WINDOW ON THE FUTURE:

2025

PROJECTIONS OF EDUCATION ATTAINMENT AND ITS IMPACT

EDUCATION POLICY AND DATA CENTER

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With support for the U.S. Agency for International Development
and the Academy for Educational Development

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Annababette Wils

Foreword

The Academy for Education Development, as evidenced through 45 years of working in education and related areas in the United States and around the world, is committed to helping achieve the Education for All (EFA) goals. Bringing education to all children and adults is both a moral and a practical imperative—every person has a right to an education, which is an essential building block for political liberties and participation, improved health, and economic advancement.

AED is pleased to be partnering with the U.S. Agency for International Development in supporting the work of the Education Policy and Data Center (EPDC). Utilizing its pioneering work on projections, the Center is publishing this report to open a window on the prospects for human capital in developing countries. While acknowledging that any projection of social behavior is some-what speculative and cannot definitively predict the future, the EPDC projections methodologies have proven robust.

The principal author is Annababette Wils, Director of Research at EPDC. EdPop, the methodology that she developed to project future education attain-ment levels, provides the foundation for the principal contribution of this report, the expected level of human capital in 2025 in the 83 countries for which the baseline data are available. She directed the execution of EdPop, developed the graphical presentation of the data, and has provided the analysis of the data.

Why look at projections if they may not exactly predict the future? While the projections for an individual country may be inaccurate, as an individual country may significantly improve its policies and resources devoted to education or education may suddenly be disrupted by a man-made or natural disaster, testing projections across all countries and for most individual countries have demonstrated that they can be relatively strong. Projections can provide policy-makers with a picture of future challenges and, used properly, can offer guidance on the design of policies and programs to maximize opportunities and mini-mize disruptions.

The picture of 2025 is encouraging, with the vast majority of countries improving the education attainment levels of their populations, one-third of them by a significant amount. But it also is a challenging picture, as, to effectively utilize this growing human capital, governments must meet the social, economic, and political needs and expectations of a more educated populace. It is hoped that policymakers and analysts will use the data and insights presented by the report to investigate how to structure future policies in order to best take advantage of a better educated populace.

Stephen F. Moseley
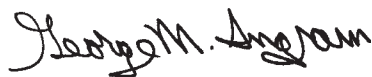President & CEO
Academy for Educational Development

Acknowledgements

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Executive Summary

This report by the Education Policy and Data Center (EPDC) presents the first large series of projections of youth and adult education levels for 83 developing countries. The projections are based on an extensive collection of household survey data and a newly developed automated projection tool. The baseline year is 2005 and the year projected is 2025.

With only a few exceptions, education levels rise in the countries in the sample. Table I lists the 18 countries that are projected to make the most significant progress, with an increase of more than 20 percentage points in youth education levels over that twenty year period. Another significant measure of progress, the education level gender gaps in secondary attainment, where they favor men, will decline by 50-95%.

In seven countries education levels are projected to fall. In several other countries, while there is progress in education—the proportions of youth and adults with schooling rises—still the absolute number of youth and adults with no schooling increases, because the growth in education is overwhelmed by population growth.

Why does this progress, or the lack of it in a few countries, matter? From decades of collection of data and research and experience, we know that education, and especially the quality of education, is important to development, in particular, to employment, poverty, health, and childbearing.

The rise in the portions of youth and adults with primary and secondary education in most countries between 2005 and 2025 will pose both opportunities and challenges. A population with a rising level of education attainment, especially if that education involves real and relevant learning, can improve a country's competitiveness in the global economy and its population's overall well-being. But to do so it must meet the challenge of creating a policy environment that encourages investment and job creation and otherwise fulfills the growing expectations of a more educated population.

Research suggests that education is accompanied by greater civic activity, and that a more open political system can channel the demands and expectation of an expanded educated citizenry into constructive behavior. Conversely, an

authoritarian regime may find itself under increasing pressure to respond to its population's expectations for greater political and economic opportunities.

The incremental effects of the projected change in education levels on some factors, in particular health, could be substantial. For example, in some countries, the effect of a rapid growth of mothers' education levels may be to cut child mortality and children per woman in half over twenty years.

An alternative set of Fastest rate projections,[1] using the fastest observed historical rates of school enrollment growth, shows that a doubling or tripling of the portion of youth with secondary education over the standard projections is possible in a number of low-education countries. In the short-to-medium term, a shift of countries to the fast rate would do little to alter the projected trends in adult education levels up to 2025. This outcome is driven by the fact that much of the next 20 years of adult education change is already embedded in today's adult education levels. Impact can be had on youth education levels, but it takes several generations to show demonstrable impact on adult education levels.

TABLE I

High Growth, High Potential

Countries with increased youth secondary level of education >20% (2005 and 2025 values shown in parentheses)

Bangladesh (57% ➜ 84%)	Gambia, The (40% ➜ 63%)
Belize (45% ➜ 68%)	Honduras (41% ➜ 65%)
Benin (33% ➜ 55%)	Malawi (24% ➜ 45%)
Bolivia (67% ➜ 88%)	Morocco (51% ➜ 76%)
Brazil (49% ➜ 73%)	Mozambique (19% ➜ 49%)
Burundi (12% ➜ 43%)	Nepal (53% ➜ 83%)
Chad (20% ➜ 53%)	Pakistan (42% ➜ 63%)
Comoros (41% ➜ 65%)	Togo (44% ➜ 74%)
Cote d'Ivoire (39% ➜ 60%)	Uganda (32% ➜ 51%)
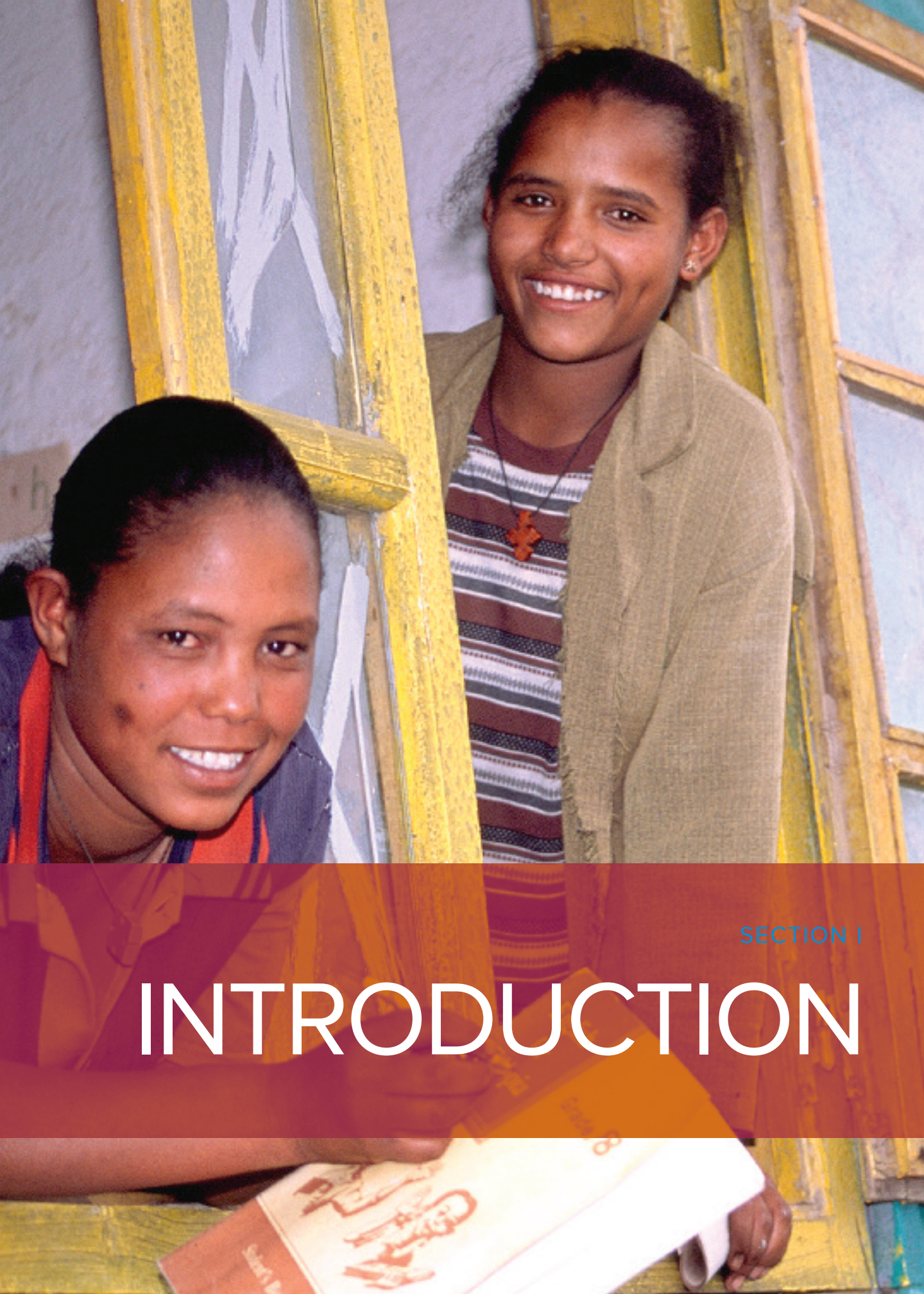
INTRODUCTION
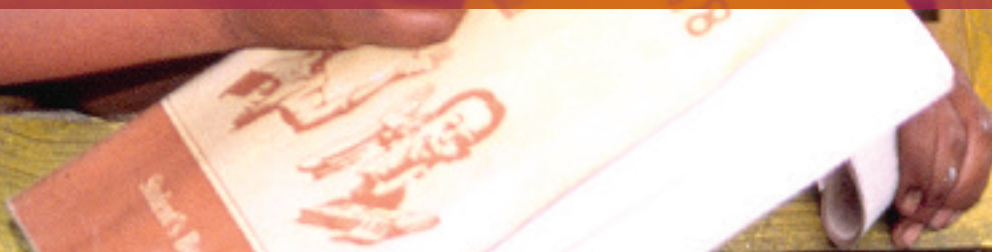
Successful and long-term socio-economic development depends on peace and stability, decent government, investments in the economy, basic health, and skills and education levels of youth and adults. The importance of well-educated youth and adults for development is widely appreciated and documented.[2]

To achieve higher youth and adult education levels, governments of developing countries have, for a number of decades, vigorously pursued the growth of education systems. Throughout, the international community has worked with governments and in this decade has focused on the Education for All agenda (increasingly more focused on quality education, not just access).

Those efforts are now bearing fruit and will continue to do so in the decades to come: measured in years of schooling, adults in developing countries are increasingly educated. The education levels of youth and young adults are growing fastest, and **the next generation of the world's young adults will not only be the largest ever, but will also have received more schooling than any before it**.

The impacts of these trends are, we hope, to generate a push towards poverty reduction and economic growth, investment opportunities, health, and peaceful civic engagement. However, the outcomes, at least in the short-to-medium term, may not be all positive. If the more educated youth revolt against their less educated elders or against actual or perceived injustice, there may also be waves of disruption and violence.

Because youth and adult levels of education are important to the social, political, and economic health of a country, **projections of education levels provide a window to view future opportunities and challenges.**

Projections of education levels can be used for practical purposes, providing a first approximation of the skills of the labor force over the next decades. For private investment, and government and donor planning, education levels indicate how large the pool of people in a country will be, that, on the one hand, can be drawn upon for professional, technical, and teaching tasks, and on the other, that needs to be reached through non-literate means. Projections of education levels can be used to estimate education-induced changes in society. They also can be used to monitor progress towards goals, for example, towards the Education for All goals of universal access to and completion of primary education and increasing adult literacy by 50% by the year 2015.

2   An overview is provided, for example, in Hannum and Buchman (2003) who review literature on the impacts of adult levels of education on the economy, health, demography, and political change. Another source for a wide range of education effects are the annual EFA Global Monitoring Reports (GMR). Each year since 2002 these reports have provided an excellent review on how a particular aspect of education matters to society (GMR 2002, Chapter 1 on adult levels of education on multiple social factors; GMR 2003/4, Chapter 1 on why girls education matters; GMR 2005, Chapter 2 on the importance of quality; GMR 2006, Chapter 5 on effects of adult literacy; GMR 2007, Chapter 5 on effects of early childhood education.

Projecting youth and adult education levels has an inherent advantage over the projection of many other social factors: education levels change somewhat predictably, with a long momentum. Much of the future change is already built into children's enrollment rates and education levels among youth and young adults today. This assists the reliability of projecting levels of education.

This report presents projections of youth and adult levels of education in 83 developing countries from 2005–2025. This is the first time levels of education have been projected for such a large set of countries. Until now, projections of levels of education were made for individual countries or limited groups of countries or regions.[3] To increase the scale of the projections to 83 countries, it was necessary to compile a large set of widely distributed household data into one data system and to develop an automated projection model linked to that system.

The result is a new, public set of education data, which is available and can be searched online at www.epdc.org, and this report. EdPop, the projection tool, is also on the EPDC website.

The last section of the report discusses the potential for **future socio-economic changes** driven by shifts in youth and adult education levels. This section is more speculative. It highlights one example of how one might use the education level projections to explore potential future changes in related areas, by calculating the incremental change in child mortality and number of children per woman as affected by education levels. The section concludes with three lists of countries that show notable patterns of education attainment.

Background: impacts of youth and adult education levels

The many different impacts of youth and adult education levels have been documented widely. The main body of the report does not detail these decades of work. However, the Appendix provides a review and some new material in this field for the interested reader.

Historically, national levels of education of youth and adults have correlated to higher GDP levels and to higher rates of GDP growth. More precisely, it appears that education quality and the education of youth and young adults matter to economic growth.[4] Better educated youth and adults are more likely to be employed in higher-paying and higher-status professional, technical,

3   Projections, for example, of Mauritius can be found in Lutz (ed.) (1991); Cape Verde in Wils (1996); four Arab countries in Goujon (1997); three south African countries Botswana, Mozambique, and Namibia in Sanderson et al., Wils et al., and Sanderson et al. (all from 2001); and 13 world regions in Lutz and Goujon (2001).

4   Barro and Lee (1991, 2001), Barro and Sala-i-Martin (2004), and Cohen and Soto (2001) among others have made significant contributions to understanding the impacts of adult levels of education on economic growth. Recently, new dimensions have been added to the education and economic literature, as Hanuscheck and Wössmann (2007) argue that education quality matters more to economic growth than education quantity; and Cuaresma and Lutz (2007) argue that accounting for age-specific levels of education, specifically of young adults, improves correlations with economic growth.

and managerial jobs and contribute to a more diversified workforce and lower unemployment. They are also less likely to be in poor households.[5]

On average, people with higher education levels are healthier—the more educated live longer, are less likely to be sick, less likely to be overweight, and children of better educated mothers are less likely to die in childhood.[6] Joel Cohen (1995) has written eloquently on population growth and the importance of women's education to slowing that growth.[7]

People with higher levels of education are, by a variety of measures, more likely to be engaged in civic activities, and the overall level of education supports the growth of democratic institutions. However, it can also happen that social engagement is frustrated and vented in acts of violence—data from Jordan, Palestine, and Israel show terrorism there tends to be perpetrated by people with higher than average levels of education.[8] So a rapid rise in the education levels of youth can result in constructive social activity but that is more likely if the society is open, offering youth new perspectives and freedoms.[9]

Data, projection method, and definitions

The **data** used in the report are derived from a variety of different household surveys, which for many countries are the most recent, or even the only, source of information on youth and adult education levels. The EPDC has accessed the data in household surveys for more than 90 developing countries from 1999–2006; data for 83 countries are used in this report. The report also uses some data from international sources.[10] The data shown in most of the figures and tables in the report relate to *educational attainment*,[11] which is the highest level of schooling reached by a specific portion of the population.[12] Some visual examples for the data are provided in Box 1 (page 14).

The **projection method** is a well-established demographic tool developed in the 1970s and called multi-state projection. It is based on the standard cohort population method (projecting the population by age group) used by the United Nations, the World Bank, and for most national projections. The modification used here is to divide the population into different groups or states that are projected in parallel, in this case, education groups. The method is described in more detail in Box 2 (page 28).

5   See Appendix 1 for EPDC analyses on occupation and poverty.

6   Cambois et al. (2001) provide an extensive list of the studies on education and life expectancy in OECD countries; Skholnikov et al. (2006) analyze education and health in Eastern Europe; see Appendix 1 for EPDC analysis on child mortality and mother's education.

7   Joel Cohen, 1995, *How Many People Can the Earth Support*? W. W. Norton & Company. See also Appendix 1.

8   Glaeser et al. (2007) contributes an overview of the literature on education and democracy, and a model for the causal mechanisms; Krueger and Maleckova (2003) on education, poverty, and terrorism; Brainard and Chollet (2007) on linking democracy and instability to poverty and other socio/economic factors.

9   Bainard and Chollet (2007).

10   UNESCO Institute for Statistics, United Nations Population Division, World Bank, World Resources Institute.

11   The only exception is Table 2, as noted in the table.

12   UIS defines education attainment as the percentage distribution of the population according to the highest level of schooling reached.

Box 1. Graphical examples of the benchmark data used to make projections.

THE ACCOMPANYING FIGURES SHOW, in graphical form, the data that are the benchmark for the projections, namely, the population of each country in a recent post-2000 year, by sex, age, and education level. The data are arranged in a population pyramid. Bars on the right represent number of males in five-year age-groups, and on the left, females. Within the bars, three colors denote groups of people in three education groups. The outer group, marked in red, is people who have entered secondary or above; the middle group, colored blue, is those who have entered primary education; and the inner group, colored brown, is people with no schooling. Human Capital Pyramids for six countries in the accompanying figure represent the range of the data's patterns. Human Capital Pyramids for all 83 countries included in this report are online at www.epdc.org, and more are added in an ongoing process.

To read a pyramid, it is better to look at it from slightly afar, not getting caught up in the details of the specific bars, but looking more at the overall patterns and shifts across the age-groups and between the sexes. The shape of the pyramid (the population age-structure) provides insight into population growth. A pyramid with a wide base (many children in the younger age groups) signals high fertility rates and often high mortality.

The pyramid for Burkina Faso, for example, has a wide base, characteristic of that country's high fertility rate (5.9 children per woman). The majority of people at all ages are unschooled (brown, inner color). In the age-group 5–9 (second bar from the bottom), there is some primary education (blue), as these children have entered primary school but the level is very low. The portion with primary education in the age-group 10–14 is higher, partly because of late school entry. In the age-group 15–19 there are also some people with secondary school (red). Note that the largest groups of people with secondary education are among the youth and young adults.

Typical human capital pyramids for six developing countries.

Burkina Faso 2005 — population pyramid by education attainment (NO SCHOOLING, PRIMARY, SECONDARY), MALE / FEMALE, ages 0-4 to 75+, Thousands.

Sierra Leone 2005 — population pyramid by education attainment, MALE / FEMALE, ages 0-4 to 75+, Thousands.

Uganda 2005 — population pyramid by education attainment, MALE / FEMALE, ages 0-4 to 75+, Thousands.

Honduras 2005 — population pyramid by education attainment, MALE / FEMALE, ages 0-4 to 75+, Thousands.

Bangladesh 2005 — population pyramid by education attainment, MALE / FEMALE, ages 0-4 to 75+, Thousands.

Moldova 2005 — population pyramid by education attainment, MALE / FEMALE, ages 0-4 to 75+, Thousands.

