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The Radical Power of Education

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Abstract

When education works, people thrive and societies flourish alongside economies. We have made real progress on primary enrollment on the global scale, with 90% of children enrolling in school. However, completion rates lag far behind—only 77% of children complete lower secondary school and 58% complete upper secondary. Those numbers decline sharply for those living in poverty, for girls, and for Indigenous communities, with 44% of adolescent girls in low- and middle-income countries (LMICs) either dropping out of primary school or never attending at all.

Low educational attainment and illiteracy exclude children from the freedoms that come with learning and also leave vast social and economic potential untapped. People with better education have greater capacity to care for themselves and their families, participate in civic life, and raise their children well. And a single year of education has been estimated to increase individual earnings by 10%, or up to 15% among women in sub-Saharan Africa. Education does more than increase earning potential or productivity—it also improves health, well-being, and quality of life. Women and girls with 12 years of education are less likely to be married as children and less likely to experience domestic or intimate partner violence (IPV) than other women.

In this report, we simulated the multisectoral benefits afforded by 12 years of education in LMICs, based on data from published sources and accounting for uncertainty. These predictive models offer a glimpse into what the future can look like if the global community can rally around the goal of universal primary and secondary education. We estimate that universal secondary education in LMICs could boost annual gross national income (GNI) by $8.1 trillion for young adults aged 15-24 years, reduce the annual number of child marriages by 2 million, and reduce the number of women aged 15-49 who experience any form of IPV by 81.3 million, Universal maternal secondary education could also reduce the annual number of deaths among children under the age of 5 years by 524,834 and the number of stunted under-5 children by 22.5 million. We discuss the socioeconomic, cultural, and systemic barriers to achieving these benefits of education and make recommendations for a path to achieving universal coverage of secondary schooling.

1. Introduction

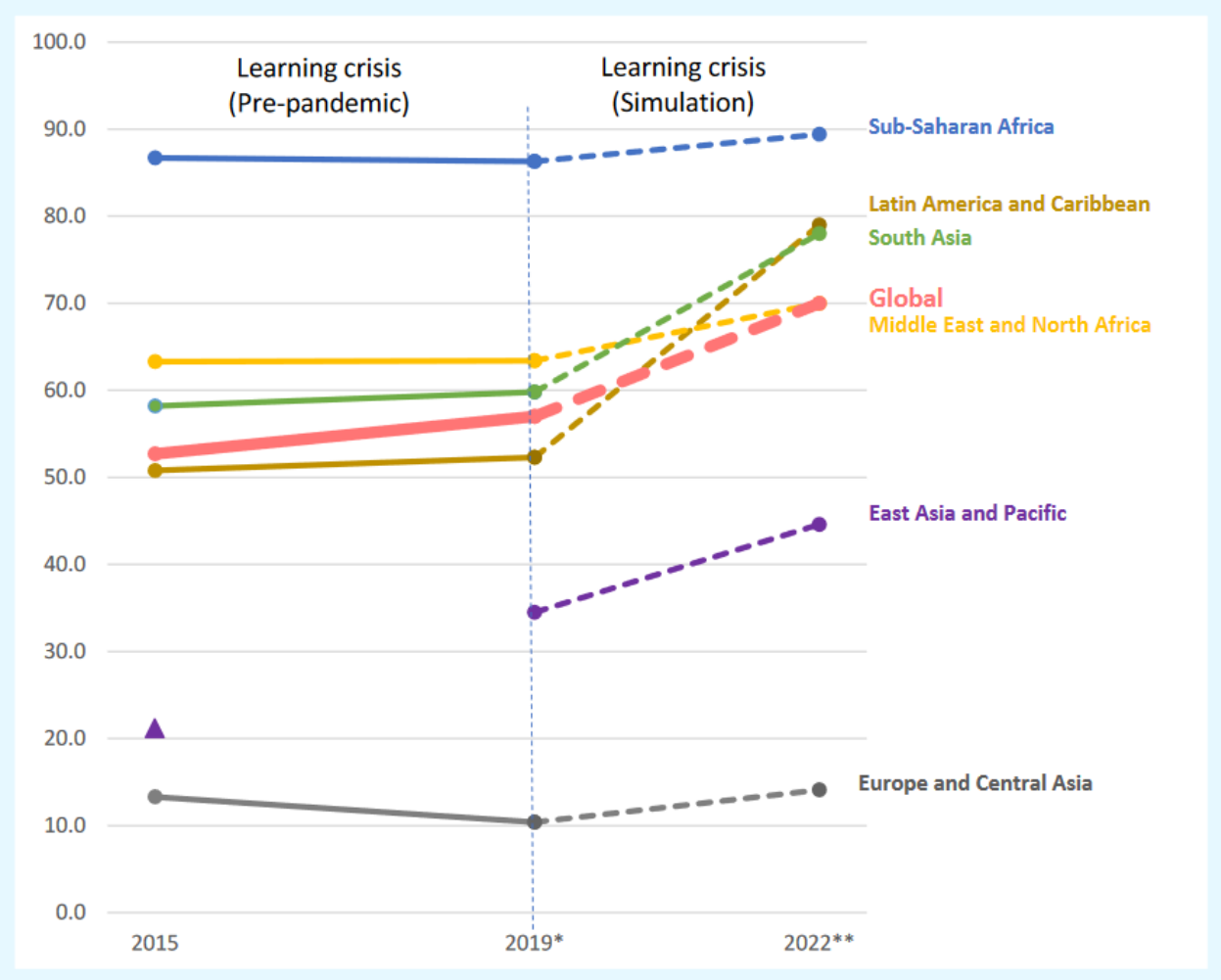
Education was first established as a fundamental human right through the United Nations General Assembly's Universal Declaration of Human Rights of 1948. The UNESCO Convention Against Discrimination in Education of 1960, signed by over 100 member states, codified global equity in education by prohibiting limitation, exclusion, or preferential treatment of people on the basis of their background such as race, gender, language, religion, economic status, or ethnicity (UNESCO, 2023). Since then, these principles have been echoed in several multilateral agreements, the most recent of which is the United Nations Sustainable Development Goals (SDGs) of 2015 Target 4 that aims to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015). SDG Target 4 covers several aspects of equitable education, including the provision of free primary and secondary education, achieving universal foundational literacy and numeracy, eliminating all forms of discrimination from education, and providing equal access to preprimary and vocational or technical education.

