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TODAY'S CHALLENGES FOR GIRLS' EDUCATION

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"If only I can get educated,
I will surely be the president."
—A teenage girl in rural Malawi

"There is no more valuable investment
than in a girls' education."
—Ban Ki Moon, secretary-general,
United Nations

Educating a girl is one of the best investments her family, community, and country can make. We know that a good quality education can be life-changing for girls, boys, young women, and men, helping them develop to their full potential and putting them on a path for success in their life. We also know that educating a girl in particular can kick-start a virtuous circle of development. More educated girls, for example, marry later, have healthier children, earn more money that they invest back into their families and communities, and play more active roles in leading their communities and countries.

Over the last 25 years, there have been large gains in girls' education, and we as a global community can congratulate ourselves for the real progress that has been made. This demonstrates that with shared goals and collective action—among governments, international organizations, civil society, media, and the private sector—we can change the educational prospects for girls around the world.

Despite this progress, our research shows that there are hotspots in the world where girls are not getting a quality education. While there certainly are places where boys are behind, we have focused on understanding how and where across the world girls are behind. The message is that many countries have work to do to improve girls' education, whether related to the gender gap in primary or secondary enrollment or learning.

There are about 80 countries where progress on girls' education has stalled. These countries are not meeting the education Millennium Development Goals. They are stuck in an education bog—still struggling to enroll all girls and boys in primary school and close the gender gaps between boys and girls at both the primary and secondary levels. There are an additional 30 countries that have successfully enrolled girls and boys in primary and secondary education but are trapped in low-quality learning. They are struggling to ensure that girls and boys master foundational skills such as basic literacy, numeracy, and science concepts. Quality learning is important for the future lives of girls and boys, but it is also an especially important ingredient in the virtuous circle of development that comes from girls' education. Finally, there are another 30 countries where children are successfully enrolled and learning. However, girls are behind boys in math. In some ways, we can think of girls in these countries bumping up against an educational glass ceiling.

In this report, we review in detail the progress in girls' education, the work that remains to be done, and strategies for success. Governments, international development agencies, and civil society organizations have supported a variety of programs that have made a difference in both large and small ways. There are valuable lessons to learn from them—but more progress is needed, especially in the poorest countries and among the disadvantaged populations in most countries. Ultimately we recommend renewed collective action for advancing girls' education in hotspots around the world, especially in the 80 countries where progress on girls' education has stalled. We recognize the powerful contribution that girls and women themselves can make to achieve this. Our first recommendation is to

lean in with girls' and women's leadership by investing in two initiatives that could go to scale in a short time frame and rally support from a range of actors, especially civil society and the private sector. The first initiative aims to build strong girl and women leaders by cultivating their skills and capacities to be agents of their own lives. The second initiative aims to put girls and women at the center of a data revolution on gender, one that would fill the critical information gaps about their status, what support they need to succeed, and which interventions have been the most and the least effective. Throughout the world today, it is possible to put mobile technology to work catalyzing a major girl-generated big data initiative.

Our second recommendation is for governments and the partners supporting them to do the long-term work needed to *focus systemic reform with a gender lens.* This includes strengthening education systems so that they work for girls (and boys). To do this, governments and their international partners must increase their investment in accelerating change in girls' education hotspots, especially to help countries stuck in an education bog where progress on basic education achievement and gender parity has stalled. Governments and their partners also must ensure that gender analysis is regularly used in developing education policy, especially in national education plans that underpin most of the systems in developing countries.

A detailed analysis underpins these recommendations. The report reviews data on six major questions:

- Why do we care about girls' education?
- What progress can we build on?
- What do we face today in the effort to educate girls?
- Why are girls behind?
- What is working to address obstacles to girls' education?
- What should we do to accelerate progress on girls education?

A summary of the key findings for each question are presented below.

Why we care: Seven main benefits of girls' education to society

We have identified seven main reasons why countries—from governments to civil society to the private sector—should care about educating girls. Ultimately, girls' education is a powerful force for catalyzing a virtuous circle of positive development outcomes.

1. **More educated girls and women aspire to become leaders and thus expand a country's leadership and entrepreneurial talent**. One of the pernicious features of gender inequality is that it feeds on itself; parents may have lower aspirations for their daughters than for their sons, and so their daughters too have lower aspirations for themselves. Yet, if given the chance, girls and women can have the confidence and skills to be change-makers. A recent review of the literature on women's leadership found that most women leaders started early, engaging in education and leadership activities as adolescents (O'Neil, Plank and Domingo, 2015). A number of cases—from India to Rwanda—have shown that having women leading in their communities can make a difference, driving policies and programs that improve family and community well-being (Abbott, 2008).
2. **It is the quality of schooling that really counts; economic growth is faster when girls (and boys) learn.** Empirical research finds that more gender equality in education is correlated with higher economic growth. In addition, research concludes that years of schooling is not an adequate measure of educational progress. Instead, it is the quality of schooling that matters. Hanushek and Woessmann

(2008) find that an increase of one standard-deviation in average reading and math scores is associated with a substantial two percentage-point increase in annual GDP per capita growth, even holding constant the average years of schooling. In other words, a big portion of the benefits of girls' education come from not just being in school but learning well while there.

3. **More equal education means greater economic empowerment for women through more equal work opportunities for women and men.** Education opens doors of opportunities for young women, especially when they cannot count on family wealth, property, or business connections. Women with more years of schooling are more likely to find employment, own and operate productive farms or firms, and earn higher wages. In Kenya, for example, more education (and more inputs) for female farmers relative to male farmers increases farm yields by as much as 22 percent (Quisumbing, 1996).

4. **More educated girls and young women are healthier—and as adults they have healthier children.** A child whose mother can read is 50 percent more likely to live past age five. Indeed, the global decline in child mortality has been traced to increases in mothers' schooling, even after controlling for household income. Gakidou et al. (2010) estimate that, of the 8.2 million fewer deaths of children aged 5 years and below around the world between 1970 and 2009, one-half of the decrease can be attributed to the global increase in the schooling of women of reproductive age.

5. **More educated mothers have more educated children, especially daughters.** Numerous empirical studies have shown that mother's education is critical for investments in the human capital of the next generation. For example, in India, children of more literate mothers study nearly two hours more a day than children of illiterate mothers in similar households (Behrman et al., 1999).

6. **More educated women are better able to protect themselves and their families from the effects of economic and environmental shocks.** More educated mothers are able to protect their children's welfare during economic or environmental crises through a higher quality of care and their greater ability to mitigate adverse shocks, such as food price changes, that might reduce food intake.

7. **Education is valuable for girls in and of itself.** Finally, in the words of Urvashi Sahni, an Indian girls' education activist, "even without all of the 'developmental and economic goodies' that come from girls' education, we should care about educating girls because it is inherently valuable to them and is their right" (Sahni, 2015).

Progress we can build on

Globally, there are more girls getting educated than ever before and the gender gap in education has narrowed considerably. This progress reflects another type of progress that is worthy of celebration and one we can build on—the emergence and consolidation of political and programmatic support for gender equality in education by civil society, national governments, the media, private sector and international development organizations. Any work today in accelerating progress in girls' education can build on very strong foundations. In particular:

- **Aggregate education expansion around the world.** Education levels have risen in most countries around the world. In 1950, the (population-weighted) average number of years of school completed by individuals aged 25 and over was 6.1 in advanced countries and only 1.4 in developing countries; 60 years later, average schooling levels had risen to 11.1 years in advanced economies and 6.9 years in developing countries. Current enrollment rates for children and years of schooling completed for adults still show gender gaps, but overall, women in developing countries have gained relative to men with respect to education.

- **Building on civil society and political momentum.** Girls themselves, their parents, teachers, and

communities have for decades worked to advance their education. Researchers have long studied girls' and boys' schooling and their different experiences of education. However, in the last quarter century, grassroots-level action has been promoted and amplified into national policy debates, donor strategies, media campaigns, multilateral action, and initiatives of increasingly high-profile global advocates.

What we face today: Girls' education hotspots

The global convergence in average years of schooling between 1950 and 2010 described above, especially between men and women, marks a notable shift toward greater gender equality in education. Nonetheless, a closer and more disaggregated look at several education indicators shows persistent gender gaps in education in a number of countries.

Assessing gender equality: gender gaps in the quantity and quality of education

Examining a range of data—familiar quantitative indicators to time series data on student learning—has made it possible to highlight progress, or lack thereof in girls' education. Some key findings emerge:

- **The largest gender gaps in enrollment are in the poorest countries.** In highly indebted poor countries, the average net enrollment rate at the primary level is 75.6 percent for girls compared with 80.9 percent for boys. The average girls' net enrollment rate in these countries is more than 5 percentage points lower than the average for low-income countries, more than 16 percentage points lower than for middle-income countries, and more than 20 percentage points lower than for in high-income countries. At the secondary level, the deficits for girls in the heavily indebted countries are much larger, as table 2 indicates. To illustrate, the average girls' net enrollment rate is 25.9 percent, as compared with 63.6 percent in middle-income countries and 90.0 percent in high-income countries.

Countries in Africa, Middle East, and South Asia are home to the widest gender gaps in enrollment

In South Asia, the average net enrollment rate for girls at the primary level is about the same as for boys, reflecting progress in primary education toward gender equality, but in secondary education the average girls' enrollment is 86.5 percent of boys' net enrollment rate. In the Africa region where the average girls' enrollment rate is 74.8 percent at the primary level and 29.8 percent at the secondary level, far lower rates than in other regions and also significantly lower than those of boys.

- **The girls who face multiple disadvantages are farthest behind.** While gender accounts for observed disparities in education, poverty persists as the most important and pervasive factor for education inequality (UNESCO, 2010; Filmer, 2008b). Data from 24 low-income countries show that poverty alone accounts for 38 percentage points of the gender difference between, but gender exacerbates that educational disadvantage, accounting for about 10 percentage points of the difference (King and Nguyen, 2013). Education lags most significantly among people who face multiple sources of disadvantage, not only income poverty, but also place of residence, disability and/or ethno-linguistic background.

- **Overall learning levels are low, but girls do worse in math and boys in reading.** The gender distribution by competency levels in international and regional assessments reveals that in general boys do better than girls in math and girls perform better in reading. Yet there is considerable variation in the size of these gender differences across countries.

- **Soft skills are also key for girls.** There is a growing body of evidence from multiple disciplines

(psychology, behavioral economics, and neuroscience) that identifies certain sets of competencies, often referred to as soft skills or non-cognitive skills, as important predictors of academic performance and later success in life. Cultivating these types of competencies or skills plays an important role in girls and women's empowerment and leadership. A common definition of female empowerment looks both at cultivating the "power within" (belief in self-work, self-respect and self-acceptance), the "power to" (ability to make choices and influence others), as well as the "power over" and the "power with" Rowlands (1997).

Emerging hotspots: Bogs, traps, and ceilings in girls' education

The education data points to relatively clear country patterns with respect to gender equality. There are clear girls' education hotspots where progress must continue to be made. For convenience, we use the monikers of "bogs," "traps," and "ceilings" to refer to three broad groups of countries; each group is a different type of hotspots. We defined these groups as:

- **Bogs:** Eighty countries where primary enrollment rates may have increased but have not reached the target levels of the MDGs, and gender gaps in enrollment rates at the primary and secondary levels have not narrowed sufficiently. In general, these countries have stalled in reaching the MDGs for education.

- **Traps:** The countries where both primary and secondary enrollment rates (and perhaps even tertiary enrollment rates) have progressed well and have generally reached the MDG targets, and gender gaps in school enrollment have narrowed sufficiently. However, these countries lag behind in terms of learning outcomes, as measured by their students' average performance relative to the average performance in international or regional assessments. In varying degrees, these countries have not made sufficient improvement in learning outcomes and appear to be caught in a low-quality education trap.

- **Ceilings**: Thirty countries that have reached the highest levels of enrollment rates at all levels and have achieved also relatively high levels of student learning as measured by their average performance on international assessments, but face gender inequality in the academic performance. We use a simple measure of gender gap in performance: the relative shares of girls to boys in the extreme competency levels. The male dominance of adolescent boys in math in international assessments means that in many ways the glass ceiling begins in school.

Why girls are behind: What we know about gender equality in education

To examine why girls are behind in hotspots, we begin with the girl and her family at the center, but also trace gender differences to the norms, resources, and constraints in the broader community and economy that influence choices and outcomes. This framework is well known and it ultimately allows us to see that gender gaps in education reflect, in large part, gender inequality in other aspects of society and the economy, and are also often instruments for perpetuating that gender inequality. Some of the root causes of the gender gap in education are:

- **Schooling is more costly for girls.** The direct costs (e.g. school fees where they exist, uniforms, transportation) and opportunity costs (e.g. time could have spent working or helping family) of school often impact boys and girls differently. Many non-experimental studies using household survey data find that girls' schooling is more sensitive to cost, however defined, than is boys' schooling (see for example Glick and Sahn, 2007). For example, in Kenya, higher school fees increase dropout probabilities for girls but have no effect on boys (Lloyd, Mensch, and Clark, 2000). A study in Ethiopia finds that boys are less likely than girls to combine work and schooling or to be engaged in work only, and are more likely to be involved in leisure activities only compared to girls, so the sum of domestic and non-paid work for girls is higher for girls (Woldehanna, Jones, and Tefera, 2008).

- **Restricted space and expectations limit girls' ability to reap the returns to education.** Social norms define the roles that women and men have in the family and the community, the expectations they have about their futures, their individual preferences and the kind of relationships they form. For example, in West Bengal, Beaman et al. (2011) find that, in places where no woman had ever been the local leader, 86 percent of parents wanted their daughters to be either a housewife or whatever their in-laws would decide for her, compared with less than 1 percent for their sons. Also, twice as many parents reported that they wanted their teenage sons to graduate from secondary school or college as those who wished the same for their daughters. In all, the degree of autonomy and empowerment that girls and women possess affects how much they can expect to gain from schooling.

- **Early marriage and teen pregnancy keep girls out of school.** Today, one in three girls in low- and middle-income countries (excluding China) continue to be married before the age of 18 and one in nine girls are married before their 15th birthday. While countries with the highest prevalence of child marriage are concentrated in Western and sub-Saharan Africa (e.g. in Niger 76 percent of girls marry before age 18), due to population size, the largest number of child brides reside in South Asia. Child marriage imposes heavy costs for girls socially, physically, and emotionally and undermines efforts to improve girls' education. In rural Bangladesh, for example, each additional year that marriage is delayed between ages 11 and 16 could add 0.22 year of schooling and 5.6 percent higher literacy (Field and Ambrus, 2008).

- **Pervasive school-related violence harms millions of girls and young women.** The relationship of school-related violence to educational participation and academic performance is typically not examined in research on the determinants of schooling, perhaps because of the absence of systematic information on its prevalence. However, what data exist paints a picture of extensive school-related violence inflicted on girls. This violence ranges from extreme acts such as kidnapping, bombing, maiming, and killing—acts which often occur in contexts of armed conflict, militancy, and political violence and in 15 countries around the world are directly targeted at girls (e.g. Malala in Pakistan, Chibok girls in Nigeria). But it also includes the often invisible but pervasive practices of sexual abuse, exploitation, and bullying. For example, one study finds that more than 30 percent of girls in southern Africa are raped in and around school (Prinsloo, 2006).

What is working: Evidence on addressing girls' education

Evidence from evaluations of programs and policies, mostly in the developing world, that have been undertaken to increase girls' and women's education point to, among others, several important strategies.

- **High-quality and gender-sensitive curricula and learning materials.** Textbook provision is almost universally accepted as an important tool for teaching and learning when the textbooks are used. But thumbing through textbooks used in primary schools in many countries around the world, one gets an immediate sense of the traditional and accepted gender roles in those countries. Over the past three decades, an increasing number of studies have been undertaken to examine the gender content of textbooks: females tend to be greatly underrepresented; males and females are associated with certain personal traits; they are depicted in stereotyped ways in both occupational and domestic spheres (Blumberg, 2007). The content of textbooks has been slow to change, so they do not reflect actual progress in women's empowerment and changing roles in society and the economy. Ensuring gender equality is reflected in teaching and learning materials and across the education system "may represent the strongest source of counter messages to traditional norms learned in the family, community, and national media" (Stromquist, 2007 as quoted in Blumberg 2007).

- **Girl-friendly infrastructure.** Programs that focus on improving infrastructure and school inputs

Table 1. Education and gender indicators: Bogs, traps and ceilings

EDUCATION INDICATORS			
Gender indicators	**Girls' net primary and/or secondary enrollment rate are/ is below the global means[a]**	**Girls' net primary and/or secondary enrollment rates above the global means[a]**	
		Learning outcomes below average basic competency level[b]	**Learning outcomes at or above average basic competency level[c]**
Gender parity education not reached[d]	**BOGS** Albania, Antigua & Barbuda, Azerbaijan, Cameroon, Comoros, Dominican Republic, Ghana, Guatemala, India, Kenya, Malaysia, Morocco, Mozambique, Papua New Guinea, Palau, Timor-Leste, Zambia* **1SD below the enrollment mean**: Afghanistan, Angola, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Cote d'Ivoire, Democratic Republic of Congo*, Djibouti, Ethiopia, Guinea, Guinea-Bissau, Haiti*, Iraq, Lao PDR, Jamaica, Liberia, Malawi, Mali, Niger, Nigeria, Pakistan, Sierra Leone, Solomon Islands, South Sudan, Syrian Arab Republic, Togo, Uganda, Yemen		
Gender parity in net enrollment rates[e]	Bermuda, Bhutan, Bolivia, Botswana, El Salvador, Honduras, Maldives, Marshall Is., Myanmar, Namibia, Nicaragua, Philippines, Paraguay, Sao Tome & Principe, Senegal, Suriname, Tanzania, Turks & Caicos, Tuvalu, Vanuatu, Venezuela*, Zimbabwe **1SD below the enrollment mean:** Equatorial Guinea, Gambia, Guyana, Lesotho, Madagascar, Mauritania, Puerto Rico, Swaziland		
Gender inequality in math achievement[f]		**TRAPS** Algeria, Argentina, Bangladesh*, Brazil, Chile, Colombia, Costa Rica, Croatia, Ecuador, Greece, Grenada, Hungary, Iran, Italy, Kuwait, Lebanon, Luxembourg, Malta, Mexico, Mongolia, Peru, Rwanda*, Saudi Arabia, Serbia, Slovak Republic, South Africa, Spain, Sri Lanka*, Tunisia, Turkey, Uruguay, [Boys' deficit[g]: Bahrain, Egypt, Jordan, Oman, Palestinian NA, Qatar, Thailand]	**CEILINGS** Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, France, Germany, Hong Kong, Ireland, Japan, Korea, Liechtenstein, Netherlands, New Zealand, Portugal, Switzerland, United Kingdom, Vietnam [Boys' deficit[g]: Iceland]
No significant gender inequality in learning		Bulgaria, Cyprus, Georgia, Indonesia, Israel, Kazakhstan, Kyrgyz Republic, Lithuania, Macedonia, Mauritius, Moldova, Montenegro, Panama, Romania, Russian Federation, Sweden, Turkey, Trinidad & Tobago, United States, United Arab Emirates	China (Shanghai), Finland, Latvia, Macao (China), Norway, Poland, Singapore, Slovenia, Taipei (China), Ukraine

Bogs: Includes countries (a) where girls' primary and/or secondary net enrollment rates are below the global means, whether or not their female/male ratio of enrollment rates is above or below the mean of that ratio; and (b) where girls' primary and secondary net enrollment rates are above the global mean but the female/male ratio of enrollment rates falls below the mean of the ratio. The table also marks those countries that where the girls' net enrollment rates are 1 SD below the mean.

Traps: Countries where (a) girls' primary and secondary enrollment rates (and perhaps even tertiary enrollment rates) are above the global means and the female-male ratio of enrollment rates is above the mean, but the average learning outcomes, as measured by the % of students performing at the low competency level is 40% or more.

Ceilings: Countries where (a) girls' primary and secondary enrollment rates (and even tertiary enrollment rates) are above the global means, their female-male ratio of enrollment rates is above the mean, and they have achieved relatively high levels of student learning as measured by their performance on international assessments; however, the performance of girls relative to boys in math literacy is (statistically) significantly lower. For countries that participated in the most recent PISA and TIMSS assessments, we used their analysis of gender differences in math assessment (OECD, 2012; Mullis et al., 2012).

Missing data: Asterisks (*) indicate the countries that have missing gender-disaggregated net enrollment rates or test scores for the period 2000-14. For countries that have data on net enrollment rates for both primary and secondary levels, we used the data available to assign countries to their groups. For countries that have gender-disaggregated data only for either primary or secondary education, we used the available data to assign the countries to categories. Many countries do not have student assessment data, but those countries tend to have low net enrollment rates that place them in the "bog" category.

Notes:

[a]Net enrollment rates of girls at the primary and/or secondary levels are below the global mean. UNESCO data for 2000-2014.

[b]Learning is below the average competency level in math as signified by PISA, TIMSS, PASEC, SACMEQ and LLECE assessments (latest years of data). When PISA or TIMSS data are available for a country, that country is used to benchmark the other countries in the same region that did not participate in either assessment.

[c]Learning is above the average competency level in math as signified by PISA, TIMSS, PASEC, SACMEQ and LLECE assessments (latest years of data). When PISA or TIMSS data are available for a country, that country is used to benchmark the other countries in the same region that did not participate in either assessment.

[d]Gender parity is not reached when the female-male ratio of enrollment rates is equal to or less than the global mean for the ratio.

[e]Gender parity is reached when the female-male ratio of enrollment rates is greater than the global mean for the ratio.

[f]Source: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2012; Mullis, I., Martin, M.O., Foy, P. and Arora, A. 2012. TIMSS 2011 International Results in Mathematics. Chestnut Hill, MA: International Association for the Evaluation of Educational Achievement (IEA)

[g]In a few countries, the gender inequality in math achievement is significantly to the disadvantage of boys. The data sources are PISA and TIMSS.

should be designed with incentives for girls in mind to ensure that they improve girls' education outcomes. In Burkina Faso, a government program, the Burkinabé Response to Improve Girls' Chances to Succeed (BRIGHT) program, which placed well-resourced schools in 132 villages, is an example of such a program. The package of interventions included, among other things, school construction, teaching and learning inputs, teacher support and housing, gender sensitivity training for officials, incentives to children to attend school, and a mechanism for mobilizing community support for education in general and for girls' education in particular. The program results are promising. Enrollment of all children rose by 19 percentage points and scores improved by 0.41 standard deviations on a test that covered math and French subjects (Kazianga et al., 2012). The program increased girls' enrollment by 5 percentage points more than boys' enrollment, but boys' and girls' test scores increased by the same amount. "Girl friendly" amenities were found to be especially impactful in doing this.

- **Great teachers.** A focus on the role of teachers in addressing gender disparities is well-deserved. There is strong evidence of the positive relationship between teachers' education, experience, and cognitive skills and their students' academic performance. Six recent reviews of hundreds of impact evaluations of education interventions find that programs that train, support, and motivate teachers are among the most effective. For example, in the United States, having a good teacher is equivalent to the average gain in learning of one school year; having a great teacher means advancing 1.5 grade levels or more. Great teachers are important for girls and boys equally. While there are some arguments for the importance of female teachers, this is most salient in contexts where social norms preclude girls learning in classrooms with male teachers. Generally, what appears most important is for male or female teachers to use gender-sensitive pedagogy.

- **Cost-reducing mechanisms.** Demand side interventions, which reduce the costs of schooling, tend to have the clearest gender-differentiated results on enrollment (Glewwe, 2002). Conditional cash transfer programs (CCTs) that offset a family's opportunity cost of sending girls and boys to school have been shown to increase enrollment, although only half of available studies of the educational impacts of CCTs actually report results by gender. Who receives the transfer for the family, not just the size of the transfer, also appears to make a difference in CCT programs. One study of a CCT program in Nicaragua shows that impacts of CCTs are higher when the woman holds more power in the household (Gitter and Barham, 2008). Scholarship programs can reduce the direct costs of schooling but the design of the program is essential to get right if scholarships schemes are going to be effective. Perhaps the best known scholarship scheme is the Bangladesh Female Secondary Stipend Program, which dates back to 1982 and to which researchers attribute the country's impressive increase in girls' education. To continue to receive the stipend, each girl must maintain a minimum 75 percent attendance rate, at least a 45 percent score in the annual school exams, and must remain unmarried until she obtains the Secondary School Certificate (SSC) or reaches age 18 (Raynor and Wesson, 2006).

- **Safety in schools and freedom from violence.** On the factors that might explain school violence, a study of 37 countries found that while national rates of general crimes are not good predictors of system-wide levels of school, factors inherent in the education system—such as large variation in school quality and in student achievement—are more powerful predictors of school violence. Akiba et al. argue that equalizing the quality of education that all students receive might be a national policy intervention that can reduce school-related violence (2002). Providing girls a safe means for getting to school can also increase enrollment. For example, an innovative program state of Bihar (and neighboring states) in India aimed to reduce the gender gap in secondary school enrollment by providing girls who continued to secondary school with a bicycle. This bicycle program, launched in 2006, increased

girls' age-appropriate enrollment in secondary school by 30 percent and reduced the gender gap in age-appropriate secondary school enrollment by 40 percent (Muralidharan and Prakash, 2013).

- **Girls' and women's capabilities for leadership and ability to make choices.** A recent review of literature on girls' and women's leadership found several elements to be especially useful. First, girls and women need diverse skills to be leaders and cultivating the soft skills is important for their long-term leadership capabilities. Mentorships, networks, experiential learning opportunities, smart deployment of technology, and support from boys and men are all ways that can be helpful in building girls' and women's leadership skills and capabilities (O'Neil, Plank and Domingo, 2015). These capabilities and leadership experiences contribute to an expanded ability to make choices and an expanded vision for their future. Engaging adolescent girls in leadership activities is an important way of laying the foundations for future leaderships. Studies have found that one of the characteristics of women leaders today is that they usually started early, with educational and leadership activities as girls (O'Neil, Plank and Domingo, 2015).

What should we do: Taking action on girls' education

Taking action on girls' education should not be confined to the halls of government offices or multilateral institutions. Civil society networks, business leaders, media organizations, academia, social enterprises, philanthropic communities, and individual global champions all have a role to play. With this in mind, we are recommending two focused streams of action.

- **Recommendation 1:** Lean in with girls and women's leadership. Our first recommendation proposes specific initiatives that are well positioned for engaging diverse actors, including: women's groups, technology companies, media partners, transparency and education NGOs, and government education planning departments. These initiatives are envisioned as catalytic "quick wins" that, if given sufficient financial and political support, could be scaled up within a short time period. They also represent an attempt to explore relatively new approaches to tackling the decades-long girls' education problem. They are also recommended with the notion that while not directly confronting violence and early marriage, they will certainly help empower girls to push back against these forces. It is our assessment that all countries could benefit from leaning in on girls and women's leadership, as it is fundamental to sustainable social change not only for girls' educational opportunities but for gender equality more broadly. The two initiatives we recommend are:
  - **Recommendation 1.1:** Build strong girl leaders. We propose a girls' leadership initiative that simultaneously provides opportunities for girls to develop the soft skills so crucial for their success as well as provides roles models and networks that help shift social perceptions and norms around girls' education and gender equality. We propose a mentorship model be used with either teachers or recent secondary school girl graduates and that the initiative be scaled up with diverse partners starting in countries where girls' education is the most behind.
  - **Recommendation 1.2: Girl-generated data.** We propose a girl-generated big data initiative, which would combine the power of "factivists and feminists" (Drummond, 2015). Girl-generated data has the potential to radically change the power dynamics, with girls themselves generating regular information about their circumstances, needs, and achievements that is translated into digestible and timely insight for policymakers, civil society actors, community leaders, and educators. Transparency and accountability take on whole new meanings in this light and ultimately puts the girls at the center of the process. A girl-generated big data initiative also can go a long way in helping fill the data gap on girls' education, both on basic education data that we have seen is often missing in many countries, but also

more importantly on sensitive issues such as school-related gender-based violence and child marriage. We propose a model where technology firms would partner with civil society and governments to collect, analyze, and disseminate this girl-generated data to those actors who can make the changes needed to improve girls' lives.