Legend: NO SCHOOLING | PRIMARY | SECONDARY

Source: *EPDC projections using data from household surveys.*

The **definitions** of the youth, adult groups, and education levels are as follows:

For *youth*, the definition throughout the report is people aged 15–24, an age interval commonly used by the World Bank and the United Nations for youth. In a person's life, this decade often sees the transition from school to (seeking) work, to marriage and family formation, and to civic engagement.[13] It is also the age when risky health behavior peaks, and males are more likely to participate in violence as well as rebel and terrorist groups.[14]

Most of the data used and the accompanying text refer to *adults* as those *over 24 years* of age. However, some of the data used have the slightly different period of those *aged 25–64*. When data are used that are based on that or another age range, the report so indicates.

The projections are made for three levels of education. The education levels refer to the highest level of schooling *attained*. The three projected levels are: *no schooling, entered primary, and entered secondary and above.*

No schooling includes people who never entered any school, but who could have had pre-primary education, non-formal, or "other" education. Non-formal education can be superior to formal schooling[15] and equivalent to primary, secondary, or even higher education.[16] It is problematic to include it in no schooling, but it is placed there because of the uncertainty regarding its content and equivalency. In practical terms, non-formal schooling is but a small portion of education in most countries.

The two other education levels are *entered primary* and *entered secondary*. We have chosen these two for the practical reason that they capture the broadest range of educational experience in the set of 83 countries. The decision to focus on primary entry rather than primary completion is based on the observation that there are many countries where the portion of adults who have completed primary is low today and projected to remain low; if we focused on primary completion, this report would leave out the millions of people who have achieved at least some level of education. Such a finding would ignore that many countries are making considerable progress at the lower education level of primary entry. On balance, using completion underestimates the number of people with some level of education, while using entry overestimates the number of people who likely have a functional education. We have erred on the positive side in choosing to focus on primary entry. Secondary entry was deemed essential because of the increasing evidence that secondary education has higher impacts on development than primary education, particularly for developing countries that are advancing economically.

13   World Bank (2007)

14   Brainard and Challot (2007)

15   De Stefano et al. (2006)

16   EPDC (2007), not published yet.

TODAY: Global distribution of youth and adult levels of education

Youth and adult education levels matter, and country distribution of education across a global map mirrors a map of development. Today's levels of education are the starting point for the projections.

Figure 1 presents two global maps of education levels for adults using data from 1999–2005. The top map contains the proportion of adults who have entered primary school (it is the inverse of a map showing proportions of no schooling); the bottom map contains the (clearly lower) proportions of adults who have entered secondary and above.

The top map shows that in most of the world the large majority of adults have had at least some primary education. The exception is a wide band of countries across the Sahara desert in sub-Saharan Africa and parts of South Asia. In this band, which includes Mali, Burkina Faso, Niger, Chad, Afghanistan, and Pakistan, the portion of adults with primary education is distinctly lower than in other parts of the world. Most of these countries are also among the world's poorest.

The bottom map of secondary education attainment has many more countries with lighter shading—lower than the portions of adults who have entered primary school, as would be expected. The portion of adults with secondary attainment is near-universal only in the OECD, Tunisia, and former communist countries. Among the remaining countries, secondary attainment ranges from 6–72%—meaning that, even for developing countries with the highest levels of secondary attainment, there is quite a gap to the 90%+ secondary attainment levels in the OECD.

There appear to be some geographical clusters of countries with moderate and with low rates of secondary education among adults. Moderate rates prevail in most of the Arab countries, the western portion of South America, the southernmost countries of Africa, and the neighboring countries Ghana, Cameroon, and the Republic of Congo. The lowest levels of adult secondary education are found in eastern Africa and in the same wide band as where low primary levels of adult education are found.

FIGURE 1

Portions of adults[17] in the world in 2005 who have received (a) some primary education (top globe) and (b) some secondary education (bottom globe).

Source: *Data from calculations from household surveys by EPDC, OECD (2007), Barro & Lee (2001).*

Adult primary education attainment (1999-2005)

- <50%
- 51-69
- 70-84
- 85-94
- 95-100

- NO DATA FOUND

Adult secondary education attainment (1999-2005)

- <30%
- 31-49
- 50-69
- 70-89
- 90-100
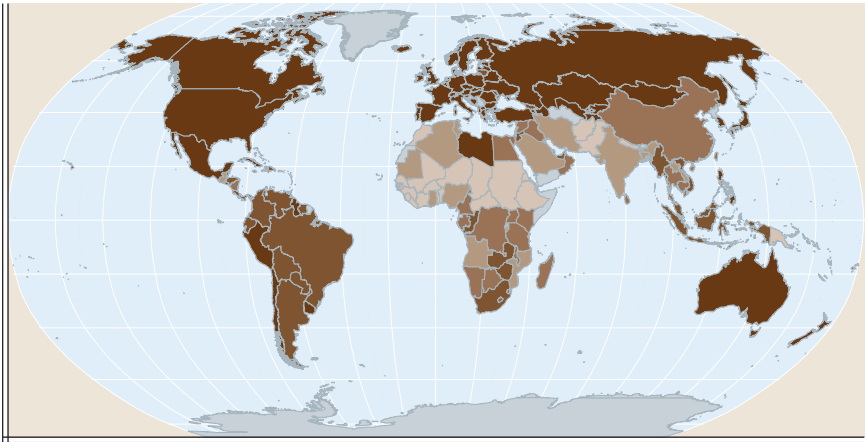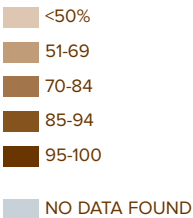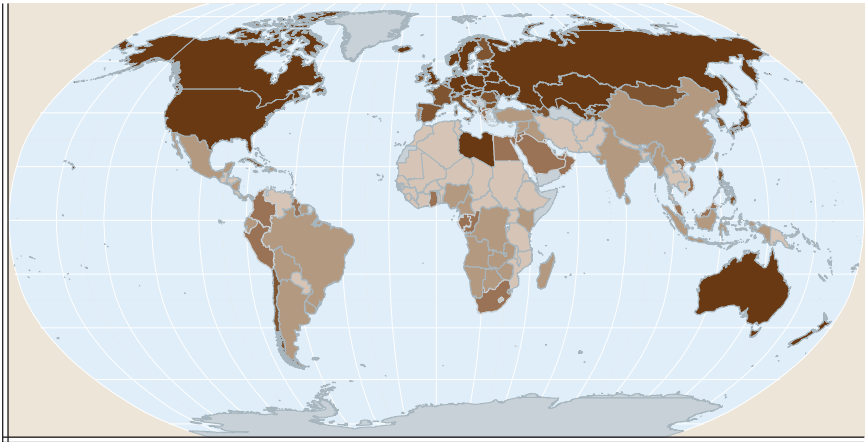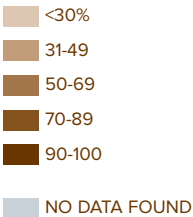
- NO DATA FOUND

17 The age ranges for adults vary somewhat due to variations in the data found. It is 25-64 for 113 countries; 25+ in 25 countries; 15+ in 19 countries; and 25-69 in two countries.

Youth levels of education relative to that of adults

The maps in Figure 1 showing overall adult levels of education do not reveal what are, in many countries, significantly higher youth levels of education compared to those of adults. These generational differences can mean a lot for a country. In the short run, the education levels of the middle aged are more important to the quality of leadership in business and governance than the education levels of youth. On the other hand, a large pool of moderately or highly skilled young adults can be attractive for investors, such as those who invested in India's high-tech industry or China's manufacturing boom, and it is often the young and highly skilled who are innovative entrepreneurs and a country's creative spirit or force. But, if there are large differences in education levels across generations, there is the possibility of tension; for example, will the youth accept the leadership of a less educated older generation? The expectations and views of the youth could differ sufficiently from that of the older generation that conflicts arise. Or more educated youth could forge a path independent of the older generation and be a positive agent of change.

Generational differences can signal ongoing shifts in society. For example, a new generation of better educated mothers will probably lead to declines in family size and child mortality rates. A new generation of better educated women will have greater opportunities for more diverse and higher paying employment and other enhancements in their position vis-à-vis men.

The extent of generational differences in education levels may differ for primary and secondary levels of education. In some countries, the youth have far higher portions of primary education, compared to adults, but similar portions of secondary, and in other countries the reverse pattern is the case. Of course, such patterns signal where most of the recent growth in school attendance has been. If growth in youth levels of education has been concentrated in primary school, the economic and occupation shifts that occur are likely to be more incremental; on the other hand, if most of the education growth has been concentrated at the secondary level, this may signal the possibility of more economic growth in the high-skill sectors, but also the possibility of growing social inequality.

Figure 2 shows the youth and adult levels of education for 83 countries, broken out separately for primary education (first figure) and for secondary education (second figure). The bars denote the percentages of adults 25–64 with primary education levels (brown) or with secondary education levels (orange). The

FIGURE 2

Youth and adult levels of education in 83 countries, 2005

Source: *Household surveys and census data from 1999–2006 collected by EPDC.*

Youth and adult levels of education— Primary

◆ YOUTH 15-24

▮ ADULTS 25+

Niger
Afghanistan
Burkina Faso
Mali
Guinea
Gambia, The
Chad
Ethiopia
Senegal
Guinea-Bissau
Comoros
Pakistan
Nepal
Burundi
Benin
Cote dIvoire
Morocco
Eritrea
Central African Republic
Togo
Bangladesh
Sierra Leone
Nigeria
Mozambique
India
Lao PDR
Belize
Haiti
Rwanda
Egypt, Arab Rep.
Ghana
Angola
Mauritania
Cameroon
Cambodia
El Salvador
Malawi
Uganda
Tanzania
Ecuador
Botswana
Congo, Dem. Rep.
Madagascar
Suriname
Nicaragua
Sao Tome and Principe
Swaziland
Cuba
South Africa
Kenya
Congo, Rep.
Gabon
Namibia
Mexico
Honduras
Jordan
Lesotho
Azerbaijan
Brazil
Indonesia
Bolivia
Zambia
Myanmar
Costa Rica
Mauritius
Panama
Sri Lanka
Vietnam
Dominican Republic
Tajikistan
Colombia
Mongolia
Peru
Zimbabwe
Guatemala
Argentina
Philippines
Guyana
Moldova
Armenia
Kazakhstan
Uzbekistan
Bosnia and Herzegovina

Percentage of youth or adults

FIGURE 2 CONTINUED

Youth and adult levels of education— Secondary

◆ YOUTH 15-24
▮ ADULTS 25+

Percentage of youth or adults
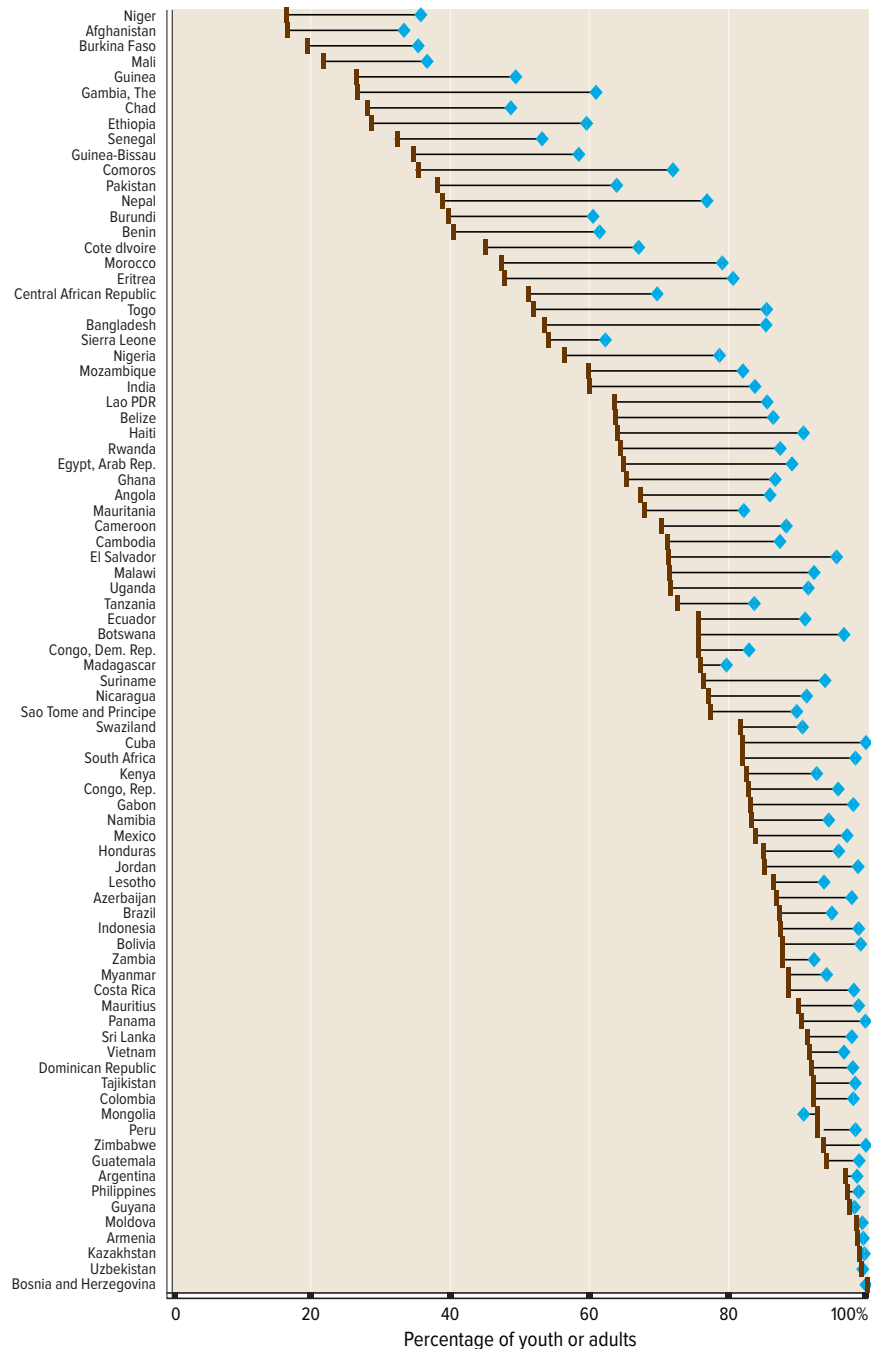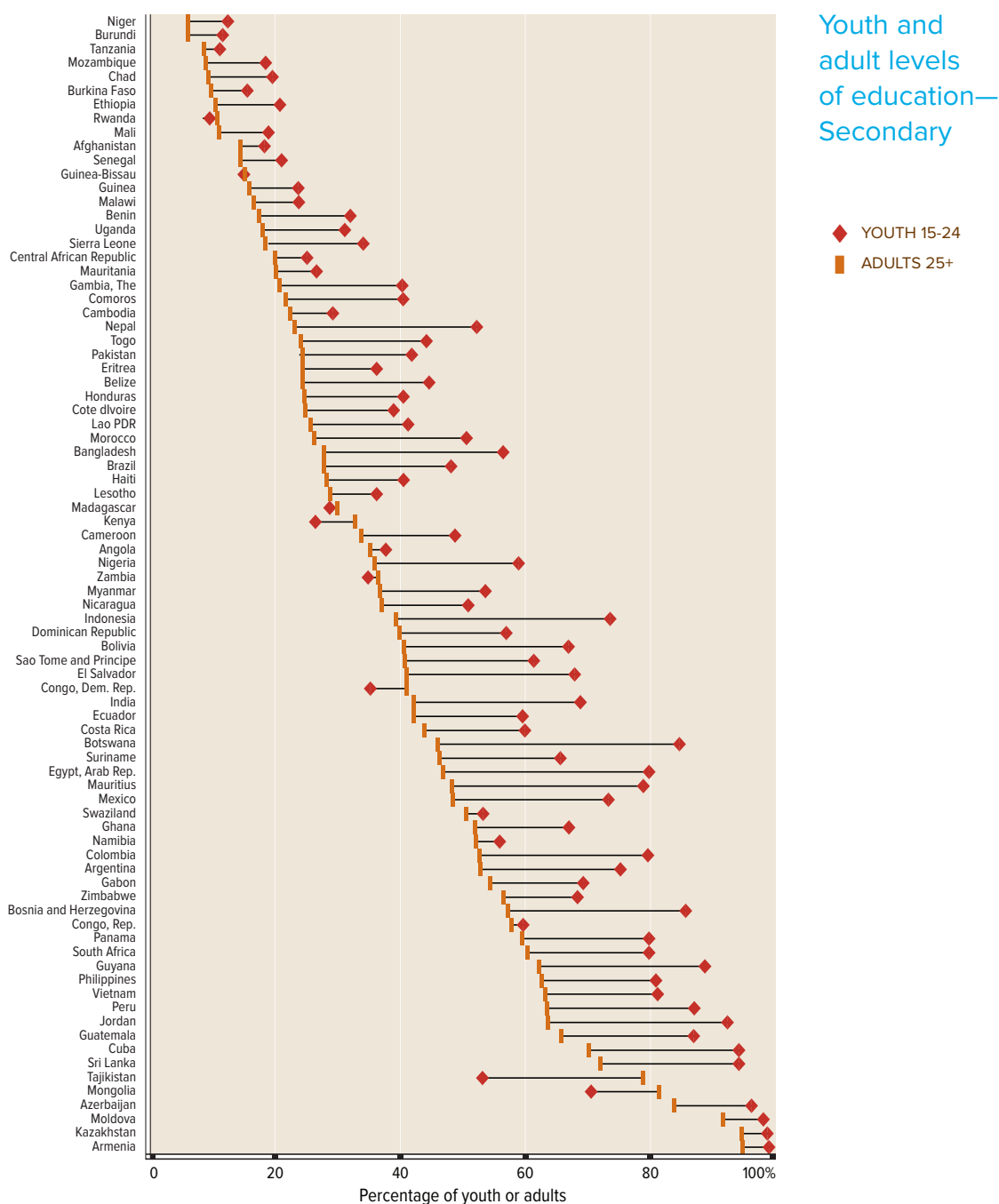
diamonds denote the portion of youth with primary (blue) and with secondary (red) levels of education. The countries are arranged from lowest to highest portion of adults with primary and secondary in 2005, respectively.

The graphs highlight the international differences in levels of education found in the maps. Taking adult primary levels of education, for example, the range is from extremely low, below 20% in Niger, Afghanistan, and Burkina Faso, to 100% in the former communist countries in Asia and Europe. In a little under half the countries, 80% or more of the adults had primary education. Secondary education levels, as shown in the maps, are lower than primary. There is a sizeable group of countries with extremely low secondary levels (<20%) among both adults and youth. These are (starting from the lowest levels): Niger, Burundi, Tanzania, Mozambique, Chad, Burkina Faso, Ethiopia, Rwanda, Mali, Afghanistan, Senegal, Guinea-Bissau, Guinea, Malawi, Benin, Uganda, Sierra Leone, Central African Republic, and Mauritania. The former communist countries aside, no developing country had adult levels of secondary education above 72%.

The education levels of youth are significantly higher than those of adults in most countries shown. In particular, youth consistently have higher rates of primary education than adults. In many countries, the generational differences with regard to primary education are quite large, exceeding a factor of two. For example, in The Gambia only 27% of the adults had received primary schooling, compared to 61% of the youth; in Niger the corresponding numbers are 16% and 32%; in Comoros 35% and 72%; in Ethiopia 28% and 60%. The one country where youth and adults have nearly the same, incomplete level of primary is Madagascar, where the respective portions with primary education are 76% for adults and 80% for youth.