Despite the repeated calls to action, access to quality education remains far from universal, especially in low- and middle-income countries (LMICs). Net enrollment rate in primary education has remained at 90% in LMICs for a decade now, and vulnerable and marginalized children continue to disproportionately suffer from lack of access to education (UNESCO Institute for Statistics, 2015; UNICEF, 2016; World Bank, 2023a). Among the estimated 258 million children and youth who were out of primary and secondary schools globally in 2019, 97.5 million were from sub-Saharan Africa and 93 million were from South Asia (UNESCO Institute for Statistics, 2023a). By 2030, the promise of 12 years of education for all (SDG Target 4.1) will likely be fulfilled in only one out of every six countries of the world (United Nations, 2015). Newly released 2023 data by UNESCO show that substantial educational disparities remain across geographies and socioeconomic groups – with only one in six countries being able to close the wealth gap in primary schooling completion rates (UNESCO Institute for Statistics, 2023b).

Global inequalities in schooling opportunities and quality of education are reflected in the ongoing learning crisis. In 2019, even before the COVID-19 pandemic severely disrupted education delivery around the world, the learning poverty rate – defined as the proportion of 10-year-old children who cannot read and understand simple text –

was 57% in LMICs and 86% in sub-Saharan Africa, as compared with only 8% in high-income countries (World Bank, 2022). Despite substantial progress in education delivery during the past few decades, learning poverty rates largely remained stagnant in the decade leading up to 2019 in LMICs, and then increased from 57% to 70% during the pandemic (Figure 1) (World Bank, 2022). In a historic move, the United Nations hosted the Transforming Education Summit during the 77th UN General Assembly in 2022, bringing together a diverse array of state actors to address the global education crisis.

Figure 1: Learning poverty among 10-year-old children in LMICs



Note: Reproduced from the World Bank report "The State of Global Learning Poverty: 2022 Update," Figure 1, p. 9 (World Bank, 2022). The global estimates are for all LMICs. * East Asia and Pacific estimates for 2015 and 2019 were not directly comparable. ** Estimates for 2022 are based on simulations.

In this report, we discuss the current challenges facing education systems in LMICs, including inequalities in access to quality education and student outcomes, the learning crisis in a post-pandemic world, and the role of public policy and adequate financing. We present new estimates on multisectoral benefits of education by modeling some of its key health, economic, and social impacts to demonstrate the urgent need to accelerate investment in quality education. Finally, we highlight strategies to improve learning and attainment in LMICs.

2. What are the gender and socioeconomic gaps in schooling and learning in a post-pandemic world?

There remain inequalities in educational opportunities and outcomes not only across countries and regions of the world but also between men and women and population subgroups within countries. Even in high-income countries with universal or high levels of access to quality education, schooling and learning outcomes may vary by race or socioeconomic status. For example, while school dropout rates in the US among 16-24-year-old whites was 4.1% in 2021, dropout rates among Black, Hispanic, and American Indian/Alaska Native groups were 5.9%, 7.8%, and 10.2% respectively (National Center for Education Statistics, 2023). Analysis of multicountry Programme for International Student Assessment (PISA) standardized tests for 15-year-old children show that even in 38 high-income Organisation for Economic Co-operation and Development (OECD) countries, a one-unit increase in the PISA index of socioeconomic status of the student was associated with an increase of 37 points in the reading assessment score (OECD, 2019). There are also substantial male-biased gender gaps in mathematics proficiency and the choice of STEM-related fields of higher education in OECD countries, although girls tend to perform better than boys in reading proficiency tests (OECD, 2023).

Gender and socioeconomic gaps in schooling and learning outcomes in LMICs are more extreme (Graetz et al., 2020). Among 10-19-year-old adolescent girls from the poorest wealth quintile in LMICs, an estimated 30% never attended any school and another 14% dropped out of primary school in 2020 (UNICEF, 2020). Girls who are in school continue to experience poor learning opportunities (Evans et al., 2021). A recent study of 43 LMICs found that only 62% of 15-19-year-old adolescent girls with primary education had basic literacy skills as compared with 69% of boys, and in nine African countries, less than 50% of girls did so (Psaki et al., 2018). Among primary- and middle-

school-age children, boys consistently score 0.05–0.09 standard deviation higher in standardized tests such as those for mathematics, language, and reasoning skills than girls in large LMICs such as India (ASER Centre, 2021, 2020; Das and Singhal, 2023; Dickerson et al., 2015; Hervé et al., 2022).