- **Recommendation 2:** Focus on systemic reform with a gender lens. Ultimately, the best approach for helping girls get educated is to ensure governments have strong education systems, ones that enable all children to access good schools and quality learning opportunities. Good schools must be in places where girls and boys alike are given the opportunity to thrive and grow. Developing an education system where good schools are a reality, including for marginalized girls, necessitates systemic reform in many of the countries where girls are behind. In support of systemic reform we propose:
    - **Recommendation 2.1:** Design for education hotspots. We recommend that international donors and multilateral institutions focus increased attention on hotspot countries, in particular in countries stuck in an education bog where girls' education progress has stalled. This includes both ensuring aid dollars flow to those countries and that the dollars go toward shoring up basic education and gender equality, including in humanitarian contexts. Governments must also do their part and employ strategies for including girls in education progress. This could include defraying costs, supporting great teachers, or improving teaching and learning materials. Teacher organizations also have a role to play. Global capacity can be deployed to help the professional development of teachers across countries where girls are farthest behind.
    - **Recommendation 2.2:** Focus with a gender lens. Countries themselves, and their regional and global partners, must ensure they undertake systemic reforms with a gender lens. This means all decisions around things such as policy, budgets, hiring, and monitoring must be evaluated with the understanding of their differential impacts on girls versus boys. Gender analysis tools should be systematically used in the development of education sector plans. Applying a gender lens to the process of sector plan development—including sector analysis, plan preparation, and plan appraisal—can ensure that that the key tools for national education system reform and associated policies and strategies promote effective actions that advance gender equality.

While made separately and with distinct purposes in mind, these two recommendations are also mutually reinforcing. Improved girls' and women's leadership, and boosting the availability of relevant data generated, can provide an important feedback loop for governments either for planning or monitoring purposes. Likewise, government reforms can open up space for girls' and women's leadership, serving to both help such leadership flourish and reap its outcomes in terms of improved girls' education opportunities. Ultimately, we hope that these two recommendations, and the specific initiatives made within each, are translated into action and together with the wide range of other strategies actors are pursuing can make a difference to girls, their learning opportunities, and ultimately their ability to be successful in their lives and livelihoods.

TODAY'S CHALLENGES FOR GIRLS' EDUCATION

Elizabeth M. King and Rebecca Winthrop

Education for All (EFA) Dakar Goals (2000), Goal 5: Eliminate gender disparities in primary and secondary education by 2005, and achieve gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality.

Millennium Development Goal (MDG) 3, Target 4: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015.

I. WHY WE CARE: SEVEN MAIN BENEFITS OF GIRLS' EDUCATION TO SOCIETY

Education is central to a person's ability to respond to opportunities and challenges that one encounters in life. By equipping young people with a set of competencies and skills, behaviors and attitudes, and a sense of cooperation and social responsibility that enable them to participate in society as productive workers and responsible citizens, education contributes to economic development, lowers poverty and inequity, and improves lives. Education yields its greatest benefits in societies undergoing rapid technological, economic, and political changes. It also has the potential to benefit most the people and communities who have the least in terms of other resources. And it benefits society in other ways too—in terms of better health, enhanced ability to cope with economic and environmental shocks, and greater social cohesion, among others. Given these benefits, it's not surprising that individuals, families, and governments alike have been investing increasingly in education.

The central importance of education for human development is one of the reasons why governments around the world have committed to ensuring its delivery to children. In 1948 with the Universal Declaration of Human Rights and the subsequent convention on economic, social, and cultural rights, including the 1989 Convention on the Rights of the Child, the world's governments agreed that all children, both boys and girls, should have access to free education at the elementary levels that is devoted to the full development of the human personality (United Nations General Assembly, 1948). While this commitment clearly acknowledges the value of education for young people themselves first and foremost, in addition to the benefits their education brings to society, there remains much work to fulfill this commitment.

Indeed, education systems around the world are still facing the challenges of providing basic education to hard-to-reach or disadvantaged groups, expanding post-primary education to meet the demand for employable skills and global citizenship competence, and ensuring learning at all levels. Too many young people are leaving school and entering the workforce without the relevant knowledge or competencies needed in today's economy. In a number of countries we identify as education hotspots, where the education system needs the greatest attention and support, the quantity and quality of education have stagnated and girls' schooling, in particular, lags far behind that of boys. Because of their gender gaps, these countries do not fully reap the benefits from investing in education.

1. **More educated girls and women aspire to become leaders and thus expand a country's leadership and entrepreneurial talent.** One of the pernicious features of gender inequality is that it feeds on itself: parents may have lower aspirations for their daughters than for their sons, and so their daughters too have lower aspirations for themselves. Yet, given the chance to be a policymaker or entrepreneur, with more education, women have the skills and confidence to be able to influence their country's legislative agenda and entrepreneurial success. Gender quotas for the election of legislators have been used since the late 1970s in a few countries such as Germany and Norway, but the list now includes Argentina, India, Nepal, Rwanda, South Africa, and many more. Indeed, the representation of women in national parliaments has increased to over 21 percent as of the end of 2013, and there has also been an increase in the number of women in other government levels (IPU, 2015). Political action, legislation, and women's greater visibility in the labor market and higher education levels have brought this progress about. But has women's greater political representation made a difference for them and their constituencies? Many cases indicate that it has. For example, in India where there has been a political reservation policy for women in rural councils, these councils are investing more in the development priorities expressed by women.[1] In the state of West Bengal, where women complained more often than men about water and roads, reserved councils invested more in water and roads; in Rajasthan, where women complained more often about drinking water but less about roads, reserved councils invested more in water and less in roads. In Rwanda, women have the majority in parliament after the genocide. Although important gender gaps remain, women in the Rwandan parliament have influenced major reforms in banking and property laws (Abbott, 2008). In entrepreneurial activities, education also gives women easier access to credit and business training opportunities, and greater confidence in negotiating the bureaucracies of government. In Nepal, women who have small businesses express frustration at not being adequately prepared for the business world and not having access to relevant business management and technical training (Bushell, 2008).

2. **It is the quality of schooling that really counts; economic growth is faster when girls (and boys) learn.** Empirical research finds that more gender equality in education is correlated with higher economic growth.[2] In addition, research concludes that years of schooling is not an adequate measure of educational progress, in part because an additional year of schooling in one country does not mean the same for another country in terms of human capital formation.[3] Instead, it is the quality of schooling across countries (albeit measured simply by average student test scores) that is more strongly associated with economic growth—and also with sustained increase in demand for schooling (Pritchett, 2013).[4] Without learning and without substantial improvements in the skills of students, more years of schooling will not translate into higher productivity or real advances in the lives of young people. To illustrate, Hanushek and Woessmann (2008) find that an increase of one standard-deviation in average reading and math scores (roughly equivalent to improving a country's ranking from the median to the top 15 percent in

international student assessments) is associated with a substantial two percentage-point increase in annual GDP per capita growth, even holding constant the average years of schooling. In addition, how well the performance of students in reading and math translates into problem-solving skills later in life is key to changing the skills profile in the population. Analyzing PIAAC data on 22 countries to estimate earnings functions, Hanushek et al. (2013) find that education quality, as measured by performance on cognitive skills, also raises adult earnings: "Across the 22 countries, a one-standard deviation increase in numeracy skills is associated with an average 18 percent wage increase among prime age workers. Moreover, because of measurement errors in skills, these estimates should be thought of as lower bounds on the return to skill" (p. 15).

3. **More equal education means greater economic empowerment for women through more equal work opportunities for women and men.** Unequal access to economic resources weakens women's abilities to participate fully in society and the economy and to improve their life prospects. Education opens doors of opportunities for young women, especially when they cannot count on family wealth, property, or business connections. Women with more years of schooling are more likely to find employment, own and operate productive farms or firms, and earn higher wages. Across high- and lower-income countries, gender differences in education explain a significant fraction of the variation in productivity, wages and incomes between men and women (World Bank, 2011). Several reviews of the labor market returns to schooling for men and women in developing countries have found generally larger private returns to schooling for women than for men.[5] Despite the lower average wages for women overall, controlling for education and family background, those women who have more education have higher earnings than those with fewer years of schooling. Even in rural economies, education makes a difference in productivity. In Kenya, for example, more education (and more inputs) for female farmers, relative to male farmers, increases farm yields by as much as 22 percent (Quisumbing, 1996). There are several pathways for these increases in productivity and earnings. The simplest answer is that knowledge and experience beget more learning, giving girls and women greater confidence to learn new production technologies, and to decipher and handle relationship challenges in the workplace.

4. **More educated girls and young women are healthier—and as adults they have healthier children.** The global decline in child mortality has been traced to increases in mothers' schooling, even after controlling for household income. Gakidou et al. (2010) estimate that, of the 8.2 million fewer deaths of children aged 5 years and below around the world between 1970 and 2009, one-half can be attributed to the global increase in the schooling of women of reproductive age. A child whose mother can read is 50 percent more likely to live past age five. In part, this is because education increases knowledge about the benefits of vaccination and effective strategies for coping with inadequate public health services, and thus help reduce the spread of infectious diseases (Desai and Alva, 1998). In all regions, but especially in the low-income countries of South Asia and sub-Saharan Africa, the percentage of children who are immunized is larger when mothers have some secondary education than when mothers have only some primary schooling, and much larger when mothers have no schooling. A mother's presence is so important for children's welfare that, in Tanzania, losing one's mother has a permanent adverse impact on a child's final height and one year of completed schooling (Beegle, de Weerdt, and Dercon, 2010). Among adults, education facilitates better decision-making in many aspects of life—about where one lives and works; how to access and process health-related information; how to choose appropriate medical care; and how generally to promote good health through nutrition and avoidance of risky behaviors (Wolfe and Zuvekas, 1995). Brunello et al. (2011) find that, in 12 European countries, one additional year of education reduces self-reported poor health decades later by 7.1 percent for adult women and 3.1 percent

for men, with improved health behaviors (regarding smoking, drinking, and exercising) contributing 23-45 percent of this total effect, depending on gender.

5. **More educated mothers have more educated children, especially daughters.** Numerous empirical studies have shown that mother's education is critical for investments in the human capital of the next generation. In Malaysia, for example, while both the mother's and the father's education have significant positive effects on their children's school enrollment, the mother's education has a far greater effect than father's education on daughters' education, while the mother's and father's education have about equal, although lower, impact on sons' education (Lillard and Willis, 1994; King, Anderson and Wang, 2013). Similarly, in Guinea and Pakistan, a mother's education has a significant and larger impact only on daughters' schooling, suggesting differences in maternal and paternal preferences for schooling daughters relative to sons (Glick and Sahn, 2000; Holmes, 2003).[6] One of the ways that mother's education benefits their children's schooling is by being able to help with their studies at home. In India, children of more literate mothers study nearly two hours more a day than children of illiterate mothers in similar households (Behrman et al., 1999).

6. **More educated women are better able to protect themselves and their families from the effects of economic and environmental shocks.** Economic crises, environmental or natural shocks, and unexpected illness or death in the family can have catastrophic outcomes for individuals and their families. Even when shocks do not have differential gender impacts, the absolute welfare losses for both men (and boys) and women (and girls) can be substantial. More educated mothers are able to protect their children's welfare through a higher quality of care and their greater ability to mitigate adverse shocks, such as food price changes, that might reduce food intake. Research also indicates that countries where women have higher education are better able to protect their economic productivity from the adverse effects of environmental shocks (Blankespoor et al., 2010).

7. **Education is valuable for girls in and of itself.** Education has an intrinsic value that allows for personal growth, self-fulfillment, and empowerment. In the words of Urvashi Sahni (2015), an Indian girls' education activist, "even without all of the 'developmental and economic goodies' that come from girls education, we should care about educating girls because it is inherently valuable to them and is their right." When states uphold one's right to education through the provision of basic education, a symbolic message is relayed: States deliver on basic human rights and their citizens live in a context that values what education has to offer to individuals and the society as a whole. Where social norms and poverty limit the opportunities a young girl may have to realize her full potential, a quality education can help inform and empower her to make good life choices (UNESCO, 2014). With a better understanding of their rights and greater awareness of their options, girls' daily lives have a greater chance of being improved. The 2013/14 EFA Global Monitoring Report finds that, in countries where arranged marriage is common, girls with "at least a secondary education are 30 percentage points more likely to have a say over their choice of spouse than women with no education in India and 15 percentage points more likely in Pakistan" (182). Murphy-Graham (2010) highlights how the non-cognitive skills acquired through an education program for adolescents in rural Honduras can equip women with the gender consciousness, communication, and negotiation skills to strengthen relationships in their domestic household.

II. PROGRESS WE CAN BUILD ON

Globally, the overall trend in familiar indicators about enrollment and completion rates over the past 25 years point toward solid progress. These quantitative indicators reflect another type of progress that is worthy of celebration and one we can build on—the emergence and consolidation of political and programmatic support for gender equality in education by civil society, national governments, and international development organizations.

Building on aggregate education expansion around the world

Education levels have risen in most countries around the world, responding to rising demand for more skilled labor in the workplace in many countries and to the greater availability of schools and classrooms financed by successive generations of parents, communities, and governments. The past two generations have seen a narrowing of inequality across countries and, within countries, between and within genders. In 1950, the (population-weighted) average completed years of schooling of individuals aged 25 and over was 6.1 years in advanced countries and only 1.4 years in developing countries; 60 years later, average schooling levels had risen to 11.1 years in advanced economies[7] and 6.9 years in developing countries. During the same period, the ratio of women's to men's schooling improved from 0.92 to 0.97 in advanced economies, and in developing regions we see substantial convergence—among the regions with the largest gender gaps in 1950, from 0.47 to 0.65 in South Asia, 0.58 to 0.78 in sub-Saharan Africa, 0.48 to 0.89 in the Middle East, and 0.48 to 0.92 in East Asia. These improvements have been the result of large advances in the enrollment rates of girls at the primary and secondary levels. Current enrollment rates for children and years of schooling completed for adults still show gender gaps, but overall, women in developing countries have gained relative to men with respect to education. Regional and income-group averages still mask a large variation among countries, however, and we turn to available analyses of country evidence in the next section. Moreover, we have to keep in mind that enrollment rates and average years of schooling are measures only of the quantity of education. In the next section we also include a discussion of learning outcomes.

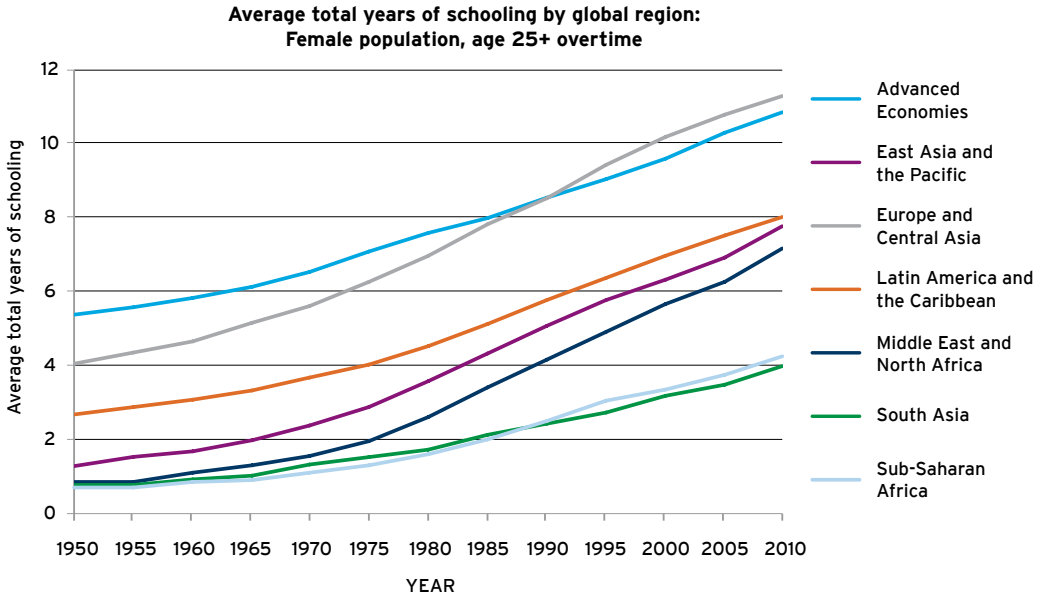
Women in developing countries have gained relative to men with respect to education.

Building on civil society and political momentum

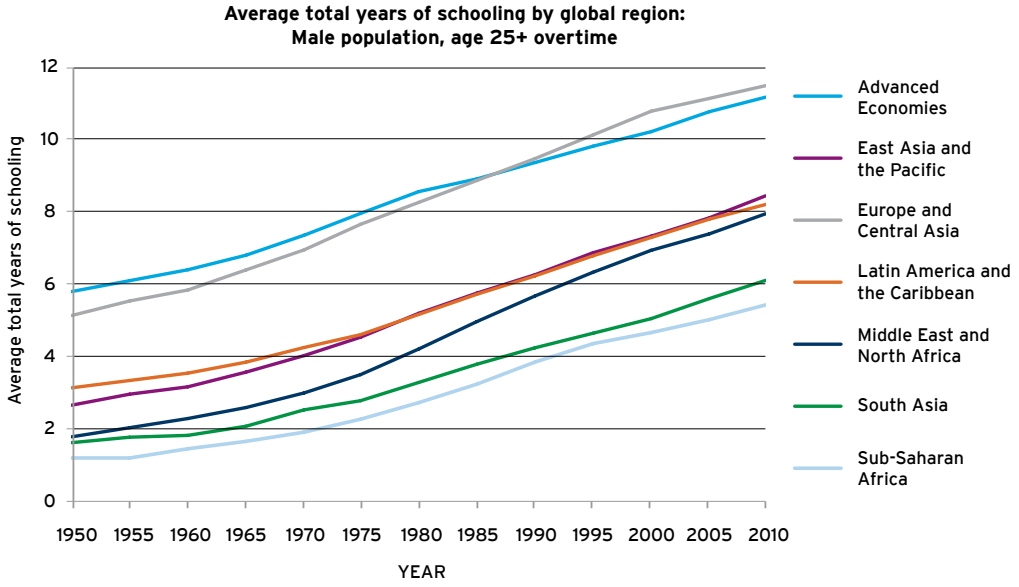
Increases in global education numbers have been helped by a growing momentum around the globe around the importance and social and economic benefits of educating girls. In 1990, girls' education was clearly holding back educational progress in a broad cross-section of countries, and most education ministers in the developing world and international leaders recognized its importance as a global priority when they established the six Education for All goals. Since then girls' education as a development priority has been identified by a broad set of actors (figure 2).

Girls themselves, their parents, teachers, and communities have for decades worked to advance their education. Researchers have long studied girls' and boys' schooling and their different experiences of education. However, in the last quarter century, grassroots-level action has been promoted and amplified into national policy debates, donor strategies, media campaigns, multilateral action, and initiatives of increasingly high-profile global advocates.

Figure 1. Trend in average years of schooling, 1950-2010

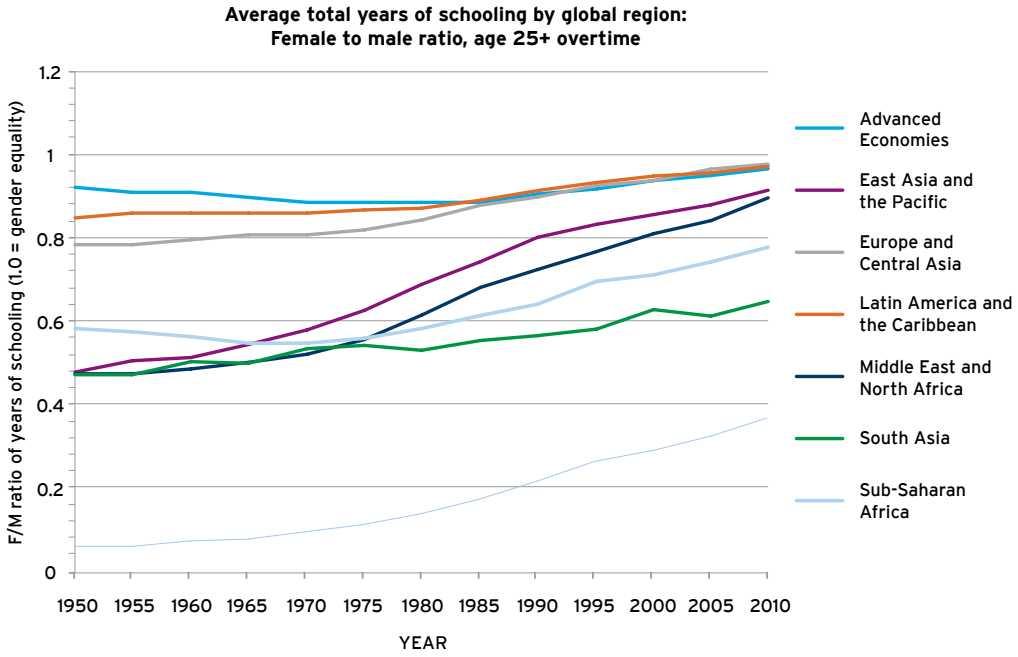


Educational attainment for female population, 1950-2010
Avg. years of total schooling
Age Group 25+
Source: Barro R. & J.W. Lee – v. 2.0, 06/14



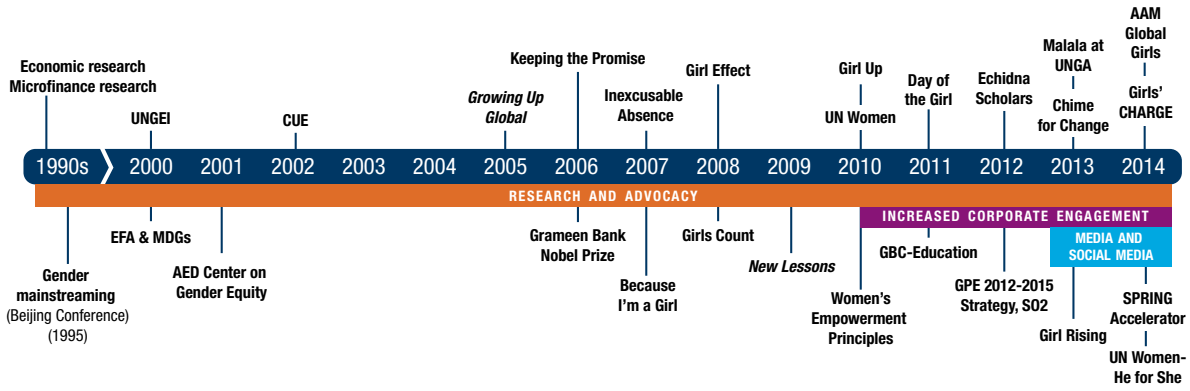
Educational attainment for male population, 1950-2010
Avg. years of total schooling
Age Group 25+
Source: Barro R. & J.W. Lee – v. 2.0, 06/14

Figure 1. Trend in average years of schooling, 1950-2010 (continued)



Source: Barro R. & J.W. Lee – v. 2.0, 06/14

Figure 2. Timeline of research, advocacy, and media milestones for girls' educationn



Source: Ackerman, X. 2015. Innovation and Action in Funding Girls' Education. Global Economy & Development: Working Paper 84. Washington, D.C: Brookings Institution.

Commentators and scholars on girls' education have noted the emergence of girls' education from a technical field within international development to a global movement (Ackerman, 2015). Noted examples include the establishment in 1992 by five female African ministers of education of the Forum of African Women Educationalists (FAWE). Today, FAWE is a pan-African organization working closely with the association of African ministers of education to advance policy and practice on girls' education issues in Africa. In 2000, the United Nations increased its focus on girls' education through the establishment of the U.N. Girls Education Network (UNGEI), a network of organizations focused on actions to close the gender gap in primary and secondary school. Today, UNGEI deploys diverse strategies for advancing girls' education, including providing technical tools and advocacy for national education plans to be developed using a gender lens.

In the last 10 years, the girls' education movement has taken on new momentum with growing global advocacy efforts. These include Plan International's *Because I am a Girl* campaign (2007), the Nike Foundations' *Girl Effect* (2008), and the Documentary Group's *Girl Rising* (2013) to name a few. The United Kingdom's David Cameron has identified girls' education as a top priority for its overseas development assistance and in 2012 launched a significant program of investment titled the Girls Education Challenge fund, with the aim of investing 300 million pounds and reaching 1 million girls. Global figures are also increasingly speaking out, including Graca Machel and Archbishop Desmond Tutu and other members of the Elders who have taken up the issue of child marriage, in partnership with the civil society movement *Girls Not Brides*. Former U.S. Secretary of State Hillary Clinton and former Australian Prime Minister Julia Gillard jointly launched in 2014 *Collaborative for Harnessing Ambition and Resources for Girls' Education* (CHARGE), a girls' education collaborative of over 40 organizations focused on "second-generation" issues with a shared commitment of reaching 15 million girls. In 2015, U.S. First Lady Michelle Obama launched *Let Girls Learn,* an initiative focused on supporting developing country grass roots leadership in girls' education. Finally, the joint Nobel Peace Prize award to *Kailash Satyarthi* and Malala Yousafzai for their work on children's rights, in particular girls' right to get an education, has put the global spotlight on the issue in a way never yet seen.

The high-level attention and advocacy have helped increase attention, resources, and ultimately on the ground action around girls' education. Indeed, today girls' education can celebrate its success by no longer being a topic of concern across most countries but rather being an issue for a subset of "hotspot" countries. Indeed, in many regions such as Latin America and the Caribbean, it is now boys who are falling behind. This attention and progress in girls' education is a useful platform to build on and provides an important set of insights and tools with which the remaining girls' education challenges in hotspot countries can be addressed.

III. WHAT WE FACE TODAY: GIRLS' EDUCATION HOTSPOTS

The global convergence in average years of schooling between 1950 and 2010 described above, especially between men and women, marks a notable shift toward greater gender equality in education, an observation made also with respect to changes in Millennium Development Goal 3. Nonetheless, a closer and more disaggregated look at several education indicators shows some big challenges. Persistent gender gaps in education in a number of countries and in parts of several countries lead to several questions: What are the sources of these gaps? Can they be reduced by economic growth, government policy, social mobilization, or international pressure? If so, what are the best ways to do so? Who should be involved in making this progress? This section examines a broad set of education indicators that reveal the fuller contours of gender inequality in education, and identifies where these are large and remarkably persistent. In later sections, we present a framework for understanding the roots of gender inequality, together with a brief survey of a rich body of evidence about this framework. We review a variety of policy and program interventions that have proved to be effective in addressing gender gaps, and then put forward a strategy for pushing progress toward greater equality.

Assessing gender equality: gender gaps in the quantity and quality of education

To reveal fully the contours of gender gaps in education, we examine a broad set of education indicators, including the familiar indicators of net enrollment rates and gender parity in enrollment rates as well as gender differences in learning indicators. In this section, we identify types of "education hotspots" that affect different countries, including those that seem veritably stuck in a low education level for girls. While there has been significant progress in girls' education over the past two decades especially, in many cases at a faster pace than boys' education, progress has stalled in a number of countries. In these countries, girls are being left behind because of the persistent dampening effect of barriers such as poverty, conflict, and violence, poor service delivery, social and religious norms, and limited opportunities for women to reap the economic dividends of education. We also recognize the continuing challenges in those countries that have achieved much higher average levels of education for girls (and boys), but where gender challenges in education remain for minority or disadvantaged groups, including low-quality education. While these two concerns are not, in themselves, gender-specific, research evidence suggests that they most affect girls' education. We note too that even in countries that seem to have done it all, girls and young women encounter "glass ceilings" in education that reflect "glass ceilings" in the workplace and society as a whole.