The generational differences with regard to secondary are far less consistent. There are some countries where youth are significantly more likely than adults to have secondary education (1.5 to 2 times as much)—The Gambia, Comoros, Morocco, Bangladesh, India, Egypt, Jordan, Indonesia, and Bolivia. Many of these countries are among those with the highest levels of youth secondary education, but only a few have achieved a level above 80%. In general, one can expect these youths with higher levels of educational attainment to have different employability skills than their parents' generation and to have seen that in their parents' generation that secondary education was the gateway to higher status employment. This poses both a challenge and an opportunity, as youth seek to match their expectations with their reality.

On the other hand, there are several countries where the youth rates of secondary education are almost the same as for adults, for example Burundi, Tanzania, Angola, and Zambia. There are even several countries where the rates of secondary education among youth are slightly lower than the adults'—Democratic Republic of Congo, Madagascar, Kenya, and Zambia. In one extreme case, Tajikistan, the youth rate of secondary education is a full third less than that of adults, 54%, compared to 79% for adults—a serious reversal of education growth. A similar, but less severe reversal is in Mongolia, where the proportion of youth with secondary is 71% compared to 81% of the adults. Such stagnation, and in particular reversals, are worrisome for the future of development in these countries. The youth education levels provide a sense of the direction in which education levels are moving (as today's youth are tomorrow's adults), but actual projections (next section) give substance to that direction, quantify it, and provide a clearer picture.

THE FUTURE

Projections of Education Level

This section presents the projections for youth and adult education levels for 83 countries, from the starting year 2005 to 2025. The potential for economic growth, more rewarding occupation, lower poverty incidence, lower mortality, better health, and reduced population growth will be driven in part by future shifts in youth and adult levels of education. A picture of future youth and adult education levels provides a window through which to see the potential for change.

Box 1 provides the benchmark data in a visual form for six illustrative countries. All of the benchmark data are available online at www.epdc.org in a searchable data system. Box 2 describes the projection method and provides directions for further and more detailed reading.

Figure 3 presents 83 country graphs of youth and adult population (ages 15–64) projections by education level from 2005-2025. The height of the colored areas in the graphs shows the size of populations over time and the different colors within the graphs denote people of different education levels. The top wedge of each graph denotes youth and adults with at least *secondary and above* education; the middle wedge shows people with at least *primary* education; and the bottom wedge shows people with *no schooling*. The population scale on each graph is different and ranges from a few hundred thousand for the smallest countries, like Suriname, to half a billion for India. Thus, the figures cannot be used to compare absolute population size; they are more useful for looking at the *relative growth rates* of education levels and population at the national level.

Highlights from the projections

In almost all countries the proportion of people age 15–64 with no schooling will decline—conversely, the proportion of people with some schooling rises; despite this, in some countries the absolute number of people 15–64 with no schooling remains relatively constant, and in a few countries even increases.

In one group of countries, the proportion of youth and adults with no schooling in 2005 was already low and is projected to decline further to close to 0%, as a result of progress toward the EFA goal of universal primary education. These countries are Namibia, Lesotho, Uganda, Zimbabwe, South Africa, Mauritius, Botswana, Republic of Congo, and Gabon in sub-Saharan Africa; Sri Lanka, Philippines, Indonesia, and Vietnam in Asia; much of Latin America, including Cuba, Guatemala, Panama, Mexico, Colombia, Costa Rica, Dominican

Box 2. Description of the projection method— case of Egypt

TO PROJECT HUMAN CAPITAL CHANGE, we use a demographic technique called the multi-state projection method. It was developed in the 1970s, and since the late 1980s has been applied, in particular at the International Institute for Applied Systems Analysis (IIASA) and the EPDC.[1]

The starting point of the projection is the population pyramid by age, sex, and education in the starting year, shown in the top panel of the accompanying figure with Egypt as an example. Although the pyramid is shown in five-year age groups, the actual projections for this report are done step-wise, year-by-year. The projection is a simulation of how a population changes—through aging, deaths, births, and education transitions. In the calculation of each new projection year, all the population in the pyramid "ages up" by one year. People who died in that year are subtracted from each age group; births are added to the bottom age group; and people in the school-age groups (5 to 24) shift to a new education level. There is no migration assumed in these projections.

The deaths are calculated with age-specific mortality rates based on life expectancy projections. New births are calculated by multiplying the number of women in child-bearing ages with the age-specific birth rates, based on the total fertility rate projection. Trends for both life expectancy and births are taken from the United Nations 2004 population projection.[2] The data for life expectancy for all the countries in this report can be found online at www.epdc.org under the tab "Data/Search The Data," as well as the data for children per woman.

With regard to education, in each year people who enter primary school transition from the category "No Schooling" to the education level "Primary," and people who enter secondary school transfer from the education level "Primary" to "Secondary" (in addition to aging one year). The education transitions (primary and secondary school entry rates) can apply to people between the ages 5 and 24 for primary and between ages 10 and 24 for secondary. The education transitions are based on projections of primary and secondary school entry rates, shown for Egypt in the middle panel of the figure. The method and results for projecting school entry rates for developing countries have been discussed in earlier EPDC reports.[3] Basically, these projections are extrapolations of trends from the past 15 years. The school entry projections are made by the EPDC and are updated in an ongoing fashion as new data become available. The projections used in this report and the projection tool EdPop can be found online at www.epdc.org under "Tools/Projections."

The projected 2025 human capital pyramid is shown in the bottom panel. Note that the groups with no education have disappeared from the youth and younger adult age groups following the trend to universal primary (see trend graph in the middle) and there is near-universal secondary schooling among youth and young adults (also following the school trend).

1   For a more technical explanation of the method, see Rogers (1975) and Lutz, Goujon, and Wils (2005) at www.epdc.org.

2   United Nations (2007).

3   Wils et al. (2005) and Ingram et al. (2006).

Egypt as an example of the projection method

MALE / FEMALE pyramid chart, ages 0-4 through 75+, scale 5000 4000 3000 2000 1000 0 to 0 1000 2000 3000 4000 5000 Thousands
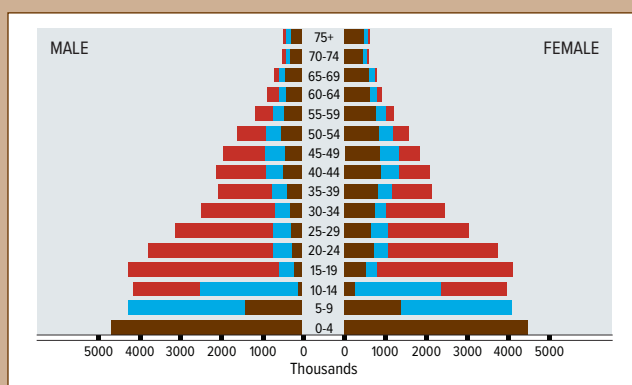
Starting human capital pyramid for 2005.

There are still some youth and young adults with no schooling in 2005.

2005 starting year

- ■ NO SCHOOLING
- ■ PRIMARY
- ■ SECONDARY

School entry rates line chart, 0% to 100%, years 1990 to 2025
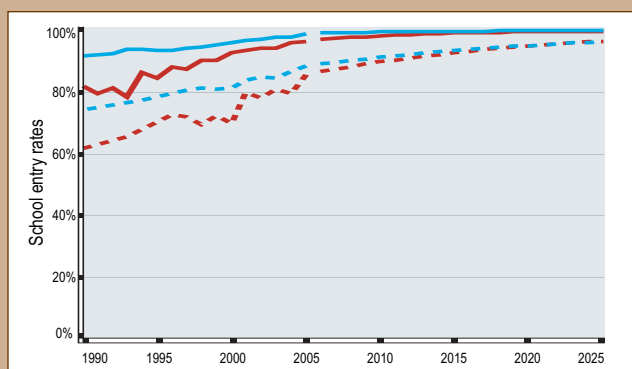
School entry trends 2005–2025

The primary and secondary school entry trends that drive the projection

- —— FEMALE PRIMARY
- - - - FEMALE SECONDARY
- —— MALE PRIMARY
- - - - MALE SECONDARY

MALE / FEMALE pyramid chart, ages 0-4 through 75+, scale 5000 4000 3000 2000 1000 0 to 0 1000 2000 3000 4000 5000 Thousands
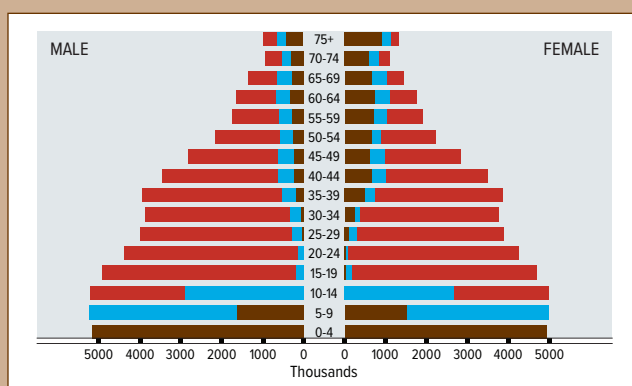
Ending human capital pyramid for 2025

No more unschooled youth and near universal attainment among youth.

2025 base simulation

- ■ NO SCHOOLING
- ■ PRIMARY
- ■ SECONDARY

Republic, Argentina, Bolivia, Peru, Brazil, Guyana, Honduras, and El Salvador; as well as Jordan in the Middle East countries in the sample; and all of the European and Central Asian countries in the sample.

On the other hand, there are also some countries that have high rates of no schooling among youth and adults in 2005 and despite some progress are projected to remain so by 2025. The most extreme case in this group is a sub-set of countries where declines in the *proportion* of youth and adults with no schooling are not enough to overcome rapid population growth. In these countries, the *absolute* number of youth and adults with no schooling is projected to increase: Afghanistan, Burkina Faso, Guinea-Bissau, Democratic Republic of Congo, Madagascar, Burundi, Niger, Mali, Chad, Guinea, and Zambia. For these countries, there is a need to devise programs that address the employment and livelihood of these unschooled adults, but also to look for ways to improve educational levels. Adult literacy programs and non-formal adult programs are one way to address the issue; as are stronger programs to reduce population growth through smaller families, in particular among young women with no schooling. Trying to raise the growth of schooling trends is another, but may be challenging, as schooling is already growing rapidly in many of these countries (but from a very low starting point).

In 51 of the 83 countries, secondary emerges as the predominant level of education, but in a sizeable minority of countries, primary remains the most common education level among youth and adults in 2025.

The countries where primary remains the dominant education level are a diverse group including Angola, Afghanistan, Senegal, Niger, Burkina Faso, Cambodia, Central African Republic, Ethiopia, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mauritania, Mozambique, Rwanda, Tanzania, Uganda and Zambia. The challenge in these countries is that as secondary education becomes more widespread around the world, the returns to primary are falling, and these countries may find that the many adults with only primary education are as entrenched in poverty as unschooled adults were in earlier generations.

In almost all countries, secondary attainment will rise, and in some countries the rise is rapid, but, overall, the expansion of secondary attainment will be uneven.

It is apparent from the figures that the global disparity in secondary education attainment is likely to remain for the next generation. According to many economic studies, secondary attainment is becoming more important for

economic betterment and social goods, so the continued differentials in secondary suggest long-term, continued disparity in progress on development around the world.

Only a handful of countries in the series are projected to reach near universal secondary education (80% or higher) among youth and adults by 2025. These are: Philippines, Vietnam, Guyana, Peru, South Africa, Botswana, Jordan, Guatemala, Bosnia Herzegovina, Egypt, Panama, and Colombia; in addition, Azerbaijan, Kazakhstan, Moldova, Uzbekistan, Armenia, Cuba and Sri Lanka started out with 80%+ secondary education levels among youth and adults in 2005.

Even in countries that are not projected to reach near-universal youth and adult levels of secondary educational attainment, there are many that are projected to undergo a major shift towards more secondary attainment, and they are spread across all continents. The largest growth in youth and adult secondary education levels are in sub-Saharan Africa—Mozambique, the Gambia, Togo, Nigeria, Burundi, Botswana, Comoros, and Chad are all projected to have a 20–30% percentage point increase. These projections may prove optimistic though, for example, if school attendance growth slows drastically or if there is high out-migration of skilled adults. In the latter situation, the country may continually educate its young, only to see them pulled away by stronger economies.

There is also a small group of countries where secondary education levels are low and projected to remain low. These are, among others: Rwanda, Tanzania, Madagascar, Kenya, Cambodia, and Afghanistan. Most of these countries will have very high primary education levels, but with secondary education levels stagnating, it will be difficult to induce economic growth. Obviously, this slow growth group of countries is of particular concern.

Population growth rates 2000–25 are generally correlated inversely with overall education levels.

Overall, the higher the initial level of schooling, the lower the population growth rates. Conversely, most rapid population growth is projected in the low-education countries. Most of them are in sub-Saharan Africa. Other countries with rapid population growth include countries in Central America (Belize, Guatemala, Honduras, and Nicaragua), as well as Afghanistan, Laos, and Bolivia.

In some sub-Saharan African countries HIV/AIDS will likely arrest population growth—Lesotho, Swaziland, South Africa, Botswana and Zimbabwe. These

FIGURE 3

Population of youth and adults (ages 15–64), with no schooling (brown, bottom section), some primary (blue, middle section), and some secondary or above education (red, top section) from 2005–2025 in 83 countries, organized alphabetically.

Source: *EPDC projections using data from household surveys.*

■ NO SCHOOLING   ■ PRIMARY   ■ SECONDARY

FIGURE 3 CONTINUED

Legend: NO SCHOOLING, PRIMARY, SECONDARY

Charts: Cameroon, Congo, Dem. Rep., Dominican Republic, Central African Republic, Congo, Rep., Ecuador, Chad, Costa Rica, Egypt, Colombia, Cote d'Ivoire, El Salvador, Comoros, Cuba, Eritrea

FIGURE 3 CONTINUED

NO SCHOOLING   PRIMARY   SECONDARY

Ethiopia · Guinea · India · Gabon · Guinea-Bissau · Indonesia · Gambia, The · Guyana · Jordan · Ghana · Haiti · Kazakhstan · Guatemala · Honduras · Kenya

FIGURE 3 CONTINUED

Legend: ■ NO SCHOOLING ■ PRIMARY ■ SECONDARY

Charts (each plotting Population (thousands) vs Year, 2005–2025): Laos, Mauritania, Morocco, Lesotho, Mauritius, Mozambique, Madagascar, Mexico, Myanmar, Malawi, Moldova, Namibia, Mali, Mongolia, Nepal.

FIGURE 3 CONTINUED

■ NO SCHOOLING   ■ PRIMARY   ■ SECONDARY

FIGURE 3 CONTINUED

NO SCHOOLING   **PRIMARY**   **SECONDARY**

countries have particular challenges, especially for youth, the age group that typically acquires HIV. In Botswana and South Africa, despite the HIV epidemic, the levels of educational attainment among youth and adults are projected to grow rapidly.

Most countries with slower rates of population growth, below 1.5% annually, are characterized by relatively small family sizes, higher life expectancies, and higher youth and adult education levels. The countries in this group include the Latin American countries Colombia, Peru, Panama, Dominican Republic, Suriname, Argentina, Costa Rica, Mexico, Brazil, and Guyana; South and Southeast Asian countries, India, Vietnam, Indonesia, Myanmar, Sri Lanka; Central Asian countries, Mongolia, Uzbekistan, Azerbaijan; as well as Morocco and Mauritius.

Finally, there are some countries, all of which have high education levels, with universal secondary school attainment among young adults, where population growth is projected to be zero or negative. The countries in this group are: Armenia, Bosnia and Herzegovina, Cuba, and Moldova. Low fertility levels in the former-communist countries preceded the past decades of economic change (and often turmoil), although since 1990, fertility has fallen even further.

Projected youth education levels

The future trends of education levels among youth deserve special attention. Youth is the group in which we expect to see the most change. All of the issues that youth face today—transition to work, family formation, 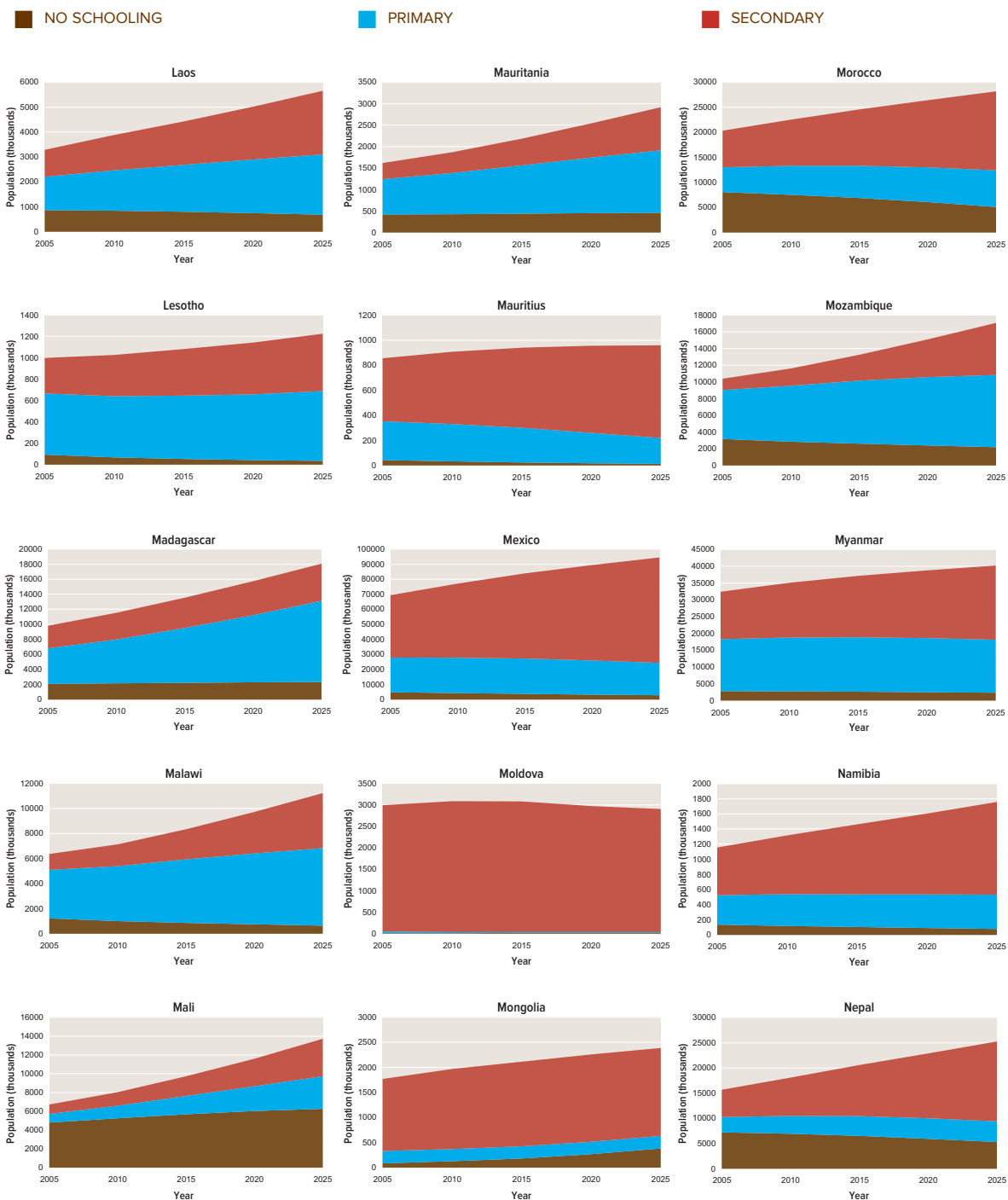responsibility, civic engagement—will also be faced by the youth of tomorrow. Education levels are an important factor in how youth go through these transitions. By highlighting projections of youth, we highlight a vulnerable group, but also one that is the most receptive to new ideas and ways and has within it the potential for powerful positive change.

