a reconstructive cohort method to calculate the enrollment flow, using several key assumptions on the inputs:

- Growth in the population of children at the appropriate age for a level of education follows the United Nations Department of Economic and Social Affairs (UN DESA 2013) projections for these age groups: ages 6–11 or 7–12 for primary and ages 12–14 or 13–15 for lower-secondary.
- The current pattern of student flow (including intake, promotion, repetition, and transition rates) is extrapolated based on the trend from the most recent two consecutive household surveys.
- Universal primary and lower-secondary completion is assumed to be achieved by 2025 and 2028, respectively.
- The out-of-school incidence at the primary school level continues to drop at the current rate.
- The current unit costs (public and household unit costs) remain the same in nominal terms in U.S. dollars, assuming that the U.S. dollar remains stable over the projection period.
- The share of students directly enrolled in private schools remains unchanged at all levels of education.
- The student-teacher ratio (STR) remains the same for the model.
- The average class size is assumed to be 50 at the primary level and 40 at the lower-secondary level in the Sub-Saharan Africa region as well as in the four focus countries.

As large as these numbers are for these two Group 1 countries, they pale in significance compared with the projected enrollment increases in the educationally lagging countries. In Ethiopia (Group 3), primary enrollments will increase by 5.4 million students (34 percent) and in Senegal (Group 4) by 1.6 million students (80 percent), as the countries push to rapidly increase their primary completion rate (figure 8.1, panels d and e). At the lower-secondary level, the required pace of expansion is staggering: an additional 5.4 million students in Ethiopia by 2030 (2.6 times the current level) and 0.8 million students in Senegal (three times the current level) (figure 8.2, panels d and e).

Some approximate estimates about the requirements for additional teachers and classrooms at the lower-secondary level, which will face the greatest expansion, provide an insight into the challenges that face Sub-Saharan African

countries in the next 15 years. These two major inputs will drive costs and impose huge demands on the education sector to train, manage, and support teachers; build and equip classrooms with minimum learning conditions; and ensure that the capacity exists to manage this rapidly expanding system while improving quality.

Based on the projected enrollment at the lower-secondary level, by 2030, 2 million additional teachers and 1.4 million additional classrooms are needed across the region—in both cases, slightly more than double the current levels. The requirements for additional teachers and classrooms in Ethiopia and Senegal will be relatively higher than in Ghana and Kenya. For example, in Ethiopia, maintaining the current student-teacher ratio of 43 to 1 in lower-secondary schools will require an increase in the number of teachers from 77,000 in 2015 to 202,000 in 2030. In Senegal, which has a student-teacher ratio of 53 to 1, the increase would be from 12,000 teachers in 2015 to 28,000 teachers in 2030.

These projections for increased enrollments have implications for learning in the region. First, the experience of countries in Group 1 shows that it is possible for countries to both reach basic education for all and to improve learning. Virtually all countries in this group show trajectories of improved learning while reaching increasingly more students. Second, however, out-of-school children in many countries—particularly those in Groups 3 and 4, where large shares of children remain out of school—may come from more disadvantaged households. Research shows that, on average, students from disadvantaged households perform less well on learning assessments. As education systems expand to include more and more out-of-school children, they are likely to enroll a higher share of students from disadvantaged backgrounds. The consequence could be a decline in average levels of learning, unless concrete steps targeting these students are taken.

Education systems need to provide all schools with minimum learning conditions. They also may need to develop and implement programs that ensure that all students are learning, no matter what their family backgrounds may be. Research in many low- and middle-income countries demonstrates that compensatory programs are highly effective in improving learning; they are, however, rare in Sub-Saharan Africa (Snilstveit et al. 2015). In the long run, as economies improve and more households have educational resources, learning will improve. In the short run, however, higher shares of children from disadvantaged backgrounds may require such additional resources as smaller class sizes and supplementary materials, all of which have implications for education budgets.

These are sobering trends. Many Sub-Saharan African countries will find themselves losing ground in the face of vast population growth and less-than-robust economic growth. This group includes those still mired in as many

challenges as in the mid-1990s, but also some that managed to increase primary enrollment substantially in the 1990s. The most pressing challenge for these countries is to reduce and stabilize population growth.