In this section, we revisit the trends and gender differences in familiar quantitative indicators of educational progress across world regions and countries—net enrollment rates at all education levels, persistence rates at the primary level, and average completed years of education—and in results from a number of student assessments. More time-series country data on student learning have made it possible to highlight progress, or lack thereof. However, even to this day, basic gender-disaggregated education data are not available for all developing countries, especially some of the poorest countries (e.g., Haiti, Sierra Leone, Somalia), and in many countries that do have data, it is not possible to examine trends from the past two decades because data are either too old or not available for more than one year (e.g., Afghanistan, Gabon, Libya). By delving into selected household survey data,

we are able to illustrate the layers of disadvantage that girls from minority groups or in rural areas face. Finally, we translate student test scores from international and regional assessments into gender ratios to examine gender patterns in math and reading comprehension competencies without having to tackle the issue of comparability across the different student assessments. To our knowledge, this type of cross-country comparison has not been previously undertaken.

The largest gender gaps in enrollment are in the poorest countries

- Averaging across all countries for which gender-specific enrollment data are available, the net enrollment rates of girls is only 1.1 percentage points below that of boys at the primary level as well as at the secondary level. However, when we group countries according to income levels, larger gender gaps are revealed. Gender gaps narrow considerably at higher income levels. Average net enrollment rates over the period 2010-14 (or the latest year of data, either 2005-09 or 2000-04)[8] indicate that girls face the greatest disadvantage in the lower-income group of countries, especially in the least developed economies and highly indebted countries. In highly indebted poor countries, the average net enrollment rate at the primary level is 75.6 percent for girls compared with 80.9 percent for boys. The average girls' net enrollment rate in these countries is more than 5 percentage points lower than the average for low-income countries, more than 16 percentage points lower than the average for middle-income countries, and more than 20 percentage points lower than the average for high-income countries. At the secondary level, the deficits for girls in the heavily indebted countries are much larger, as table 3 indicates. To illustrate, the average girls' net enrollment rate is 25.9 percent, as compared with 63.6 percent in middle-income countries and 90.0 percent in high-income countries.

- Translating these enrollment rates as a proportion of the net enrollment rates for boys in each country income group, in the poorest countries the female-male ratio is .93 at the primary level and .78 at the secondary level. In middle-income countries, these ratios are .99 and .96, respectively, and in high-income countries, the ratios are equal to 1.

Countries in Africa, Middle East, and South Asia are home to the widest gender gaps in enrollment

- By geographical region, girls face the largest education gap in the developing countries in the Middle East, South Asia, and Africa. In South Asia as a whole, there is no gender gap at the primary level, reflecting progress in basic education toward gender equality, but in secondary education the average girls' enrollment is only 44.7 percent, equivalent to 86.5 percent of boys' net enrollment rate. In the Africa region, the average girls' enrollment rate is only 74.8 percent at the primary level and only 29.8 percent at the secondary level, far lower rates than in other regions. We note that in the Middle East, it is the Arab countries on average that have lower enrollment rates for both boys and girls. In those countries, the average girls' net enrollment rates are .95 and .92 of the boys' rates at the primary and secondary levels, respectively.

By geographical region, girls face the largest education gap in the developing countries in the Middle East, South Asia, and Africa.

- The income group and regional averages mask far larger gender gaps in several countries. Net enrollment rates vary widely across countries at both primary and secondary levels. The primary net enrollment rates in 171 countries for girls range from a high of 99.7 percent (Germany, Spain, and the United Kingdom, with several other advanced economies coming very close) to a low of 39.5 percent (Liberia). The highest net enrollment rates at the secondary level for girls in 156 countries range from 99.2 percent (Greece, Ireland) to a low of just

Table 2. Gender gaps in net enrollment rates in primary and secondary education
By income group and world region, using average value for 2010-14

	PRIMARY EDUCATION				SECONDARY EDUCATION			
Income group/World region	Total (%)	Females (%)	Males (%)	Female/ Male	Total (%)	Females (%)	Males (%)	Female/ Male
World	91.17	90.33	91.95	0.982	63.94	62.53	65.28	0.958
High income	96.44	96.72	96.17	1.006	89.65	90.02	89.31	1.008
Upper middle income	95.67	95.24	96.06	0.992	76.65	77.28	76.06	1.016
Middle income	92.35	91.66	93.00	0.986	65.03	63.57	66.40	0.957
Lower middle income	90.26	89.41	91.06	0.982	56.31	53.41	59.02	0.905
Low income	83.05	81.14	84.92	0.956	36.35	34.23	38.44	0.891
Least developed countries*	81.11	78.66	83.51	0.942	33.46	31.14	35.76	0.871
Heavily indebted poor countries	78.26	75.55	80.92	0.934	29.62	25.88	33.34	0.776
*UN Classification								
OECD members	96.72	96.99	96.46	1.005	86.98	87.31	86.67	1.007
Euro area	99.11	99.28	98.95	1.003	91.20	91.77	90.67	1.012
European Union	98.53	98.64	98.43	1.002	91.39	91.93	90.89	1.011
North America	93.52	93.94	93.12	1.009	87.23	87.79	86.69	1.013
Europe & Central Asia (all income levels)	97.32	97.34	97.30	1.000	88.54	88.45	88.64	0.998
East Asia & Pacific (all income levels)	95.81	95.94	95.69	1.003	74.70	75.42	74.05	1.019
Middle East & North Africa (all income levels)	95.77	93.94	97.51	0.963	72.09	69.37	74.71	0.929
Developing countries only:								
Europe & Central Asia	94.79	94.40	95.16	0.992	85.73	84.80	86.65	0.979
East Asia & Pacific	95.53	95.68	95.40	1.003	73.10	73.84	72.43	1.019
Latin America & Caribbean	94.10	94.34	93.88	1.005	72.61	74.99	70.30	1.067
Middle East & North Africa	96.01	93.78	98.13	0.956	70.13	67.30	72.86	0.924
Arab World	85.69	83.27	88.00	0.946	63.48	61.24	66.79	0.917
South Asia*	94.23	93.97	94.46	0.995	48.39	44.74	51.78	0.864
Sub-Saharan Africa	77.53	74.75	80.25	0.931	32.13	29.80	34.44	0.865

Data source: UNESCO data through World Bank, EdStats website. We use the average for the years 2000-14 because the latest available data for all countries covered these years; for South Asia, the latest data for secondary education are for the years 2005-09.

8.5 percent (Guinea Bissau, with Chad being a close second at 9 percent). Focusing on deficits for girls, several countries stand out. Table 3 lists those countries where the gender gaps in primary education are more than one standard deviation below the corresponding global averages. Note that these lists are incomplete because gender-specific data through UNESCO are not available for many countries (e.g.,

Table 3. Gender gaps in net enrollment in primary and secondary education
Countries with the lowest primary net enrollment rate and/or largest gender gap, using latest data available from 2000*

	PRIMARY EDUCATION				SECONDARY EDUCATION			
			Gender Gap				Gender Gap	
Country ordered by Primary Net Enrollment Rate: Lowest to highest	Latest year	Female Net Enrollment Rate (%)	F-M (%)	F/M	Latest year	Female Net Enrollment Rate (%)	F-M (%)	F/M
South Sudan	2010-14	34.33	-13.92	0.712	n/a			
Liberia	2010-14	38.44	-2.11	0.948	2010-14	16.65	-2.99	0.835
Niger	2010-14	54.70	-12.05	0.819	2010-14	11.86	-4.55	0.678
Cote d'Ivoire	2005-09	56.29	-11.07	0.836	n/a			
Djibouti	2010-14	56.97	-7.48	0.884	2005-09	22.86	-8.36	0.690
Equatorial Guinea	2010-14	59.14	-0.39	0.993	2005-09	22.02	-5.83	0.766
Nigeria	2010-14	60.03	-11.16	0.843	n/a			
Central African Republic	2010-14	61.36	-19.00	0.764	2010-14	14.09	-8.48	0.538
Ethiopia	2005-09	61.78	-6.43	0.906	2000-04	13.52	-5.63	0.655
Chad	2010-14	62.58	-17.76	0.779	2000-04	8.96	-8.80	0.339
Burkina Faso	2010-14	63.17	-3.85	0.943	2010-14	19.08	-3.70	0.823
Syrian Arab Republic	2010-14	65.09	-1.13	0.983	2010-14	62.13	0.11	1.002
Pakistan	2010-14	67.06	-10.56	0.864	2010-14	36.18	-10.58	0.744
Guinea	2010-14	68.58	-11.85	0.853	2010-14	30.41	-13.73	0.631
Mali	2010-14	68.99	-10.26	0.871	2010-14	34.41	-10.58	0.733
Guinea-Bissau	2010-14	69.07	-3.44	0.953	2000-04	8.46	-4.75	0.562
Madagascar	2000-04	69.56	0.59	1.009	2010-14	30.37	0.14	1.004
Gambia, The	2010-14	73.47	3.85	1.055	n/a			
Mauritania	2010-14	73.48	3.97	1.057	2010-14	21.80	-3.06	0.869
Angola	2010-14	76.32	-18.61	0.804	2010-14	13.46	-2.80	0.812
Solomon Islands	2005-09	77.60	-2.61	0.967	2005-09	32.63	-5.48	0.845
Additional selected countries:								
Yemen, Rep.	2010-14	78.20	-15.24	0.837	2010-14	41.11	-17.52	0.647
India	2000-04	81.29	-10.83	0.882	n/a			
Papua New Guinea	2010-14	83.26	-6.79	0.925	n/a			
Palau	2005-09	83.62	-11.66	0.878	2005-09	44.50	-9.49	0.807
Togo	2005-09	85.49	-12.48	0.873	2000-04	23.53	-16.40	0.484
Cameroon	2010-14	85.87	-11.23	0.884	2010-14	42.03	-15.79	0.684
Iraq	2005-09	86.02	-11.15	0.885	2005-09	39.63	-9.49	0.807
Benin	2010-14	88.20	-11.67	0.883	2010-14	34.12	-15.79	0.684
Afghanistan	n/a				2010-14	46.83	-26.71	0.554

Data source: UNESCO data, latest years
Notes: *The net enrollment rates of these countries are at least one standard deviation below the average for all countries with available data.

gender-disaggregated data for primary education in Afghanistan and Haiti and for secondary education in Haiti, Nigeria, and South Sudan).

- As a result of increasing enrollment rates across birth cohorts, the average years of schooling have risen globally, especially for women's schooling relative to men's. According to the Barro-Lee data for the period 1970-2010 for 143 countries, the mean years of schooling of women aged 25 years and older has increased relative to men's from an average ratio of 66:100 to 89:100. In fact, in eight countries, women's gains are such that the average schooling of women is one standard deviation greater than the average schooling of men. However, in 21 countries, the average schooling of women relative to men's is one standard deviation below the mean female-male ratio, even in 2010. We will come back to these countries below. When the years of schooling of younger birth cohorts (ages 15 to 24 years) are included to reflect the more recent increases in girls' education, there are 15 countries, down from 21, where women's average years of schooling relative to men's are one standard deviation below the overall mean female-to-male ratio.

The girls who face multiple disadvantages are farthest behind

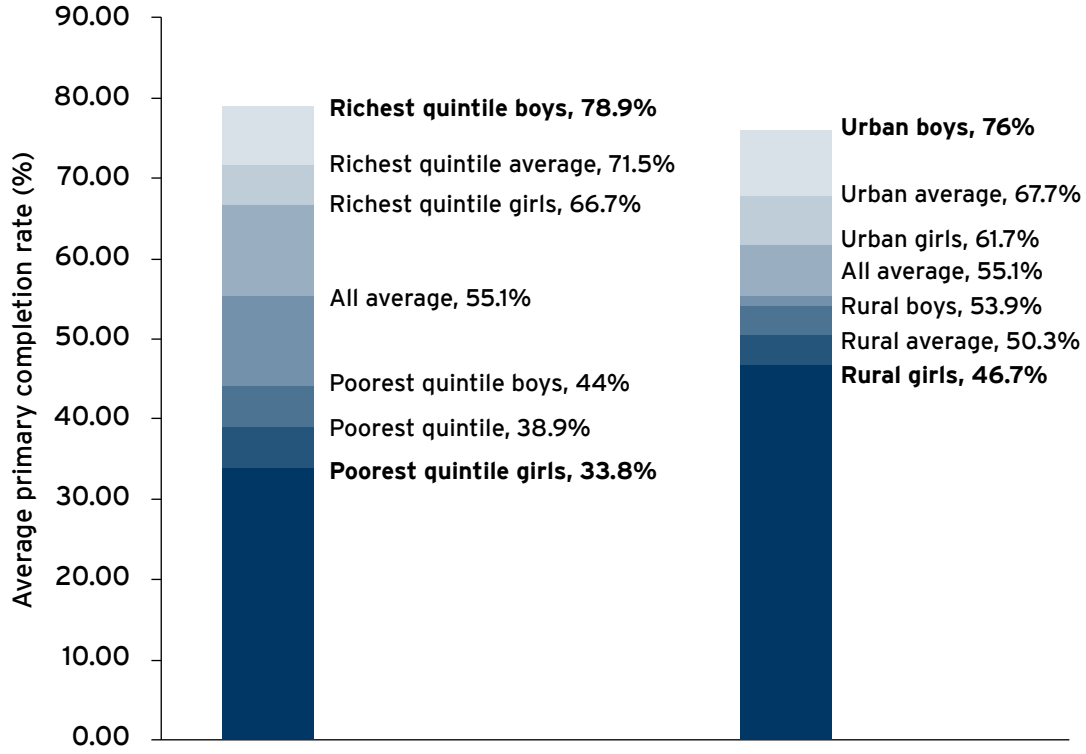
- While gender accounts for observed disparities in education, poverty persists as the most important and pervasive factor for education inequality. UNESCO's EFA Global Monitoring Report in 2010 highlighted this point in its analysis of education marginalization, finding that in numerous countries gender exacerbates the existing educational disadvantages due to poverty and other factors (UNESCO, 2010). Multivariate analyses also support this conclusion; differences in educational attainment are more highly associated with economic status than with gender, orphanhood, or rural residence in poor countries (Filmer, 2008b). Individual-level data from Demographic and Health Surveys (DHS) in 24 low-income countries show this even in the poorest countries (King and Nguyen, 2013). On average, only 34 percent of girls in the poorest-quintile households in these countries complete primary school, compared with 72 percent of girls in the richest-quintile households, a difference of 38 percentage points due to income poverty alone (figure 3). In comparison, controlling for income, the gap between the poorest girls and the poorest boys is about 10 percentage points, and that between the richest girls and the richest boys is 12 percentage points.

- These simple statistics that show that disparities due to income poverty greatly exceed the differences due to gender do not diminish the need to pay attention to why gender makes any difference. Note that in the lowest-income countries for which DHS data are available, gender inequality is not wider among the poor than among the rich; on the contrary, the education gender gap among the poorest households where education levels are lower for all may be narrower than among the richest households.

- Distinguishing among groups further, we find evidence that education lags most significantly among people who face multiple sources of disadvantage, not only income poverty, but also place of residence, disability and/or ethno-linguistic background. On average, urban children have higher school enrollment and completion rates, compared with children in rural areas (68 percent versus 50 percent). In fact, the primary completion rate of urban girls is 15 percentage points higher than that of rural girls and 7 percentage points higher than that of rural boys, indicating that gender is not the full story behind observed disparities. However, urban boys have the highest completion rate, exceeding that of urban girls by nearly 15 percentage points and that of rural girls by 30 percentage points.

- Adding ethnic and linguistic background to place of residence, the case of two low-income countries illustrates that gender inequality is indeed a more complex story. In Bolivia, for example, the gender gap in years of schooling among the non-indigenous population, even at the age groups that correspond to secondary and tertiary education, has

Figure 3. Average completion rates in primary education, by gender, income and rural-urban residence



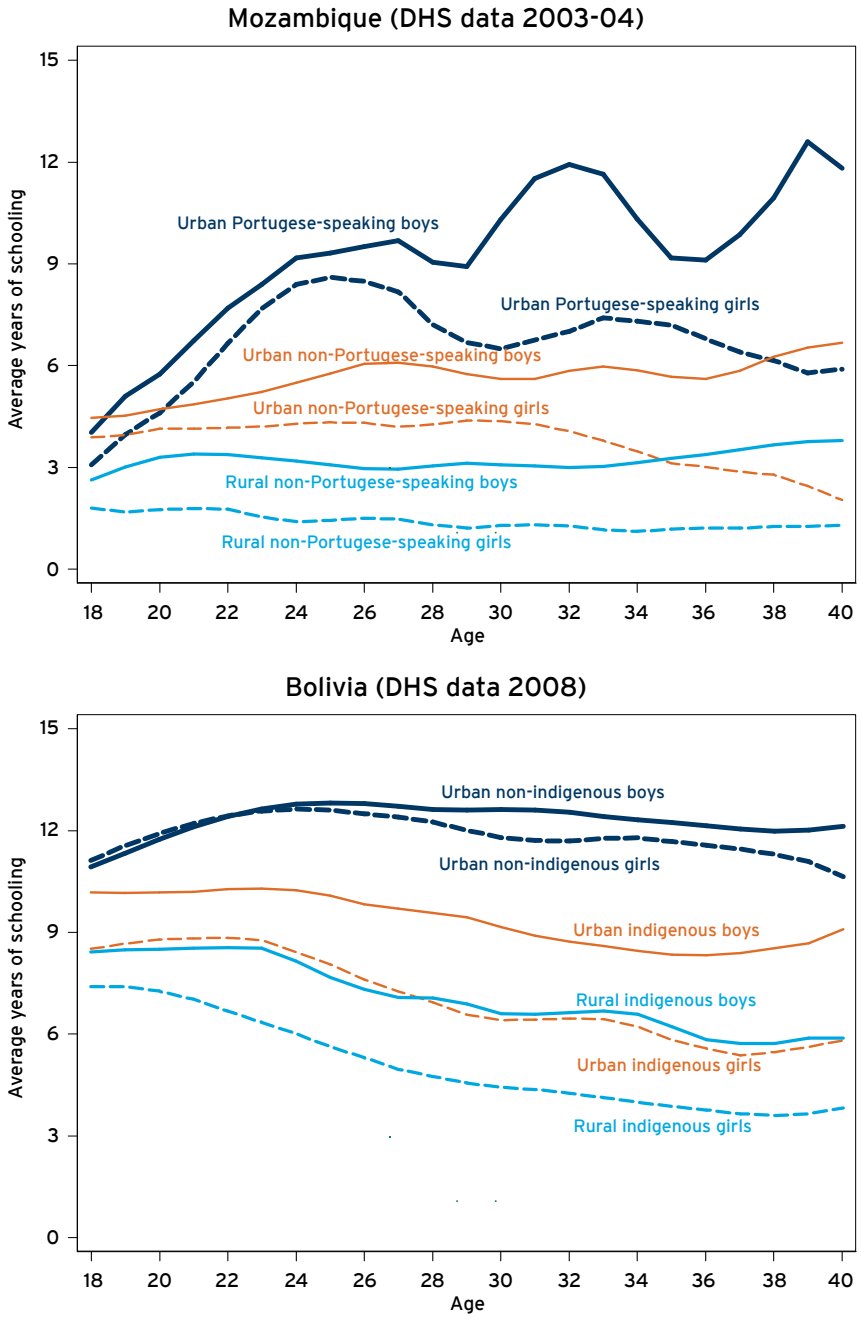
Source: Authors' calculation using latest available data from Demographic and Health Surveys 2000-2011.
Note: Aggregates for low-income countries are averages of 24 low-income countries for wealth disaggregates and for urban/rural disaggregates weighted by primary school age population.

disappeared, as shown by the overlapping curves for the non-indigenous groups in figure 4. However, among the indigenous population which makes up about 40 percent of the total population, the gender pattern varies by place of residence: urban men have approximately two more years of schooling than urban women at age 18, but urban women have as many years of schooling as rural men. It is rural indigenous women who have the least schooling, a difference of about seven years at age 18. We note, however, that the total gap between urban, non-indigenous men and rural, indigenous women has narrowed dramatically for younger age cohorts, from nine years among the 40-year-olds to three years among the 18-year-olds.

- In Mozambique, one of the poorest countries in Africa, urban-rural differences are as large as in Bolivia. Adding language to place of residence, in urban areas lusophone (or Portuguese-speaking) and non-lusophone women have closed the gap in years of schooling with urban men, although this is relatively recent progress. Moreover, urban lusophone women appear to have overtaken urban non-lusophone men. In rural areas, however, among the non-lusophone groups, women have not gained on men across the years and generations. Yet the total gap in the population—between urban, lusophone men and rural, non-lusophone women—has narrowed dramatically. Among the youngest cohorts it has closed to three years among the 18-year-olds from 10 years among the 40-year-olds.

- Clearly, gender is not the only dimension of inequalities in schooling, but among population groups that already suffer from other sources of disadvantage,

Figure 4. Gender gaps in Mozambique and Bolivia, by urban-urban residence and language group



Source: King and Nguyen, 2012
Notes: The curves for the lusophone (or Portugese-speaking) groups fluctuate more than the other curves, even after applying a STATA smoothing function to extract the age pattern, so we have omitted them; they represent a small population compared to the other groups.
Non-indigenous population is defined as those people whose native language is Spanish; the indigenous population is defined those whose native language is Quechua, Aymara, Guarani, or other native languages. By this definition, the non-indigenous population in rural areas is small and we have omitted them here. A STATA smoothing function has been applied to extract the age pattern in the data.

gender widens that gap further. These two country examples demonstrate that to understand the degree of gender inequality, it is not enough to use country-level averages. The very low level of education and large deficit for groups facing multiple sources of disadvantage—from poverty, to geography, to ethnicity and language group, to disability—suggest that the barriers they face are great even at the most basic levels, and that extraordinary efforts in policy and investments are needed to break down those barriers (Lewis and Lockheed, 2006; Chitrakar, 2009; UNESCO, 2010).[9]

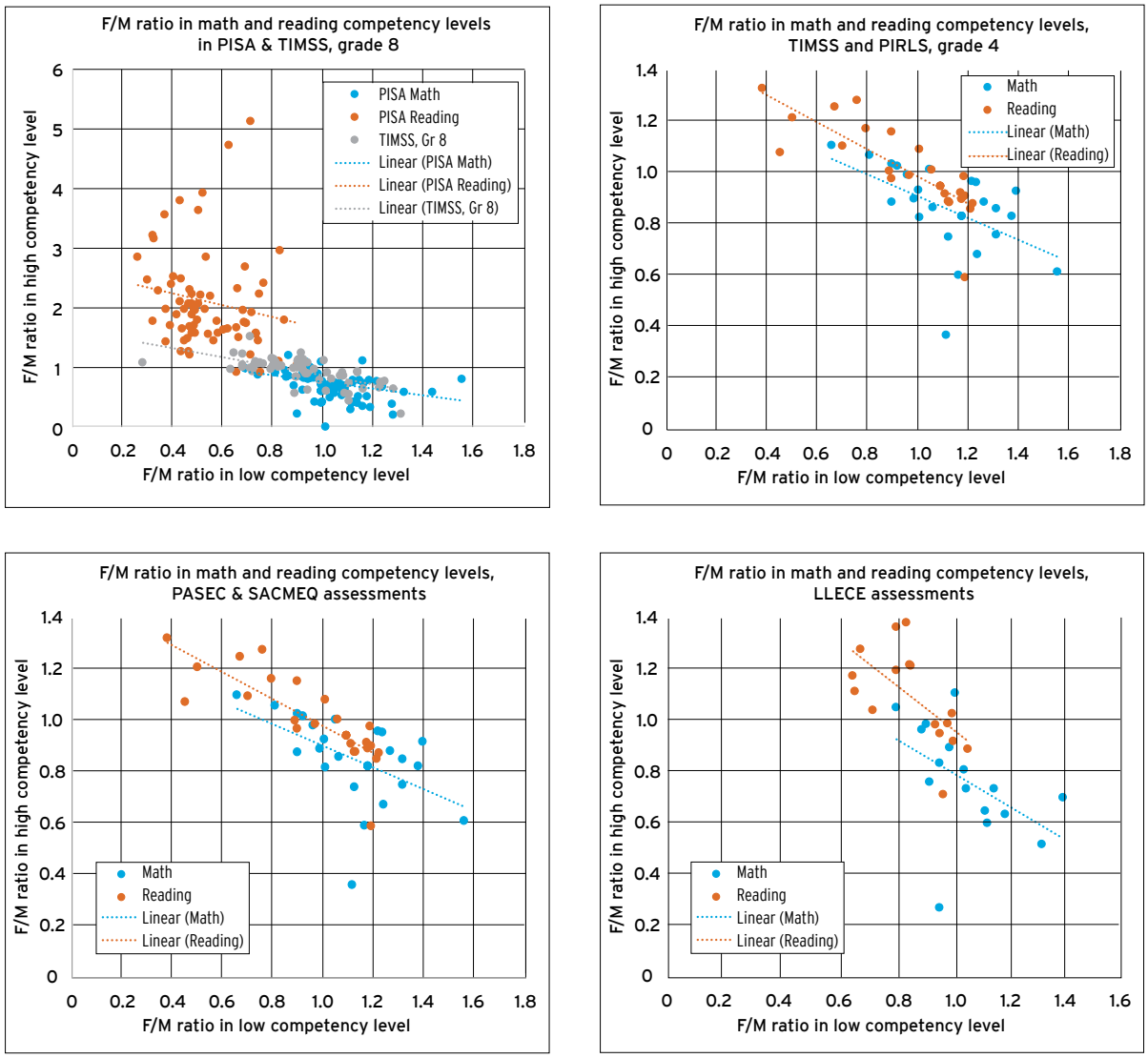
Overall learning levels are low, but girls do worse in math and boys in reading

- Only a limited number of countries have data on student achievement, as measured by student performance on international standardized assessments (such as PISA, TIMSS, and PIRLS), which would allow comparisons across countries. However, there are countries that participate also or only in regional standardized assessments (including SACMEQ, PASEC, and LLECE) and these assessments allow cross-country comparisons within regions. These assessments test performance at different ages or grades so comparing scores across tests is not straightforward; however, cross-country comparisons are possible within tests.[10] To minimize comparisons across these assessments, we avoid working directly with test scores and instead analyze the percentage distribution of students by gender across the competency levels defined for each assessment. By taking the ratio of percentage shares of girls to boys in the extreme low- and high-competency levels of each assessment, we are able to compare gender ratios in performance across countries. Unfortunately, many countries in East Asia, South Asia, and the Middle East do not participate in international or regional assessments, thus limiting our cross-country comparisons.

- The gender distribution by competency levels in international and regional assessments reveals an interesting pattern. In general, boys do better than girls in math and girls perform better in reading. Yet there is considerable variation in the size of these gender differences across countries. Figure 5 presents a set of scatter plots based on gender ratios from the different international and regional student assessments. In these plots, gender equality at any competency level is signified by a gender ratio (F/M) equal to one, so a gender ratio exceeding one means over-representation of girls relative to boys in a given competency level and a gender ratio below one means under-representation relative to boys. We omit the middle competency level from each graph; this means that if girls are under-represented in the two extremes taken together, then they are over-represented in the middle competency level. On average, in math, girls are over-represented in the low competency levels relative to boys and under-represented in the high achievement levels. In reading comprehension, girls are under-represented in the low achievement levels and equally represented or over-represented in the high achievement levels. The gender patterns in math and reading competency levels are depicted in figure 5 by the fact that the scatter plot for the reading gender ratios tend to be above and to the left of the plot for math gender ratios. This pattern is most evident for the PISA tests which cover 15-year-olds; we overlap the TIMSS test for grade 8 students and find that the scatter plots for math for both assessments are similarly placed. By comparison, figure 5 shows the plot of the gender ratios for grade 4 TIMSS (math) and PIRLS (reading). This plot shows that the math advantage of boys over girls and the reading advantage of girls over boys are not as marked as we see in the PISA comparison, a pattern that we think reflects the more different gender expectations about math and reading skills in adolescence.