The youth trends most closely mirror the trends of the school system. In fact, many youth are still in school, in particular secondary schools. Figure 4 compares the education levels of youth in 2005 to 2025, with primary education levels in the first graph and secondary in the second. The small bars are the 2005 levels of education (brown for primary and orange for secondary), and the triangles are the 2025 levels. The countries are arranged from the lowest to the highest education attainment in 2005.

By 2025, in all but 12 of the 83 countries—Afghanistan, Burkina Faso, Niger, Mali, Chad, Central African Republic, Sierra Leone, Guinea, Senegal, Guinea-Bissau, Burundi, and Mongolia—more than 85% of the youth will have received some primary education. That means that in all of Latin America, most of Asia, and well over half of the countries in Africa covered in this report, access to primary education among the youth will be close to universal.

The group of countries where the increases in the portions of youth who have had schooling (primary+) are projected to be the greatest (>15 percentage points) are mostly located in sub-Saharan Africa—Niger, Guinea-Bissau, Mali, Burkina Faso, Chad, Ethiopia, Benin, Sierra Leone, the Gambia, Senegal, Guinea, Cote d'Ivoire, and Comoros. The only non-African countries in this group are Afghanistan, Pakistan, Nepal, and Morocco. In a small number of countries—Burkina Faso, Niger, and Guinea-Bissau—the projected rise in the portion of youth with primary education levels is quite fast (16–20 percentage points) but, nonetheless, is not sufficient to overcome rapid growth of the youth population: in these countries, the absolute number of youth with no schooling will continue to rise.

The graph for secondary education attainment progress is different from the primary attainment graph. Increases in the portions of youth with secondary education are inconsistent – while many countries are projected to have large increases, there are also many where portions of youth with secondary education stagnate or even reverse. Only a minority of countries is projected to reach 90% secondary education levels or higher for youth by 2025—the Philippines, Guatemala, Indonesia, Mauritius, Colombia, Botswana, Peru, Egypt, Vietnam, Guyana, and Bosnia Herzegovina , in addition to the formerly communist countries, Jordan, Sri Lanka, and Cuba, that already had attained that level by 2005.

FIGURE 4

Projections for primary and secondary education levels of youth, 2005 compared to 2025 for 83 developing countries.

Source: *EPDC projections using data from household surveys.*

Youth level of Education 2005 and 2025, Primary Education

■ 2005

▶ 2025

Percentage of youth with primary education

FIGURE 4 CONTINUED

Youth level of Education 2005 and 2025, Secondary Education

■ 2005
► 2025

Percentage of youth with secondary education
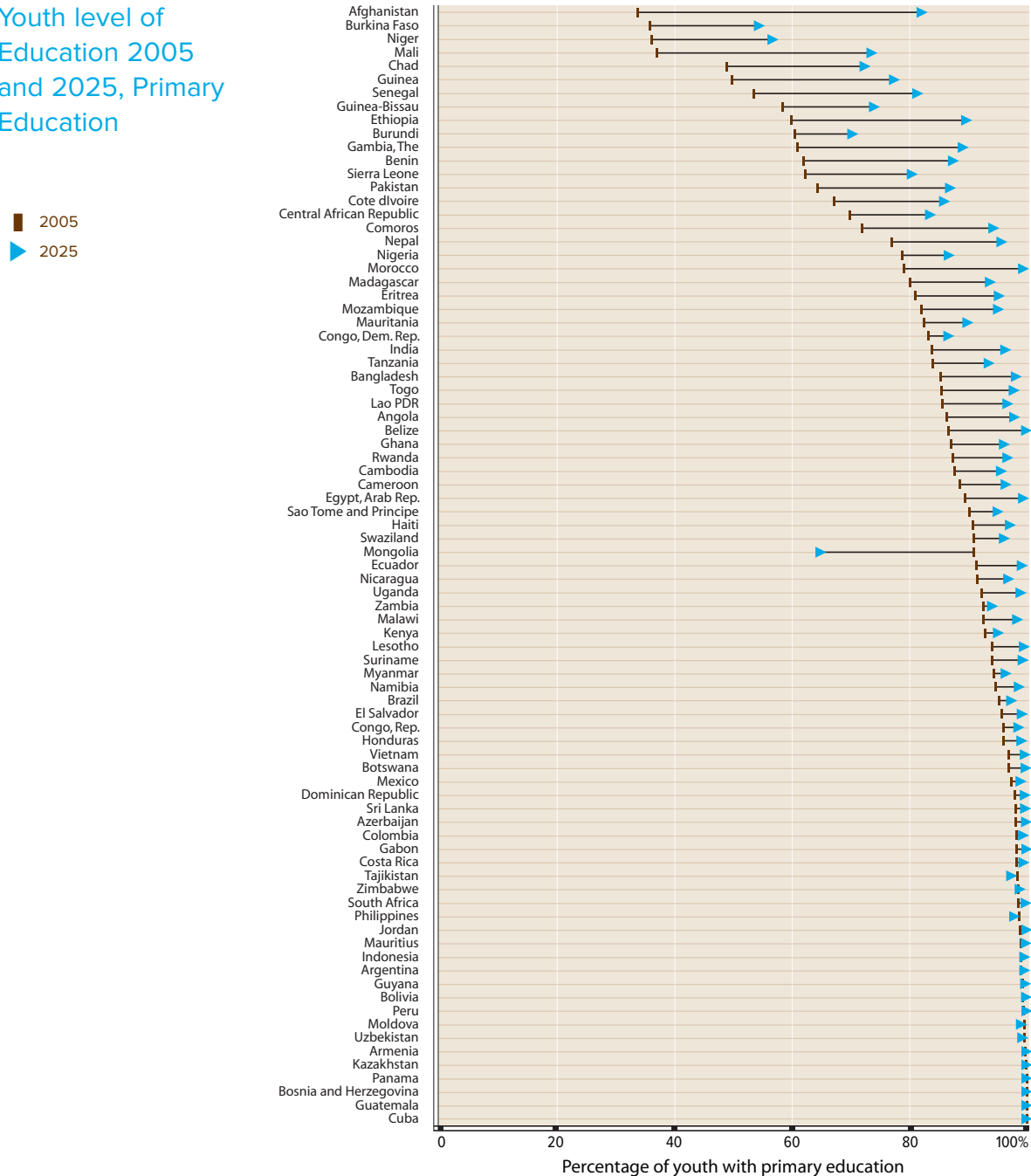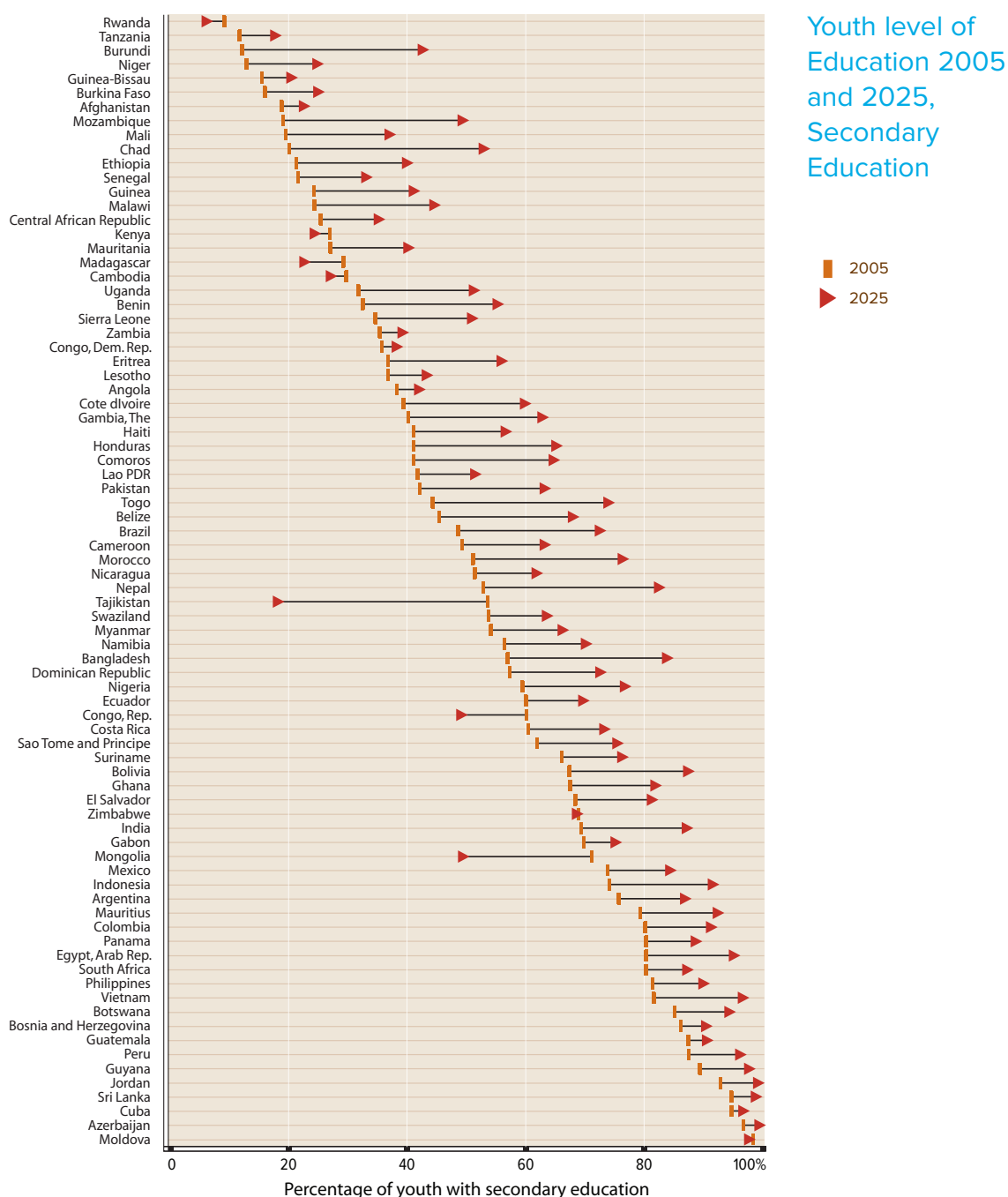
Projected changes in level of education gender gaps

In about half of the countries in the dataset, the levels of education of men and women diverge by multiple percentage points. In the majority of the countries with these differentials, the education levels of men exceed those of women, but there is a small group where the opposite is the case (Lesotho and Latin American countries). To the extent that education levels signal, for both sexes, access to opportunities, gender gaps can mean that one sex is, on average, dis-advantaged. In countries where the traditional roles of women are especially circumscribed, education may be, even more so than for men, the way out of a narrowly defined life.

Figure 5 shows the gender differentials for youth and adult education levels measured by the ratio of male to female education levels. If the ratio exceeds 1, males have higher education levels than women; and vice versa if the ratio is less than 1. The bars in the graph indicate the starting level of the ratios in 2005 (primary in the first panel, and secondary in the second panel), and the triangles the projected ratios for 2025 (blue triangles for primary and orange for secondary). The figure pertains to youth and adults (ages 15–64). The countries are arranged in order of 2005 values.

In 2005, countries with the largest disparities between male and female education levels are Afghanistan, Nepal and Pakistan in Asia, and Chad, Ethiopia, Guinea, Benin, Guinea Bissau, and Mali in Africa. In these countries, men are 50% more likely as women to have received some primary education, and 200–300% more likely to have received some secondary. The countries where the male/female ratio is close to one—both in primary and in secondary—are the same ones where overall levels of education are high.

The projections show that by 2025 much of the education level gender discrepancies are projected to disappear, or be significantly reduced, at both the primary and the secondary levels. Chad is perhaps the most extreme case. In 2005, the portion of men with primary education was twice as high as that of women (49% versus 25), and more than three times as high for secondary (21% versus 6). By 2025, the country is projected to attain near-gender parity for youth and adult education at both levels.

There are a number of countries where female secondary education is catching up so quickly to males, that, if trends persist, young women will have higher secondary education levels than young men by 2025—Burkina Faso, Burundi, Tanzania, Zambia, Zimbabwe, and Kenya. In the Latin American countries where young female secondary levels are already higher than young males', this differential is projected to increase.

FIGURE 5

Ratios of male to female youth education levels, primary and secondary, in 83 developing countries in 2025 compared to 2005.

Source: *EPDC projections using data from household surveys.*

Ratio of male to female youth level, Primary Education

■ 2005 RATIO
◀ 2025 RATIO

Country (top to bottom)
Afghanistan
Nepal
Chad
Pakistan
Guinea
Guinea-Bissau
Ethiopia
Benin
Mali
Burkina Faso
Niger
Central African Republic
Morocco
Gambia, The
India
Senegal
Eritrea
Togo
Cote dIvoire
Mozambique
Burundi
Nigeria
Angola
Lao PDR
Comoros
Egypt, Arab Rep.
Congo, Dem. Rep.
Cambodia
Bangladesh
Uganda
Ghana
Cameroon
Tanzania
Malawi
Sao Tome and Principe
Congo, Rep.
Mauritania
Rwanda
Haiti
Bolivia
Jordan
Indonesia
Kenya
Madagascar
Mauritius
Myanmar
Suriname
Zambia
Peru
El Salvador
Vietnam
South Africa
Sri Lanka
Gabon
Mexico
Zimbabwe
Ecuador
Cuba
Tajikistan
Moldova
Kazakhstan
Honduras
Belize
Panama
Guatemala
Costa Rica
Armenia
Swaziland
Guyana
Philippines
Argentina
Brazil
Bosnia and Herzegovina
Colombia
Uzbekistan
Dominican Republic
Nicaragua
Mongolia
Namibia
Botswana
Azerbaijan
Lesotho
Sierra Leone

Ratio Male to Female

0.50   1.00   1.50   2.00   2.50   3.00

FIGURE 5 CONTINUED

Ratio of male to female youth level, Secondary Education

2005 RATIO
2025 RATIO

Ratio Male to Female
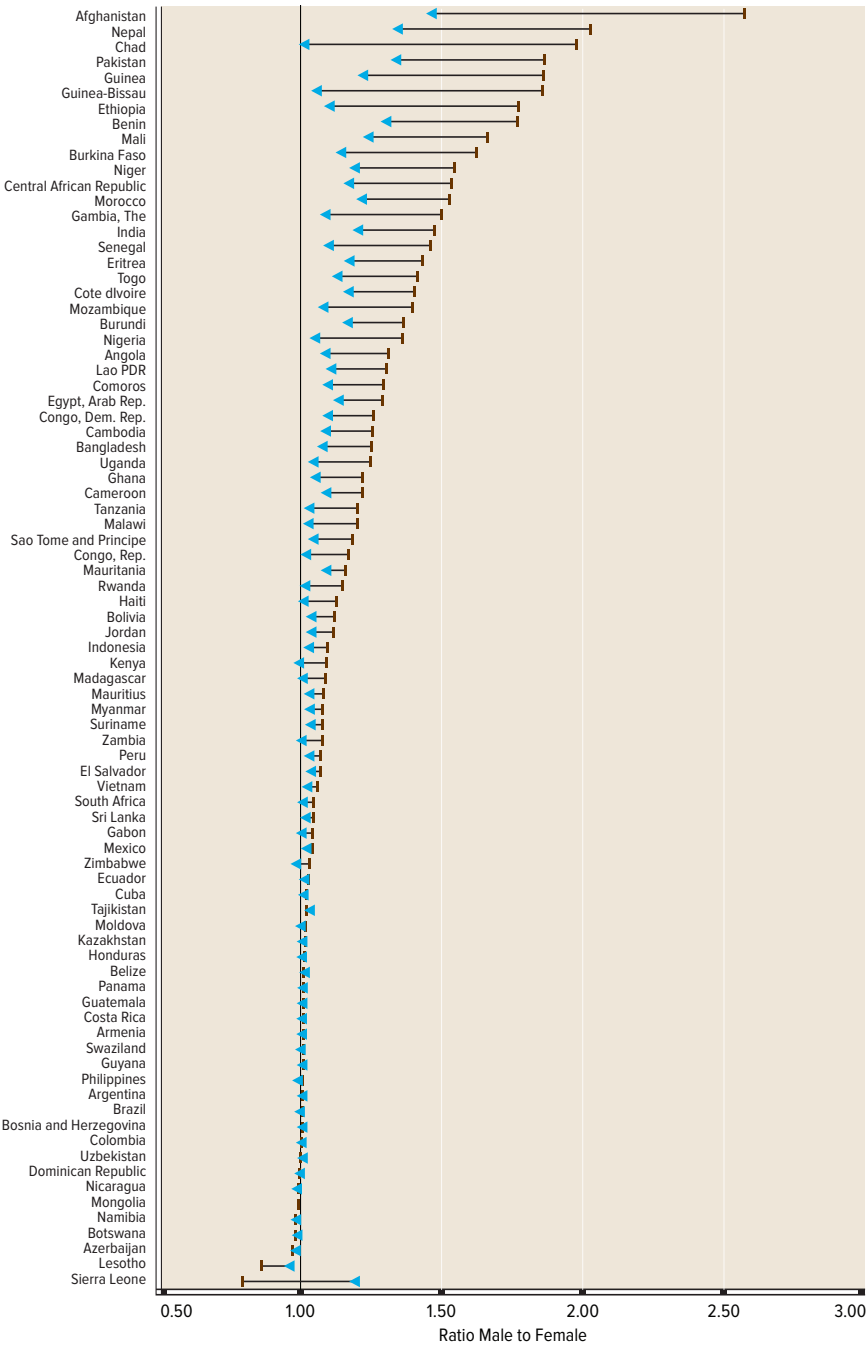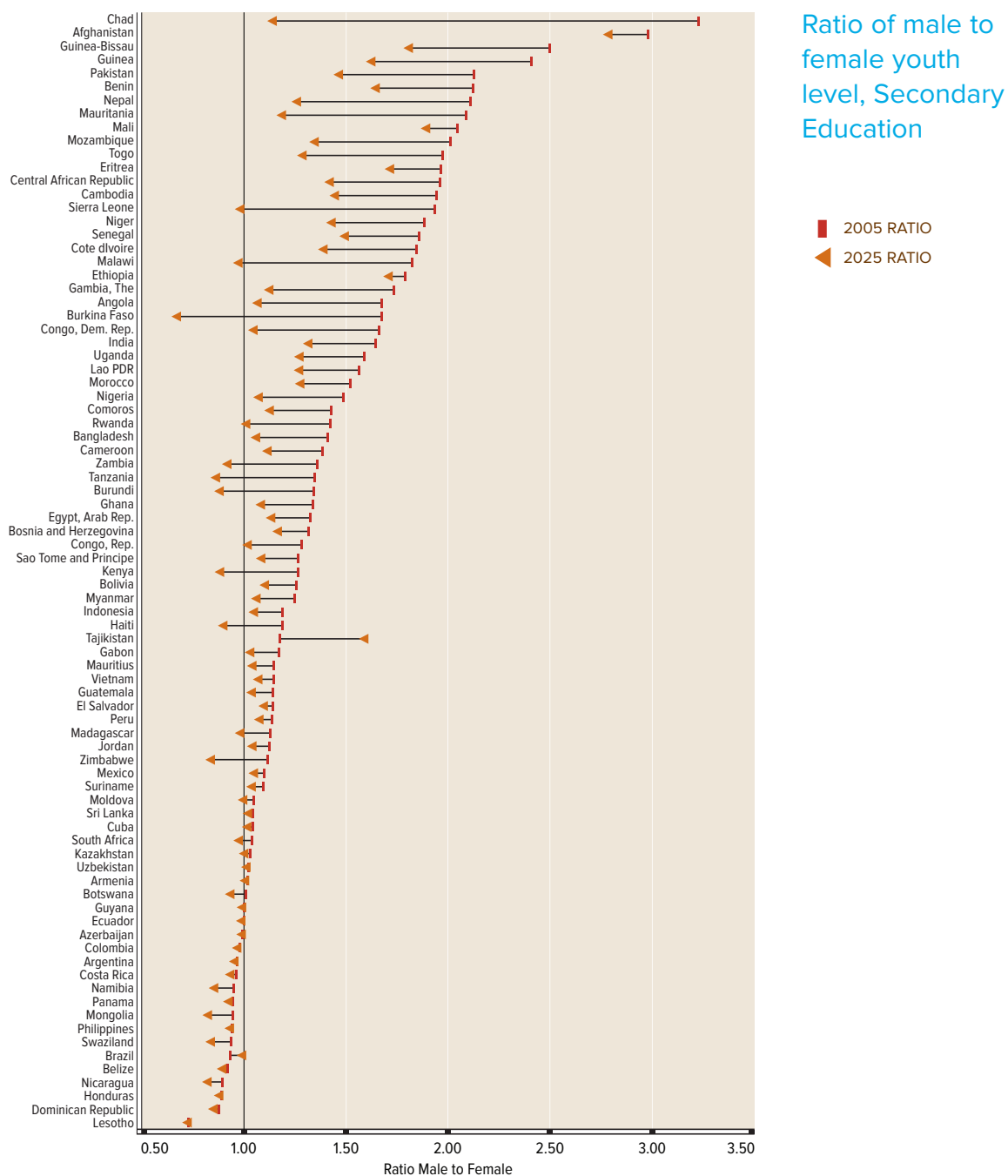
Sub-national differences in education levels