The COVID-19 pandemic has substantially worsened schooling and learning outcomes around the world and exacerbated associated gender and socioeconomic inequalities. School closures affected more than 1.4 billion students in LMICs (World Bank, 2023b). Globally, average learning loss due to the pandemic was 0.1– 0.17 standard deviation, which is equivalent to up to 6 months of learning (Betthäuser et al., 2023; Patrinos et al., 2023). The negative effects on learning outcomes were likely larger for LMICs such as India where 330 million students were out of school for 18 months, and where there were deep socioeconomic and gender inequalities in access to online learning tools (UNESCO et al., 2021). In Africa, immediate or short-term learning loss from the pandemic was equivalent to about 1 year, while long-term losses were projected to be substantially higher at 2.8 years for a child in grade 3 (Angrist et al., 2021). Global loss in future earnings of students due to school closures are estimated to be up to $21 trillion in present value (Azevedo et al., 2021; World Bank, 2022) or equivalent to an annual reduction of 0.8 percent of the global economic growth (Psacharopoulos et al., 2021). Children from low-income families and other vulnerable backgrounds will experience the largest future economic cost of pandemic-related learning losses (Psacharopoulos et al., 2021).

A digital divide exacerbated inequalities in learning opportunities during the pandemic. Due to unequal gender norms in many LMICs, school-age girls had substantially lower access to digital learning tools and were more likely to be engaged in household chores as compared with boys during the pandemic (Ahinkorah et al., 2021; Asadullah and Bhattacharjee, 2022; Centre for Catalyzing Change, 2020; Crompton et al., 2021). There were also substantial disparities in access and outcomes across socioeconomic groups. For example, in India, loss in reading ability among adolescent girls in the lowest wealth quintile was more than tenfold the loss in those in the highest wealth quintile (Nandi et al., 2023). In high-income countries such as the US, students from minority race groups and disadvantaged socioeconomic backgrounds had lower access to digital learning opportunities than those from privileged backgrounds (Francis and Weller, 2022).

3. Are LMICs investing enough in education?

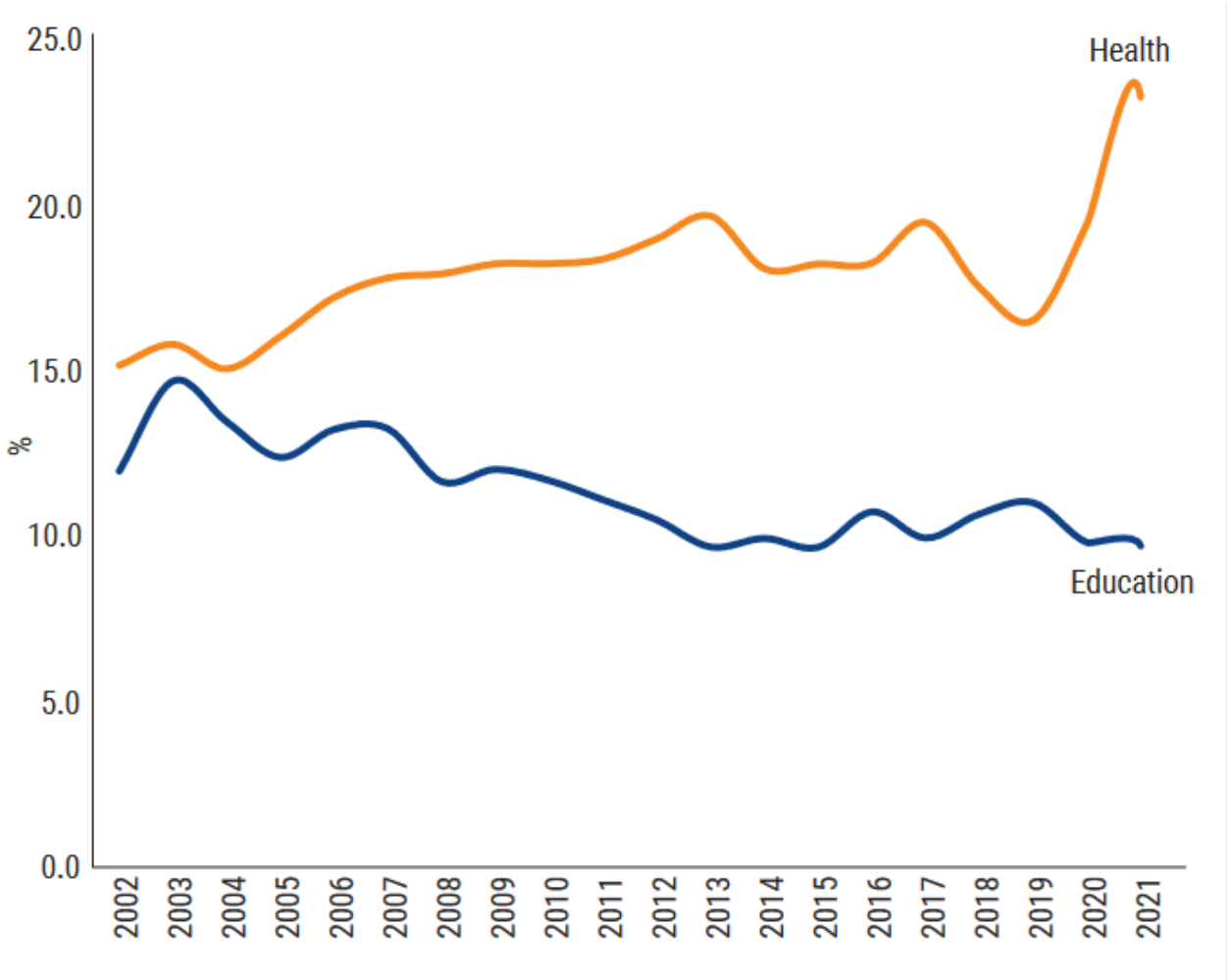
While annual global spending on education as a share of gross domestic product (GDP) has remained in the 4-5% range for more than two decades now, LMICs consistently spend less than this conventionally accepted target, especially in terms of per capita expenditure (Arias and Kheyfets, 2023). Low-income countries annually spend an estimated US$53 per child on education as compared with US$7,800 spent by high-income countries (Al-Samarrai and Benveniste, 2022; Arias and Kheyfets, 2023). Even after considering purchasing power parity, high-income country governments spend almost 85 times as much as compared with low-income country governments to educate the average 18-year-old (Arias and Kheyfets, 2023).