- Two cases illustrate extremes in the patterns we see. In Argentina the gender ratio of girls to boys in the high math competency level for PISA is only 0.3 while the gender ratio in the high reading competency level is 2.2. In a few countries in Africa, however, girls are over-represented in the low

Figure 5. Female-Male ratios in math and reading competency levels, various assessments, latest year



competency levels in both math and reading, and under-represented in the high competency levels in both. In Burkina Faso, for example, girls are 31 percent more likely to be in the low-competency level in math than boys and 21 percent more likely to be in the low-competency level in reading.

Is the gender pattern by area of competency due to intrinsically gender-related talents? An excellent review of the research on the cognitive development of infants, preschool children, and students does not support the claim that this gender pattern has any basis in genetic predisposition of boys to math (and science) or the opposite for girls (Spelke, 2005). Instead, this gender pattern may be reflecting widely held cultural views about the appropriate roles for women and men. Kazianga, Levy, and Linden (2013)

attribute the gender inequality in math competency in Burkina Faso to a host of factors, including the practice of teachers of directing more difficult, higher-order questions to their male students and simpler recall questions to their female students, confirming in the minds of boys and girls the expected occupations and proper roles for men and women. Mutekwe and Modiba (2013) point to the gender stereotypes embodied in school textbooks and syllabi (the hidden curriculum), and that in Zimbabwe the general perception communicated by teachers is that "mathematics and science subjects are a preserve for boys, whereas languages and the humanities are a female domain." The gender pattern in unequal competencies that emerges from PISA and TIMSS results has certainly attracted the attention of researchers and policymakers not only in developing countries but also in more advanced countries.

Soft skills also key for girls

The addition of learning outcomes is a welcome change in the research on the economic growth of countries. This change is made possible by the greater availability of international and regional standardized tests for many more countries; as a result, more growth studies are including measures of average cognitive achievement in addition to years of schooling as a determinant of economic growth. We hasten to add that while learning outcomes have been typically measured in terms of students' reading and math numeracy scores on tests, these are admittedly a limited set of cognitive skills and of skills in general. Moreover, as Heckman, Humphries, and Kautz (2014) note, improving academic skills does not necessarily translate into better labor market and life outcomes. Specific technical or vocational skills related to an occupation can expand opportunities in the labor market, and the so-called soft skills such as communication, teamwork, critical thinking, and problem-solving are undeniably useful for people to function well at home, in their communities, and at work.

In fact, there is a growing body of evidence from multiple disciplines (psychology, behavioral economics, and neuroscience) that identifies certain personal capabilities as also important predictors of academic performance and later success in life. These capabilities—such as self-esteem, generalized self-efficacy, locus of control, and emotional stability—are receiving greater attention among researchers to explain labor market success.[11] Additionally, these soft skills also have been documented to show improved life outcomes. Evidence from longitudinal studies of nine OECD countries found the development of competencies and character skills such as perseverance, self-esteem, and sociability may have a bigger influence on addressing social challenges such as crime, health decisions, and ensuring success in the labor market (OECD, 2015; Mischel, 2014). Overall, these findings suggests that the development of social and emotional skills and other non-cognitive skills may be just as important as the development of cognitive skills (Heckman, Stixrud, and Urzua, 2006; Kautz et al., 2014). Despite relatively equal levels of cognitive ability, for example, boys generally get lower grades, are less able to pay attention in class, are less organized in terms of their homework, have more disciplinary problems, and are more likely to be in special education classes. These skills have received greater attention in explaining gender differences in transition rates to college education—where the rates for girls exceed those for boys. Research suggests that in the United States the higher non-cognitive skills and college premiums among women account for nearly 80 percent of the gender gap in higher education enrollment rates (Jacob, 2002). And as we have noted above, measures of soft skills are growing, but

these are still rare in developing countries and define a promising area for better understanding gender differences in educational success but also in other areas of life.

Soft skills, at times also referred to as non-cognitive or transferable skills, are not usually cultivated through pencil-and-paper tests and in general can be acquired through a quality education that privileges experiential learning activities and assists students in becoming problem solvers, strong communicators, and leaders—qualities that could be potentially lifesaving and certainly qualities well sought after in today's economy (UNESCO, 2012). A quality education and staying in school longer has a positive effect on girls' and boys' self-esteem, confidence, and aspirations overall (UNESCO, 2012). In particular, marginalized girls and women who face multiple disadvantages could benefit from a quality education that allows for the development of non-cognitive skills. Murphy-Graham (2010) found that an innovative secondary education program in rural Honduras that encouraged students to analyze the context in which they lived helped build the female students' gender consciousness and strengthen their relational resources (ie. communication and negotiations skills). This research remarked on the "transformative potential of education" suggesting that when education provides the opportunities for students to develop relationships, learn how to express their ideas and use their negotiation skills, it can transfer over into the household sphere leading to potentially positive influence on household gender relations (Murphy-Graham, 2010, 330).

Female empowerment has been well examined in literature on women's leadership. This paper builds from the empowerment/leadership framework presented in Rowlands (1997) in which Rowlands presents four dimensions of empowerment:

1. "Power within": belief in self-worth, self- respect and self-acceptance
2. "Power to": ability to make choices and influence others
3. "Power over": ability to control others
4. "Power with": acting with others to challenge discriminatory structures

(O'Neil, Plank, and Domingo, 2015, 7; Rowlands, 1997)

This empowerment/leadership framework is useful in reflecting upon how the outcomes of developing soft skills could benefit girls' future and agency. Cultivating soft skills that leads to greater confidence and improved self-esteem provides girls with the ammunition—or the *power within*—to transition into adulthood with more opportunities to succeed and in a better position to make choices over their lives (also known as the *power to*). The notion of leadership, applying soft skills, and developing female leaders is addressed in a later section.

Emerging hotspots: Bogs, traps, and ceilings in girls' education

The gender education indicators discussed above—including the gender gaps in enrollment rates, completed years of schooling and academic performance—together point to relatively clear country patterns with respect to gender equality. For convenience, we use the moniker of "bogs," "traps," and "ceilings" to refer to three broad groups of countries. We defined these groups as:

- **Bogs:** the countries where girls' net primary and secondary enrollment rates may have increased but have not reached the target levels of the MDGs, and gender gaps in enrollment rates at the primary and secondary levels have not narrowed sufficiently; in general, these countries have stalled in reaching the MDGs for education.

- **Traps:** the countries where both primary and secondary enrollment rates (and perhaps even tertiary enrollment rates) have progressed well and have generally reached the MDG targets, and gender gaps in school enrollment have narrowed sufficiently. However, these countries lag behind in terms of learning outcomes, as measured by their students' average performance relative to the average performance in international or regional assessments. In varying degrees, these countries have not made sufficient improvement in learning outcomes and appear to be caught in a low-quality education trap.

- **Ceilings:** the countries that have reached the highest levels of enrollment rates at all levels and have achieved relatively high levels of student learning as measured by their average performance on international or regional assessments, but face gender inequality in academic performance. We use a simple measure of gender gap in performance: the relative shares of girls to boys in the extreme competency levels. In particular, we use the "glass ceiling" implied by the math dominance of adolescent boys in international assessments as a gender measure.

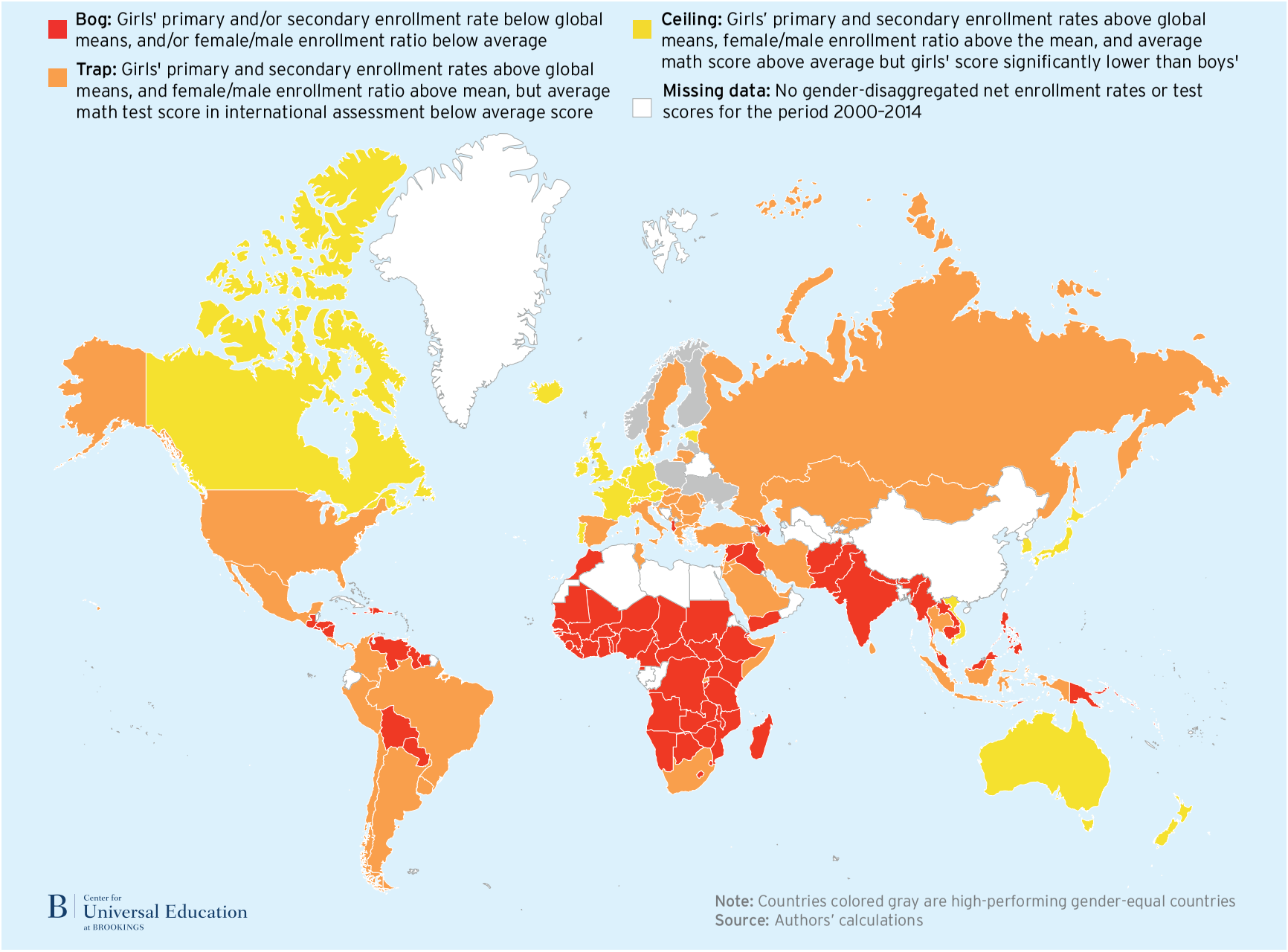
How we have categorized countries into these three groups is summarized in table 1. A fourth group of countries consists of those that have high enrollment and completion rates at all education levels, have performed relatively well (though not all at equally spectacular levels) on international assessments, and have attained relative gender parity with respect to learning outcomes. Figure 6 presents a visual aid of the four groups of countries. Finally, a missing group of countries pertains to those that do not have gender-disaggregated data on enrollment rates at either primary or secondary levels or have not participated in international or regional assessments that allow cross-country comparisons.

Stuck in an education bog

Various education indicators repeatedly point to a group of about 80 countries that have not made sufficient progress to meet universal primary education, including about 50 that have not met the MDG target on gender equality in education. Returning to table 3, on average, low-income countries, especially the least-developed countries (a U.N. classification) and the highly indebted poor countries have not reached the enrollment target for primary education. Among these countries are South Sudan, Liberia, Niger, Cote d'Ivoire, Djibouti, and Nigeria, a group of 21 countries which have the lowest adjusted net enrollment rates at the primary level. Several of these countries have the widest gender gaps as measured by the female-male ratio—for example, South Sudan, Central African Republic, and Chad have gender gaps in excess of 20 percent. The net enrollment rates at the secondary level in about two-thirds of these countries are only about one-half of the global mean and their gender gaps are substantial. In Afghanistan, Chad, Togo, and the Central African Republic, girls' net enrollment rates are about 0.5 or less of boys' rates.

These countries' gender gaps in enrollment rates at the primary and secondary levels eventually translate into sizable disparities in the completed years of schooling of the adult population. The Barro-Lee data on years of schooling give us a long-run view of education in these countries, and we do see some movement toward greater equality from 1970, as measured by the average years of schooling of the adult population aged 25 years and above (figure 7). For example, both Afghanistan and Pakistan are such countries. However, the 30-year long view also reveals that the progress has been generally modest and has not been a continuously upward trend (in Mauritania, for example), and there has not been an acceleration after 1990 when the Education for All goals were established or after

Figure 6. Girls' Education Hotspots



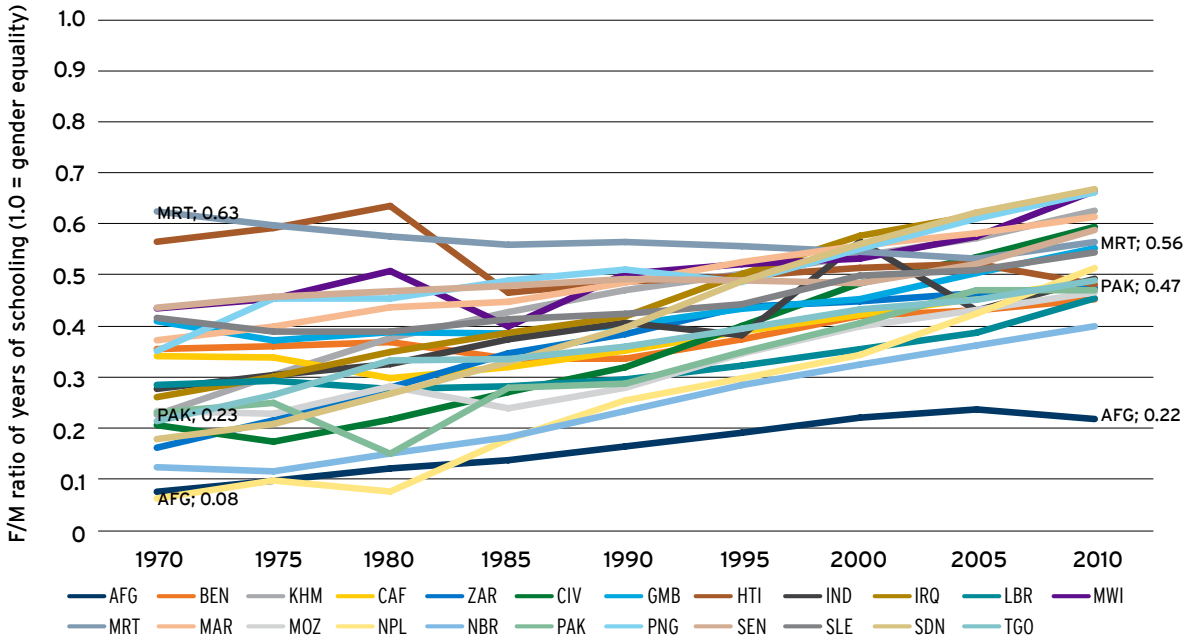
the MDG targets were declared in 2000. As a group these countries appear stuck with respect to gender equality. Indeed, there is much to understand about why this is so.

Caught in an education quality trap

Notable increases in enrollment rates for girls since 1990 have led to celebratory remarks about progress in gender equality. On the basis of the rudimentary indicators used to measure that goal and for the countries that have time-series data on the indicator, there has been progress. The education systems in this large group of countries, perhaps reinforced by economic forces, have succeeded in getting children—boys and girls alike—to school, keeping them in school until the end of the primary cycle, and raising transition levels to secondary education. Trends show that once girls are enrolled, they are more likely to remain in school and complete more years of schooling. The current average net enrollment rates in primary education and at the secondary level in most regions of the world exceed 90 percent and 70 percent, respectively (table 2). More reports are noting that gender disparities show not only female disadvantage but also male disadvantage with respect to enrollment and completion rates, especially in Central and South America and in parts of East Asia (Grant and Behrman, 2010; World Bank, 2011). However, robust successes in entry and completion rates in primary education and in transition rates to secondary education and even to tertiary education have created perhaps a more difficult set of education challenges.

First among these challenges is that within these countries there are segments of the population for

Figure 7. Female-Male ratio of completed years of schooling
24 countries with largest gender inequality, Barro-Lee Data, 1970-2010
(Population 25 years and older)



Source: Barro R. & J.W. Lee – v. 2.0, 06/14

whom gender gaps have been persistent, suggesting that system-wide policies or interventions do not work well everywhere. Multiple sources of disadvantage such as gender, rural residence, and minority affiliation contribute to leaving groups of children behind. We illustrated this above with the cases of Bolivia and Mozambique (and the 2009 EFA Global Monitoring Report gives the case of Nigeria), but it should be possible to examine this inequality using household survey data for other countries. We saw that this type of analysis highlights the fact that average gender equality in a country masks much larger gender differences in some population groups, but individual survey data are needed to undertake such an analysis. Secondly, the inflow of large numbers of students into the upper grades of basic education and then into the secondary level has put a heavy strain on public resources for education and on the capacity of the education systems to deliver instructional services of acceptable quality. Greater education equality comes with additional financial and administrative requirements. Thirdly, these education systems have not performed well on international and/or regional tests relative to high-performing systems. Although these student assessments are, by far, not a perfect measure of instructional quality and learning, they provide a way of benchmarking the performance of education systems and thus of reminding policymakers and civil society that the ultimate goal of schooling is student learning. We use data from the international and regional assessments to examine whether countries are caught in a low-quality trap. In particular, if a country's average math score is below the global average for the test, then that country is included in this category. An alternative measure would be to use the percentage of students who fall in the low competency level. For example, using 40 percent as a threshold value for this measure would shift a few countries from the "trap" category to the "ceiling" group or better (e.g., Israel, Italy, Greece, and the United States).

Bumping against a gender "glass ceiling"

These countries have demonstrated their capacity to achieve not only high enrollment and completion rates at the basic and secondary level but also relatively high academic performance. Judging by how well their students have performed in international or regional assessments, these are some of the best education systems in the world. However, there remain in these countries gender gaps that need to be addressed; there are significant differences in the level of competencies of boys and girls and also a gender-specific concentration in competency. One example we have already presented is that of male dominance in math performance and female dominance in reading comprehension. This gender pattern has been the subject of numerous studies that examine a range of factors, from biological or neurological abilities (see critical review by Spelke, 2005), to gender discrimination in the classroom (e.g. Dee, 2007), to social attitudes pertaining to gender traits and roles.[12] These gender patterns in competencies are important because they foreshadow the fields of study that young men and women choose in post-secondary education and even their choice of occupation as adults. Glass ceilings at work and other places in society start with glass ceilings in school. In the U.S., for instance, more young women than young men are proceeding to college but they tend to concentrate in certain areas of study, with consequences for their future jobs. Jacob (2002) notes that "[w]hile women have made considerable inroads into traditional white-collar male jobs, they have had significantly less success moving into skilled blue-collar occupations... For this reason, it is likely that a young man with high school diploma will have a better chance than a comparable young woman of finding a relatively high-paying construction or manufacturing job" (590). And while we highlight this challenge for this set of countries, the male dominance in math is present in the other country groups as well.

IV. WHY GIRLS ARE BEHIND: WHAT WE KNOW ABOUT GENDER EQUALITY IN EDUCATION

There is a rich literature that has explored the relationship between education indicators and sets of economic, social, and political factors. In this section we review familiar elements of a basic conceptual framework for education outcomes and survey research findings that help identify strategic and programmatic approaches to increasing and improving girls' and women's education. The framework begins with the girl and her family at the center, but also traces gender differences to the norms, resources, and constraints in the broader community and economy that influence choices and outcomes. With the increasingly shared belief across the world that basic education is a human right, the cost of schooling, the policy environment (e.g., compulsory education laws, education finance), the supply of and support for teachers, and so on have changed, with consequences for the educational level of populations and gender differences in education.

Understanding the roots of education gender gaps

Basic education has been enshrined as a universal human right over the past six decades, and the benefits from women's education for development are fairly well-recognized in global fora—so why do gender gaps in education persist, and what are the best ways to further reduce these disparities? Past studies have included the following as factors affecting education: household wealth or income, parents' education, presence of parents in the household, age of child, household composition, the price or cost of schooling, ethnicity or language spoken at home, urban/rural residence, characteristics of teachers and the school, and the perceived returns to schooling. This is a familiar list of factors in the literature, but to understand how these factors affect gender differences in education, it is useful to begin with a model of demand for education that explicitly recognizes that the demand for girls' education and boys' education are distinct and may be affected differently by a host of factors.[13] The basic model of demand for education postulates that an individual or the family makes education decisions by comparing the discounted costs of schooling against the discounted value of anticipated returns in the future, and that a child remains in school until the discounted (perceived) returns are equal to the costs of schooling. Boys and girls grow up in the same households, so the household income and parents' discount rate that affect schooling decisions are thus equal among siblings, and the availability of schools is frequently the same, except where there is a strong cultural preference for single-sex schools or classrooms. The framework must also acknowledge the power of social and cultural forces that shape preferences, expectations, and attitudes about girls' education, as well as the legal and policy environments that affect the space in which education decisions are made.

Schooling is more costly for girls

Most countries do not charge tuition fees in primary education, and some countries have eliminated such fees even at the lower secondary level. Nonetheless, there are other direct costs that can discourage school attendance. When these other costs are gender-specific (e.g. expenses for uniforms or transportation), when the supply of school differs by gender (e.g., girls are allowed only in single-sex schools or classrooms), or when the opportunity cost of school-age children's time varies by gender, the total cost of school enrollment for girls may be large enough to result in gender differences. In addition, when schools

fail to stimulate interest in learning adequately or generally make it worthwhile, students may decide to spend their time elsewhere, are not motivated to attend classes daily, and may eventually drop out. Many non-experimental studies using household survey data find that girls' schooling is more sensitive to cost, however defined, than is boys' schooling. Greater distance to school or the absence of a nearby school has stronger negative impacts on girls' than boys' enrollments in many settings.[14] This is because cultural mores or concerns about the safety of teenage girls imply the need for girls to be chaperoned to and from school by their older brothers or fathers when in public, implying greater transportation costs. In the case of settings where teenage girls cannot be seen in public, distance to school may not even be relevant. School fees, to the extent that they exist, also may have differential effects on girls and boys. For example, in Kenya, higher school fees increase dropout probabilities for girls but have no effect on boys (Lloyd, Mensch, and Clark, 2000).

In addition to direct costs, the opportunity cost of schooling may present a greater obstacle for girls. Addressing these hidden costs pay off in completed schooling and beyond. There is a fairly clear gender pattern of time use that assigns care and housekeeping work to women and market work to men, a gender division of labor that applies to children and adolescents in families where young household members are expected to contribute. In lower-income countries, the realities of poverty imply that work and schooling are competing activities for children's time. There may be pressure for adolescent boys to do farm or market work instead of or in addition to attending school, and girls are usually expected to help in preparing food, collecting water and fuel, and housework and care activities, which may or may not be flexible enough to allow school attendance. In Nicaragua, a large percentage of students combine schooling with work, despite the fact that combining these activities decreases the probability that they will complete primary school by over 20 percentage points and that working over three hours a day eventually shortens their completed schooling by 27 percent (Zabaleta, 2011). In rural Honduras, students drop out of school for several months during the harvest season, only to return the following year (Bedi and Marshall, 2002). In sub-Saharan Africa, on average, one-third of boys aged 7-14 work and one-fourth of them combine work and schooling; the corresponding shares are only slightly lower than for girls (table 4). The proportion of children working is much higher than in other regions, illustrating the importance of the opportunity cost of schooling in African countries. In these settings, abolishing tuition fees will be more effective in raising enrollment rates if it is combined with a mechanism to compensate families for the other costs associated with schooling.

When domestic work for which comparable data across developing countries are rare is also considered, girls' work burden may actually be heavier than boys'. Low household income and parental absence due to employment push significant care and household work onto children—particularly girls—as a family coping or survival strategy. A study in Ethiopia finds that boys are less likely than girls to combine work and schooling or to be engaged in work only, and are more likely to be involved in leisure activities only compared to girls, so the sum of domestic and non-paid work for girls is higher for girls (Woldehanna, Jones, and Tefera, 2008). As countries impose and enforce legislative restrictions on child labor outside the home, boys would likely reduce their farm or market work while girls would likely continue with their responsibilities at home, with the result of increasing the relative cost of schooling for girls. Research evidence shows that the

Table 4. Percentage of children aged 7-14 who are working

	Working			Working and studying		
Region	Girls (%)	Boys (%)	F/M	Girls (%)	Boys (%)	F/M
Central and Southeastern Europe (non-EU) and CIS	10.5	12.5	0.841	10.2	12.2	0.838
East Asia						
Southeast Asia and the Pacific	11.2	12.5	0.901	8.4	9.3	0.907
South Asia	13.4	17.1	0.786	9.0	11.7	0.764
Latin America and the Caribbean	8.3	14.1	0.587	6.9	11.1	0.621
Middle East						
North Africa	4.6	7.4	0.620	2.6	5.2	0.502
Sub-Saharan Africa	30.9	33.9	0.912	21.3	24.0	0.886

Data sources: World Indicators Database, latest years
Notes: *Percent of children working, whether working only or combining work and study.

absence of basic public services such as water supply for household use and electricity imposes a heavy time burden on girls and women in households, leaving them even more "time poor," and increases the opportunity cost of schooling (Bardasi and Wodon, 2010).

In Pakistan and Peru, hours of child labor respond positively and significantly to child wages (Ray, 2000). Of particular interest are the estimated coefficients of the adult wage variables, which indicate the nature of the interaction between the child and adult labor markets. In Peru increasing adult wages reduce boys' and girls' labor hours, suggesting that child and adult labor hours are substitutes. In Pakistan, the estimated coefficient of the woman's employment status is positive and statistically significant for both boys and girls, so children from households in which the mother is employed work longer hours than other children. However, the size and significance of this relationship is much higher for girls than for boys, suggesting a stronger relationship between women's and girls' labor markets. Without good schools and satisfactory day care arrangements, mothers who work have to put their children, especially daughters, to work as well (Basu, 1999).

Restricted space and expectations limit girls' ability to reap the returns to education

Social norms define the roles that women and men have in the family and the community, the expectations they have about their futures, their individual preferences and the kind of relationships they form. Social norms create powerful incentives that guide people's attitudes and behaviors; behaviors outside the accepted social boundaries can unleash formal and informal systems of social sanction. There are social taboos, for example, against allowing unmarried girls in public or traveling far from home, but there are typically no such taboos for unmarried sons. These taboos make the cost of school attendance greater for girls than for boys. In Pakistan special transportation or a chaperone must often be arranged for daughters in middle and secondary schools, adding to the cost of schooling for low-income families (Holmes, 2003).

Schooling itself may be considered a threat to a girl's honor and thus to her marriage prospects if contact with boys cannot be avoided. Single-sex classrooms with female teachers, boundary walls, and separate latrines in schools may be the only way to bring more girls to school in some communities. Indeed, because of strong social taboos, simply imposing a compulsory education law and eliminating fees may not be sufficient to increase girls' schooling in those settings.