In many countries there are large disparities in levels of education by sub-national region. The youth and adult levels of primary or secondary education can be up to 5–15 times as high in the best educated sub-national region as in the least educated. The sub-national differences correspond to differences in wealth[18] and signal a deficit in the less-educated regions.
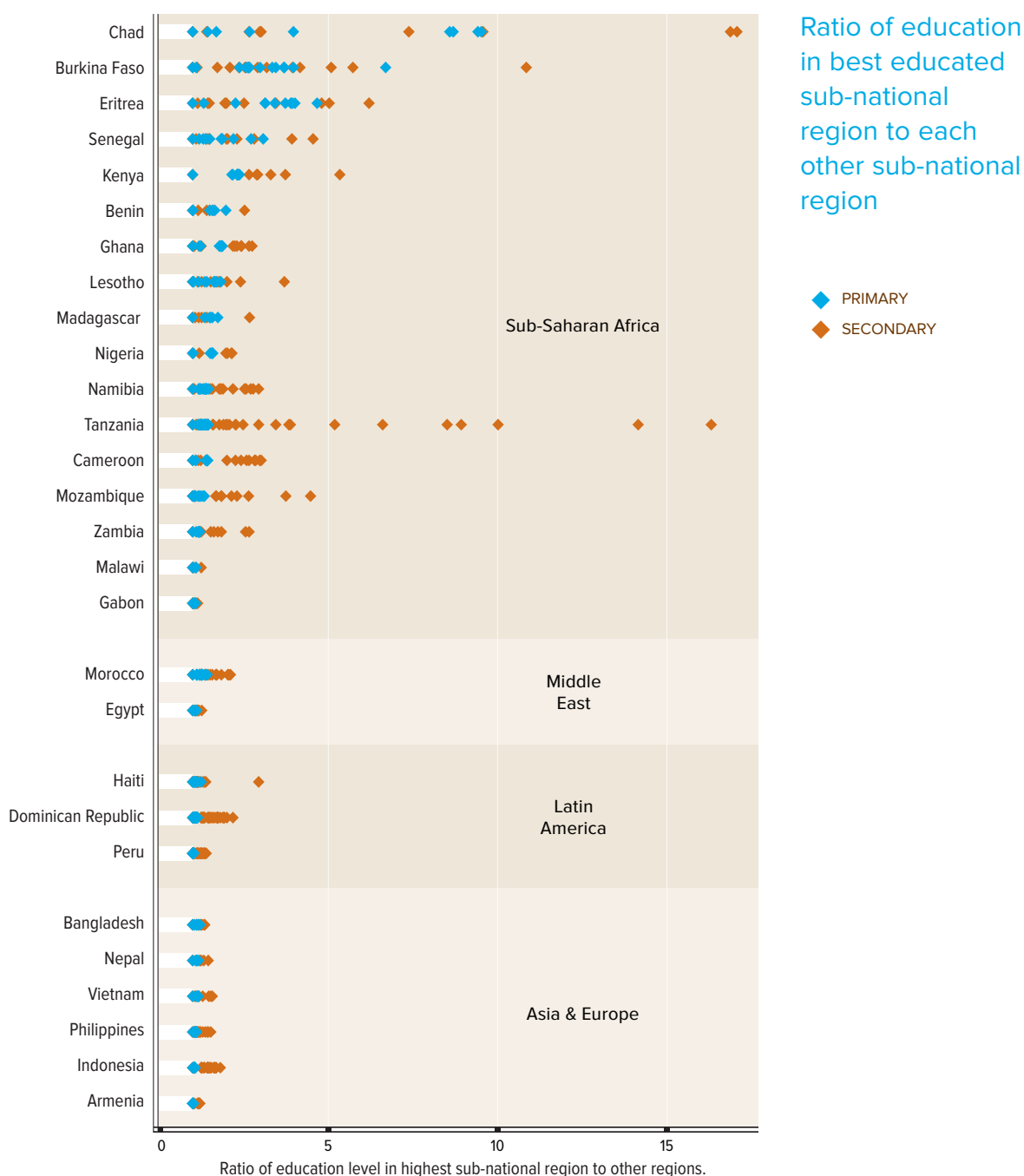
Very large sub-national education attainment disparities can be the result of multiple factors, such as a variation in school facilities and enrollment rates, or because migration patterns cause concentrations of better educated adults in more favored regions, such as those with large cities, with the poorly educated being left behind in less favored regions. At this point, the data do not reveal the cause. However, it is an important practical and policy question—if the differences are caused by migration then disadvantaged regions need economic opportunities to encourage residents to stay; if the differences are the result of school attendance variations, then policy should focus on equalizing opportunities to attend school.

Figure 6 shows the sub-national educational inequalities measured, like the gender gaps above, as ratios. The referenced sub-national region is the one with the highest level of primary or secondary education, and the ratio is the education of 15-64 year-olds in that referenced region divided by the level of education in each other sub-national region. The region with the highest youth and adult education level would have the ratio of one (highest education level divided by itself); and the region with the lowest education level would have the highest ratio value. The figure shows sub-national data for 28 countries. Each dot on the figure shows the education ratio for one region, blue diamonds show the primary education level ratios and orange diamonds the ratios for secondary levels. The dots for each country are arranged horizontally: the wider the spread, the larger the sub-national disparities. The figure shows the largest sub-national gaps are in Africa, and that the gaps are larger for secondary than for primary in all countries. The most extreme cases of sub-national inequality are Chad and Tanzania.

18   Ahuja and Filmer (1995); Wils, Zhao, Hartwell (2005).

FIGURE 6

Chart of sub-national differentials in education levels, as measured by the ratio of primary and secondary youth and adult education level in the best educated sub-national region compared to other sub-national regions in the country, shown for primary (blue diamonds) and secondary (orange diamonds). The ratios for each country are arranged horizontally. **Source:** *EPDC data extractions from DHS surveys.*

Ratio of education in best educated sub-national region to each other sub-national region

◆ PRIMARY
◆ SECONDARY

Ratio of education level in highest sub-national region to other regions.

Sub-national projections of levels of education in youth and adults

Today's sub-national differentials are large, but a select set of sub-national projections for four countries show that some may decline over the next decades. We chose four countries with relatively high sub-national education disparity around 1990—Kenya, Madagascar, Nigeria, and Nepal—and made sub-national projections for each. For Kenya, there are eight sub-national regions; for Madagascar and Nigeria, six; for Nepal, four. The data are from recent DHS surveys.

The method of projection is the same as for the national projections. A separate projection is made for each sub-national region using sub-national school entry growth trends. For fertility and mortality trends, we had to use national data due to data limitations, but this should not affect the sub-national education attainment projections noticeably. The results are shown in Figure 7, with the youth primary levels of education for each of the sub-national regions in the four countries shown as trends lines from 1990-2025. The youth levels of education are advance trends of what will follow in adult levels of education about 20 years later.

Figure 7 shows that in 1990 all four countries had sub-national differentials in youth levels of primary attainment. Over time, from 1990–2025, an increase in the youth levels of primary attainment is projected for most sub-national regions, and, in general, the gaps between sub-regions decline. In Nepal,Kenya, and Madagascar that convergence applies to all sub-national regions; in Nigeria it does not.

In Kenya, seven of the eight sub-national regions have similar youth levels of primary education; just one region, the North East, was far behind the rest of the country in 1990. By 2025, the gap between the North East and the rest of the country is reduced by more than half, although the North East in still projected to lag behind the other regions.

In Nepal the initial gap between the youth levels of education in the Central compared to the Western in 2006 is close to thirteen percentage points; 77% and 90% respectively. By 2025, there are few regional differences and all regions in Nepal have youth levels of primary education above 97%.

In 2005 in Madagascar, the youth primary education levels ranged from 52% in Toliara to 93% in Antananarivo. By 2025, the gap is projected to decrease, with 86% youth primary education projected in Toliara and 99% in Antananarivo.

Historical trends and projections for sub-national youth levels of primary education
in Kenya, Nepal, Madagascar, and Nigeria.

Source: *EPDC projections using data from DHS surveys.*

Kenya
- CENTRAL
- COAST
- EASTERN
- NAIROBI
- NORTH EASTERN
- NYANZA
- RIFT VALLEY
- WESTERN

Nepal
- CENTRAL
- EASTERN
- FAR-WESTERN
- MID-WESTERN
- WESTERN

Madagascar
- ANTANANARIVO
- ANTSIRANANA
- FIANARANTSOA
- MAHAJANGA
- TOMASINA
- TOLIARA

Nigeria
- NORTH CENTRAL
- NORTH EAST
- NORTH WEST
- SOUTH EAST
- SOUTH SOUTH
- SOUTH WEST
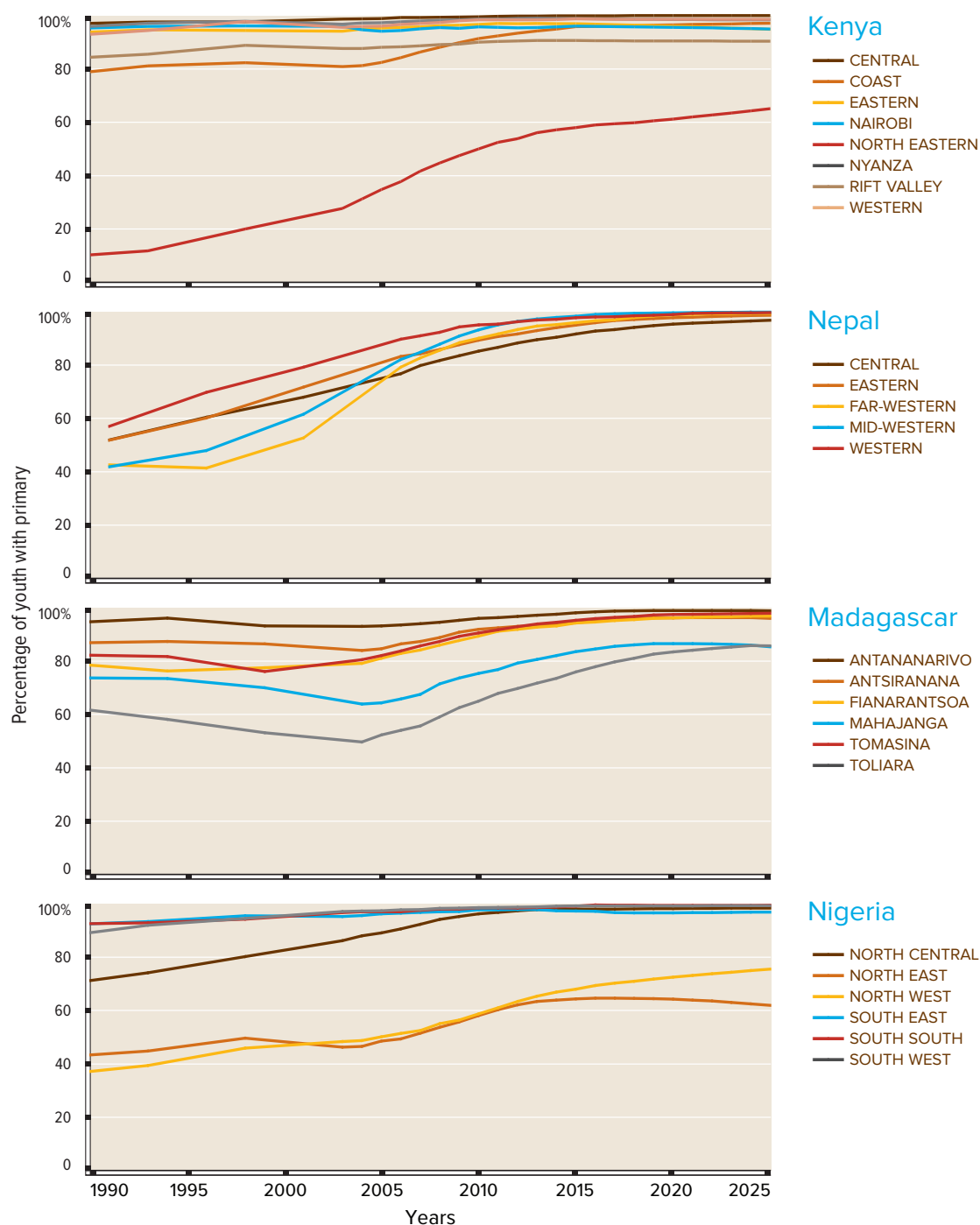
Two regions had declining trends from 1990–2005, but are projected to increase, following the recent rapid growth in enrolment in Madagascar; as a result of this recent shift, the youth education levels of all regions are projected to converge.

In Nigeria three regions in the southern half of the country are clustered together at higher youth levels of education: South East, South West, and South South; two regions in the northern half of the country, North West and North East, are clustered together at lower levels; the North Central is between the two groups. North Central is the only region where youth levels of primary education are projected to increase significantly by 2025 and converge with the three regions with higher levels of education. The two other regions—North West and North East—are both projected to remain behind the rest of the country.

The Fastest rate projections

The projections in Figures 3–5 are Trend rate projections, in which we assume that present trends in the growth of enrollment rates continue. Clearly, for many countries, if these present trends continue, both the youth and the adult education levels will remain low even in 2025. But future school enrollment trends could be faster if there are improvements in education policy and implementation, quality of education, education demand, and economic development.

One way to think about improving on present trends is to compare what would happen if future school enrollment growth proceeded at the fastest rate observed in other developing countries. The fastest schooling growth trends in the set of 83 countries were identified[19] and used to make a set of alternative projections based on the assumption that schooling trends in all countries could accelerate to the pace of these countries with the fastest trends. Figure 8 shows the Fastest projections (blue stars) compared with the starting 2005 values (orange bars) and the original Trend projections (red triangles) for youth and adult secondary education levels arranged in order of 2005 percentage of youth and adult with secondary education.

For 18 countries (almost 20% of the 83) the Fastest projection would result in a more than 20 percentage point improvement in the percentage of youth and adults with secondary education by 2025. Most of these countries are in sub-Saharan Africa—Madagascar, Angola, Zambia, Democratic Republic of Congo, Guinea-Bissau, Kenya, Central African Republic, Mauritania, Niger, Burkina Faso, Rwanda, Mali, Republic of Congo, and Tanzania. The four non-African countries where the Fastest projections would make a big difference (compared

19 The Fastest trend for female primary schooling is the average of the rates in Morocco, Belize, Suriname, Egypt; the Fastest male primary trend is the average of rates in Belize, Gabon, Botswana, Morocco; for female secondary Guatemala, Botswana, Bosnia and Herzegovina, Burundi are used; for male secondary it is Guyana, Bosnia and Herzegovina, Vietnam, Burundi. Each of these sets of four countries represents the countries with the fastest growth for each sex and school level over a 15 year period.

FIGURE 8

Secondary education levels for youth and adults age 15–64 in 83 countries, in the year 2005 (orange bars), and projected to 2025 with the original Trend projection (red triangles) and with the Fastest projection (blue stars).