A newly released Education Finance Watch report from the World Bank and partner organizations show that during 2012-2021, while aggregate real education spending in low-income and lower-middle-income countries grew 61% and 49%, per capita government spending in education in these countries increased only 33% and 15% respectively (World Bank, 2023c). While these rates of growth were higher than the growth rate of per capita spending in high-income countries, the levels of spending in LMICs continue to be substantially lower than high-income countries.

Overseas development assistance (ODA) in education, which can be important for large infrastructural investments, dealing with emergency situations such as natural disasters, and targeted service delivery for vulnerable populations in LMICs, has also been growing at an inadequate pace over the past two decades. The share of total development assistance that is allocated to education has been declining since 2003, and although ODA share for the health sector saw explosive growth following the pandemic, the relative share for the education sector continued declining in 2020-2021 (Figure 2) (World Bank, 2023c). By 2021, almost a quarter of ODA was earmarked for health, compared to below 10% for the education sector.

While higher per capita spending may not always translate into improved educational outcomes, cross-country analysis shows a clear positive relationship between learning adjusted years of schooling (LAYS), which is a composite metric of the quantity and quality of schooling received, and per capita public educational expenditure (Filmer et al., 2020; World Bank, 2023c).

Figure 2: Share of overseas development assistance that is allocated to health and education sectors