In contrast to the strictures about the movement and exposure of girls in parts of South Asia and the Middle East, family systems in Latin America and Southeast Asia are generally more egalitarian. Women are rarely secluded and are typically expected to contribute to household economy by working outside the home and managing family finances. In African countries as well, women are expected to help grow crops or sell farm produce, even if their ability to own land or property is constrained. In these settings social norms and customs also influence the roles that men and women take in their personal relationships, the aspirations they have about a future occupation and earnings, and their ability to own and manage property. And while there may not be strict limits on women's movement outside the home, there are negative consequences nonetheless for girls and women who cross the boundaries of social norms, including domestic violence, bullying in schools, and sexual harassment at work, the topic of a later section. In all, the degree of autonomy and empowerment that girls and women possess affects how much they can expect to gain from schooling.

Lack of self-confidence as well as low self-esteem can also limit a girls' education. In a 2015 Baseline Report of 19 diverse and innovative education projects for marginalized girls supported by the U.K.'s Department for International Development's (DFID) Girls' Education Challenge Fund (GEC), six projects being evaluated identified the lack of self-confidence as a barrier to girls' education (Coffey, 2015). The same report identifies female aspirations, motivation, and autonomy factors such as self-confidence as a barrier "that has a direct influence on girls' enrollment, retention, attendance, and learning" (Coffey, 2015, 54). CAMFED's SEM statistical model designed to examine their education data from programming in Zimbabwe also finds a strong relationship between academic success and academic self-efficacy ("the sense of being good at and enjoying academically-related activities" (Johnson and Liht, 2015, 3). This correlation suggests that a strong academic achiever perceives his or herself as a strong student. In addition, children's perceptions of their self-efficacy in their academic performance are correlated with choices and aspirations about their occupation (Bandura et al, 2001; Rolleston and James, 2012). Program findings about an overall lack of self-esteem, confidence, and self-efficacy among adolescent girls have led development actors such as CARE to develop a *Girls' Leadership Model* for their girls' education programming. This model identifies self-confidence as a key component for girls to gain agency in their decisions and in becoming leaders (CARE, 2012). A good quality education can help boost the confidence and motivation among girls who may have a low self-esteem due to their socio-cultural environment (UNESCO, 2012).

Gender differences in benefit streams help explain why parents might invest less in girls' education than boys' even within the same family.[15] In the previous section, we presented some of the benefits from women's education that also spell out the cost of *not* investing in girls' schooling—higher earnings in the labor market, better health and education for the next generation, greater ability to cope with external shocks, among others. The belief is that parents—and

students themselves—try to see into the future and form expectations about how education might improve their lives. Where parents and students expect that education will open up possibilities of a better life for their children (and the family as a whole), they are more likely to spend time and resources for education, at a given level of costs, than where they do not expect such benefits. Of course, what are regarded as possibilities for a better life in the future are likely to be as varied as people are different and are typically influenced by social norms. For male adolescents, for example, being able to find a well-paying job and a good marriage might be paramount. For female adolescents, the same may be true but not necessarily in equal measure. Education may not be seen as equally important for these life dimensions. We have already mentioned that in traditional communities in South Asia more education increases the price a girl has to pay to marry since social norms require that husbands have more education than wives; in these communities, the returns to an additional year of schooling for daughters, as compared with that for sons, is low. In West Bengal, Beaman et al. (2011) find that, in places where no woman had ever been the local leader, 86 percent of parents wanted their daughters to be either a housewife or whatever their in-laws would decide for her, compared with less than 1 percent for their sons. Also, twice as many parents reported that they wanted their teenage sons to graduate from secondary school or college as those who wished the same for their daughters.

The large variation in the number and type of income-earning opportunities that await girls and boys after school matters to parents and students themselves when they make education decisions, although this consideration likely differs across families and communities according to prevailing social norms and also poverty levels (Jensen, 2010). In the Middle East, the average labor force participation rate (LFPR) of adult women in 2012 is 21 percent as compared with 85 percent for adult men. In Latin America, the average LFPR of adult men is about the same as in the Middle East at 85.5 percent, but the average LFPR of adult women is 57 percent. In sub-Saharan Africa, although average education levels are lower than in any other region, the average LFPR of men is 87 percent and that of women, 72 percent. These patterns suggest that while labor market returns may be associated with the demand for girls' schooling, there are powerful mediating factors such as norms regarding the acceptable roles of women and men at home and in the workplace. Indeed, a study of gender differences in earnings in Pakistan illustrates the effect of social norms and attitudes, including of employers, to male and female workers (Aslam, 2009). Although the marginal returns to women's education are substantially and statistically significantly higher than men's (7-11 percent for men as compared with 13-18 percent for women), a decomposition of the gender wage gap reveals a large "residual" component that is not explained by individual characteristics such as education and work experience.

Early marriage and teen pregnancy keep girls out of school

Child marriage is a global problem affecting 15 million girls every year (UNICEF, 2014a). The United Nations Population Fund (UNFPA) reported that "[d]espite national laws and international agreements, child marriage remains a real and present threat to the human rights, lives, and health of children, especially girls, in more than a hundred countries" (UNFPA, 2012, 10). Moreover, according to UNFPA today, "one in three girls in low and middle-income countries (excluding China) will marry before the age of 18. One in nine girls will marry before their 15th birthday" (UNFPA,

Table 5. Labor force participation rates, by sex and age group, by world region, latest year

Region	Youth, 15-24			Adult, 25+		
	Females (%)	Males (%)	F/M	Females (%)	Males (%)	F/M
WORLD	39.0	55.2	0.706	53.5	83.3	0.643
Developed Economies and European Union	45.1	48.9	0.921	54.2	70.8	0.765
Central and Southeastern Europe (non-EU) and CIS	32.9	47.4	0.695	54.0	76.6	0.705
East Asia	52.9	57.0	0.928	65.6	83.0	0.791
Southeast Asia and the Pacific	45.3	59.4	0.763	63.5	89.6	0.709
South Asia	22.6	55.4	0.407	33.3	90.4	0.368
Latin America and the Caribbean	42.5	62.3	0.681	56.9	85.5	0.666
Middle East	13.4	47.4	0.283	20.9	84.9	0.246
North Africa	19.4	47.4	0.409	25.5	84.9	0.300
Sub-Saharan Africa	51.9	56.4	0.921	71.7	87.4	0.820

Data source: ILO - Estimates and Projections of the Economically Active Population (EAPEP), 2013 Edition

2012, 10). UNICEF predicts that if there is no reduction in child marriage, 1.2 billion girls will marry as children by 2050 (UNICEF, 2014a). While most countries have laws in place to address this practice, inconsistencies between customary law and state law as well as inadequate policies and systems in place to ensure implementation, mean child marriage remains a culturally entrenched social norm in many countries.

Figure 8 shows that in Niger, as much as 76 percent of girls marry or are in a union before age 18 and 28 percent by the age of 15 (UNICEF, 2014b). In eight other countries with data on age of marriage during the period 2000-1, at least one-half of girls marry before age 18, and in three other countries, about 30 percent marry by age 15. While countries with the highest prevalence of child marriage are concentrated in Western and sub-Saharan Africa, due to population size, the largest number of child brides reside in South Asia UNICEF, 2014b).

Child marriage imposes heavy costs for girls socially, physically, and emotionally. The practice of child marriage undermines efforts to improve girls' education and must be addressed if real, lasting progress is to be made in improving the lives of girls. Girls who have no education are three times more likely that those with a secondary or higher education to marry by the age of 18 (UNFPA, 2012), illustrating how effective schooling can be in preventing girls from marrying before they are ready (UNICEF, 2010). In rural Bangladesh, for example, each additional year that marriage is delayed between ages 11 and 16 could add 0.22 year of schooling and 5.6 percent higher literacy (Field and Ambrus, 2008).

Figure 8. Percentage of women aged 20 to 24 years who were first married or in union before ages 15 and 18

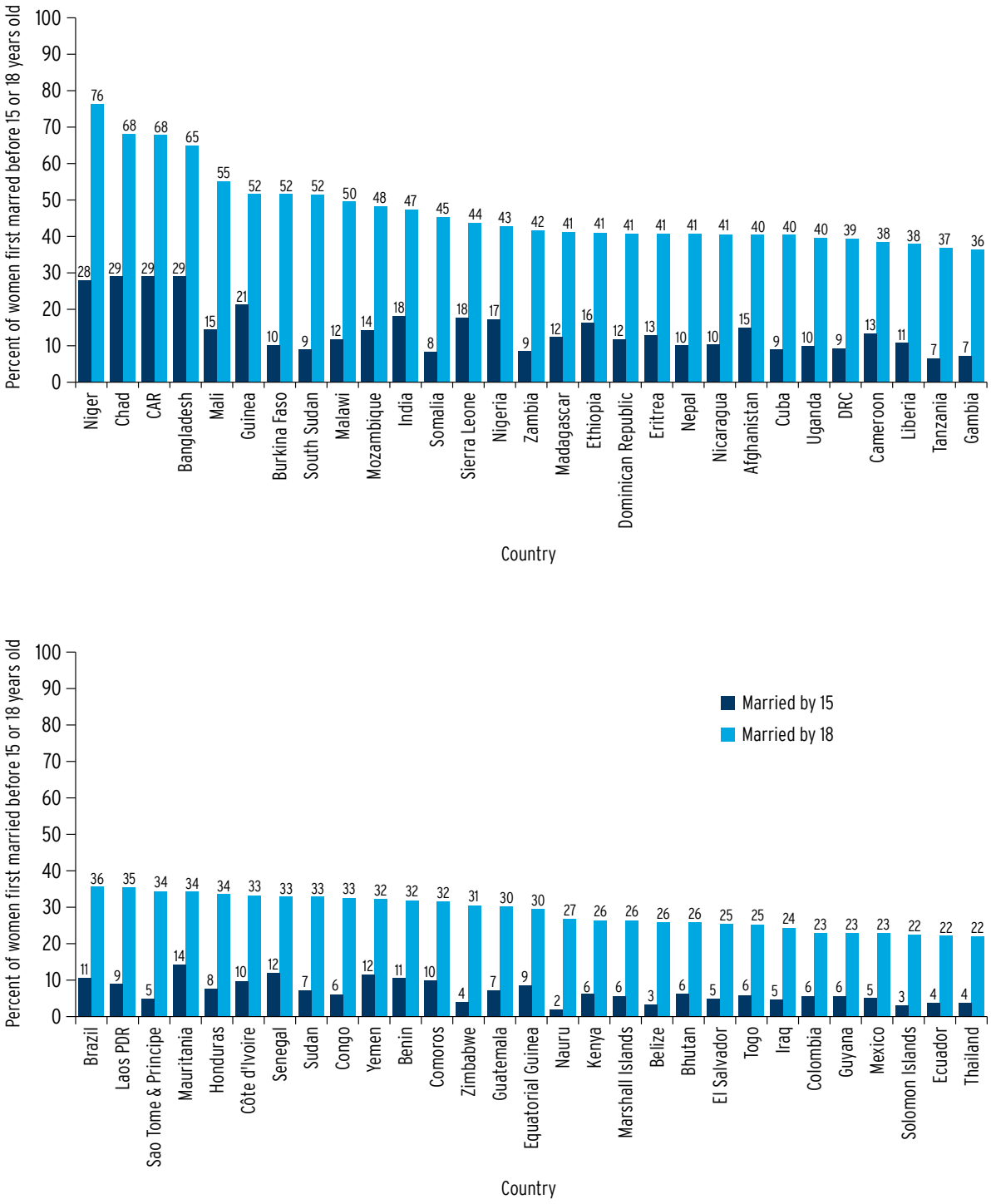
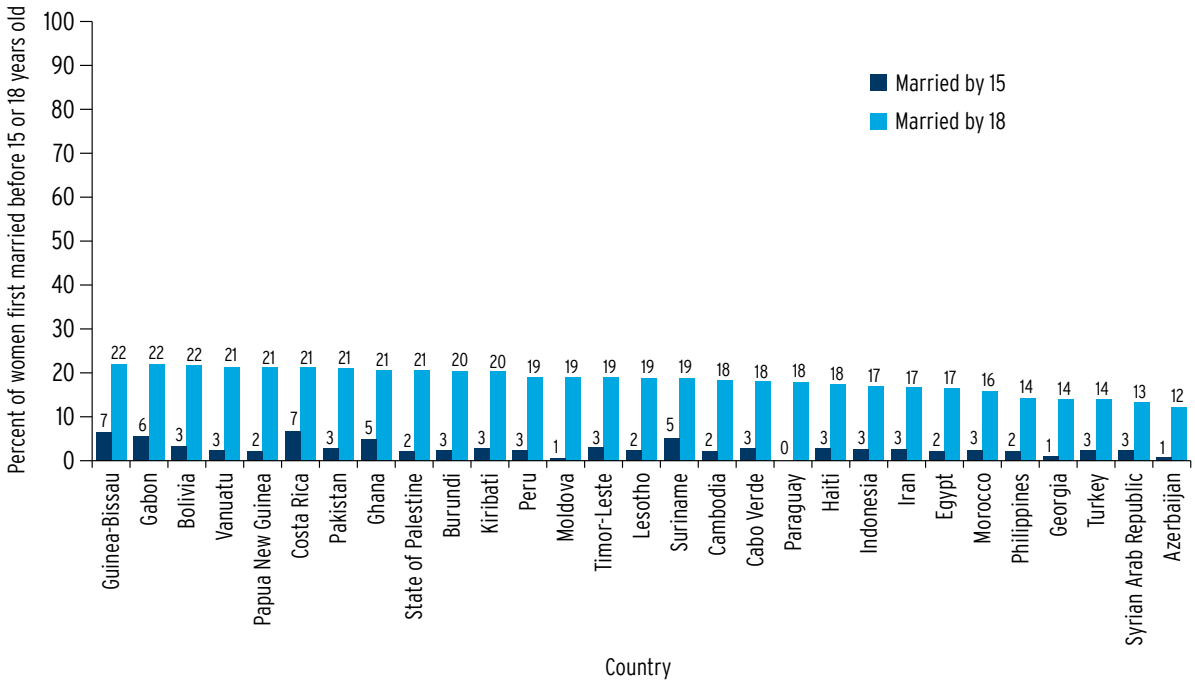
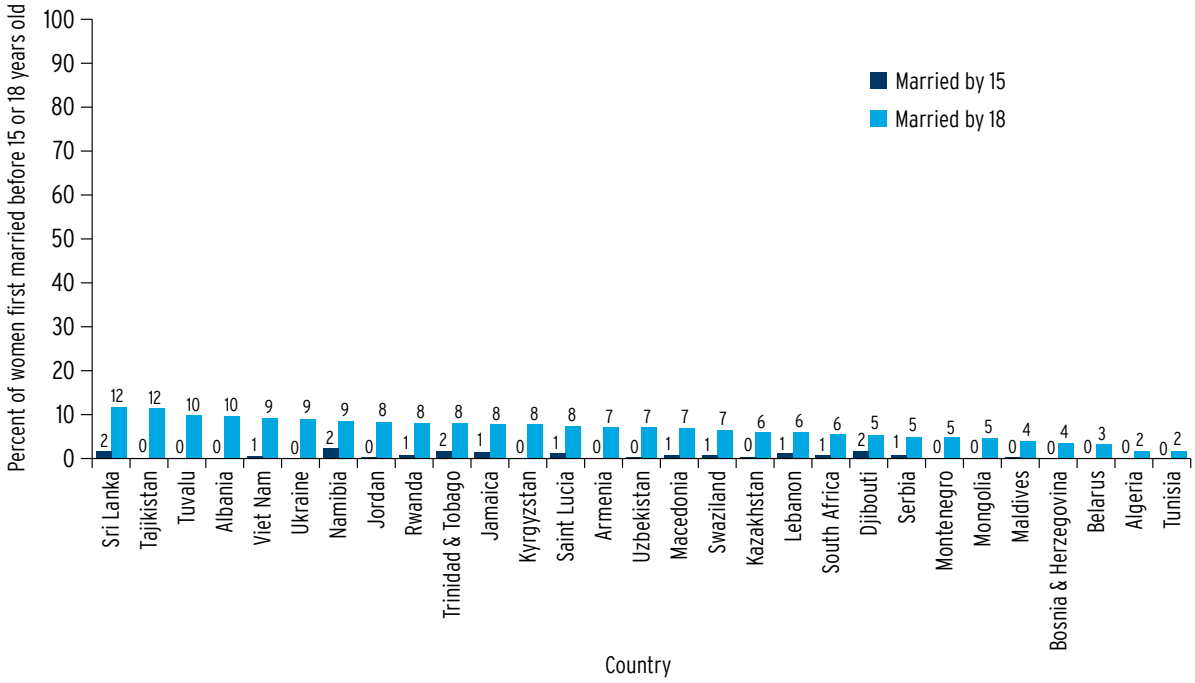


Figure 8. Percentage of women aged 20 to 24 years who were first married or in union before ages 15 and 18 (continued)





Child marriage can be both a cause and consequence of poor educational attainment and often takes place in the time before a girl is about to be married, or shortly afterwards when her domestic burden has significantly increased and she is no longer able or allowed to continue her education. Child marriage is not always the reason for school dropout—school fees, safety concerns, and poor quality of teaching also have a significant impact on whether girls remain in school—but once a girl has left school, it is more likely she will marry and start to have children before she is physically and emotionally ready.

Child marriages, particularly those below the age of 12, are typically arranged marriages that involve very young girls marrying much older men.[16][1] Such a large age gap between partners can make it difficult for girls to assert their rights, especially when it comes to their sexual reproductive health. Child marriage is often closely followed by intense pressure on girls to prove their fertility and start child bearing, often before she is physically or emotionally ready. Early pregnancy is consistently among the leading causes of death of girls aged 15-19 worldwide. In sub-Saharan Africa, a woman faces a 1 in 31 chance of dying from complications due to pregnancy or childbirth, compared with a risk of 1 in 4,300 in developed regions (World Bank, 2011). Girls younger than 15 face worse odds than this; they are five times more likely to die in childbirth than women in their 20s (UNFPA, 2012). Lack of agency to use contraceptives also means that married girls are often at a higher risk of repeated unwanted pregnancy, sexually transmitted diseases, and HIV/AIDS (UNFPA, 2012).

Domestic violence is also a serious risk, especially for girls who marry before their 18th birthday (WHO, 2012). For example, research conducted in two states in India found that girls who marry before 18 are twice as likely to report being beaten or threatened by their husbands than girls who marry later (ICRW, 2006). These girls can suffer psychologically, including feelings of hopelessness, helplessness, and severe depression (Khan and Lynch, 1997). Often when girls marry, they are forced to live with their new in-laws and many find this leads to social isolation, restricted movement, and diminished support networks.

Pervasive school-related violence harms millions of girls and young women

School violence is not a new concern, although it has been a topic of international concern in the past decade as horrifying details of incidents have become more public through social media. Its relationship to educational participation and academic performance is typically not examined in research on the determinants of schooling, perhaps because of the absence of systematic information on its prevalence. However, what data exist paints a picture of extensive school-related violence inflicted on girls. This violence ranges from extreme acts such as kidnapping, bombing, maiming, and killing, acts which often occur in contexts of armed conflict, militancy, and political violence but also in the often invisible but pervasive contexts of sexual abuse, exploitation, and bullying. In her landmark 1996 report to the U.N. secretary-general, *Impact of Armed Conflict on Children,* Graca Machel put the issue of extreme violence suffered by girls and boys on the global agenda. Sexual abuse and exploitation of girls is exacerbated by armed conflict as children are especially vulnerable during times of upheaval (Greene et al., 2013).

Research and global advocacy groups have responded by increasingly focusing on school-related violence. Relatively recent attacks on schools have been documented by human rights advocates in over 30

countries around the globe (GCPEA, 2014). In at least 15 countries, girls have been singled out for attack (Winthrop and McGivney, 2014). In these cases, girls are maimed and killed for trying to go to school, as the world bore witness to in the high-profile case of Malala Yousafzai in Pakistan. Girls' schools are bombed, girls are raped, girls are abducted and forced to work as "wives" in fighting forces. In Pakistan, the outright ban on female education by the Taliban forced 900 schools in the Swat Valley to close or stop enrolling female students. Although schools have since re-opened, a year later many girls were still too afraid to return to school (Winthrop and McGivney, 2015).

In these contexts of armed conflict, schools in many countries are partially or fully occupied by armed forces or groups seeking places to shelter or to wage battle. The Global Coalition to Protect Education from Attack (GCPEA) estimates that "at least 26 conflict-affected countries in Africa, Asia, Europe, the Middle East, and South America" were used by armed groups or armed forces over the 10-year period of January 2005 to March 2015 (GCPEA, 2015, 14). Children who attend military-occupied schools experience a wide range of physical violence from crossfire or explosive devices, sometimes leading to serious injuries or death (GCPEA, 2015). The psychological consequences of children witnessing violence including torture, harassment, and sexual abuse can have long-term consequences that derail a child's educational trajectory and harms overall well-being (GCPEA, 2015).

Although incidents of extreme violence have garnered global attention (e.g. Malala and the Chibok girls in Nigeria), much of the school-related violence experienced by girls is invisible or unrecognized.[17] For this reason, it is important to examine the evidence presented by school- and individual-level data from a number of countries on the different forms of school violence: sexual harassment, bullying, use of abusive language, fights, and so on.[18] One study of 19 countries around the world surveyed more than 100,000 male and female students to estimate and examine the prevalence of bullying in schools (Fleming and Jacobsen, 2010). Of the respondents, 34 percent reported having been bullied in the month previous to the survey. About one-half of those who had been bullied had been victimized one or two days in the month while 8 percent were victimized every day of the month. The prevalence of bullying within individual countries ranged from less than 20 percent in Tajikistan, to 20-40 percent in China, Lebanon, Morocco, Oman, the Philippines, the United Arab Emirates, Tanzania, and Venezuela, and to 41–61 percent in Botswana, Chile, Guyana, Jordan, Kenya, Namibia, Swaziland, Uganda, Zambia, and Zimbabwe (Fleming and Jacobsen, 2010). On average, boys are more frequently bullied than girls but the difference is small (36 percent compared with 33 percent).

A study using the 1998 Demographic & Health Survey in South Africa found that 1.6 percent of the adult female respondents reported being raped before the age of 15 and that the most common perpetrators (one-third of the cases) were male teachers (Jewkes et al. 2002). Another study finds that more than 30 percent of girls in southern Africa are raped in and around school (Prinsloo, 2006). Students suffer other forms of violence in the hands of their teachers. In middle schools in Ghana, Malawi, and Zimbabwe, a study using survey data from schools finds that the abuse of girls by male teachers is part of a wider problem of school-based violence (which includes the excessive use of corporal punishment and bullying), much of it perpetrated by males (Leach et al., 2003). Likewise, survey data from middle and secondary public schools in Egypt show that, despite a ministerial decree against the use of physical punishment as

a disciplinary action, both boys (80 percent) and girls (62 percent) were subjected to corporal punishment, usually for poor behavior or academic performance—with boys usually suffering the worse injuries from this type of punishment (Youssef, Attia, and Kamel, 1998). A study based on a representative sample of more than 10,000 public school students in grades 7-11 in Israel find that 29 percent of students have been victims of specific acts of sexual harassment in school during the month before the survey (Zeira, Astor, and Benbenishty, 2002).

School-based violence or threats of violence of different forms militate against learning for all students and serve as a deterrent to both school continuation rates and academic performance. The sexual harassment or abuse of girls by teachers and peers imposes huge physical and psychic costs on parents and students that deter schooling. In addition, the cross-national study by Fleming and Jacobsen (2010) finds evidence of long-lasting effects on students. For example, students who have been bullied are more likely to suffer from some form of mental illness, such as depression, insomnia, and suicidal ideation, and to adopt risky health behaviors such as tobacco, alcohol and drug use, but the size and statistical significance of these relationships among victimization and health impacts vary by age, gender, and culture. Indeed, serious violence experienced by children and young adolescents could stunt their mental and psychological development into adulthood.

Lifting the obstacles to girls' education

In this section we consolidated a number of factors that contribute to gender gaps in education into four sets: (1) the direct and indirect costs of schooling that are higher for girls than boys, (2) the restricted space and expectations embodied in social norms and attitudes that limit girls' ability to reap the returns to education, (3) early marriage and teen pregnancies that keep girls out of school, and finally (4) the school-related violence that harms millions of girls and young women. We find that these four sets of obstacles are present in the countries that are most behind with respect to their education indicators (the "bogs"). Compulsory education laws, the abolition of tuition fees, and support for other costs through scholarships have had positive effects on girls' enrollment and completion rates, but these interventions have addressed mainly the first set of obstacles. To break the barriers and achieve greater progress in this group of countries, the other obstacles must be addressed too. Improvements in the education system as a whole are needed—ensuring that learning happens in order to increase the social and economic returns to education, addressing gender bias in the formal and hidden curricula, and making schools welcome and safe places for girls (and boys). These different reforms will lift obstacles across the three groups of countries. To supplement system-wide reforms, there are specific interventions that can be targeted to girls; we discuss the evidence on some of those interventions in the following section. Finally, reforms outside the school system are needed too—enacting or enforcing existing laws about the minimum age of marriage and addressing gender bias in the workplace. Gender gaps in education reflect, in large part, gender inequality in other aspects of society and the economy, and are also often instruments for perpetuating that gender inequality.

V. WHAT IS WORKING: EVIDENCE ON ADDRESSING GIRLS' EDUCATION

This section presents the evidence from evaluations of programs and policies, mostly in the developing world, that have been undertaken to increase girls' and women's education. In addition to individual research publications, the discussion has been largely informed by several recent excellent reviews of evaluations of education interventions (Conn, 2014; Duflo, 2012; Glewwe et al., 2014; McEwan, 2014; Murnane and Ganimian, 2014; Unterhalter et al., 2014, among others) and by recent reports prepared by or for development organizations (NGOs and bilateral and multilateral organizations) (UNESCO, 2006; UNFPA, 2012; UNGEI, 2012; World Bank 2011). We give priority to those findings that are based on empirical evaluations with credible counterfactuals. As with previous reviews, our review is affected by a "publication bias"—that is, the published and accessible literature tend to feature primarily those interventions that have succeeded or have merited an evaluation and publication. Hence, we have less to say about what interventions have not worked than about interventions that are working. In fact, many more impact evaluations are needed for gender-targeted education programs. In her review of programs for adolescent girls, for example, Lloyd, and Young (2009, 78) found:

> ...very little evidence that the activities currently underway have been evaluated or that evaluations are being planned...A little more than a quarter of the programs (28 percent) reported that an evaluation had been conducted or planned. Fewer than 10 percent of the evaluations reported have been or will be carried out by external partners or agencies that can bring more objectivity and scientific rigor to the evaluation. The rest are presumably internal. We found only three comprehensive evaluation reports publicly and readily available on organizations' web sites: two provided by the World Bank, and one by BRAC.

And while education as a sector has many more rigorous evaluations, evaluations do not often disaggregate results by gender.

It is important to consider female-targeted programs—those policies that alter the costs or benefits of girls' schooling relative to boys' schooling—as well as supposedly gender-neutral interventions, which do not specifically target female (or male) schooling returns or costs. Supposedly gender-neutral interventions can still have gender-differential effects, widening rather than narrowing gender gaps, or vice versa. Policies to improve girls' education in developing countries have generally focused on increasing the immediate benefits of schooling as well as on reducing the costs of attending school for girls. Policies not directly concerned with education, labor market, and childcare services (such as those providing cash transfers to households), have also been shown to affect schooling incentives and may do so differently for girls and boys. There have been some relatively recent reviews of interventions on girls' education,[19] so we draw from their findings in our discussion of strategies.