Source: *EPDC projections using data from household surveys.*

Secondary education levels age 15–64, Trend and Fastest projections

- 2005
- ▶ TREND PROJECTION
- ★ FASTEST PROJECTION
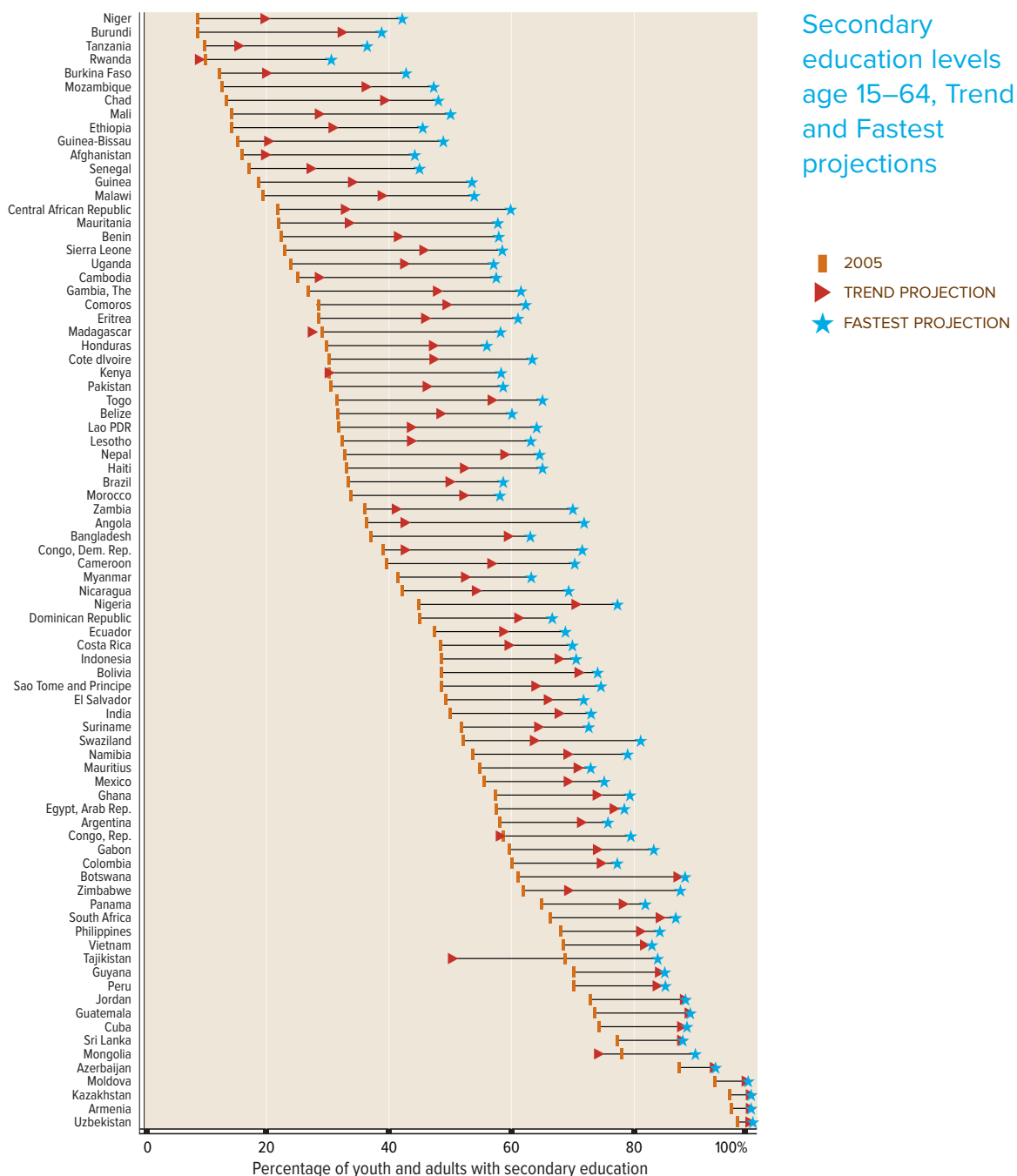
to the Trend projections) are Cambodia, Laos, Afghanistan, and Tajikistan (in the latter, the Fastest projection would turn around the trend of rapidly declining secondary attainment).
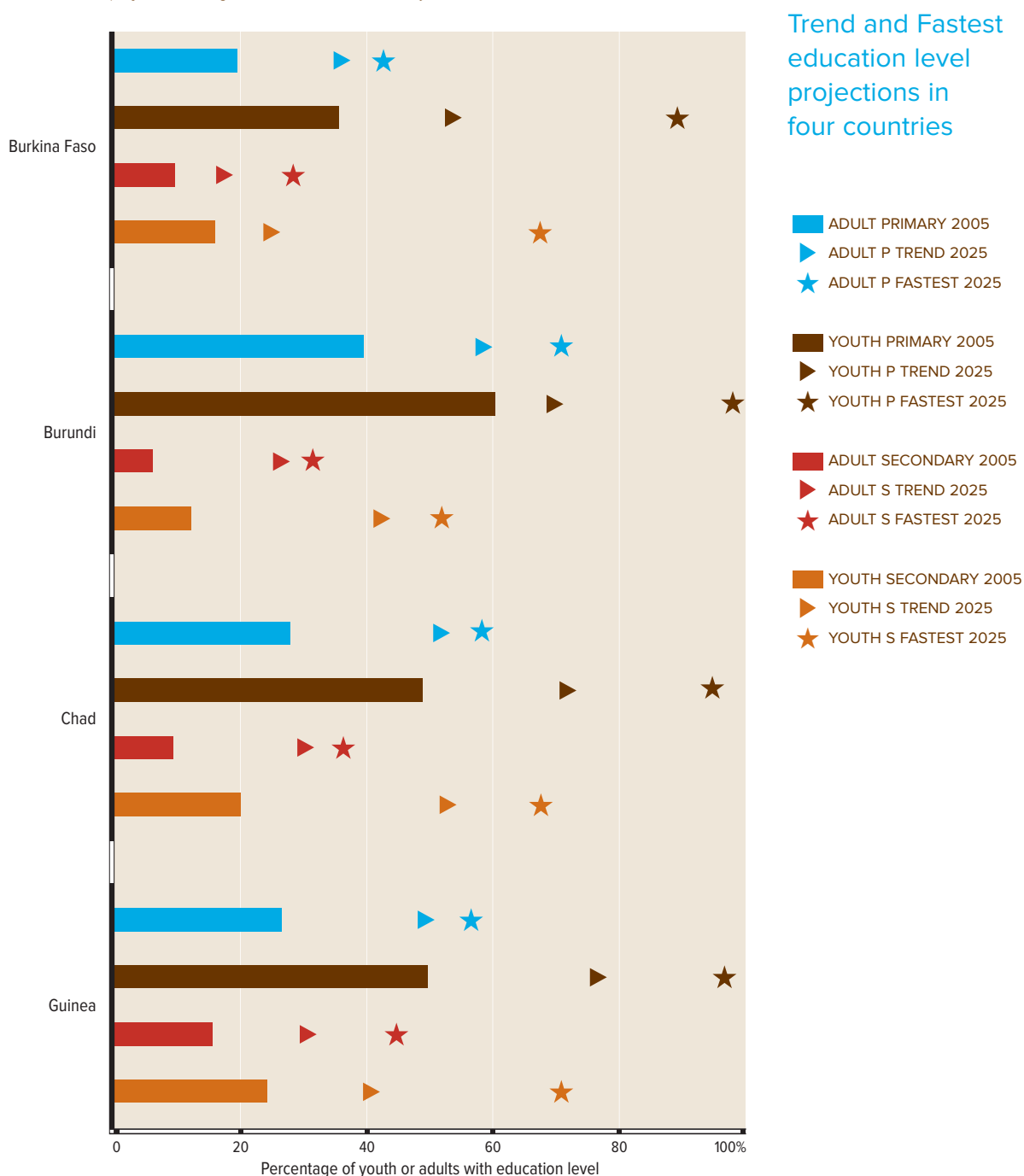
The 18 countries where the Fastest projection would make the biggest difference are also those where existing trends of secondary attainment growth are the slowest. The high concentration in sub-Saharan Africa, with many countries where levels of secondary education are low, is troubling; ideally, secondary education in this region would be growing rapidly and catching up to other countries, rather than falling relatively further behind. Some of these countries have experienced rapid growth in primary, and indeed, the focus of the Education for All movement has principally been on the growth of primary education. Moving forward, stagnation in secondary in these countries will be a barrier to economic growth and also to sustained education growth because a quality education system needs an adequate supply of educated (secondary and tertiary level) teachers, pedagogical experts, and administrators. Therefore, an effort to shift the secondary growth trends towards the Fastest projection is important.

The Fastest projection has the most effect on youth education attainment. Figure 9 highlights the different effects of the Fastest projection for youth versus adults in Burkina Faso, Burundi, Chad, and Guinea. The chart shows four bars for each country, each denoting different 2005 starting levels of education. The blue bar shows adult (25+) primary education levels; the brown bar, youth primary education levels; the red bar, adult secondary education levels; and the orange bar, youth secondary education in 2005. The bars show relatively low levels of adult primary education, and even lower levels for secondary (all <20%). The original projected values for the education levels of the four groups are shown by triangles beside the bars. In each of the four countries, the change for youth from 2005 to 2025 is larger than that projected for adults. The new, Fastest projection values are shown by stars. For the adult levels of primary and secondary education, the Fastest trend projections are a few percentage points higher than the original projection. But for the youth, the Fastest projection results are much greater: in Burundi, Chad, and Guinea, by 2025 over 90% of the youth would have primary education (as opposed to 60-75%). For secondary, the Fastest projection results make the biggest difference in Burkina Faso: the portion of youth with secondary would be 68% in 2025 with the Fastest projection compared to 25% with the original projection.

FIGURE 9

Comparison of the youth and adult levels of education with two projections—the *Trend* rate projection (used throughout the report) and the alternative *Fastest* rate projection—in four African countries with low initial levels of education.

Source: *EPDC projections using data from household surveys.*

Trend and Fastest education level projections in four countries

ADULT PRIMARY 2005
ADULT P TREND 2025
ADULT P FASTEST 2025

YOUTH PRIMARY 2005
YOUTH P TREND 2025
YOUTH P FASTEST 2025

ADULT SECONDARY 2005
ADULT S TREND 2025
ADULT S FASTEST 2025

YOUTH SECONDARY 2005
YOUTH S TREND 2025
YOUTH S FASTEST 2025

Percentage of youth or adults with education level

IMPACTS

**Social and Economic Effects of Future
Changes in Levels of Education**

The projected changes in youth and adult education levels will affect, for better or worse, the economy, the health of the population, political engagement, and even the environment, and (partly through these changes) will feed back into the education system and children's school enrollment patterns, and therewith, to following generations of youth and adults.

Exactly how these impacts will materialize is not known, not least because other factors are involved, and over the long-term, the relationships are interactive. In the short-to-medium term, youth and adult levels of education are independent of other socio-economic factors because, at any given time, the education levels are the result of past school enrolments and past determinants of those school enrolments. This section considers the impacts of youth and adult levels of education on economic and social factors, recognizing that interactive effects may take longer to manifest themselves.

Based on the review of the relationships of education levels with economic and social factors in section one and more detailed data and analysis presented in the appendix, and taking license to simplify for the moment, one could say the following:

★ In countries where the portion of youth and adults with primary and/or secondary is projected to increase, on average, GDP is likely to grow; employment in agriculture will decline; poverty incidence will decline; child mortality will fall; women will have fewer children, in particular, young teenage women; the gender gap in education will narrow and that will open opportunities for women.

★ On average, these changes will be larger where the rise in education levels is larger and where more of the education level rise is concentrated in secondary education levels.

These are highly simplified statements of average shifts. In reality, each country's economic development also will be determined by, among other factors, policies on trade, investment, business formation, wealth distribution, and property rights; by the ability to maintain a system of law and to reduce corruption; by the global economy. In the social arena, again, policies play a role, as does the ability to implement programs effectively, citizen initiatives, and, to a lesser extent, donor activity.

The impacts of education also will be determined by its quality: how much and what pupils learn in school. While studies looking at the correlation of education and economic indicators have found, in general, a positive relationship, the strongest relationship is with education quality, or learning.[20] The implication is that if the quality of schooling and learning improve, then the economic and social effects of levels of education are, on average, greater (vice versa if quality declines).

Does this mean we should have projected learning rather than levels of education? The answer is both yes and no. Yes, because, if it were possible to project learning, that would be a more precise measure of the impact of education in other areas. No, if education quantity is a proxy for learning, and, in particular, if *change* in education quantity is a proxy for *change* in learning (granted, this assumes there is learning happening in the classroom). Then our projections are useful. We would argue that at least change in education levels is a proximate if not always accurate stand-in for change in how much is learned. Say, in country X, the school system has a given quality and it remains constant over the period 2005–25. Then, so long as learning is greater than zero and reasonably consistent in each additional grade, more years of schooling in this system mean more learning, and if the youth and education levels in country X rise, learning does too. This is true even if the amount of learning in country X is far less than in country Y, where school quality is higher.

Using the projections

There are many ways the projections can be used. As mentioned earlier, they can serve as input into planning where the future labor force supply needs to be estimated—for business investments, as well as for government policies and programs. They can also be used to identify target groups, for example, the persistently large group of unschooled youth and adults in some countries, or, alternatively, the new cohorts of youth with secondary education levels in countries where their elders are, on average, far less educated.

The projections can also be used to estimate impacts on the social, economic, and political health of a society. One of the most straightforward examples for such an application is the impact of mother's education on child mortality and women's education on childbearing.

20   Hanuschek and Woessman (2006)

Projections of the impact of women's education on child mortality and childbearing

Projections of child mortality and childbearing can be made using the correlations of women's education with child mortality and childbearing, together with our projections of women's education levels. As it turns out, the effects of education can be large, as *rapid growth of women's education levels in some countries could reduce child mortality rates by half or more within a generation.*

These projections do not take account of other factors such as health policy, clean water, income levels, GDP growth, etc., and assume that today's correlations between education and health will remain more or less the same for the time being (more technically, the coefficients of the correlations are assumed fixed). This line of thinking is consistent with most modeling practice.

The child mortality and fertility[21] projections are based on a model that takes into account 1) the projected changes in education levels of mothers, 2) the different fertility and child mortality levels by education of mothers, and 3) the spill-over effects from overall education levels. Table 2 shows child mortality and fertility rates around 2000-05 (based on data from the most recent DHS household surveys) and projected for 2025 for 36 countries.

Many of the projected child mortality and fertility rates for 2025 are substantially lower than in 2000/05. The extent of the changes depends on how much educational change is projected in the country and how big the mortality and fertility differentials by education of mother are to begin with. Where educational change is greater, and the health differentials by education level are bigger, the incremental education effects on child mortality and fertility are larger.

Some of the largest absolute projected changes in child mortality are in sub-Saharan Africa—in Mozambique, Nigeria, Chad, Ethiopia, and Malawi, child mortality would fall from levels above or around 200 per 1000 children born to levels around 100 per 1000 children born. In Nepal and Morocco, with some of the largest projected changes in female education levels, education effects could reduce child mortality to $\frac{1}{3}$ and $\frac{1}{5}$ of the starting values, respectively. In all these countries education is growing rapidly. Countries with the least projected child mortality change include Kenya, Madagascar, and Gabon.

21 Fertility is the expected number of children per woman, also referred to as the total fertility rate.

The table also shows the UN projected values for child mortality and women's fertility. For some countries, such as Uganda and Nepal, the UN's projected women's fertility is higher than in our model. The UN projects Nepal's fertility to be 2.4 and Uganda's to be 5.5 in 2025;[22] compared to 1.8 and 4.7, respectively, projected with our model. For other countries, such as Madagascar and Kenya, the UN fertility rates are lower than the EPDC projected rates. The UN projects child mortality and women's fertility based on the assumption that most countries will eventually transition to a small family size of around two as a correlate of general development—including education, economic growth, better medical infrastructure. One could say our projections provide the "education component" of that transition. If that is so, then the projected increases in women's education will contribute an average of 75% of the UN projected changes in child mortality and 60% of the UN projected changes in women's fertility.

22 UN Medium projection.

TABLE 2

Starting and 2025 projected values for child mortality and women's fertility rates for 36 countries.

Data for starting values come from the most recent DHS surveys. 2025 values projected by EPDC and UN.

	CHILD MORTALITY RATE			TOTAL FERTILITY RATE		
	2000-5	EPDC Projections 2025	UN Projection 2025	2000-5	EPDC Projections 2025	UN Projection 2025
Armenia	48	48	25	1.7	1.7	1.6
Bangladesh	97	53	27	3	2	2.3
Benin	163	87	93	5.6	4.1	3.5
Bolivia	93	42	32	3.8	2.4	2.3
Burkina Faso	193	117	125	5.9	4.2	4.5
Cambodia	122	106	75	3.8	3.5	2.6
Cameroon	148	103	102	5	4	2.7
Chad	202	104	128	6.3	4.5	5.2
Colombia	26	16	20	2.4	2	2
Dominican Republic	43	23	26	3	2.4	2.1
Egypt	69	35	17	3.5	3	2.3
Eritrea	107	46	46	4.8	3.2	3.2
Ethiopia	187	104	95	5.5	4	3.5
Gabon	91	83	38	4.2	3.7	2.5
Ghana	110	79	49	4.4	3.2	2.6
Haiti	138	75	61	4.7	3	2.5
Indonesia	54	28	21	2.6	2.1	1.9
Jordan	29	23	12	3.7	3.5	2.1
Kenya	113	104	65	4.9	4.8	3.2
Madagascar	111	109	68	5.2	5.3	3.1
Malawi	203	119	100	6.3	4.1	3.7
Mali	238	160	140	6.8	5.8	4.9
Mauritania	102	52	85	4.5	3.6	3.5
Morocco	54	11	18	2.5	1.4	2.1
Mozambique	178	73	93	5.5	3.6	3.3
Namibia	60	43	21	4.2	3.4	2.5
Nepal	108	30	30	4.1	1.8	2.4
Nicaragua	45	21	21	3.2	2.4	2
Nigeria	217	116	123	5.7	4.1	3.2
Peru	60	32	29	2.8	2.1	2.1
Philippines	42	27	15	3.5	3.1	2
Rwanda	207	126	130	5.8	4.9	3.2
Tanzania	132	83	105	5.7	4.9	2.7
Uganda	157	90	70	6.9	4.7	5.5
Vietnam	33	23	18	1.9	1.5	1.9
Zambia	168	140	87	5.9	5.1	3.3

Countries of special note

There is a number of countries that stand out in the projections, the majority because there is rapid growth in secondary education levels, and a few because there is stagnation at the secondary level or because of the overwhelming impact of population growth. These countries fall into three distinct patterns, as presented in Table 3:

1. **high growth, high potential countries** where youth levels of secondary education is projected to rise by over 20 percentage points in 20 years, in a few countries doubling or tripling from their 2005 levels
2. **declining trend countries** where the youth levels of secondary education is projected to go down
3. countries where **education growth is overwhelmed by high population growth**

The first category obviously is the desired direction in which countries should be headed—a significant increase in the proportion of youths with secondary schooling. This trend will lay the foundation for improved economic competitiveness, health, and civic engagement. However, in restrictive political regimes or without supportive social/economic policies and environment where the expectations and opportunities for the better educated generation are not fulfilled, this same positive trend could be destabilizing.

The seven countries with reverse trends appear to be special cases. Tajikistan and Mongolia are still struggling with the transition from half a century of communism to more participatory government, and the initial transition period in the 1990's was characterized by a lack of investment in social infrastructure, including education. Kenya is emerging from a restrictive political regime and has been focusing policy on achieving universal primary education. Other countries with similar backgrounds do not show such declines, suggesting that while unrest or regime may limit secondary growth, sufficient political will can overcome such problems.

There are six countries in which the absolute number of youth with no education is projected to increase over the next twenty years. All are on a trend for a noticeable increase in the number of people with some primary and secondary or greater education (Burundi, in fact, has one of the the fastest growth rates), but that progress is overwhelmed by the more rapid growth in population. These countries clearly need a combination of programs to further improve access to education and efforts to reduce the rate of fertility if they are to achieve the goal of bringing the benefits of education to their entire populations.

TABLE 3

Countries of Special Note

High growth, high potential	Declining trends	Education growth overwhelmed by population growth
countries with increase youth secondary level of education >20%	countries where the youth secondary education levels decline.	countries where the population with no schooling will increase by more than 10%
Bangladesh Belize Benin Bolivia Brazil Burundi Chad Comoros Cote d'Ivoire Gambia Honduras Malawi Morocco Mozambique Nepal Pakistan Togo Uganda	Cambodia Congo, Rep. Kenya Madagascar Mongolia Tajikistan Rwanda	Burkina Faso Burundi Congo, Dem. Rep. Guinea-Bissau Niger Zambia

Conclusions

The aim of this report is to explore how much education levels in youth and adults will change within the next generation, and what some of the possible social, economic, and health effects of that change might be. The report presents the first large series of projections of youth and adult education levels—83 developing countries—based on accessing data from a large number of household surveys and a newly developed automated projection tool. The projections capture the fact that school enrollment trends underlie future youth and adult education change.