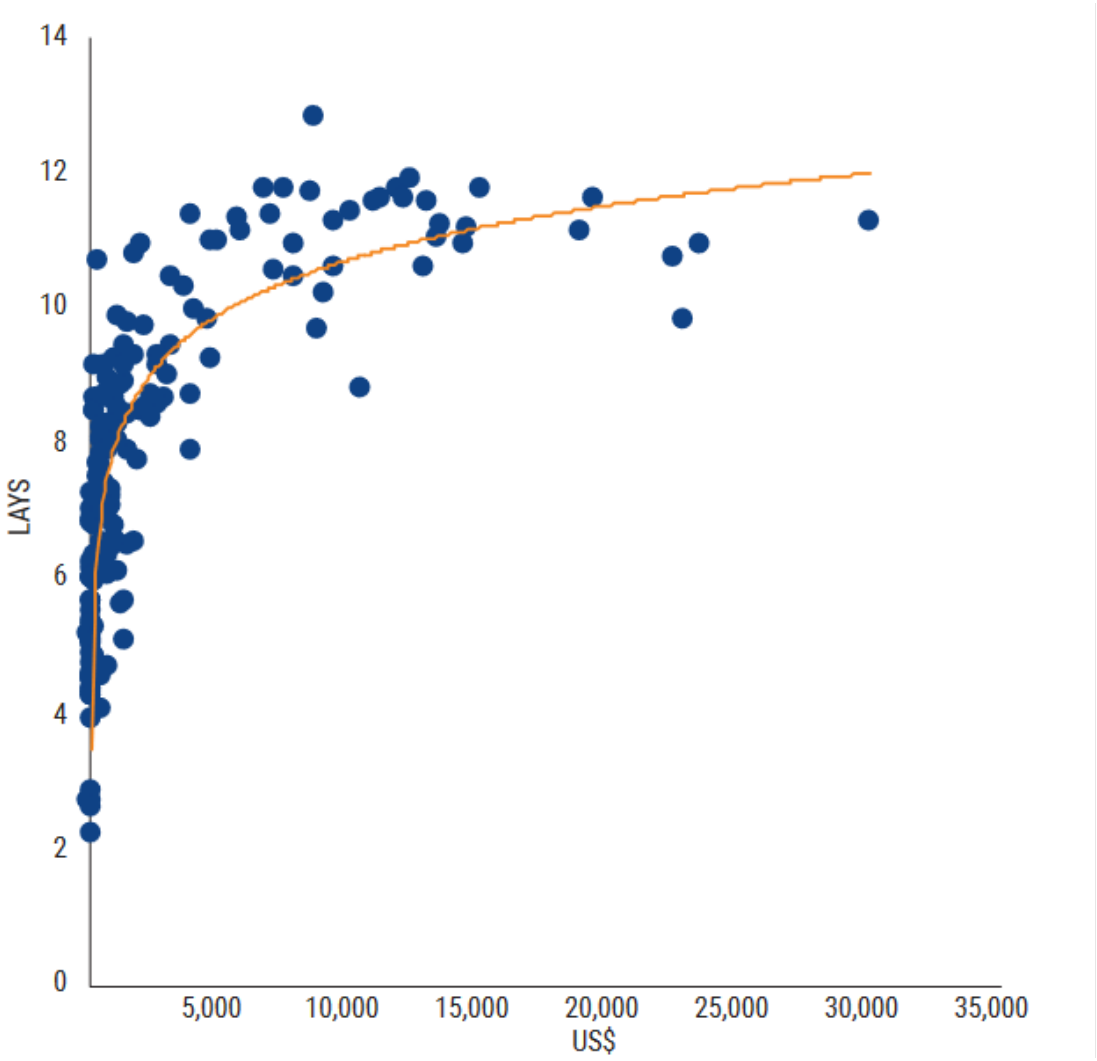


Note: Reproduced from the report "Education Finance Watch 2023," Figure 11, p. 13 (World Bank, 2023c). The lines represent the percentage of total overseas development assistance that is allocated to health and education sectors in LMICs each year.

As Figure 3 shows, the relationship is concave, with potentially very high marginal rates of return (i.e., rise in LAYS with every dollar increase in per capita education spending) at low levels of spending. This implies that low-income countries, which typically have the lowest levels of spending, could improve schooling outcomes substantially even with small increases in per student education spending. At higher

levels of per capita spending, the marginal rate of return reduces, with the relationship eventually becoming almost flat.

Figure 3: Per capita public education expenditure and learning adjusted years of schooling (LAYS) in low-income and lower-middle income countries, 2020



Note: Reproduced from the report "Education Finance Watch 2023," Figure 16, p. 20 (World Bank, 2023c). Scatter plot represents LMIC countries.

In addition to increasing per capita spending on education, how that money is spent, and accountability for results is critical (Beeharry, 2021). The efficiency or cost-effectiveness of spending should also be considered. Recent reports by the Global Education Evidence Advisory Panel identifies cost-effective ways of improving LAYS

(Global Education Evidence Advisory Panel, 2023, 2020). Programs such as those that provide support to teachers and teaching children at their current level of learning instead of the grade level, reducing travel time to school, and early childhood education may have substantially higher rates of return (LAYS gained per dollar spent).

Other interventions have been shown to be effective in increasing enrollment, retention, and attainment. A synthesis of reviews in the Girls' Education Roadmap (Psaki et al., 2021) finds that addressing the economic and physical barriers to schooling, such as policies eliminating school fees, conditional cash transfers, and community schools and/or transportation, as well as school feeding programs and covering the costs of school materials, are effective in improving enrollment and/or attainment.

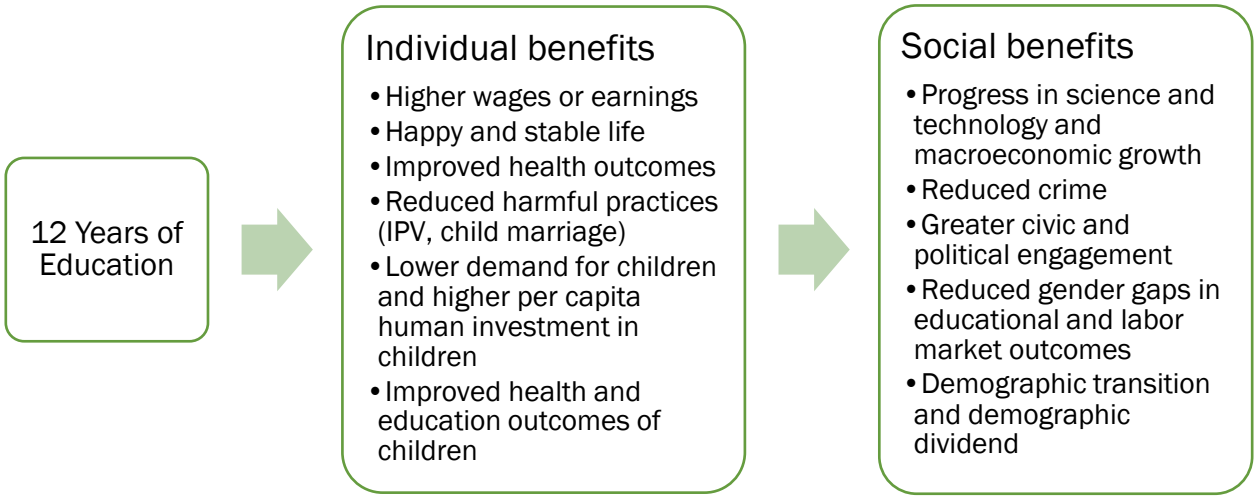
4. What are the potential benefits of investing more in education?