High-quality and gender-sensitive curricula and learning materials

Textbook provision is almost universally accepted as an important tool for teaching and learning when they are used. But thumbing through textbooks used in primary schools in many countries around the world, one gets an immediate sense of the traditional and accepted gender roles in those countries. Boys and men

are engaged in outside activities or leading meetings. Girls and women are busy with house work or care activities. Men are doctors or policemen. Women are nurses or primary school teachers. These textbooks and the curricular design underlying them reflect as well as reinforce gender roles. By reflecting existing gender roles, their depiction of family, community, or professional relationships is not put into question. However, that depiction also sends an implicit message about the right order of things. Over the past three decades, an increasing number of studies have been undertaken to examine the gender content of textbooks. Most of these studies survey the frequency with which males and females are featured in textbooks and the types of roles attributed to them. Some present quantitative evidence based on content analysis of all textbooks or a representative sample of textbooks in a country. Others are more impressionistic and polemical. Blumberg (2007) undertakes a comprehensive review of a large number of studies and arrives at a number of conclusions. He notes that gender bias in textbooks is widespread geographically and more so than is suggested by the gender parity ratio (as defined by MDG 3). Blumberg also concludes that gender bias in textbooks exhibits a strikingly common pattern across developed and developing countries: Females tend to be greatly underrepresented; males and females are associated with certain personal traits; they are depicted in stereotyped ways in both occupational and domestic spheres. The content of textbooks has been slow to change, so they do not reflect actual progress in women's empowerment and changing roles in society and the economy.[20]

Blumberg links the gender bias in textbooks to a hidden gender bias in formal curricula that leads girls away from mathematics and science and into "female" courses of study, while boys are unsupported in developing reading and language skills. The relatively unrecognized bias in basic curricula explains, at least in part, the gender disparities in academic performance that we have seen in international and regional tests. In addition to the gender bias in textbooks, there are gender stereotypes perpetrated in school activities outside the classroom, including in sports, cultural activities, and non-academic responsibilities assigned to girls (or even female teachers) in the school.

What will it take to see faster change in the content of textbooks and other learning materials and in extracurricular activities in schools? Blumberg (2007) offers a set of recommendations. From that set, we find promising the recommendation to engage with NGOs, textbook experts, and researchers familiar with this issue in developing non-sexist learning materials and curricula, crafting an implementation strategy, and sensitizing teachers to explicit and hidden gender bias in materials and curricula as early as their pre-service training. We would pick out also the recommendations to undertake adequate, gender-disaggregated monitoring and evaluation of any intervention in this content area, and to support impact research using varied evaluation techniques—randomized trials, natural experiments, and quasi-experimental designs—in order to understand how specific measures affect a range of outcomes at different points in the educational cycle. The funding and expertise required to mount such a systematic attack on the problem will be substantial, so poorer countries are going to need financial and technical support that would best be undertaken with a coordinated donor effort.

This set of recommendations would be a major undertaking that would require considerable funding and expertise, as well as political will and support. The need for political support is emphasized by Stromquist (2007), who writes about Latin American countries but whose caution applies to other countries as well:

> The evidence suggests that insufficient work is occurring in most national educational systems to modify curriculum content, textbooks, and teachers' skills and understanding of gender issues. [Institutions such as governments and conservative religious hierarchies] are reluctant to alter curriculum and practices [toward greater gender equity]. [But] despite the weak attention to gender equity in schooling, it may represent the strongest source of counter messages to traditional norms learned in the family, community, and national media. (as quoted by Blumberg, 2007, 35).

In the United States, it took legislative action (Title IX) to reduce or eliminate gender discrimination in educational institutions at all levels.[21] The most well-known application of Title IX is about equal athletic opportunities for males and females, but the law also protects students from discrimination on the basis of pregnant status, marital status, or parenthood. Research on the impact of the law reveals that, at least in the case of athletics, there has been a huge increase in the number of girls' teams across different sports and a large number of girls and young women competing in those sports (Brake, 2010). In turn, an impact evaluation using pre- and post-law cohorts indicates that a 10-percentage point rise in state-level female sports participation generates a 1-percentage point increase in female college attendance and a 1 to 2 percentage point rise in female labor force participation (Stevenson, 2010). The law has also provided a legal recourse for young women who have been sexually harassed or discriminated against in their educational institutions, although the implementation of the law in this regard has been rife with controversies.

Taiwan has a similar national law, the Gender Equity Education Act passed in 2004, that aims to "promote substantive gender equality, eliminate gender discrimination, uphold human dignity, and improve and establish education resources and environment of gender equality" (Taiwan, Republic of China, 2004). The passing of the law was preceded by an assessment of gender bias in Taiwan's curriculum and teaching practices. It prohibits schools from discriminating by gender orientation in its admissions policies (except for schools that are historically single-sex schools) and in its teaching practices, assessments, and facilities. Similar to Title IX, it specifically protects the right to education of pregnant students. It specifies that teachers will be given gender equity courses in their pre-service and in-service training. The U.S. and Taiwan experience with amendments or additions to the specifics of the law, implementation, enforcement, and dispute resolution issues offer lessons for countries that have yet to enact or enforce this type of legislation.

Girl-friendly infrastructure

The most common government intervention in education is the direct provision of public schools, which includes the construction of school buildings and classrooms, the allocation of teachers, and the distribution of textbooks, school supplies, and classroom equipment. Previous studies have examined the effect of different aspects of this provision. In many studies, one or more measures of school quality, usually defined as instructional materials, have been shown to explain variation in attendance or enrollment, controlling for other household, school, and community factors. However, not all spending for infrastructure and school inputs adds to learning; these inputs are not effective when they are not accompanied by complementary programs such as teacher training or curriculum reform (McEwan and Marshall, 2004; McEwan, 2012). Schools and classrooms must be

environments conducive to learning. Considering the state of schools especially in rural or low-income areas, investments in the physical capacity of schools to deliver services adequately are warranted.

Programs that focus on improving infrastructure and school inputs should be designed with incentives for girls in mind to ensure that they improve girls' education outcomes. In Burkina Faso, a government program, the Burkinabé Response to Improve Girls' Chances to Succeed (BRIGHT) program, which placed well-resourced schools in 132 villages, is an example of such a program. The package of interventions included school construction, incentives to children to attend school and a mechanism for mobilizing community support for education in general and for girls' education in particular. The prototype school included three classrooms, classroom equipment, school kits and textbooks, a playground, housing for three teachers, separate latrines for boys and girls, and a borehole equipped with a manual pump that served as a source of clean water. All students were eligible for school meals each day they attended school, but girls were also eligible for take-home rations conditional on 90 percent attendance each month. There was an extensive information campaign for parents on the potential benefits of education, particularly of girls' education; an adult literacy training program for mothers; and capacity building among local officials. The program sought to place more female teachers in program schools, and teachers and ministry officials received gender sensitivity training. Using a regression discontinuity evaluation design, a study finds that the enrollment of all children rose by 19 percentage points and scores improved by 0.41 standard deviations on a test that covered math and French subjects (Kazianga et al., 2012). The program increased girls' enrollment by 5 percentage points more than boys' enrollment, but boys' and girls' test scores increased by the same amount. The evaluation also finds that the "girl-friendly" amenities alone increased enrollment by 13 percentage points above the 27 percentage point effect on girls of providing a regular school, and raised test scores for all children in the village by 0.35 standard deviations, in addition to the 0.32 standard deviation effect of providing a non-BRIGHT school.

Great teachers

A focus on the role of teachers in addressing gender disparities is well-deserved. There is strong evidence of the positive relationship between teachers' education, experience, and cognitive skills and their students' academic performance. Six recent reviews of hundreds of impact evaluations of education interventions find that programs that train, support, and motivate teachers are among the most effective. For example, in the United States, having a good teacher is equivalent to the average gain in learning of one school year; having a great teacher means advancing 1.5 grade levels or more; but having a weak teacher means mastering less than half of the expected subject content (Hanushek and Rivkin, 2010). What a "great" teacher means and how to produce one are the critical questions, of course. What is needed to produce a great teacher is not always as expected. In India, for instance, contrary to expectations, students whose teachers have fewer than 10 years of experience do significantly better in language achievement tests compared with those whose teachers have more experience, but students whose teachers have had in-service training in the previous 12 months tend to perform better than students whose teachers have had no such training (Chudgar and Sankar, 2008).

The shift in teacher ability and pedagogy that is needed is characterized by Darling-Hammond (2010)

as follows: "education can no longer be productively focused on the transmission of pieces of information that, once memorized, comprise a stable storehouse of knowledge. Instead, schools must teach disciplinary knowledge in ways that focus on central concepts and help students learn how to think critically and learn for themselves so that they can use knowledge in new situations and manage the demands of changing information, technologies, jobs, and social conditions."

Having great teachers may be even more important for girls. In contexts where the benefits of sending girls to a formal school are not recognized and formal schooling is regarded with suspicion, effective teaching and learning right from the early grades ensure that girls have acquired the basic competencies of reading and math by the time they are pulled out of school—and may even convince the girls and their parents of the rewards of school attendance. However, a school and classroom environment that is less conducive for girls than for boys to learn would make schooling less attractive to girls and could mean lower gains for them with each year of enrollment. How teachers manage the classroom and interact with students and their mastery of subject content can make the school more or less attractive to girls. In the Philippines, for example, a program that improved the availability and quality of schools through more teacher training, and more textbooks especially at earlier grades, improved education indicators, especially for girls. In terms of the female–male gap, the program is estimated to have resulted in 0.34 more school years, 0.14 lower repetition rate in high school, 9 percent higher college entry rate, and lower likelihood of girls working while they were still enrolled in school, controlling for other factors. The long-term impact of these relative gains for girls, as seen for those beneficiaries who were tracked by a survey, was to reduce the salary gap between young men and women (Yamauchi and Liu, 2011).

But are great teachers for girls necessarily female teachers? Advocacy pieces have argued strongly for hiring more female teachers as a means to increase girls' schooling (Kirk, 2006; UNESCO, 2014). What is the basis for this advocacy, and does the evidence show that indeed female teachers are more likely than male teachers to increase girls' enrollment and their learning? Are female teachers better at teaching girls? Or is the need for a larger presence of female teachers primarily about alleviating parental concern about the moral or physical safety and well-being of their daughters which may be of paramount importance to girls' schooling in traditional, gender-segregated societies?

Some of the reasons for the advocacy for female teachers are summarized by Kirk (2006):

- In some conservative communities, parents will not allow their daughters to be taught by a male teacher. In such settings, mothers feel more comfortable talking about their children with a woman teacher. Parents may regard the presence of female teachers as partial protection for girls from unwanted attention from boys or male teachers, and even from sexual abuse and exploitation.
- In the school, female teachers may act as advocates for girls, representing their perspectives and needs, and promoting more girl-friendly learning. For example, women teachers may be able to advocate for better toilet and washing facilities, and for providing female students with accurate information about their own bodies and how to look after them.
- The presence of female teachers can support and encourage girls by serving as role models. They represent possibilities that can open up when girls continue their studies. They demonstrate that women can be active outside the home and be agents for community development.

With respect to effective teaching, however, the evidence for female teachers is decidedly mixed. For

example, a study of Indian classrooms in five states that investigates the relationship between student learning outcomes and the presence of female teachers finds that, controlling for teacher's education and training background, male and female teachers do differ in their classroom management practices, but this difference is not directly related to learning outcomes (Chudgar and Sankar, 2008). On the whole, the widest differences between the classroom management styles of male and female teachers pertain to their views on the need for strict discipline and the importance of fear, with male teachers emphasizing the need to maintain control and authority in the classroom. The study concludes that having a female teacher is relatively advantageous for language learning but has no effect on math learning. However, girls did not show a significant benefit when compared with boys, and although girls did poorly in math overall compared with boys, that performance was not further enhanced or worsened by the gender of the teacher.

A careful study of a large sample of schools, teachers, and students in Pakistan examines various hypotheses that might explain the relationship between teacher gender and any observed gender gap in math achievement (Warwick and Jatoi, 1994). When matched against other possible influences on achievement, teacher gender is the single most powerful predictor on two mathematics tests, but the hierarchical linear model results challenge the notion that male teachers are inherently better than female teachers at teaching math.[22] The findings do not demonstrate a general pattern of male superiority in teaching mathematics and warn against making statements about male and female ability in teaching and learning mathematics: "The results on student achievement in urban areas, and especially those showing a reversal of the gender gap among teachers with university degrees, remove the basis for any universal claims about male and female capability in teaching mathematics" (Warwick and Jatoi, 1994). It is useful to list here the key findings of the study because these identify possible areas for inquiry and policy change in other countries:

1. The female school supervisors visited girls' schools and met with rural female teachers significantly less often than their male counterparts visited boys' schools and met with rural male teachers. The problem was lack of adequate transportation for women in rural areas. Whereas male supervisors could use motorcycles and bicycles to reach schools, for cultural reasons female supervisors had to be driven to schools in appropriate transportation which proved to be harder to secure.

2. The level of formal schooling attained by the teacher is related to their students' achievement, and female teachers have, on average, much less formal schooling than male teachers, especially in rural areas. According to school supervisors, rural schools find it difficult to attract and retain urban women as teachers. These teachers must face the "lack of transportation allowances for visits to their homes, less contact with learning coordinators than is the case in rural male schools, the risks of robbery, rape, and kidnapping in certain areas, the absence or poor quality of school buildings, the need to deal with a new language or culture in their communities, and difficulties in making social contacts with village residents." In urban schools, whether the student has a male or female teacher has no relationship to the mathematics achievement of boys in grade 4. Among girls in that grade, those taught by women score much higher than those taught by men. But one grade up, boys do significantly better with male teachers while girls have about the same achievement scores with male or female teachers.

3. According to officials, the students of male teachers have higher scores in math because male teachers use different teaching classroom practices. They are more likely than female teachers to use classroom practices associated with higher mathematics

achievement: greater coverage of the curriculum in mathematics and science and having student translators explain what teachers are saying to students who speak a different language. Again, these differences are present in rural schools but not in urban schools where female teachers have received a university degree.

In all, Warwick and Jatoi (1994) conclude that the math gender gap arises mainly from the urban or rural location of schools, the formal education attained by the teachers, and coverage of the math curriculum by teachers. Hierarchical linear modeling shows that teacher gender has a much stronger influence on the mathematics achievement of students than student gender.

The evidence for the recruitment of more female teachers has been justified by the observation that in "countries where there are more or less equal numbers of male and female primary teachers, there is close to gender parity in student intake. In contrast, in countries where women constitute only 20 percent of teachers, there are far more boys than girls entering school." The evidence presented is accurate but the interpretation is a spurious one. While the average share of women in the teacher force across 127 countries with available data is 54 percent, among the countries where the gender gap in net enrollment rate in secondary education is one standard deviation below the average gender gap, the average share of female teachers is indeed only 20 percent (table 6). However, this statistic does not imply causality. It is not surprising that in countries with the lowest secondary enrollment rate for girls now the supply of future female teachers is also likely to be the lowest.

Table 6. Percent share of female teachers in secondary education

Region/Country Name	Latest year	% female teachers
World	2013	52.2%
High income	2012	65.0%
Upper middle income	2012	66.8%
Middle income	2012	53.2%
Lower middle income	2012	50.3%
Low income	2012	30.5%
Least developed countries: U.N. classification	2012	30.1%
Heavily indebted poor countries (HIPC)	2010	27.2%
OECD members	2012	61.9%
Euro area	2012	65.4%
European Union	2012	66.9%
North America	2012	66.8%
Europe & Central Asia (all income levels)	n/a	
East Asia & Pacific (all income levels)	2012	53.2%
Middle East & North Africa (all income levels)	2009	48.7%
Developing countries only:		
Europe & Central Asia	n/a	
East Asia & Pacific	2012	53.5%
Cambodia	2013	42.1%
Timor-Leste	2011	30.4%
Latin America & Caribbean	2012	63.2%
Middle East & North Africa	2008	47.1%
Arab World	2005	46.8%
South Asia	2012	42.4%
India	2011	44.5%
Bhutan	2012	42.3%
Afghanistan	2012	31.0%
Nepal	2014	27.4%
Bangladesh	2012	19.9%
Sub-Saharan Africa	2010	29.5%
Madagascar	2012	44.7%
Zambia	2011	30.2%
Rwanda	2009	28.5%
Ethiopia	2012	27.1%
Djibouti	2013	26.2%
Ghana	2014	25.3%
Niger	2012	22.2%
Mozambique	2009	21.0%
Burundi	2009	19.5%
Gambia	2013	18.9%
Senegal	2008	18.8%
Mali	2013	16.8%
Eritrea	2012	16.3%
Burkina Faso	2009	15.8%
Sierra Leone	2013	14.5%
South Sudan	2011	14.0%
Comoros	2013	13.9%
Mauritania	2013	12.8%
Benin	2013	11.1%
Guinea	2011	5.7%
Chad	2012	5.7%
Liberia	2014	4.8%

Data source: UNESCO data through World Bank, EdStats website; we use the average for the years 2000-14 because the latest available data for all countries covered these years.
Notes: Teachers refer to teaching staff in lower secondary (public and private, full and part-time, all programmes).

Cost-reducing mechanisms

Demand-side interventions which reduce the costs of schooling tend to have the clearest gender-differentiated results on enrollment (Glewwe, 2002). We review here two broad types of mechanisms: those that transfer cash to households in exchange for children attending school (a means perhaps to compensate households for the foregone work, domestic work, or work for pay, of children; and those that eliminate or reduce direct costs associated with school attendance.

Cash transfers to households. The potential effect of cash transfer programs on schooling has been demonstrated by how much they have influenced school enrollment and attendance, although the impacts of these programs have been found to be larger when specific conditions about schooling are imposed on the households.

Existing conditional cash transfer (CCT) programs, when they provide transfers for both boys and girls, generally provide identical transfers. Only about half of available studies of the educational impacts of CCTs actually report results by gender. Of those reporting results by gender, the PROGRESA/Oportunidades program is the only program where impacts (for enrollment) are significantly higher for girls than boys. Most studies show similar impacts of CCTs for girls and boys, with a couple of contexts where CCTs appear to improve educational outcomes for boys more than for girls. This evidence thus suggests that CCTs do not act to reduce gender inequalities in education favoring boys (Behrman, Parker and Todd, 2011). The PROGRESA/Oportunidades program probably obtains gender differences in impact because transfers for girls are about 15 percent higher more at the secondary (grades 7–9) and high school levels (grades 10–12) than for boys. This feature was originally motivated by the higher dropout rates of girls than boys after primary school in rural areas of Mexico, although in fact overall grades of completed schooling were similar for boys and girls at the time of program implementation.

Experimental evidence clearly reveals the importance of conditionality attached to the transfer and not just the size of the cash transfer.[23] In Malawi, school attendance and enrollment are significantly higher in a program's conditioned group, using data from teacher-reported attendance and enrollment rather than student/family reports (Baird, McIntosh, and Ozler, 2011). Compared with a control group, the conditioned group of girls aged 13 to 22 shows higher scores on math and English achievement tests and a cognitive (Raven's) test, whereas the unconditioned group shows no significant impact. Enrollment is not sensitive to the size of benefits in the conditioned groups, but is responsive in the unconditioned transfer group; each additional dollar increases enrollment by 0.08 percentage points. Who receives the transfer for the family, not just the size of the transfer, also appears to make a difference in CCT programs. Gitter and Barham (2008) analyze the Nicaraguan CCT program to test whether impacts on school enrollment are higher in households where women hold more power (measured as women's level of education divided by men's level of education). Their results suggest that impacts of CCTs are higher when the woman holds more power in the household.

Can these programs actually sustain improvements for girls beyond their initial impact on enrollment? A stipend initiative for girls in Pakistan introduced incentives for girls to spend more time in school and less time at work (Alam, Baez and del Carpio, 2011). An evaluation found that in the short term enrollment rates went up by almost 9 percentage points; five years hence, the program seems to have also

increased transition rates from middle to secondary school and completion rates at grade 9.

Zero-fees and scholarships. Advocates for the abolition of school fees claim that school fees and other policies that increase the direct costs to families are a significant obstacle to enrollment, especially for the poorest and most vulnerable children. Across-the-board elimination of school fees, it is argued, has the lowest overhead and yields the broadest impact, and that it is less expensive and ultimately fairer to pay fees for everyone than to divert funds into identifying, verifying, and delivering financial assistance to a subset of students. Abolishing fees can be done quickly while setting up the infrastructure for delivering targeted scholarships can significantly delay getting benefits to needy families. Those less supportive of abolishing school fees for all students argue that this approach tends to subsidize the affluent as well as the needy, unnecessarily increasing the fiscal cost of basic education. Those families that can pay for their children to attend school should and the resources used to subsidize them could be used to augment subsidies for the most disadvantaged students and/or invest in better school quality.

On the one hand, some argue that the most appropriate way to reduce school costs to families is for international organizations to directly subsidize the costs of education in selected countries, thereby allowing the government to abolish school fees; on the other hand, some argue for a more targeted scholarship program, in which only those most in need of financial assistance receive it. Both approaches have strong advocates but there are positive and negative elements of each approach. A central issue is whether it is feasible and cost effective to identify eligible candidates and deliver scholarships to targeted subsets of students in countries characterized by weak economic and social infrastructure and moderate to high levels of corruption.

There are several examples of scholarships programs targeted to girls. It is important to take note of the design of these programs: the size of the scholarship and what costs it covers, how recipients are selected, whether conditions exist with respect to retaining the scholarship, and how outcomes are monitored. We focus here on those programs that have been evaluated in a rigorous fashion.

- The Bangladesh Female Secondary Stipend Program dates back to 1982 when it was established—first in a small number of rural districts, before it was expanded to more rural districts and finally expanded once more to become a national program in 1994. Under the program, all rural girls who enter secondary school are eligible for a monthly sum amounting to less than $1, with additional grants in Class 9 for new books and in Class 10 for exam fees. The stipend is expected to cover 50 percent of the costs of textbooks, uniforms, stationary, transportation, exam fees, and miscellaneous direct educational expenses. The stipend is paid directly to an account in the girl's name in the nearest Agrani Bank, a state agricultural bank with branches throughout the country. Once a school participates in the program, all female students satisfying these criteria receive the grants as prescribed for each grade and the school is directly paid by the program for the corresponding tuition. To continue to receive the stipend, each awardee must maintain a minimum of 75 percent attendance rate, at least a 45 percent score in the annual school exams, and must remain unmarried until she obtains the Secondary School Certificate (SSC) or reach age 18 (Raynor and Wesson 2006). In the past two decades, Bangladesh has seen impressive increases in girls' enrollment at the primary and secondary levels. Researchers have attributed these increases to the stipend program. One evaluation estimates that, on average, one year of the stipend program has increased girls' secondary school enrollment by 12 percentage points, but

with this impact being larger for girls from families who own more land (Khandker, Pitt and Fuwa, 2003).

- In Cambodia, the Japan Fund for Poverty Reduction (JFPR) scholarship program, launched in the 2004 school year, awarded scholarships to poor girls who were completing sixth grade, the last grade of primary school. The value of the scholarship is large—in 2002, mean per capita gross domestic product in Cambodia was approximately $300 (World Bank 2005). Another way of benchmarking the magnitude of the transfer is by comparing it with expenditures by households on education. On average, the $45 transfer is almost exactly equivalent to average household spending per student in lower secondary school, as reported in a recent household survey. The program increased the enrollment and attendance of recipients at program schools by about 30 percentage points (Filmer and Schady 2008). Impact is larger among girls in the lowest socioeconomic stratum at baseline. The results are robust to a variety of controls for observable differences between scholarship recipients and non-recipients, to unobserved heterogeneity across girls, and to selective transfers between program schools and other schools.

- In Pakistan in the 1990s, the government of the province of Balochistan initiated two pilot programs that assisted communities in setting up private schools and offered financial assistance to defray the initial costs of operation as well as to assist in setting up an endowment (Alderman, Kim and Orazem, 2003). In both the urban girls' fellowship program and the rural program the government support was based on the number of girls the new schools could enroll. Despite the hurdles in finding a qualified local woman who could serve as a teacher in the rural school, more than 200 new schools were established as a result of the program. Many villages could not participate because they lacked an educated woman who could serve as a teacher. Villages that qualified for the rural girls' fellowship schools were among the least-educated villages in the province. The estimated two-year enrollment changes ranged from 25–45 percentage points in Quetta, and by 25 and 29 percentage points in two rural districts with initially very low enrollments.

- In Kenya, girls who scored well on academic exams had school fees paid and received a grant as part of a merit scholarship program (Kremer, Miguel and Thornton, 2009). Girls showed substantial exam score gains and teacher attendance improved in program schools. There were positive externalities for girls with low pretest scores, who were unlikely to win a scholarship. There was no evidence for weakened intrinsic motivation. There were heterogeneous program effects. In one of the two districts, there were large exam gains and positive spillovers to boys. In the other, attrition complicates estimation, but one cannot reject the hypothesis of no program effect.

- Another example of a targeted scholarship program is the Ambassadors Girls' Scholarship Program (AGSP), which is funded by USAID. The AGSP in Sierra Leone and Djibouti illustrate the weakness of the latter approach which is partly due to the lack of administrative capacity to implement a targeted program (Chapman and Mushlin, 2008). Scholarships are to be given to girls who are (a) orphaned or in a single-parent/guardian home, (b) handicapped or disabled, (c) economically disadvantaged, and (d) highly academically motivated as evidenced by past school performance. The scholarship package was essentially the same across all AGSP schools. It provided for payment of school charges and the provision of textbooks, book bags, uniforms, shoes and socks, school supplies, and a school lunch. Local selection committees decide which girls will receive an award. In Sierra Leone, while recipients and parents were grateful for the scholarships, the program fueled envy among other equally needy and qualified non-recipients who were not selected as beneficiaries. Community members and parents recount stories of non-scholars expressing their envy and sense of inferiority by choosing not to go to school. In Djibouti girls who did not receive the scholarships they thought they deserved apparently dropped out of school from frustration at being passed over.

- One scholarship program that managed the conflict that could arise from non-beneficiaries who believe that they were qualified to be a beneficiary is Colombia's scholarship program in the 1990s, which was targeted toward low-income students in urban areas. As in Sierra Leone and Djibouti, the demand for the scholarship exceeded the number of beneficiaries that the program could support, so the government agency that managed the program instituted a lottery among those applicants who met the selection criteria of the program (King, Orazem and Wohlgemuth, 2001). Although the program did not distinguish between male and female recipients, an impact evaluation of the program (which used the lottery mechanism to define an appropriate control group) finds that the benefits differed by gender. In particular, the school voucher programs targeted to girls were found to increase enrollment rates of both girls and boys (King, Orazem, and Wohlgemuth 1999; Angrist et al., 2002).

Safety in schools and freedom from violence

On the factors that might explain school violence, a study of 37 countries that participated in TIMSS concludes that predictors of national rates of general crimes are not good predictors of system-wide levels of school violence (Akiba et al., 2002). Although basic national conditions (e.g., GDP) and demographic conditions (e.g., size of the youth population) associate with levels of violence, the study finds that factors inherent in the education system such as large variation in school quality and in student achievement are more powerful predictors of school violence. The authors argue that equalizing the quality of education that all students receive might be a national policy intervention that can reduce school-related violence.