The **projections highlight** that:

1. Most (but not all) countries will have **rising youth and adult education levels.**

2. There is a number of **high growth, high potential countries** where youth levels of education will rise by over 20 percentage points in 20 years, in a few countries doubling or tripling from their 2005 levels.

3. **Gender gaps in adult education will decline** by 50–95% in all countries that start with a male dominated gender gap.

4. There is a small number of **declining trend countries** where the youth and adult levels of secondary education will actually fall.

5. Despite overall education improvements, in a few countries the **absolute number of unschooled youth and adults grows** due to rapid population growth.

6. In a number of countries it would be **possible to double or triple growth of secondary attainment among youth**. This can be done by increasing secondary enrolment growth in those countries to the rates observed recently in Morocco, Egypt, Suriname, Botswana, Burundi, and Guatemala.

There is consistent evidence that education levels, even with the large education quality differentials between countries, are important to development. The data in the appendix confirm much of what is found in the literature on education on why and how youth and adult education levels matter, in particular, to occupation, poverty, gender, and health.

The projections of youth and adult education levels show that, around the world, the portions of youth and adults with no schooling will decline. However, there are a few countries where population growth is so rapid as to offset that trend, and in those countries the absolute number of unschooled youth, and unschooled adults, will increase. Serious attention needs to be given these countries with regard to programs to help that growing pool of unschooled citizens.

In most countries, the portions of youth and adults with secondary education levels will rise. In a number of countries, the projected rise is substantial, 20–30 percentage points over 20 years. In a small number of countries, levels of youth and adults secondary education are projected to stagnate or reverse— these are candidates for programs for focusing on secondary enrollment growth.

Although substantial education level differentials exist between the sexes and between sub-national regions in countries, these gaps are likely to decrease as more and more sub-groups of youth and adults attain higher levels of education. The closing of the gender gap will bring to more women a level of education attainment that will allow them to find new opportunities in both home and work life and to contribute their talents to the social, economic, and political advancement of their countries.

The projections with regard to adult education levels are relatively robust, because much of the next 20 years of adult education change is already embedded in today's adult education levels. An alternative set of Fastest rate projections, using the fastest observed historical rates of school enrollment growth, shows that a shift of countries to the fast rate would alter the projected trends in youth education levels quite substantially in a number of countries—doubling or tripling the change in the portion of youth with secondary education compared with the standard projections.

The incremental effects of the projected change in education levels on some factors, in particular health, could be quite substantial. For example, in some countries the effect of a rapid growth of mother's education levels may be to cut child mortality and children per woman in half within the next generation.

We have noted the value of this report as being a first of its kind. It is only a first step, but an important one. It is part of an ongoing commitment to contribute new thinking and analysis to the Education for All movement, recognizing that the EFA concepts go beyond primary school enrollment and to fostering change that improves the lives and livelihoods of the less fortunate. This report outlines some of the challenges facing countries and policymakers concerned with education and development. It points to key areas where data need to be mined further, policy debated and articulated, and action taken. Reflection on these findings leads to more questions and serious consideration of the challenges facing countries, especially poor ones, as they move to take their rightful places in a globalizing world. And, in this globalizing world, investors willing to engage in poorer countries are looking to where there may be opportunities for success.

We believe that this report points to some of those opportunities that can be capitalized on by the full range of partners in the development process—whether it is a women's NGO that promotes girls' education, a national policy to promote equity in employment, an education ministry seeking to fulfill its vision, or a company considering a new location. It is clear that investing in the potential of people must remain a priority. By starting with a window to the future we can open doors to opportunity.

Appendix

Evidence of the relationship of education to economic and social factors

Youth and adult levels of education matter

Youth and adult levels of education matter because more educated adults and their children are healthier; they are less likely to be poor; more likely to be able to escape subsistence farming; more likely to participate in environmental initiatives; less likely to resort to violence; and more likely to push for more open, transparent, participatory political systems. There are countless studies on these relationships. Rather than summarize the literature, this appendix provides some new data on the relationships.

Global pictures of education levels, the economy, and health

Correlations can be found between youth and adult education levels and aggregated measures of the economy and health, namely GDP per capita and life expectancy at birth. Countries with higher education levels among youth and adults are, on average, wealthier and their citizens live longer.

Education has economic and health effects. People who are better educated have, on average, a skill-set that better fits market needs and jobs with higher compensation, and they are better able to access the resources and use the information that lead to better health. Research has demonstrated that education, particularly for girls who obtain a secondary education, can have a significant impact on the avoidance of HIV. For example, in Uganda a girl is 40% less likely to be infected if she has had a lower secondary education than one who has had no education.[23]

But the effects of education, health, and the economy are reciprocal—health and economic factors influence education. Countries with higher GDP and parents with higher incomes have greater resources to educate their children, leading, in time, to the next generation of more educated adults. Moreover, in a growing economy with enough jobs, people are able to utilize and build their skills. On the health side, people who are healthier are more productive, and healthier children are better able to learn and more likely to remain in school, again leading to higher education levels in the next generation.

23 GMR 2006

The correlation of education level with wealth is shown in the top panel of Figure 10, with life expectancy in the bottom panel. The figures are cross-tabulations. Along the x-axis is education, approximated by the portion of youth and adults (age 15–64) who have at least entered secondary school or a higher level of education some time in their life, and along the y-axis are GDP per capita in purchasing power parity (top) and life expectancy at birth (bottom).
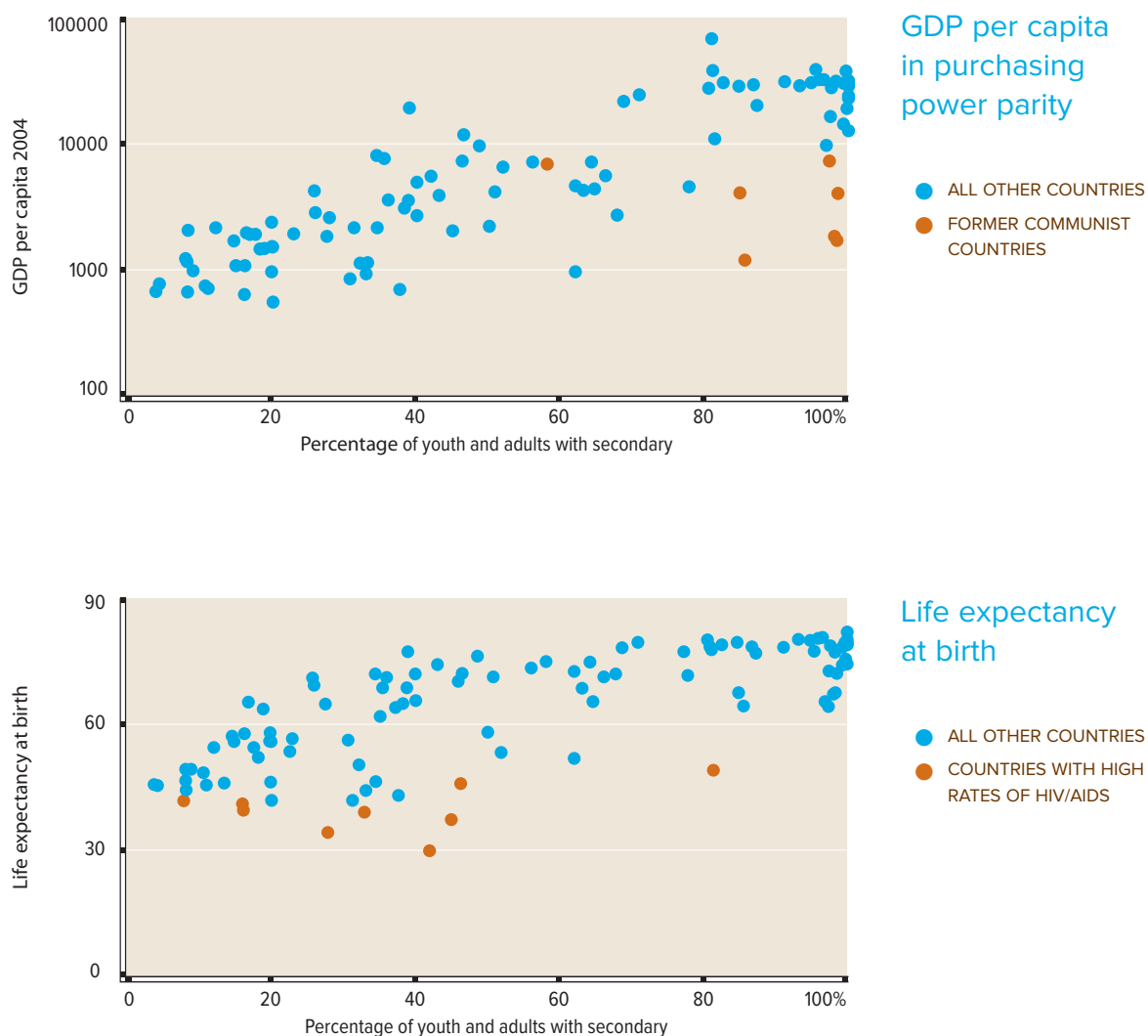
There are clear, if imperfect, positive correlations. All countries where fewer than 25% of the youth and adults have entered secondary school had a per capita income below $2000; whereas all countries where 80% or more of the youth and adults had entered secondary had a per capita income higher than $10,000. The exception is the group of former communist countries, which had very low levels of income relative to their education levels. The case of the former communist countries underscores the point, along with the dispersed nature of the education-income relation for all other countries, that other factors are also important to income, such as government and trade policy, rule of law, investment rates, and the nature and quality of education.

For life expectancy, found in the lower panel of Figure 10, there is a clear, if imperfect, relation to *lack of education*—where fewer than 50% of the youth and adults have entered secondary or more, lower education corresponds to lower life expectancy. In particular, low education levels appear to set an upper (but not a lower) bound on life expectancy, as shown by the neat diagonal arrangement of the dots along the top of the distribution. Probably the largest single component of this relationship is that the higher the education of the mothers, the lower are the rates of infant and child mortality. But the education effect continues for all ages, even if non-education factors, such as the health system, clean water supply, income, and disease vectors, also intervene. One such other factor is the AIDS epidemic. Countries with HIV prevalence rates >10% for youth and adults are highlighted on the scattergram; they all have very low life expectancy regardless of the level of education.

FIGURE 10

2005 education measured as the portion of youth and adults age 15–64 who have entered secondary school or above with (1) 2004 GDP per capita in purchasing power parity for 105 countries (with formerly communist countries highlighted) (top panel) and (2) life expectancy at birth (with high HIV/AIDS countries highlighted) (bottom panel).

Source: EPDC data system, OECD (2007), World Resources Institute (2007), UN (2007)

GDP per capita in purchasing power parity

● ALL OTHER COUNTRIES
● FORMER COMMUNIST COUNTRIES

GDP per capita 2004

Percentage of youth and adults with secondary

Life expectancy at birth

● ALL OTHER COUNTRIES
● COUNTRIES WITH HIGH RATES OF HIV/AIDS

Life expectancy at birth

Percentage of youth and adults with secondary

Income and education levels

Education provides the gateway to higher incomes and better employment opportunities—provided the education is of sufficient quality and/or the employment market rewards education. Many studies have shown that this expectation bears out: on average, those with higher education have more income and are in higher status jobs.[24] Evidence from DHS surveys, presented in Figure 11, shows these effects.
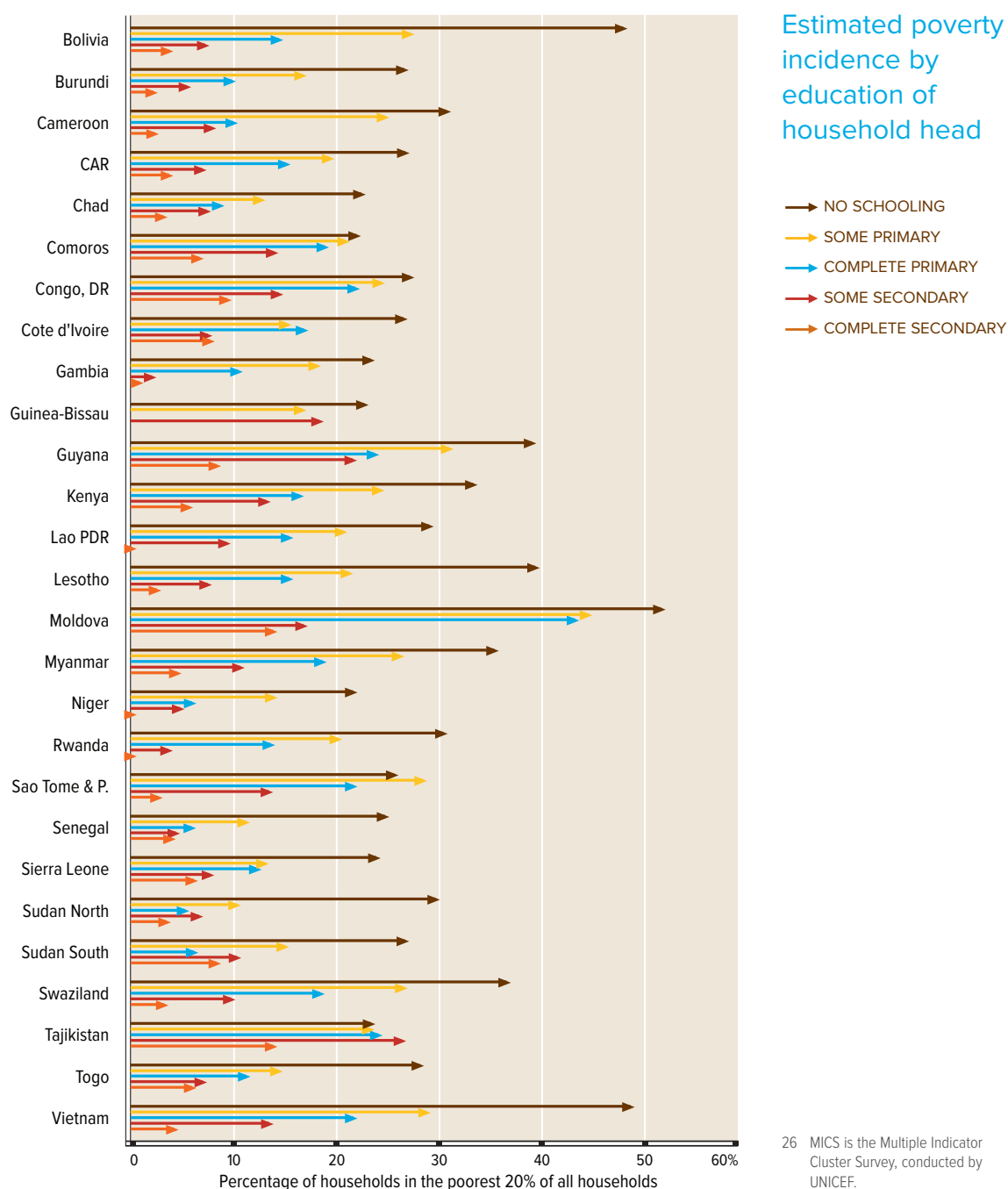
Most telling is how much education matters to youth and adult income. Households headed by a more educated person have, on average, higher wealth and lower poverty incidence.[25] Figure 11 shows household poverty incidence (measured as being among the poorest 20% of households) by education of the head of household. Five education levels are distinguished: no education, some primary, primary completion, some secondary, secondary completion and above. Almost universally, the higher the level of education of the head of the household, the lower the incidence of poverty. To look at the country that is at the top of Figure 11, Bolivia, close to half of households with unschooled heads are in the lowest fifth of incomes; 27% if the household is headed by a person with some primary; 15% if headed by a person who has completed primary; 7% if headed by a person with some secondary; and 3% if headed by a person who has completed secondary or above. In summary, for Bolivia, each incremental education level, as defined here, reduces the likelihood of being among the poorest fifth of households by one half. The rest of the countries, except Tajikistan, also show declining incidence of poverty for each higher level of education.

24 World Bank (2007); UNESCO GMR reports.
25 Ahuja and Filmer (1995)

FIGURE 11

Estimated poverty incidence (portion of households in the poorest 20% of income) by education of the head of the household—no education, some primary, complete primary, some secondary, complete secondary and above. 27 countries with MICS[26] 2000 surveys are included. Education levels for all countries are in the same order as for Bolivia.

Estimated poverty incidence by education of household head

→ NO SCHOOLING
→ SOME PRIMARY
→ COMPLETE PRIMARY
→ SOME SECONDARY
→ COMPLETE SECONDARY

Percentage of households in the poorest 20% of all households

26 MICS is the Multiple Indicator Cluster Survey, conducted by UNICEF.

Occupations and education levels

One of the reasons households with more educated heads have higher incomes is because people with higher education are, on average, employed in better-paying occupation groups. To show this point, Figure 12 shows education levels and the likelihood of being employed in one of two occupation groups more or less on opposite ends of the pay scale: professional/technical/managerial jobs on the one hand (top chart) and agriculture on the other (bottom chart). The information covers men age 15–54, interviewed in 13 recent DHS surveys. Women are not shown because the available data for women refer only to those ever-married and therefore excludes many women.


FIGURE 12

Likelihood to be employed in a professional/technical/management job (top chart) or in an agricultural occupation (bottom chart) by highest education level, for men interviewed in DHS surveys, between the ages 15–54.

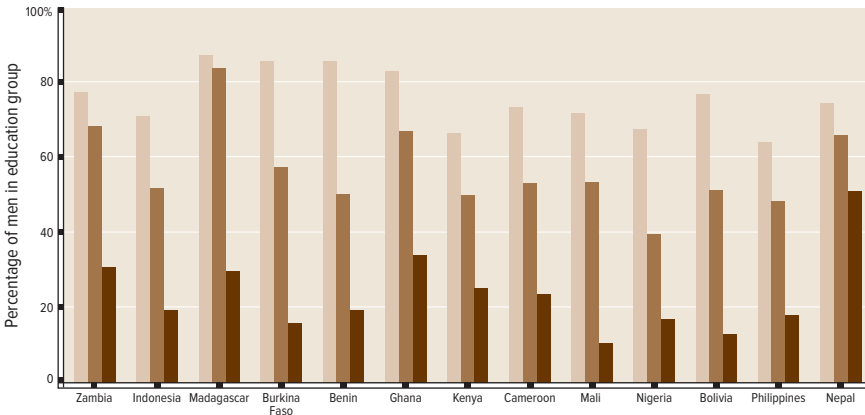**Source:** *13 countries with recent DHS surveys.*

Working in professional, technical, and management

- NO FORMAL SCHOOLING
- PRIMARY
- SECONDARY OR MORE
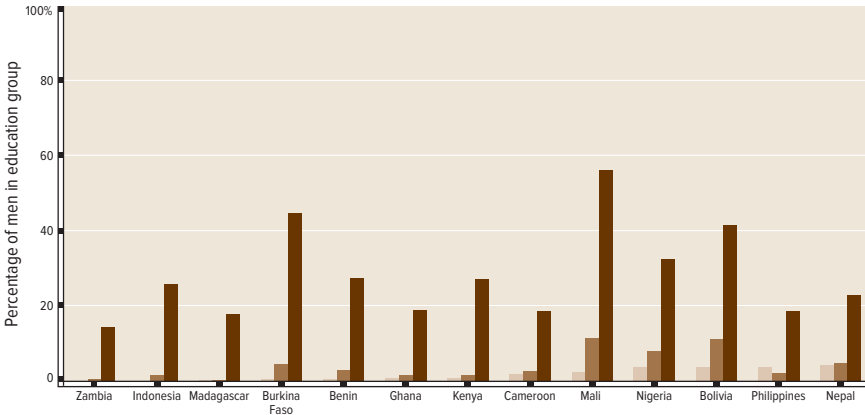
Working in agriculture

- NO FORMAL SCHOOLING
- PRIMARY
- SECONDARY OR MORE

In the top graph, the dark bars show the probability of being employed in professional occupations for those who have at least entered secondary school. The likelihood of being a professional varies from a low of 14% in Zambia to a high of 56% in Mali. The much smaller and lighter bars show the likelihood of being employed in professional occupations with only primary, or no schooling. Most professionals have secondary education or above. In contrast, the likelihood of being employed in agriculture (bottom of Figure 12) is greater, the lower the education levels. The lightest bars show the likelihood of agricultural occupation for those with no schooling—the levels vary from 64% to 87%. Among men with secondary education, much smaller portions—10%–51%—work in agriculture. The values for people with some primary education fall in the middle. The implication is that, without schooling, there are few alternatives to subsistence economic activity, and the higher the education level, the more alternative forms of employment are available. There are also macro-economic effects on occupation that are not shown here—for example, the availability of people with at least some secondary education provides a labor pool for an expanding economy that requires a range of skills and capabilities.