The individual and social benefits of education are multisectoral (Figure 4). Education can help build skills for employment or other gainful economic activities in later life. Globally, an extra year of education is estimated to increase individual earnings by 10%, and the rate of return is as high as 15% among women in sub-Saharan Africa (Montenegro and Patrinos, 2021; Psacharopoulos and Patrinos, 2018). In many LMICs, education is a path out of poverty. It is estimated that universal primary and secondary attainment could reduce the number of people living in poverty across the world by more than half or by 420 million (UNESCO, 2017).

From a human capital perspective, education can improve the quality of life of individuals beyond increasing wages or earnings (Grossman, 2006). Schooling helps build critical thinking and decision-making skills that can be invaluable throughout one's life. Better educated individuals have happier and more stable lives, live longer, and are more capable of taking care of their own and family members' health and making good financial decisions than those who are less educated (McMahon, 2018, 2009; McMahon and Oketch, 2013; Means and Voss, 1996). For example, a recent meta-analysis of 89 studies from 25 countries estimated that one additional year of schooling could reduce the risk of obesity by 25% and the risk of mortality, smoking, and hypertension by 1-5% for an individual (Hamad et al., 2018). Parental education is also linked to better health, educational, and economic outcomes for the next generation (Akresh et al., 2023; Black and Devereux, 2011; Cornelissen and Dang, 2022; Kaushal, 2014; Mazumder et al., 2023). Education can improve the health and health-care-seeking behavior of women, such as use of family planning methods and prenatal, postnatal,

and newborn care. This can improve maternal health and reduce neonatal and infant mortality (Kim, 2016).

Figure 4: The potential multisectoral benefits of education



Beyond private gains in health or labor market outcomes, education can contribute substantially to the building of an equitable and just society. It has the potential to help reduce crime; increase civic and political engagement; spur economic growth and development through innovations, technological progress, and demographic transition; and, ideally, with equity in access to quality schooling, reduce gender and socioeconomic disparities in opportunities and outcomes.

In LMICs, there are substantial gender gaps in labor market outcomes. In 2022, only 46% of LMIC women age 15 years and above were in the labor force, as compared with 78% of men of the same age (World Bank, 2023a). Women in sub-Saharan Africa earned 33% less than men who hold similar jobs (World Economic Forum, 2021). Considering that returns to schooling rates are typically higher for women than men in LMICs (Montenegro and Patrinos, 2021), investing in girls' schooling can help reduce such disparities. Such improvements, however, will be limited as long as gender pay gaps, driven by labor market discrimination against women in many economies around the world, persist.

Education can also reduce the likelihood of girls and women experiencing harmful practices such as child marriage and gender-based violence. Child marriage is especially interlinked with low education levels – it can act as a barrier to schooling but robust education policies can, in turn, also reduce child marriage rates. The 2017 Global Education Monitoring Report of the UN estimated that 12 years of education could reduce the prevalence of child marriages by 64% worldwide (UNESCO, 2017).

Reducing child marriage rates through education can bring substantial health benefits for young mothers and their children. An estimated 12.7 million adolescent girls give birth annually in LMICs, and maternal conditions that include pregnancy and birth complications are the second leading cause of death among adolescent girls worldwide (Blum and Gates, 2015; Darroch et al., 2016; UNICEF, 2022a). Children born to adolescent mothers have 12-25% higher risk of low birth-weight and neonatal death than those born to older mothers (Ganchimeg et al., 2014). Delayed marriages are also positively linked with children's later-life outcomes including cognitive development and schooling attainment (Chae and Ngo, 2017; Chari et al., 2017; Duncan et al., 2018).

Similarly, violence can have a severely detrimental effect on the physical and mental health of women and their children. In 2019, intimate partner violence (IPV) caused 86,500 deaths and 8.5 million disability-adjusted life years (DALYs) lost among women worldwide (IHME, 2020). An estimated 35% of women in South Asia and 27-44% of women in sub-Saharan Africa experience some form of IPV in their lifetime (Sardinha et al., 2022). IPV experienced by mothers can negatively affect the cognitive and socio-emotional development of children who are exposed to the violence in early childhood (Mueller and Tronick, 2019). Women with some or completed secondary-level education have 11-36% lower risk of experiencing domestic violence than other women (World Bank, 2014).

In LMICs with high fertility rates, education can help accelerate demographic transition. With improved educational outcomes and returns to schooling, the demand for skilled workers may rise. As a result, parents may have fewer children and instead invest more in each child (Becker et al., 2010; Bleakley and Lange, 2009; Galor, 2012; Murphy, 2015; Murtin, 2013). This can help countries receive a "demographic dividend," i.e., having a larger share of working population than nonworking population, that can stimulate longer-term economic growth (Bloom et al., 2017; Bloom and Williamson, 1998).