The village-based schools program in rural Afghanistan illustrates the benefit of shortening the distance to school to girls' education. While all children have benefited from the program, the effects accrue disproportionately to girls (Burde and Linden 2013). Decreasing distance to school affects girls more than boys—girls' enrollment rises by 6 percentage points more per mile reduced and, perhaps because of their consistent attendance, their test scores rise by an additional 0.09 standard deviations. Likewise, providing girls a safe means for getting to school increases enrollment. An innovative program state of Bihar (and neighboring states) in India aimed to reduce the gender gap in secondary school enrollment by providing girls who continued to secondary school with a bicycle. This bicycle program, launched in 2006, increased girls' age-appropriate enrollment in secondary school by 30 percent and reduced the gender gap in age-appropriate secondary school enrollment by 40 percent (Muralidharan and Prakash 2013). An impact evaluation finds that increases in enrollment mostly took place in villages where the nearest secondary school was further away, suggesting that the mechanism for program impact was the reduction in the time and safety cost of school attendance made possible by the bicycle. The coordinated provision of bicycles to girls appears to have improved safety for girls cycling to school in groups, and countered social norms that proscribe female mobility outside the village.[24]

Girls' and women's capabilities for leadership and ability to make choices

Although the large variation in labor force participation data across countries and world regions indicates that the relationship with demand for education is not a simple one, within the limits of the cultural context, it appears that young people do respond to labor market incentives. Not many studies directly test this responsiveness to expected future returns to education on schooling decisions. For this reason, the experimental study by Jensen (2010a) provides

very useful information. The pre-intervention survey indicated that, on average, eighth-grade boys in the Dominican Republic significantly underestimate the returns to secondary education; 42 percent expected that there would be no difference in their future earnings if they completed only primary school, while 12 percent expected higher returns. The boys in the treatment group were then provided information on the actual increases in earnings for workers who completed more years of education. Better information on returns to schooling increased the perceived returns of the treatment group by 28 percent and these boys completed, on average, 0.20–0.35 more years of school over the next four years than those who did not receive the information. Underestimating returns to education perhaps explains why, in 2012, whereas the persistence rate for boys in the Dominican Republic at the primary level was 76 percent, their net enrollment rate at the secondary level was 20 percentage points lower. The study suggests that the dissemination of information about returns is relatively inexpensive, so this seems a cost-effective way of encouraging young people to stay in school longer. Would this intervention work for girls as well?

Instead of providing information about labor market returns to education for young women, an experiment in India provided three years of recruiting services to help young unmarried women in randomly selected rural villages get jobs in the business process outsourcing industry (Jensen, 2010b). This randomized intervention examined whether an increase in employment prospects in India's growing business process outsourcing industry would lead to more schooling for girls. The intervention connected young women to experienced recruiters. The evaluation found that girls in the treatment villages were indeed more likely to be in school; they also had greater body mass index (BMI) measures, a reflection of nutritional status.

As examined in the prior discussion of soft skills, the literature on the benefits of developing soft or non-cognitive skills in developing countries is limited; nonetheless, a number of studies, particularly from OECD countries, have suggested the positive benefits soft skill brings to life outcomes. In addition to these longitudinal studies that support the connection between soft skills and the development of self-esteem, perseverance, and sociability, there are projects and initiatives that are working with girls to develop leadership programming that provides hands-on learning where the girls learn soft skills through guided life experiences like leadership activities. These projects have important takeaways and positive outcomes worth noting:

- CARE's Girls Leadership Programme focuses on developing the leadership skills of girls through extracurricular activities such as sports, the arts, debate clubs, and school government (CARE, 2012). The girls then apply the leadership skills acquired to civic engagement activities in their schools and communities. External evaluations of CARE's two girls' leadership programs reveal demonstrated development in girls' agency as well as "robust evidence of and potential to impact girls 'leadership development'" (CARE, 2012). CARE's definition of a "girl leader" is an "active learner who believes she can make a difference in her world, and acts alone and with others to bring about positive change" (CARE, 2012, 2). Additionally, the girl leader must demonstrate and develop the mastery of certain soft skills such as voice/assertion, decision-making/action, self-confidence, organization, and vision/ability to motivate others—a competency-based approach that helps girls find their *power within* and a similar empowerment/leadership framework presented in Rowlands (2009) (Care, 2009; O'Neil, Plank, and Domingo, 2015). CARE's Girls Leadership Programme assisted in building girls' confidence in Bangladesh leading to girls' action in initiating a community engagement about child marriage that resulted in the abandonment of child marriage in villages (CARE, 2012).

- Camfed's Learner Guide Programme[25] in sub-Saharan Africa and Study Hall Foundation's Girls' Education program in India provide similar insights.[26] Girls in both programs have a chance to talk with others, reflect on that engagement, and most importantly use these opportunities to practice improving skills—an approach sometimes referred to as "hands-on, minds-on" learning, which has been shown to be an effective pedagogical approach that assists in the development of soft skills. Both programs have a core set of teaching and learning materials that are designed to cultivate leadership and life skills among marginalized girls, have a networking component that links students and mentors or teachers together, and anchors their work in existing institutions like the school and community. In Camfed's Learner Guide program, young women graduating secondary school act as mentors for marginalized girls at lower levels of education. The young women are trained on leadership skills and how to help teach them, are given a recognized position in the community and in the schools, are networked with peers in other communities, and run weekly sessions with girls helping them problem-solve around the challenges they are facing. In the Study Hall Foundation's program, teachers are trained on gender dynamics and life skills, they are networked digitally with other teachers in the same program, and once a week in addition to the government curriculum the teachers run a session for girls discussing their aspirations for their lives and the problems they face. In both cases, these strategies have provided a safe forum for marginalized girls to discuss and address a range of issues from basic problems such as needed school supplies to much more sensitive issues such as abuse, exploitation, and early marriage.

What do project findings and the research suggest for designing and implementing women's and girls' leadership training? The DfID-funded *Learning and Evidence Project on Women's Voice and Leadership in Decision Making* provides a useful assessment of the existing evidence around girls and women's leadership. A number of recent reports, all conducted by the Overseas Development Institute, review in total hundreds of studies on different dimensions of the topic, including the role of technology. Overall, the evidence base needs to be strengthened, but the data that does exist points to some relevant findings, including:

- **A range of capabilities are important, especially soft skills.** Girls and women need diverse skills to be effective leaders. Studies drawing on evidence from multiple countries indicate important capabilities that include things such as creativity, flexibility, patience, and the ability to take risks (O'Neil, Plank and Domingo, 2015). Interestingly, some studies show that mastering the use of new technology, such as information and communications technologies, can help cultivate women's confidence and sense of self—both traits important for developing the "power within" (Cummings and O'Neil, 2015).

- **Adolescence is a great time to start cultivating leadership skills.** Various authors have found that girls are open and interested in learning leadership skills at this time in their lives. Also, studies on effective women leaders point to the importance of leadership experiences during childhood and adolescence (O'Neil, Plank and Domingo, 2015).

- **Experiential learning approaches are important.** Experiential learning, sometimes called hands-on, minds-on learning, can be an effective way to cultivate leadership skills. This is especially true for developing the "power within," which is crucial because "adolescent girls confront a 'psychological resistance' in which, unable to 'hear themselves' in dominant cultural discourses, they experience a conflict between what they feel themselves to know and experience, on the one hand, and what sociocultural norms permit them to express outwardly, on the other" (O'Neil, Plank and Domingo, 2015).

- **Female role models can be effective.** Girls' observations of female role models can help provide an alternative vision for their future compared to the dominant cultural discourse. Studies from Uganda

and India found that role models can have a positive influence on girls' education and career aspirations (O'Neil, Plank and Domingo, 2015).

- **Support from men and boys.** Several studies noted the importance of men and boys in helping with girls' leadership trajectories. Some note the importance of fathers and brothers and their support inside the family as well as other areas of girls' lives, while others note the importance of engaging boys in the extracurricular leadership activities girls' engage in out in the community (O'Neil, Plank and Domingo, 2015).

- **Technology can effectively connect women.** Studies of rural women or isolated women, namely women living in contexts where they are afforded limited freedom of movement, have shown that information and communication technologies (ICT), when deployed in a way that did not fuel anger or a backlash from men in their lives, could provide increased connection and information between women and to the outside world. "Gaining both skills and access to digital ICTs can provide women and girls with alternative channels for self-expression and engagement in public affairs, regardless of their physical location and if they experience gender-based constraints on their voice locally (i.e. increased power to)" (Cummings and O'Neil, 2015, p. 6).

Interestingly, one area that studies have found women's leadership activities has not fully leveraged is in e-governance. E-governance is where the actors such as the government and civil society employ digital technology and data platforms to better understand how services are delivered and what the end user is experiencing, all in an effort to improve public service delivery (Cummings and O'Neil, 2015). Anecdotal evidence points to limited connection between these two arenas. For example, in Northern Nigeria not a single girls' club was engaged in a government civil society monitoring program (Walker, 2015).

Indeed, it is not only the monitoring of public services that holds promise. Digital technology makes possible a wide array of new possibilities for girls and women's participation in informing policy. What has been widely called the "data revolution" describes the way in which new forms of information are able to be collected, analyzed, and ultimately used. The 2014 United Nations report, *A World That Counts: Mobilizing the Data Revolution for Sustainable Development,* describes key features of the data revolution. Some of these include the ability for new voices to play a role making data inform policy, new voices such as citizens and those from marginalized groups. The advent of so called crowdsourcing—getting large numbers of people to respond to a particular issue—also opens up a new mechanism for getting accurate information as the average response is surprisingly accurate. There are a number of examples of digital technology enabling real time data collection that is then used by relevant actors. For example, in Uganda the Mtrac program collects data via SMS (or text messaging) from health workers on the outbreak of malaria, making response more effective and rapid (U.N., 2014). Originally started as an initiative by nongovernmental actors, the Ugandan government quickly adopted the practice. Another example from India and Egypt is the use of digital media to collect information from women on incidents of violence and harassment. Currently a civil society initiative, the data is tracked on maps allowing women to make decisions about where they should and should not go (Cummings and O'Neil, 2015).

Ultimately, a woman's ability to choose and act at any point in time partly reflects foundations laid earlier in her life, often starting in childhood. These outcomes, or expressions of agency, are:

- **Ability to move freely**. This is measured by women's freedom to decide their movements and their ability to move outside their homes.

- **Control over resources.** This is measured by women's ability to earn and control income and to own, use, and dispose of material assets.
- **Decision-making over family formation.** This is measured by women's and girls' ability to decide when and whom to marry, when and how many children to have, and when to leave a marriage.
- **Ability to have a voice in society and influence policy.** This is measured by participation and representation in formal politics and engagement in collective action and associations.

VI. WHAT SHOULD WE DO: TAKING ACTION ON GIRLS' EDUCATION

Taking action on girls' education should not be confined to the halls of government offices or multilateral institutions. Civil society networks, business leaders, media organizations, academia, social enterprises, philanthropic communities, and individual global champions all have a role to play. With this in mind, we are recommending two focused streams of action.

Our first recommendation, to *lean in with girls' and women's leadership,* proposes specific initiatives that are well positioned for engaging diverse actors, including: women's groups, technology companies, media partners, transparency and education NGOs, and government education planning departments. These initiatives are envisioned as catalytic "quick wins" that, if given sufficient financial and political support, could be scaled up within a short time period. They also represent an attempt to explore relatively new approaches to tackling the decades-long girls' education problem. It is our assessment that all countries could benefit from leaning in on girls and women's leadership, as it is fundamental to sustainable social change not only for girls' educational opportunities but for gender equality more broadly.

Our second recommendation, to pursue *systemic reform with a gender lens,* recognizes the central role of governments in any effort to address the gender gap in education. Governments are ultimately responsible for delivering education for all of their country's children, girls and boys alike, and for brokering partnerships that will help the state's education system deliver on this promise. We propose that governments, together with their international partners, make a long-term commitment to education system reform with a gender lens. This approach has long been recognized as important but still needs extra attention to be implemented systematically in all countries. We acknowledge that each country has a different experience with education reform, including systemic reforms undertaken with a gender lens, and therefore must decide for itself how to best advance against this recommendation. We propose specific guidance that countries should take into account when doing so.

While made separately and with distinct purposes in mind, these two recommendations are also mutually reinforcing. Improved girls' and women's leadership, including new data generated, can provide an important feedback loop for governments either for planning or monitoring purposes. Likewise, government reforms can open up space for girls' and women's leadership, serving to both help it flourish and reap its outcomes in terms of improved girls' education opportunities. Ultimately, we hope that these two recommendations, and the specific initiatives made within each, are translated into action and together with the wide range of other strategies actors are pursuing can make a difference to girls, their learning opportunities, and ultimately their ability to be successful in their lives and livelihoods.

Recommendation 1: Lean in with girls and women's leadership

Putting girls and women at the center of efforts to close the gender gap in education is smart for several reasons. While the evidence that exists for this was reviewed in previous sections, it bears repeating. Supporting girls' and womens' leadership capabilities and promoting opportunities can:

- be a positive and potentially life-changing experience for the girls themselves.
- yield important information and insight for program and policy designers.
- contribute to longer term changes in social norms.

We propose two specific initiatives that could help countries lean in with girls' and women's leadership. Both are informed by what evidence exists on this topic but ultimately both are suggestions to explore relatively new approaches. Hence, they can also serve as important learning opportunities, learning about what works and increasing the evidence base around promising new strategies to support girls' education.

Recommendation 1.1: Build strong girl leaders

The existing evidence, indicates that supporting girls' and young women's leadership capabilities and opportunities can help them increase their sense of self-worth and sense of their own ability to affect change (i.e. "power within") as well as their ability to make choices, and interact and influence others (i.e. "power to"). Girls need strong foundational skills such as literacy and numeracy, but equally important for marginalized girls is the opportunity to build up a range of capabilities. These soft skills are anything but soft. They include, as previously discussed, the ability to creatively solve problems, to communicate effectively, and to have confidence in one's abilities despite facing resistance or failure. This full suite of competencies is what we know girls need to be empowered. While many children may develop these types of capabilities from quality parenting, community interactions, and learning opportunities, in the case of marginalized girls, this is not a given. Thus, explicit attention should be paid to ensuring marginalized girls have opportunities to build these valuable skills.

Evidence also points to the ways in which girls' leadership capabilities and opportunities can support longer-term shifts in social norms. Engaging girls' in leadership activities during adolescence is a particularly useful because they are especially open to learning new skills and it can pave the way for a lifetime of activism. A common characteristic across women leaders is their engagement in leadership activities as girls. Girls and women leading in their schools or communities provides visible role models, something that has been seen to be important in shifting social norms and perceptions around gender. Finally, from girls' clubs to women's organizations to national networks, active attention to girls' education issues by local groups can provide sustained focus on gender equality, especially in the face of shifting government policy, donor priorities, or media attention.

Therefore, we propose a *girls' leadership initiative* that simultaneously provides opportunities for girls to develop these soft skills as well as provides roles models and networks that help shift social perceptions and norms around girls' education and gender equality. How could this work? Below are suggestions:

- **Program components.** Central to this initiative is a mentorship model, where teachers or girls who are finishing secondary school serve as mentors for girls, providing opportunities for girls to learn, reflect, and practice leadership skills in their daily lives. Components of such a program include:
    - **Curriculum.** Teaching and learning materials that provide guidance to mentors on how to lead discussions and help facilitate girls' development of soft skills and leadership capabilities.
    - **Safe space.** A location, whether inside the school or elsewhere in the community, where girls are able to gather together and talk freely with their mentor. In contexts where movement is highly restricted, either for security or other reasons, mentors may move from place to place.
    - **Learn by doing.** Activities either within school or within the community that give girls the opportunity to learn by doing, as many of these soft skills are cultivated through experiences and interaction with others.

- **Network.** Connecting the young women and the girls involved in the initiative in one school or community to others in different locations provides a sustaining community of practice.
- **Engaging men and boys.** Reaching out to boys in school settings or the community, as well as fathers and male community leaders, to find ways to engage them in the process will be crucial.

- **Focus.** The focus of this initiative could start with the countries farthest behind on girls' education—namely, those stuck in an education "bog." A regional focus within Africa, such as West Africa, and within Asia, such as Southwest Asia, could leverage synergies across borders.
- **Scale.** Given sufficient financial support, this initiative would have the possibility to be developed and launched within three years. There are many existing civil society organizations that are on the ground and have the capacity to expand their activities to play a role in this initiative. It could first start by building on existing NGO capacity and quickly bring in governments and international organizations, ultimately with the potential to scale up widely and sustainably across regions.
- **Partners.** Organizations that are well placed to be partners in this initiative include NGOs and networks with an expertise in girls' and women's education and leadership, including: women's groups; U.N. agencies working on girls education within the identified regions; funders from governments, foundations, or corporate sectors; and ultimately, governments with a ministry of education, ministry of youth, or ministry of gender that are interested in reaping immediate benefits to girls education and also seeding long-term social change.

Recommendation 1.2: Girl-generated data

Gender-disaggregated or gender-related data that can be used to monitor, evaluate, and advocate for gender-sensitive programs and policies are needed to promote further progress in gender equality. Girls and women can help make this happen. To date, citizen transparency and e-governance initiatives have not typically leveraged girls' and women's leadership or involvement. Yet there are some examples that illustrate the promise this synergy holds, such as using information and communications technology and crowdsourcing to identify and disseminate information about effective occupational training or financial programs for girls and women. Indeed, the data revolution as a new movement can open up possibilities for girls' and women's leadership. While the elements of the data revolution that are particularly relevant for girls' and women's leadership have been reviewed in a prior section, it is worth summarizing them below:

- Democratizing data collection, with citizens having new ways of sharing information and reporting on problems, which in particular provides the potential for increased voice from marginalized groups.
- Real time data, with information more rapidly collected, aggregated, analyzed, and ready for use than ever before.
- Easier to collect data on sensitive issues, with more private mechanisms for sharing information and reporting problems, thus enabling data to be collected on topics that face social taboos or other forms of restrictions.
- Crowdsourcing, with large numbers of people providing information on a particular topic, which has been shown to increase data accuracy.
- Promising policy linkages, with initial indications showing that real time, citizen-generated data can be effectively used by policymakers.

For these reasons, we propose a *girl-generated data initiative,* which would combine the power of "factivists and feminists." Girl-generated big data has the potential to radically change the power dynamics with girls themselves generating regular information

about their circumstances, needs, and achievements that is translated into digestible and timely insight for policymakers, civil society actors, community leaders, and educators. Transparency and accountability take on whole new meanings in this light and ultimately puts the girls at the center of the process. A girl-generated big data initiative also can go a long way in helping fill the data gap on girls' education, both on basic education data that we have seen is often missing in many countries but also more importantly on sensitive issues.

The importance of this potential to have better information on sensitive subjects in particular must be underscored. We know that violence and child marriage gravely impact girls and this appears to be particularly pervasive in countries where girls' education is not making progress, in other words, countries we have classified here as "bogs." Data on these phenomena is particularly hard to come by. Mechanisms that will allow for richer data on girls' experiences with violence and child marriage are crucial. For example, we frequently hear the phrase that a girl has dropped out of school "to get married." But dig behind this reason, and there is a complex interplay of causal factors. Often, it is not the case that a girl drops out of school, but that she is "pushed out," and at that point her only option lies in marriage (Lake, 2015). In other words, she did not drop out to get married; she was pushed out and then got married. If we can get to such hidden truths as to why girls are being pushed out of the school system, then we can inform the right action to tackle these challenges and deliver much more effective solutions. In the end, it is ultimately the girls themselves who are best able to explain and share these stories and who with technology as a tool can generate helpful and timely action on the part of adults in their lives.

This approach is especially relevant today in an era where citizen action is increasingly a force for social change and where technology is helping bring to life new forms of information and interpersonal connections that previously were unthinkable. How would such an initiative work? Below are some suggestions:

- **Program components.** At the heart of this initiative is an effort to put mobile technology into the hands of girls (and boys) and to position them as drivers of real time data on their lives and education. This includes:
    - **Girls and boys.** Both girls and boys should be actively and equally engaged in this initiative, collecting data on education and their experience in their lives. Framing this as an initiative led by young people of both genders will provide a measure of protection for girls who will need to be supported (and not negatively targeted) because they are engaging in citizen reporting. It will also provide useful information about the different (or similar) perspectives between girls and boys.
    - **Data on education and sensitive issues.** A mix of data should be collected, including information on schooling experiences, family life, and information that provides deep insight into some of the issues that are sensitive or culturally difficult to discuss publicly, such as experiences with violence and child marriage, both of which are notoriously hard to collect data on with adult-driven methods.
    - **ICT deployment, especially mobiles.** Deployment of ICT, especially mobile technology, which offers the opportunity for girls and boys to conduct short surveys using for example ODK Open Data Kit or SMS forms, even in areas with low internet access.
    - **Training.** Training activities will be provided for the girls and boys engaged in the data collection, as well as for community leaders to ensure they mobilize in support of the youth, and for decision-makers so that they understand the usefulness of the information.

- **Collection and analysis.** Data could be uploaded and stored in the so-called cloud, and storage and analysis could be done by an independent entity that is able to ensure appropriate measures are taken to protect the privacy of data collectors.
- **Dissemination.** Once analyzed, data could be disseminated back to those engaged in the initiative, and most importantly, to decision-makers at different levels, such as teachers, education administrators, community leaders, civil society actors engaged in girls' empowerment, education ministries, international agencies, and donors and investors.

- **Focus.** Similar to the prior initiative on girls' leadership, the focus of this initiative could start with countries the farthest behind on girls' education, namely those stuck in education "bogs." A regional focus within Africa, such as West Africa, and within Asia, such as Southwest Asia, could leverage synergies across borders.

- **Scale.** This initiative has the possibility to be transformative for girls' education, but it is ultimately based on a relatively new idea around the power of citizen reporting, and hence should be piloted before it is fully scaled up. However, once a successful and scalable model is developed, the initiative has the potential to scale rapidly across many countries, assuming sufficient financial support.

- **Partners.** Organizations that are well placed to be partners in this initiative include technology and data analytics companies, transparency and e-governance NGOs, teachers unions, civil society organizations, networks focused on gender equality and issues like child marriage, researchers with expertise on gender equality, planning departments of education, gender ministries, and funders and investors from governments, foundations, and corporate sectors.

- **Connection with the *Build Strong Girl Leaders* initiative.** This initiative has obvious points of intersection with the previously proposed initiative on supporting girls and women's leadership skills. For example, one of the activities on which mentors could work with girls is collecting data for the girl-generated data initiative.

Recommendation 2: Focus systemic reform with a gender lens

Ultimately, the best approach for helping girls get educated is to ensure that countries have strong education systems, ones that enable all children to access good schools and learning opportunities. Country data presented earlier indicate that the countries with the worst education indicators are those that are failing all students. Good schools must be places where girls and boys alike must be given the opportunity to thrive and grow. This means the school environment is free of violence; school culture emphasizes respect and equality; teachers are caring, motivated, and trained to teach; infrastructure is adequate and accessible; textbooks and other materials are relevant, present, and used and reflect messages of equality; and students spend their time in school engaged in learning activities.[27] These are broad as well as profound reforms that will demand the best effort from a country's political leaders, educators, students, and communities. They will require robust financing and administrative capacity, and staunch support from civil society. The most effective path for reform would depend on the specific challenges and opportunities in the country, but they cannot be simply a collection or series of effective but uncoordinated programs. Our aim is to make the case that ministries of education and their external partners (including education sections in multilateral agencies, donor groups, and civil society organizations) should consider the following two actions.

Recommendation 2.1: Design for education hotspots

Around the world, girls face very different circumstances that constrain their educational opportunities. System-wide reforms must be implemented in accordance with the preexisting contexts of those systems. In doing so, ministers of education, multilateral and bilateral institutions, and civil society organizations engaged in reform processes should ensure they pay particular attention to the key obstacles in the education system that hold girls back. In particular we urge the global community to focus on hotspots—especially on countries where progress on closing the gender gaps has stalled, those countries stuck in an education bog. This would include:

- **Governments.** Girls face numerous obstacles when attempting to access learning opportunities in a country stuck in an education bog; one of those obstacles is cost, both out-of-pocket outlays for direct costs and the time cost of attending school regularly. By prioritizing national budgets and external aid dollars, governments can remove these costs for children in struggling and disadvantaged households. This is where the value for money is potentially greatest, but it would pay to consider the lessons from other countries and to continue to learn from what works in the local context.

- **Governments and teacher organizations.** Once in school, girls must be able to learn and thrive, something particularly important during the early grades when the foundation for school success is being established. Great teachers can unleash the potential in these girls. Governments and teachers organizations must prioritize teacher training, gender-sensitive pedagogy, and classroom support in order to help as many teachers as possible in their work. Teachers and teacher organizations can be powerful agents for this reform.

- **Donors.** Overseas development assistance for basic education has been decreasing in the last five years and nowhere is this more dramatic than in sub-Saharan Africa, home to more than half of the countries we have classified as stuck in an education bog (UNESCO 2014; GPE, 2015). International donors should prioritize more of their funding toward those countries that need assistance the most, but this support should be expected to make significant improvements in the education and gender indicators that are lagging behind. Continued support for filling the gaps in gender-disaggregated data and knowledge gaps about gender-focused reforms is support for a powerful public good. Past support for improving enrollment and completion rates and expanding participation in international or regional assessments has already paid off in terms of raising awareness and building political momentum among all education actors around gender equality.

- **Humanitarian system.** Despite extensive advocacy by civil society, humanitarian aid for education remains extremely low—on average less than 2 percent of estimated needs are met (GPE, 2015; Nicolai, 2015). Emergencies and protracted crises devastate the education systems of many countries. At least 15 of the countries classified as stuck in education bogs are also facing humanitarian emergencies, based on UNICEF's recent categorization. The U.N. special envoy for global education has urged humanitarian and development actors to set up a specialized funding stream for education in humanitarian contexts. If allocated with gender issues in mind, this support would go a long way in helping to close the gender gap in these countries.

Recommendation 2.2: Focus with a gender lens

Countries themselves, and their regional and global partners, must design and implement systemic reforms with a gender lens. This means all decisions around things such as policy, budgets, hiring, and monitoring must be evaluated with the understanding of their differential impacts on girls versus boys. To do this, the issue of gender equality cannot be a top

concern for only those people in a specialized gender-focused unit, as often is the case in government ministries or donor agencies. Rather, gender equality must be a core concern of personnel across all agencies working on system reform.

It is key to move from the debate between gender targeting and gender mainstreaming to a debate that explicitly recognizes that eliminating gender inequality requires both a focus on quantitative education indicators and a wide-angle view of the key "proximate" indicators of gender inequality that impact gender gaps. These proximate indicators—including age of marriage, labor force participation rates and occupational distribution of women, and share of women in business, education, and government leadership—are closely related to education outcomes for young women because they spell out the possible futures for them. Profound, systemic education reform would require changes outside the education system as well. Designing such reforms explicitly aiming for equity and equality would mean that, while improving the performance of the education system as a whole holds the promise of improving education for everyone ("a rising tide lifts all boats"), the resulting system would be essentially blind to persistent and specific obstacles that disadvantaged populations, including girls and young women, face. For this reason, gender affirmative action policies that aim to even the playing field for women have been enacted in many countries. Such policies address unequal endowments and attempt to give women a fighting chance in what are supposed to be gender-neutral contests.

One approach that should be expanded and robustly supported is to apply a gender lens to education sector planning. In most developing countries, the Education Sector Plan (ESP) is a key policy tool for designing and planning implementation and monitoring in the education sector. It has the potential to guide the setting of priority goals, the mobilization of resources toward shared objectives, and enhanced accountability for realizing a common vision of education for all. Sound education sector planning is at the heart of the Global Partnership for Education model—and is the basis of support given by multilateral and bilateral organizations—and thus can be linked to major sources of external financing for education.

Applying a gender lens to the process of sector plan development—including sector analysis, plan preparation, and plan appraisal—can ensure that that the key tools for national education system reform and associated policies and strategies promote effective actions that advance gender equality. Applying a gender lens helps to bring to the fore gender considerations in national policy and program: Is there coherence between the compulsory education law and age of marriage law? To what extent are these laws enforced? What gender-disaggregated data are used to analyze the sector challenges and to design the reform strategy? Do the data cover both enrolment and learning outcomes? Are there teacher policies to support women's effective engagement in the sector, such as maternity leave? Does the teacher training curriculum reflect gender-related challenges that teachers will encounter in the school and classroom? Is the girls' education strategy financed? Is the governance of scholarship schemes putting girls at risk of sexual exploitation? Are systems in place to monitor rates of school-related gender-based violence (SRGBV)?

The UNGEI-GPE *Guidance for developing gender-responsive education sector plans* provides a framework for understanding gender issues in education, including the identification of key concepts and tools to help in the analysis, design, and monitoring of education sector plans (UNGEI-GPE, forthcoming). This high-quality tool can be used across a range of contexts and its guidance should be regularly part of plan development processes.