Children's health and education levels of mothers

Children of mothers with more education, on average, are healthier and have lower mortality rates. There are many reasons for this: more educated mothers are more likely to have their children vaccinated, have more access to health care, treat their children with proper rehydration when they have diarrhea, and have the income for a healthy diet, to name a few factors. One of the most important sources of information about children's and mother's health are more than 200 DHS surveys conducted in over 70 countries over the past 20 years. This large set of surveys confirms the relationship between children's health and mother's education.

A picture of this relationship is shown in Figure 13 for 37 countries with a DHS survey in the past five years. The top figure shows the likelihood that a child will die before its fifth birthday, by education of mother. The countries are arranged from highest to lowest overall under-5 mortality rate. Grey dots show the mortality of children whose mothers have no schooling; blue dots the mortality of children whose mothers have some primary schooling; and red dots for some secondary. In Mali, the under-5 mortality rate for children of mothers with no schooling is 247 per 1000 children born, almost one-quarter; of mothers with primary, 220; and of mothers with secondary, 90, almost one-third the chance that a child will die compared to the child of a mother with no schooling. In absolute terms, the biggest under-5 mortality differentials by education of

mothers are in countries where the overall mortality levels are high. At the other end of the graph is Colombia, where the corresponding numbers are 51, 32, and 20 per 1000 children born. This is still more than a two-fold difference between the highest and the lowest mortality, but much smaller in absolute terms.

Another point shown in this figure is that not all the mortality rates by mother's education are the same. In Mali, one quarter of the children of unschooled mothers die before their fifth birthday; whereas in Colombia, it is 5%. In Mali, the mortality of children of mothers with primary and secondary education is higher than the same groups in Colombia. In fact, the three mortality rates for each country are more or less clusters—moving from the left to the right of the graph, from highest to lowest mortality countries, all the values in the vertical clusters of three dots decline, on average. This means that there are broader social factors operating in these countries that also are affecting child mortality. Such factors include the overall health system, average income levels, and avail-ability of clean water. One suggestion health experts have made is that the pro-portion of well-educated women is another such social factor. The idea is that the more well-educated women there are in the society, the more influential is their example and the more people are potentially available for health profes-sions as nurses and doctors, resulting in further reduction in child mortality. If this were true, then having more women with secondary education would be correlated with lower child mortality among all education groups. The bottom panel of Figure 13 shows that, on average, this is the case for these 37 countries.

Childbearing and women's education

Childbearing patterns matter to development. High rates of teen pregnancies, short birth intervals, and high birth orders[27] all create risks for mother and child.

High fertility rates are the prime driver of high population growth. High popu-lation growth, in particular, of certain age-groups such as school-age children, poses a challenge for development. The faster the school-age population is growing, the more difficult it is for school systems to keep up. In sub-Saharan Africa, the school-age population is growing up to 4% per year.[28] As a thought experiment about why this matters, imagine the following using Burkina Faso as an example. With present birth rates and school-age population growth, the number of school-age children 5–14 in Burkina Faso will grow from 3.6 mil-lion in 2003 to 4.2 million in 2010. If, on the other hand, the fertility rate sud-denly fell from 5.9 to 2.1 children in 2003, then the number of children age 5–14 in 2010 would be 3.6 million, or no increase. Imagine further the additional investment that is needed to bring education to a growing school-age population
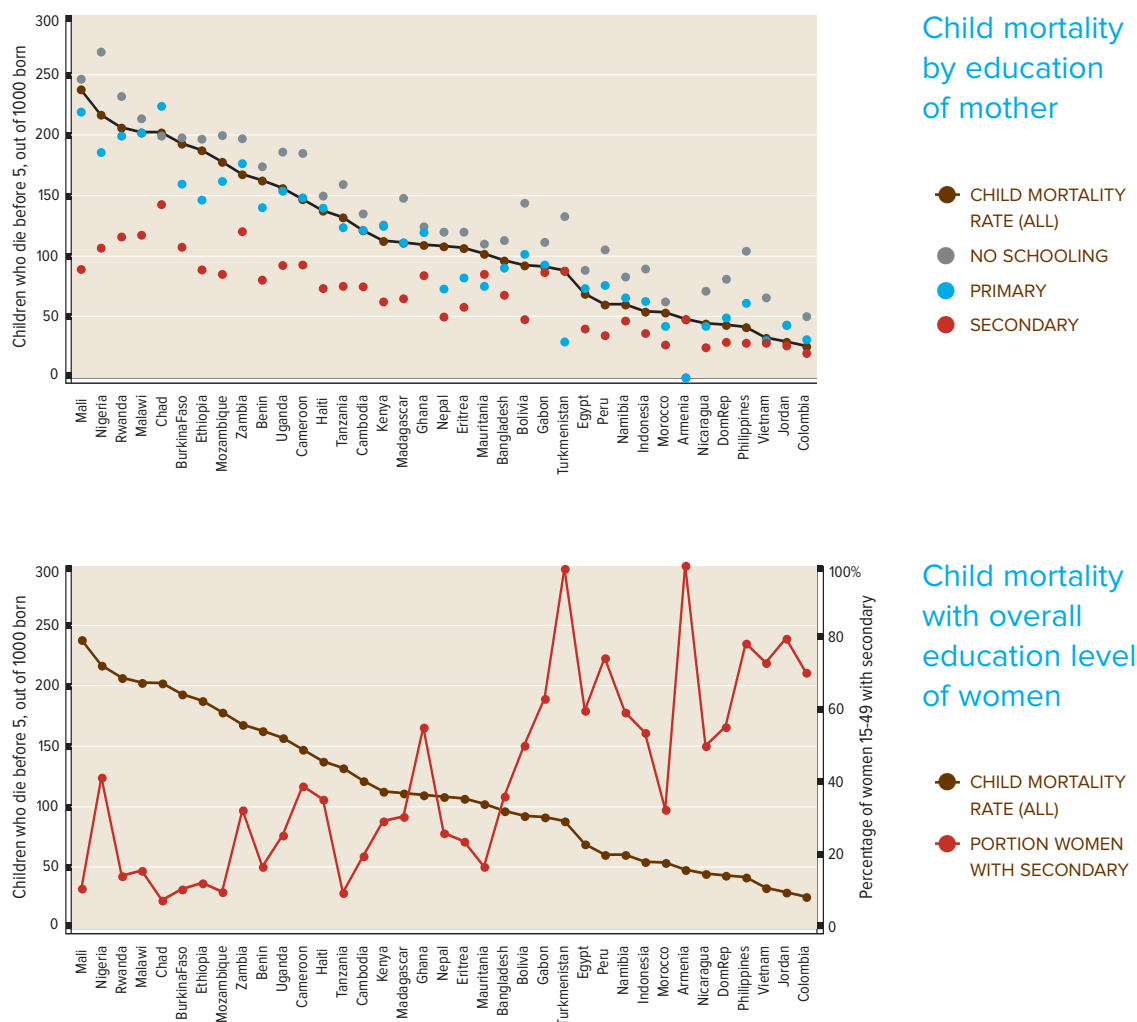
27 Birth order is a person's rank among his or her siblings (first born, second born, etc.).

28 UIS (2007)

FIGURE 13

Child mortality by education of mother (top graph) and overall child mortality by overall education level of women (bottom graph), both arranged from highest to lowest overall child mortality levels. Child mortality is measured as the number of children who die before their 5th birthday, out of 1000 children born. The education level of women is approximated by the proportion of women age 15–49 that have secondary education.

Source: *37 countries with DHS surveys in the last five years.*

Child mortality by education of mother

- CHILD MORTALITY RATE (ALL)
- NO SCHOOLING
- PRIMARY
- SECONDARY

Child mortality with overall education level of women

- CHILD MORTALITY RATE (ALL)
- PORTION WOMEN WITH SECONDARY

as compared to no growth in that population age. Higher education levels among women, leading to lower fertility rates, make it easier for countries to get closer to the target of reaching all school children.

Figure 14 shows the lower fertility levels for women with higher levels of education. The figure is arranged in the same way as Figure 13 on child mortality. As an example, in Uganda, the country with the highest fertility rates, women with no schooling (grey dots) have 7.8 children on average, whereas women with some secondary (red dots) have only half as many. In Burkina Faso, women with no schooling have 6.3 children; women with some secondary only 2.5. As with child mortality, it is believed that there is a spill-over effect from more educated women on average fertility levels—when the portion of women that is highly educated is larger, families tend to be smaller. The norm of a small family is more prevalent.

The last illustration of why youth and adult education levels matter is teen childbearing. Very young mothers (under 18) have, on average, greater pregnancy-related health problems, as do their children, compared to mothers 18 and over. One of the strongest effects of education levels in youth is to delay childbearing. A DHS study[29] of adolescents in eight African countries found that the odds of having a first child before the age of 18 were lower by 50% to 90% for women with 8 or more years of schooling (an approximation of secondary), compared to women with no schooling. The study found that among the various factors studied, *education is the single most important factor delaying child-bearing*. Figure 15 shows the odds of early childbearing for women with 1–7 years of schooling (medium brown bars), 8+ years of schooling (dark brown bars), compared to the reference group with no schooling (light brown bars) in eight countries. As the figure shows, in the most extreme case, Senegal, the odds for a young woman with secondary education to have a baby are only .09 compared to the odds of a young woman with no schooling. This is a positive health effect, both for young women and their children.

29   Mahy and Gupta (2002)

FIGURE 14

Fertility rates (expected children per woman) by education of woman, shown by colored dots: grey for women with no schooling; blue for women with primary; red for women with some secondary, arranged in order of overall fertility rates from highest to lowest (black line with dots), with the portion of women age 15–49 who have secondary education or higher (red line).

Source: *37 countries with DHS surveys in the last five years; calculated by EPDC.*

Total fertility rates and education level of women

- TOTAL FERTILITY RATE, ALL
- FERTILITY, MOTHER NO SCHOOLING
- FERTILITY, MOTHER PRIMARY SCHOOLING
- FERTILITY, MOTHER SECONDARY SCHOOLING
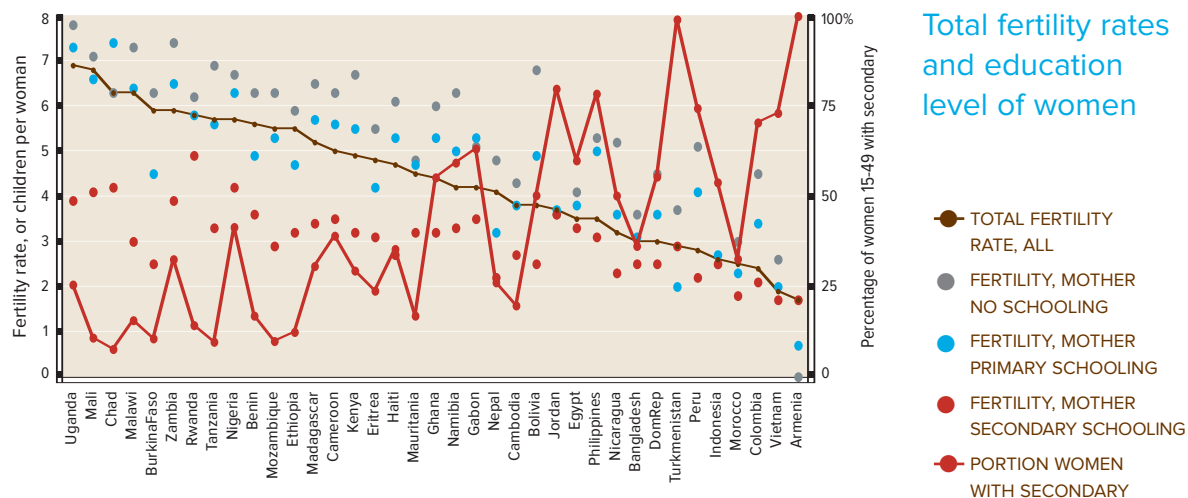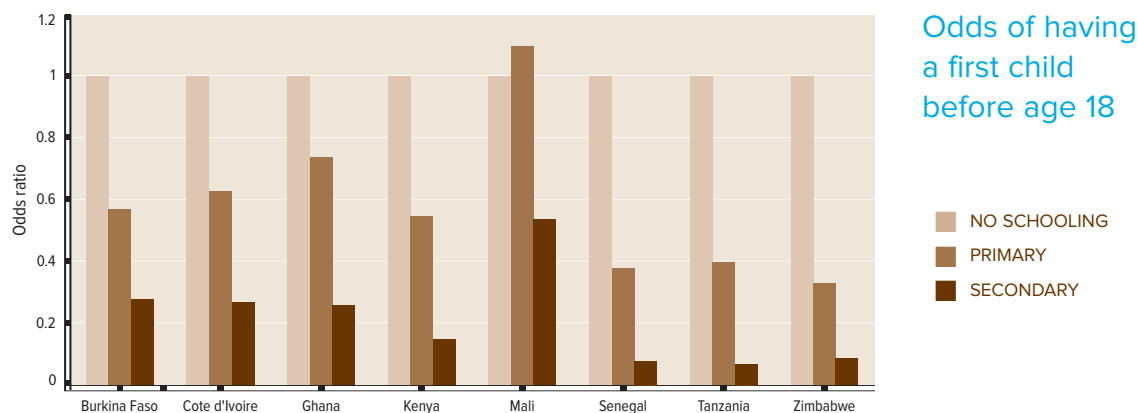- PORTION WOMEN WITH SECONDARY

FIGURE 15

Likelihood of a woman having a first child before 18, for three education groups, with no schooling being the reference category, normalized to 1.

Source: *DHS (2002).*

Odds of having a first child before age 18

- NO SCHOOLING
- PRIMARY
- SECONDARY

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Countries, Instruments, and Years for survey data

Afghanistan	MICS	2003	**Jordan**	DHS Dataset	2002
Angola	MICS	2000	**Kazakhstan**	DHS Dataset	1999
Argentina	Census	2001	**Kenya**	DHS Dataset	2003
Armenia	DHS Dataset	2000	**Lao PDR**	MICS	2000
Azerbaijan	MICS	2000	**Lesotho**	DHS Dataset	2004
Bangladesh	DHS Dataset	2004	**Madagascar**	DHS Dataset	2003
Belize	Census	2000	**Malawi**	DHS Dataset	2004
Benin	DHS Dataset	2001	**Mali**	DHS Dataset	2001
Bolivia	DHS Dataset	2003	**Mauritania**	DHS Report	2001
Bosnia and Herzegovina	LSMS	2001	**Mauritius**	Census	2000
Botswana	AIS	2004	**Mexico**	INEGI	2000
Brazil	IBGE	2000	**Moldova**	DHS Dataset	2005
Burkina Faso	DHS Dataset	2003	**Mongolia**	Census	2000
Burundi	MICS	2000	**Morocco**	DHS Dataset	2003
Cambodia	DHS Dataset	2000	**Mozambique**	DHS Dataset	2003
Cameroon	DHS Dataset	2004	**Myanmar**	MICS	2000
Central African Republic	MICS	2000	**Namibia**	DHS Dataset	2000
Chad	DHS Dataset	2004	**Nepal**	DHS Dataset	2001
Colombia	DHS Dataset	2005	**Nicaragua**	DHS Dataset	2001
Comoros	MICS	2000	**Niger**	MICS	2000
Congo, Dem. Rep.	MICS	2000	**Nigeria**	DHS Dataset	2003
Congo, Rep.	DHS Dataset	2005	**Pakistan**	HIS	2001
Costa Rica	Census	2000	**Panama**	LSMS	2003
Cote dIvoire	MICS	2000	**Peru**	DHS Dataset	2004
Cuba	Census	2002	**Philippines**	DHS Dataset	2003
Dominican Republic	DHS Dataset	2006	**Rwanda**	DHS Report	2005
Ecuador	INDEC	2001	**Sao Tome and Principe**	MICS	2000
Egypt, Arab Rep.	DHS Dataset	2005	**Senegal**	DHS Dataset	2005
El Salvador	DGEC	2005	**Sierra Leone**	LSMS	2004
Eritrea	DHS Report	2002	**South Africa**	GHS	2005
Ethiopia	DHS Dataset	2005	**Sri Lanka**	Integrated Survey	2000
Gabon	DHS Dataset	2000	**Suriname**	MICS	2000
Gambia, The	MICS	2000	**Swaziland**	MICS	2000
Ghana	DHS Dataset	2003	**Tajikistan**	LSMS	2003
Guatemala	LSMS	2000	**Tanzania**	DHS Dataset	2003
Guinea	DHS Dataset	1999	**Togo**	MICS	2000
Guinea-Bissau	MICS	2000	**Uganda**	DHS Report	2005
Guyana	DHS Report	2005	**Uzbekistan**	MICS	2000
Haiti	DHS Dataset	2000	**Vietnam**	DHS Dataset	2005
Honduras	DHS Dataset	2006	**Zambia**	DHS Dataset	2001
India	DHS Dataset	1999	**Zimbabwe**	DHS Dataset	1999
Indonesia	DHS Dataset	2002			

AIS	AIDS Impact Survey
Census	Censo de Poblacion y Viviendas (Cuba)
	Censo Nacional de Poblacion, Hogares y Viviendas (Argentina)
	Censos Nacionales de Poblacion y Vivienda (Costa Rica)
	Housing and Population Census (Mauritius)
	Population and Housing Census (Belize, Mongolia)
DGEC	Direccion General de Estadstica y Censos
DHS Dataset	Demographic and Health Surveys (DHS Dataset)
DHS Report	Demographic and Health Surveys (DHS Report)
GHS	General Household Survey
HIS	Household Integrated Survey
IBGE	Instituto Brasileiro de Geografia e Estatística
INDEC	Instituto Nacional de Estadistica y Censos
INEGI	Instituto Nacional de Estadistica Geografia e Informatica
Integrated Survey	Sri Lanka Integrated Survey
LSMS	Living Standards Measurement Study
MICS	Multiple Indicator Cluster Survey

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