Furthermore, educated women are likely to have higher opportunity cost of childbearing vis-à-vis productive economic activities in the market, and greater bargaining power within the household than less-educated women. Women with primary schooling are estimated to have up to 30% fewer children than those with no education in their lifetime, and women with secondary education have 10-15% fewer children than those with primary education (Kim, 2016).

Higher educational attainment can also increase the participation of women in political leadership in LMICs, which can have secondary individual and social benefits (Goetz, 2003). Political leadership among women has been linked with better health and educational outcomes in the community. In India, a 10 percentage point increase in women's representation was found to reduce neonatal mortality by 2.1 percentage points (Bhalotra and Clots-Figueras, 2014). Another study used data from 155 countries and found that at least 30% female representation in parliament was associated with lower child and maternal mortality rates (Macmillan et al., 2018).

The potential private and social benefits of education cannot be fully realized without robust programs and policies that mitigate barriers to schooling and inequalities in the labor market. A recent systematic review identified 18 different gender-related barriers to girls' education in LMICs, which can be broadly categorized into barriers that overwhelming affect girls (e.g., child marriage, regressive gender norms, and gender-based violence), barriers that are shared by boys and girls but affect girls more due to prevailing gender norms (e.g., preference given to boys in settings with low income and lack of schooling access), and barriers that are shared by both genders but may differ in terms of pathways of impact on educational outcomes (e.g., pedagogy and lack of teaching materials) (Psaki et al., 2022). The barriers are present at the household, school, and community levels and are often intertwined. Other reviews have similarly identified structural, political, sociocultural, and economic factors that drive inequalities in education delivery and outcomes across countries (Reinders et al., 2021; Sosu et al., 2021).

A large body of research exists on the effectiveness and implementation of programs and policies that could reduce gender and socioeconomic gaps in education in LMICs (Baird et al., 2013; Evans and Popova, 2016; Haberland et al., 2018; Psaki et al., 2022; Snilstveit et al., 2016). However, not all barriers to education receive equal attention. Interventions have focused heavily on tuition and fees (e.g., cash transfers, free

schooling), nutrition (e.g., school meal programs), and academic support. Many major challenges such as child marriage, adolescent pregnancy, and school-related gender-based violence remain inadequately addressed (Psaki et al., 2022).

5. Quantifying the individual and social benefits of 12 years of schooling: An illustrative modeling exercise

To quantitatively capture the multisectoral benefits of education, we estimated the potential benefits of the universal 12 years of schooling in LMICs, considering a select number of economic, health, and sociodemographic indicators.[1] A summary of modeling techniques and underlying data are presented in the appendix.

5.1. Economic returns to education

We project that providing all individuals aged 15-24 years in LMICs with 12 years of schooling would increase annual aggregate gross national income (GNI) by $5 trillion among men (95% uncertainty range: $4.3–$5.4 trillion) and $3.1 trillion among women ($2.7–$3.5 trillion). These estimates are in 2019 International $ (purchasing power parity) and assume full employment and no change in the labor force participation rates of men and women from the current status quo. Considering that the total GNI across all LMICs was $70.3 trillion in 2019 (World Bank, 2023a), the potential economic returns to universal secondary education would be equivalent to an 11.5% increase in GNI per year.

India, Brazil, China, Indonesia, Pakistan, and Bangladesh would experience the largest aggregate economic gains (in descending order) from universal male secondary education, while China, Brazil, India, Indonesia, Vietnam, and the Russian Federation would benefit the most from universal female secondary education. Countries such as Brazil, Libya, Namibia, Costa Rica, the Russian Federation, and Vietnam would benefit the most in terms of per capita gains in GNI due to universal secondary schooling.

If we adjust the model using higher estimates for and eliminating gender disparities in labor force participation – i.e., assume a rise in labor force participation rate to 90% both among men and women, along with full employment – universal secondary education

[1] The number of countries included in our analysis was different for each indicator, based on available data. Further details are presented in the Data and Methods appendix.

in LMICs would increase annual aggregate GNI by $9.5 trillion ($8.2–$10.8 trillion) for 15-24-year-old men and $9.8 trillion ($8.5–$10.9 trillion) for 15-24-year-old women.

5.2. Reduction in child marriages

Every year, at least 12 million girls are married before the age of 18 (UNICEF, 2023). We project that universal secondary female education could reduce the annual number of child marriages in LMICs by 2 million (1.7–2.3 million) girls. We considered a baseline of 2020 estimates of child marriage, defined as the number of 20-24-year-old women who were married before the age of 18. The 2 million child marriages averted represents a 26% reduction from the 7.7 million child marriages that are estimated to take place annually in LMICs included in our analysis (Liang et al., 2021). Using an alternative survival approach that considers 15-19-year-old women and estimates retrospective age-specific marriage rates among them before reaching the age of 18 (Liang et al., 2021), we estimate that universal secondary female education would reduce the number of child marriages by 1.5 million (1.3–1.7 million) per year.

The highest number of child marriages would be averted in India, Bangladesh, Niger, Democratic Republic of the Congo, Mozambique, and Sudan (in descending order). African countries would experience the highest per capita reduction in child marriages, with Niger, Central African Republic, Mali, Mozambique, Liberia, and Senegal accounting for the greatest reductions.