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ENDNOTES

1. A careful empirical evaluation of the impact of the reservation policy in India was undertaken first by Chattopadhyay and Duflo, 2004).
2. Among others, see Barro and Lee (1994), Dollar and Gatti (1999); Abu-Ghaida and Klasen (2004); Morrison *et al*. (2007), and Klasen and Lamanna (2009). The gender inequality in education and employment in the Middle East and North Africa and in South Asia together explain 0.9-1.7 and 0.1-1.6 percentage point slower growth in these regions, respectively, compared to East Asia (Klasen and Lamanna, 2009). In countries where boys receive more education than girls at the ratio of 70:30, average human capital is 12 percent less, growth is 0.3 percentage points lower and poverty lower, compared with countries where there is more gender equality (Morrision *et al*., 2007).
3. While data on the rate of enrollment are more ubiquitous, the average years of schooling is a better proxy for human capital in an empirical growth model because it is the result of a series of schooling decisions and is thus less likely to be correlated with contemporaneous macroeconomic shocks that also effect growth rates. In contrast, macroeconomic shocks that affect growth rates could lead to an immediate change in enrollment rates as the recent global macroeconomic crisis has demonstrated.
4. Theories of endogenous economic growth stress the role that education plays in increasing a country's labor productivity and innovative capacity, identifying education as a positive force for economic growth, especially, in the long run. Economists have attempted to estimate the size of education's effect on economic growth, but many have not found unequivocal evidence of a positive impact of education, typically measured as average years of schooling.
5. In only 5 of 71 cases are the returns to schooling higher for men, and in 59 cases the estimated returns are higher for women (Schultz 2001, 2002). These estimates may be subject to measurement error and endogeneity biases; the higher average returns to schooling for women may be due to larger estimation biases in samples of women. Most of these studies use cross-section rather than panel data for each woman which would show the change in wages over time.
6. Glick and Sahn (2000) highlight the intergenerational benefit of educating today's girls: "Education interventions targeted specifically at girls would have immediate beneficial impacts on the gender schooling gap and these impacts would be compounded intergenerationally. This can be inferred from the fact that improvements in maternal schooling so strongly favor girls' education: raising girls' enrollments now is equivalent to raising maternal schooling, hence girls' schooling relative to boys', in the next generation. Thus there are intergenerational "increasing returns" for education equity to improvements in female schooling."
7. Economies now classified as advanced include also South Korea and Singapore which were low-income countries in 1950. Barro-Lee time-series data on gender-specific completed years of schooling are available for 144 countries.
8. In all, 171 countries have gender-specific data on the net enrollment rate at the primary level, as reported by UNESCO and the World Bank's EdStats database.
9. Other examples are the ethnically and linguistically diverse countries like India and Nepal where "more than 100 ethnic/caste and language groups, which are still the basis in many communities for determining the social class hierarchy, reside in these countries. Social class divisions based on caste, ethnicity and language further

complicate the issue of gender inequality in education. The degree of inequality in educational access of a girl further increases if she belongs to an under-privileged social group such as Dalits or an ethnic minority. What is clear in all the countries of South Asia is that a typical child whose right to an education is denied is most likely to be a girl from a rural area coming from an underprivileged social group." (Chitrakar, 2009)

10. PISA tests students who are 15 years old, irrespective of grade. TIMSS tests students at grades 4 and 8. PIRLS tests students in reading at grade 4. LLECE for Latin America tests students at grade 6. PASEC which covers francophone African countries tests students at grade 5, and SACMEQ which covers Anglophone African countries tests students at grade 6. For the comparisons, we use only the results from the latest assessments.

11. See, for example, Bowles et al. (2001), Judge and Bono (2001), Lindqvist and Vestman (2011), and Murnane et al. (2000).

12. Buchmann, Diprete and McDaniel (2008) observe the following: Patterns in gender differences in test scores have been the subject of much research for decades. Maccoby and Jacklin's (1974) classic *The Psychology of Sex Differences* provided a comprehensive analysis of more than 1,600 studies in the areas of achievement, personality, and social relations. Despite the large literature on this topic, debate persists on when in the life cycle gender differences in math performance emerge, whether males are more variable than females on measures of achievement, and whether sex differences in test scores are declining over time.

13. There is a large literature on this, but see, for example, the framework and survey of the literature by Glick (2008) and Orazem and King (2007).

14. Some of the studies that have estimated these effects are: in India (Sipahimalani, 1999), Ghana (Lavy, 1996), Pakistan (Holmes, 2003; Lloyd, Mete, and Sathar, 2007), and Senegal (Glick and Sahn, 2007).

15. However, it is difficult to conclude firmly that it is the increased future earnings potential that really leads parents to invest more in their daughters. As Jensen (2010) argues, most of the returns studies use cross-sectional data, and "concerns about omitted variables bias (areas where women work differ in many ways from areas where women do not work) or reverse causality (higher human capital women are more productive and therefore earn higher wages or are more likely to be in the labor force) make it difficult to draw a causal interpretation from the results, as noted by Sen (1990) and Foster and Rosenzweig (2009)." Three studies that attempt to address these concerns are Rosenzweig and Schultz (1982), who use variation in rainfall as a determinant of women's earnings opportunities, Qian (2008), who exploits a policy reform in China that differentially affected the value of traditionally male and female crops, and Foster and Rosenzweig (2009) who use land prices and yields as measures of expected future technical change and productivity. [1] The nations with the highest rate of arranged child marriages are: Niger, Chad, Mali, Bangladesh, Guinea, Central African Republic, Afghanistan, Yemen, and Pakistan.

16. There is a dedicated web page (www.id21.org/education/gender_violence/index.html) entitled 'Gender violence in Schools', which featured summaries of studies of school-based abuse of girls and other related studies (for example, gender violence in adolescent relationships; attitudes toward HIV/AIDS among adolescents) as well as accounts from different parts of the world of innovative and effective interventions to eliminate gender violence (Leach et al., 2003).

17. A comprehensive definition of school violence is given by Leach, Dunne and Salvi (2014): "It covers both explicit and symbolic forms of violence,

violence which takes place on school premises, on the journey to and from school, and in school dormitories and other school related facilities; violence perpetrated by teachers and other education personnel, students and community members, both female and male, and both across and within gender lines. Individuals may be victims or perpetrators, or both. … An alternative approach to the separation of sexual violence from other forms of violence is one which accepts that all manifestations of violence, including corporal punishment and bullying, have their roots in inequitable gender relations. Indeed, it can be argued that the three types of violence are inter related and difficult to isolate both conceptually and practically. For example, a schoolgirl who grants sexual favours to a male teacher will expect to avoid being beaten, whereas one who turns the teacher down might risk being singled out for beating or other forms of victimisation; boys who are themselves beaten or observe male teachers behaving inappropriately with certain girls may also use physical violence to procure sexual favours and other benefits for themselves. According to this viewpoint, research that does not engage with the gendered nature of school violence, and the gender regime that encourages it, is unlikely to advance understanding of the issues, and subsequent interventions are unlikely to be effective."

18. Six recent reviews of evaluation research on education have not flagged gender differences in impact (Conn, 2014; Glewwe et al., 2014; Kremer, Brennan and Glennerster, 2013; Krishnaratne, White and Carpenter, 2013; McEwan, 2012; Murnane and Ganimian, 2014). According to our interview with some of the authors of the reviews, they did not note gender differences in the evaluation literature, except when an intervention focused specifically on either boys or girls.

19. Blumberg (2007) finds that textbooks largely ignore all the changes in women's position in recent decades, such as shifts in any country's female labor force participation rate or its distribution of occupations by gender, as well as advances in women's income, organization and activism, and community involvement, despite the fact that these things are happening worldwide.

20. Title IX, signed by the President in 1972, is a comprehensive federal law that prohibits discrimination on the basis of sex in any federally funded education program or activity. It applies to traditional educational institutions such as colleges, universities, and elementary and secondary schools, as well as to any education or training program operated by a recipient of federal financial assistance. It was renamed the Patsy Mink Equal Opportunity in Education Act in 2002, after its House co-author and sponsor.

21. Hierarchical Linear Models is a statistical model that takes account of the unique features of data organized into hierarchies such as students, teachers and schools.

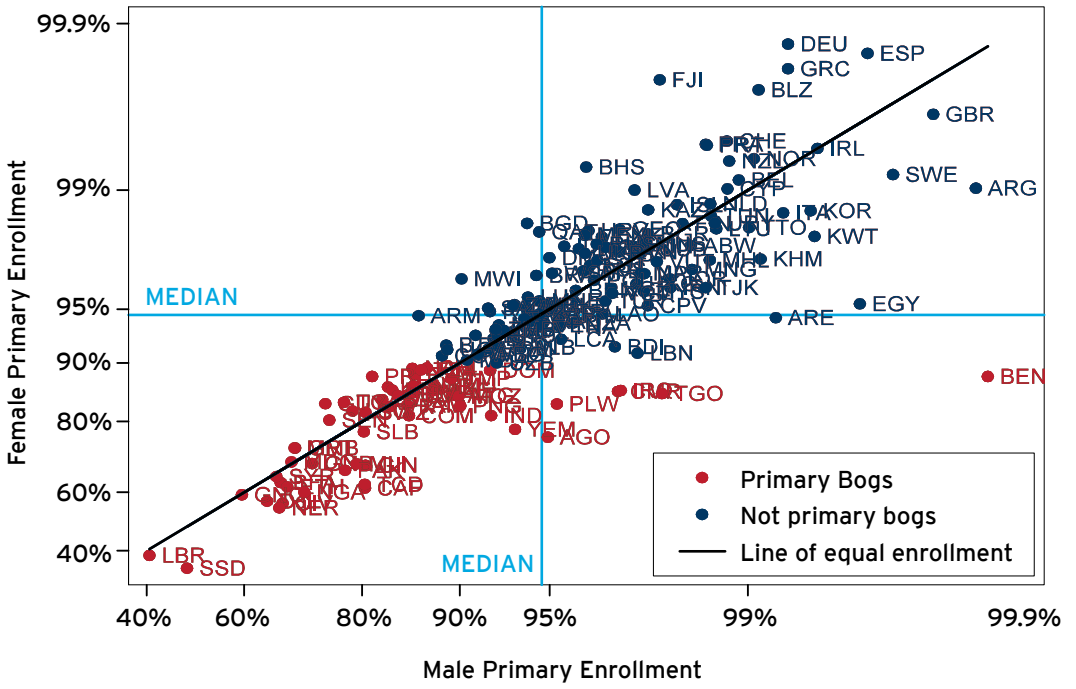
22. A different form of conditional subsidy to households is exemplified by two randomized school feeding schemes on health and education outcomes for children in rural Burkina Faso (Kazianga, de Walque and Alderman, 2012). One program provided lunch to children who attended school that day and the other program provided take-home rations to provide girl students each month, conditional on a 90-percent attendance rate. After for one school year, both programs increased girls' enrollment by 5 to 6 percentage points and decreased absenteeism for children of households that had a relatively large child labor supply and so could spare children from agricultural duties.

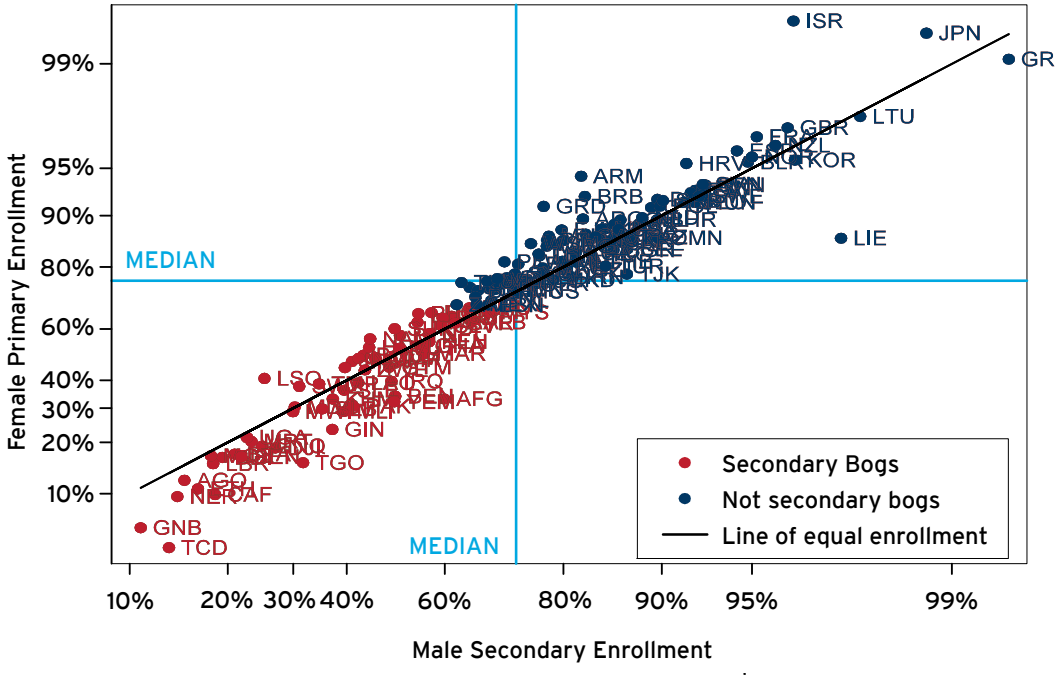
23. The authors of the evaluation cite Macy (2011) for a detailed history of the role of the bicycle in women's empowerment in the United State (Muralidharan and Prakash, 2013). The full quote from Susan Anthony cited is: "Let me tell you

what I think of bicycling. I think it has done more to emancipate women than anything else in the world. I rejoice every time I see a woman ride by on a wheel. It gives her a feeling of self-reliance and independence the moment she takes her seat; and away she goes – the picture of untrammeled womanhood."

24. Camfed's Learner Guide Programme https://camfed.org/what-we-do/leaders-of-change/
25. Study Hall Foundations Girls Education program http://www.studyhallfoundation.org/index.php
26. There are many different frameworks that have been developed to describe what makes a good school that include these basic elements, see for example: UNICEF's Child Friendly Schools framework, Right to Education Project's 4 As Framework, Inter-Agency Network for Education in Emergencies Minimum Standards, the World Bank's SABER initiative, etc.

Appendix Figure 1. Gender differences in primary and secondary net enrollment rates





Appendix Table 1. Female-Male ratio of standardized achievement tests, by competency level; International and regional tests, latest years

	F/M Ratio, PISA, 15-years-old					F/M Ratio, TIMSS Grade 8			TIMSS Grade 4			PIRLS, Grade 4			LLECE, Grade 6					F/M Ratio, PASEC, Gr 5					F/M Ratio, SACMEQ, Gr 6, 2007				
	Math			Reading		Math			Math			Reading			Math			Reading			Math			Reading		Math			Reading	
Country	Year	Low	High	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High
Albania	2012	0.988	1.089	0.893	1.046																								
Algeria						2007	1.065	0.869	2007	0.967	1.042																		
Argentina	2012	1.106	0.289	0.744	2.233							2011	0.820	1.543	2006	1.046	0.807	0.857	1.213										
Armenia						2011	0.796	1.030	2011	0.918	0.971																		
Australia	2012	1.157	0.730	0.477	1.583	2011	1.080	0.873	2011	0.993	0.887	2011	0.579	1.168															
Austria	2012	1.316	0.589	0.488	1.956				2011	1.179	0.819	2011	0.651	1.116															
Azerbaijan	2009	1.155	1.108						2011	0.923	1.125	2011	0.791	1.427															
Bahrain						2011	0.643	1.240	2011	0.837	0.795																		
Belgium	2012	1.040	0.751	0.578	1.577																								
Belize												2011	0.901	2.127														
Benin																				2005	1.309	0.753	1.181	0.903					
Bosnia and Herzegovina						2007	0.963	0.974																					
Botswana						2007	0.920	1.133																	2007	0.804	1.062	0.378	1.324
Brazil	2012	1.133	0.403	0.732	1.570										2006	1.051	0.734	0.652	1.171										
Bulgaria	2012	0.936	0.810	0.530	2.841	2007	0.726	1.050				2011	0.710	1.185															
Burkina Faso																				2007	1.311	0.853	1.214	0.872					
Burundi																				2009	0.997	0.927	0.892	0.970					
Cameroon																				2005	0.913	1.019	0.960	0.986					
Canada	2012	1.064	0.724	0.435	1.642							2011	0.665	1.138															
Chad																				2010	1.173	0.824	1.085	0.940					
Chile	2012	1.271	0.387	0.692	1.744	2011	1.225	0.760	2011	1.061	0.708				2006	0.922	0.760	0.720	1.040										
China	2012	0.922	0.956	0.372	1.433																								
Colombia	2012	1.182	0.333	0.822	1.103	2007	1.306	0.235	2007	1.103	0.205	2011	1.026	0.927	2006	1.322	0.516	1.057	0.885										
Comoros																				2009	1.173	0.824	1.085	0.940					
Congo, Dem. Rep.																				2010	1.211	0.960	1.169	0.891					
Congo, Rep.																				2009	1.042	1.008	1.050	1.004					
Costa Rica	2012	1.274	0.197	0.652	0.927										2006	1.393	0.699	0.960	0.946										
Cote d'Ivoire																				2009	1.054	0.860	1.000	1.084					
Croatia	2012	1.075	0.596	0.343	2.286				2011	1.039	0.706	2011	0.398	1.161															
Cuba															2006	0.806	1.051	0.661	1.113										
Cyprus	2012	0.964	0.420	0.460	2.066	2007	0.679	1.233	2003	1.040	0.844	2011	0.601	1.477															
Czech Republic	2012	1.179	0.787	0.465	2.311	2007	0.915	0.987	2011	1.053	0.791	2011	0.699	1.093															

	F/M Ratio, PISA, 15-years-old					F/M Ratio, TIMSS Grade 8			TIMSS Grade 4			PIRLS, Grade 4			LLECE, Grade 6					F/M Ratio, PASEC, Gr 5					F/M Ratio, SACMEQ, Gr 6, 2007				
	Math			Reading		Math			Math			Reading			Math			Reading		Math			Reading		Math			Reading	
Country	Year	Low	High	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High
Denmark	2012	1.230	0.728	0.525	1.971				2011	1.017	0.921	2011	0.713	1.161															
Dominican Republic															2006	0.958	0.271	0.839	1.381										
Ecuador															2006	0.996	0.892	0.945	0.981										
Egypt, Arab Rep.						2007	0.903	1.140																					
El Salvador						2007	1.099	0.452	2007	1.060	0.962				2006	1.151	0.735	1.002	1.027										
Estonia	2012	0.981	0.796	0.297	2.463	2003	0.834	1.031																					
Finland	2012	0.739	0.866	0.260	2.853	2011	0.760	1.067	2011	0.729	0.892	2011	0.461	1.206															
France	2012	1.001	0.693	0.499	1.785							2011	1.039	1.071															
Gabon																				2006	1.390	0.921	1.179	0.980					
Georgia	2009	0.989	0.607	0.678	1.954	2011	0.986	0.784	2011	0.865	0.889	2011	0.609	1.484															
Germany	2012	1.114	0.749	0.430	2.489				2011	1.285	0.866	2011	0.705	1.105															
Ghana						2011	1.103	0.561																					
Greece	2012	1.070	0.527	0.413	1.879							2011	0.370	1.287															
Guatemala															2006	1.120	0.646	0.986	0.987										
Hong Kong SAR, China	2012	0.992	0.760	0.443	1.448	2011	0.739	1.061	2011	0.545	0.985	2011	0.367	1.173															
Hungary	2012	1.033	0.664	0.484	1.978	2011	1.076	0.921	2011	0.868	0.932	2011	0.652	1.177															
Iceland	2012	0.848	0.945	0.403	2.524							2011	0.487	1.284															
Indonesia	2012	1.031	0.644	0.762	2.421	2011	0.896	1.102				2011	0.755	1.702															
Iran, Islamic Rep.						2011	1.034	0.805	2011	0.967	0.860	2011	0.721	1.429															
Ireland	2012	1.229	0.672	0.465	1.691				2011	0.734	0.919	2011	0.610	1.169															
Israel	2012	0.993	0.422	0.469	1.212	2011	0.676	1.044				2011	0.679	1.015															
Italy	2012	1.170	0.513	0.485	1.695	2011	1.246	0.782	2011	1.168	0.838	2011	0.729	1.041															
Japan	2012	1.024	0.686	0.463	1.263	2011	0.717	0.940	2011	0.554	0.970																		
Jordan	2012	0.894	0.219	0.473	2.239	2011	0.794	1.159																					
Kazakhstan	2012	0.988	0.717	0.710	1.208	2011	0.930	0.893	2011	0.869	0.850																		
Kenya																									2007	1.231	0.675	0.880	1.002
Korea, Rep.	2012	0.990	0.732	0.433	1.262	2011	0.632	0.978	2011	0.698	0.991																		
Kuwait						2007	0.935	0.634	2011	0.862	1.325	2011	0.770	2.511															
Kyrgyz Republic	2009	1.004	0.000																										
Latvia	2012	0.851	0.839	0.318	3.212	2003	0.708	1.000	2007	0.701	1.022	2011	0.254	1.441															

	F/M Ratio, PISA, 15-years-old					F/M Ratio, TIMSS Grade 8			TIMSS Grade 4			PIRLS, Grade 4			LLECE, Grade 6					F/M Ratio, PASEC, Gr 5					F/M Ratio, SACMEQ, Gr 6, 2007				
	Math			Reading		Math			Math			Reading			Math			Reading		Math			Reading		Math			Reading	
Country	Year	Low	High	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High
Lebanon						2011	1.157	0.646																				
Lesotho																								2007	0.979	0.894	0.790	1.166
Liechtenstein	2012	1.548	0.810	0.654	1.675																							
Lithuania	2012	0.880	0.688	0.325	3.167	2011	0.731	1.103	2011	0.911	1.001	2011	0.589	1.306														
Luxembourg	2012	1.430	0.588	0.661	1.508							2011	0.538	1.025														
Macao SAR, China	2012	0.861	0.861	0.372	1.981																							
Macedonia, FYR						2011	0.912	1.074				2011	0.794	1.427														
Madagascar																				2005	0.954	0.985	0.893	1.154				
Malawi																									2007	1.160	0.594	1.181	0.586
Malaysia	2012	0.917	0.897	0.686	2.690	2011	0.718	0.989																				
Malta	2009	0.808	0.903	0.503	3.638	2007	0.938	0.908	2011	1.061	0.803	2011	0.742	1.200														
Mauritius	2009	1.023	0.496	0.711	1.914																				2007	0.654	1.102	0.497	1.208
Mozambique																									2007	1.230	0.956	1.104	0.912
Mexico	2012	1.153	0.348	0.739	1.451										2006	1.012	1.107	0.804	1.194									
Moldova	2009	1.042	0.573	0.710	5.129	2003	0.805	1.145	2003	0.837	1.170	2011	0.669	1.275														
Mongolia						2007	1.100	0.739	2007	1.022	1.019																	
Montenegro	2012	0.994	0.611	0.518	3.920																							
Morocco						2011	1.001	1.119	2011	0.981	0.977	2011	0.916	1.151														
Namibia																									2007	1.003	0.821	0.666	1.250
Netherlands	2012	1.139	0.788	0.616	1.653	2003	1.135	0.943	2011	1.135	0.864	2011	0.589	1.079														
New Zealand	2012	1.082	0.671	0.540	1.561	2011	1.221	0.672	2011	0.918	0.904	2011	0.637	1.229														
Nicaragua															2006	1.128	0.599	0.969	0.711								
Norway	2012	0.975	0.885	0.426	2.097	2011	0.881	0.990	2011	0.959	0.748	2011	0.529	1.298														
Oman						2011	0.709	1.522	2011	0.832	1.076	2011	0.721	1.459														
Panama	2009	0.989	0.401	0.824	2.964										2006	0.957	0.832	0.804	1.364									
Paraguay															2006	0.911	0.985	0.852	1.216									
Peru	2012	1.084	0.572	0.843	1.801										2006	1.190	0.637	1.004	0.917									
Philippines						2003	0.891	0.838	2003	0.924	1.156																	
Poland	2012	0.921	0.849	0.320	1.774				2011	1.046	0.724	2011	0.601	1.168														
Portugal	2012	1.080	0.685	0.501	2.068				2011	0.916	0.872	2011	0.385	1.184														
Qatar	2012	0.964	0.830	0.659	2.313	2011	0.898	1.004	2011	0.867	0.988	2011	0.740	1.338														
Romania	2012	1.019	0.717	0.600	1.627	2011	0.913	1.243	2011	0.998	0.949	2011	0.743	1.197														

	F/M Ratio, PISA, 15-years-old					F/M Ratio, TIMSS Grade 8			TIMSS Grade 4			PIRLS, Grade 4			LLECE, Grade 6					F/M Ratio, PASEC, Gr 5					F/M Ratio, SACMEQ, Gr 6, 2007				
	Math			Reading		Math			Math			Reading			Math			Reading		Math			Reading		Math			Reading	
Country	Year	Low	High	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High	Year	Low	High	Low	High
Russian Federation	2012	0.945	1.009	0.509	2.220	2011	0.788	0.974	2011	0.815	0.994	2011	0.398	1.168															
Saudi Arabia						2011	0.885	0.575	2011	0.790	0.560	2011	0.450	1.455															
Senegal																				2007	1.259	0.881	1.207	0.852					
Serbia	2012	1.082	0.599	0.548	2.203	2007	0.820	1.016	2011	1.033	0.901																		
Singapore	2012	0.687	0.987	0.459	1.490	2011	0.280	1.074	2011	0.689	1.036	2011	0.494	1.146															
Slovak Republic	2012	0.987	0.597	0.576	1.781	2003	0.919	0.955	2011	1.100	0.841	2011	0.818	1.149															
Slovenia	2012	0.972	0.845	0.365	3.557	2011	1.134	0.915	2011	1.181	0.806	2011	0.537	1.194															
South Africa						2003	1.009	0.612				2011	0.922	1.581											2007	0.894	1.030	0.753	1.279
Spain	2012	1.134	0.504	0.560	1.445				2011	1.151	0.712	2011	0.728	1.079															
Swaziland																									2007	1.372	0.824	0.447	1.073
Sweden	2012	0.921	0.815	0.445	1.971	2011	0.899	1.115	2011	1.173	0.897	2011	0.699	1.231															
Switzerland	2012	1.115	0.788	0.477	1.881																								
Syrian Arab Republic						2011	1.083	0.576																					
Tanzania																									2007	1.552	0.610	1.163	0.917
Thailand	2012	0.857	1.205	0.425	3.804	2011	0.748	1.083	2011	0.701	1.032																		
Trinidad and Tobago	2009	0.928	1.095	0.622	4.720							2011	0.589	1.590															
Tunisia	2012	1.120	0.425	0.747	0.918	2011	1.279	0.647	2011	0.959	0.755																		
Turkey	2012	1.061	0.660	0.394	2.391	2011	0.936	1.078	2011	0.926	0.989	2011	0.736	1.391															
Uganda																									2007	1.121	0.744	1.120	0.877
Ukraine						2011	0.892	0.842	2007	0.938	0.931																		
United Arab Emirates	2012	0.917	0.619	0.473	2.070	2011	0.679	1.016	2011	0.862	0.805	2011	0.708	1.173															
United Kingdom	2012	1.210	0.766	0.682	1.764																								
United States	2012	0.949	0.816	0.488	1.570	2011	1.013	0.924	2011	1.083	0.907	2011	0.607	1.085															
Uruguay	2012	1.108	0.399	0.731	1.562										2006	0.894	0.965	0.678	1.275										
Vietnam	2012	1.004	0.695	0.389	1.708																								
West Bank and Gaza						2011	0.811	1.075																					
Yemen, Rep.									2011	0.991	0.868																		
Zambia																									2007	1.110	0.361	1.115	0.880
Zimbabwe																									2007	0.894	0.880	0.694	1.096

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