Nevertheless, there are reasons to be optimistic about the prospects for educational progress in the region. The achievements of the past two decades—particularly in improving enrollments and some modest improvements in learning—can be sustained and enhanced, especially in countries where population growth is slowing and where economies are become more diversified and resilient. The different economic trajectories of countries in the region, and their different success rates at overcoming difficult circumstances, offer relevant lessons for all these countries. It is hoped that the research and recommendations in this book will be useful for policy makers and education leaders across Sub-Saharan Africa who are committed to giving all children the opportunity to gain the basic education they need to become productive citizens in a changing world.

Notes

1. The country group typology, which chapter 1 discusses in detail, characterizes countries' divergent paths of education system expansion based on three criteria: their primary gross enrollment rates in 2000 and 2013, shares of children out of school relative to the primary-school-age population, and retention rates in primary education. From highest to lowest progress, countries are in Group 1 ("Established"), Group 2 ("Emerged"), Group 3 ("Emerging"), or Group 4 ("Delayed"). Within each country grouping, countries are further distinguished by the extent of the contextual challenges ("many," "some," or "few") faced around 2000, the start of the period covered by this study.
2. The online appendixes can be found at https://openknowledge.worldbank.org/handle/10986/29377.
3. The United Nations Population Fund (UNFPA) defines the "demographic dividend" as "the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (ages 15–64) is larger than the nonworking-age share of the population (14 and younger, and 65 and older)." In other words, it is "a boost in economic productivity that occurs when there are growing numbers of people in the workforce relative to the number of dependents." This period of increased growth usually lasts about 20–30 years. For more information, see "Demographic Dividend" on the UNFPA website: http://www.unfpa.org/demographic-dividend.
4. The TFR is the number of children who would be born per woman if she were to pass through the childbearing years bearing children according to a current schedule of age-specific fertility rates (Family Planning and Reproductive Health Indicators Database, MEASURE Evaluation, University of North Carolina at Chapel Hill, https://www.measureevaluation.org/prh/rh_indicators).

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While everybody recognizes the development challenges facing Sub-Saharan Africa, few have put together coherent plans that offer real hope for any feasible and general improvement. *Facing Forward* combines an evidence-based plan that not only recognizes the deep problems but provides specific prescriptions for dealing with the problems. In the simplest version, focus on the skills of the people and do it in a rational and achievable manner.

– Eric Hanushek, Paul and Jean Hanna Senior Fellow, Hoover Institute, Stanford University

This book offers a clear perspective on how to improve learning in basic education in Sub-Saharan Africa, based on extremely rigorous and exhaustive analysis of a large volume of data. The authors shine a light on the low levels of learning and on the contributory factors. They have not hesitated to raise difficult issues, such as the need to implement a consistent policy on the language of instruction, which is essential to ensuring the foundations of learning for all children. Using the framework of "From Science to Service Delivery," the book urges policy makers to look at the entire chain from policy design, informed by knowledge adapted to the local context, to implementation. *Facing Forward: Schooling for Learning in Africa* is a unique addition to the literature that is relevant for African policy makers and stakeholders.

– Professor Hassana Alidou, Ambassador of the Republic of Niger to the United States and Canada

As the continent gears itself up to provide universal basic education to all its children by 2030, it has to squarely address the challenge of how to improve learning. *Facing Forward* helps countries to benchmark themselves against each other and to identify concrete lines of action. It forces policy makers to think "where do I go from here?" "what do I do differently?" and to examine the hierarchy of interventions that can boost learning. It rightly urges Ministries of Education to build capacity through learning by doing and continuous adaptation of new knowledge to the local context. *Facing Forward* will unleash frank conversations about the profound reforms that are required in education policy and service delivery to ensure learning for every child on the continent.

– Dr. Fred Matiang'I, Cabinet Secretary for the Interior and Coordination of National Government, Government of Kenya (former Cabinet Secretary for Education)

Facing Forward couldn't have come at a more opportune time as countries in the region, including Mauritius, focus more on learning outcomes rather than simply on inputs and processes in education systems. The book underscores the important point that African countries need not exclusively model themselves on high-performing education systems in the world. Much can as well be learnt from other countries at the same level of development, or lower, by virtue of the challenges they have faced and successfully overcome. This presents opportunities for greater peer-sharing and networking with these countries. Indeed a number of key focus areas are highlighted in the book that demonstrate good practices worthy of being emulated. These cover domains as diverse as enabling factors leading to improved student progression, strengthened teacher capacity, increased budgetary allocation with a focus on quality, as well as improved technical capacity of implementing agencies in the region.

– Hon. (Mrs.) Leela Devi Dookun-Luchoomun, Minister of Education and Human Resources, Tertiary Education and Scientific Research, Republic of Mauritius

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