5.3. Reduction in intimate partner violence

Across the world, one out of three women have experienced intimate partner violence (IPV) at least once in their lifetime (Sardinha et al., 2022). We project that universal secondary female education could reduce the number of 15-49-year-old women in LMICs that experience any form of IPV in their lifetime by 81.3 million (61.3–100.7 million). This represents an approximately 21% reduction in the number of women in this age group who were estimated to experience IPV in LMICs included in our analysis. The highest number of women that could be protected from experiencing IPV would be – in descending order of magnitude – from India, China, Pakistan, Bangladesh, Democratic Republic of the Congo, and Indonesia. In per capita terms, countries where the most IPV cases could be averted are Afghanistan, Papua New Guinea, Burundi, Liberia, Uganda, and Sierra Leone.

5.4. Improvements in child health outcomes – under-5 mortality and stunting

In 2021, 5 million children under 5 years of age died globally (UNICEF, 2022b). We project that universal secondary female (maternal) education could reduce the annual number of deaths among children under the age of 5 in LMICs by 524,834 (501,690–559,196), which is equivalent to a 15% reduction from a baseline of 3.6 million under-5 deaths in countries included in our analysis. The largest number of total under-5 deaths averted would be from India, Pakistan, Democratic Republic of the Congo, Niger, Mali, and Afghanistan (in descending order of magnitude). In per capita terms, countries in Africa would experience the largest reduction in under-5 deaths, with Central African Republic, Niger, Mali, Sierra Leone, Benin, and Liberia receiving the most benefit.

Approximately 149.2 million children under 5 years of age are stunted globally (World Bank, 2023a). Universal secondary maternal education could also reduce the number of stunted under-5 children in LMICs by 22.5 million (19.1–26.4 million), representing an 18% reduction from the estimated 124.6 million stunted under-5 children in countries included in our analysis. The highest aggregate number of stunting cases averted would be from India, China, Pakistan, Democratic Republic of the Congo, Indonesia, and Bangladesh (in descending order of magnitude). In per capita terms, Niger, Mali, Burundi, Senegal, Afghanistan, and Central African Republic would avert the highest number of under-5 stunting cases.

6. Conclusion

The benefits to individuals and to societies of ensuring a full 12 years of schooling for all children in LMICs are vast. Our estimates of economic returns, which considers the potential economic output by 15-24-year-old men and women, finds that GNI would increase by 11.5% per year, or $8 trillion annually. Between 1.5 and 2 million child marriages would be averted, reducing the prevalence by 26%. There is also potential to reduce IPV by 21%, i.e., 81 million fewer women would experience IPV. Intergenerational benefits, which run through the mother's education, not the father's, would reduce under-5 mortality by 15% and cases of stunting by 18%.

Nonetheless, while 12 years of education can contribute significantly to improving economic and social outcomes, it is not a panacea. We see from the economic returns model that returns to 12 years of schooling for boys is over 60% higher than that for girls. This is due to persistent gender disparities in labor force participation, as well as

male-biased sex ratios in large LMICs including China, India, and Vietnam that are driven by sex-selection and other gender-based discriminatory practices.

Gender systems, as well as other structural disparities, also perpetuate violations of girls and women's rights, including child marriage and IPV. We see from this analysis that education can make inroads in reducing these harmful practices. In part by providing a viable alternative (getting an education) to child marriage, or perhaps by shifting gender norms – young women (aged 15-24 years) who are illiterate are approximately 1.5 times as likely to hold attitudes accepting of violence against women by intimate partners than their peers who are literate (Population Council, 2023). Yet even with these education-driven changes, other efforts are needed to eliminate IPV and child marriage.

The Path to Quality, Universal, Secondary Education in LMICs

Education is an important tool for economic prosperity and greater gender equity, one that offers multisectoral benefits for individuals, communities, and nations. Greater investments in quality education, directed to effective programs, is long overdue. An estimated 500 million children globally are in learning poverty (World Bank, 2022) and it is important to prepare them with foundational skills and critical thinking that can help them thrive in the 21st century world impacted by rising conflicts and the climate crisis. Universal secondary education could be achieved through a combination of investments and programs that: engage children at an early age through preschool education; provide free, high-quality schooling at elementary and secondary levels; and

reduce economic, gender, and other sociocultural barriers so that children can remain in school and effectively progress through grades.

Data and Methods Appendix

We obtained data from secondary sources including published studies and World Bank and United Nations agencies (UNESCO and UNFPA) databases. We used data on male and female labor force participation (LFP) rates for the 15-24-year-old age group in 2020 (International Labor Organization modeled estimates) and gross national income per capita (GNIPC) measured in 2019 International $ (purchasing power parity, combined for males and females) for each country from the World Bank (World Bank, 2023a). Data on average years of schooling completed in each country, separately for men and women ages 15-24 years, came from the Barro-Lee estimates (http://www.barrolee.com/) (Barro and Lee, 2013). Data for returns to schooling by country – percentage rise in earnings for one extra year schooling – were obtained from Psacharopoulos and Patrinos (2018). For LMICs that had missing returns to schooling information, we imputed data with regional estimates. These data were then combined with UN World Population Prospects (WPP) estimates of 2020 population (medium variant) in the 15-24-year-old age group for men and women in each country (United Nations, 2020). For each country and gender, we estimated the education gap (12 years of schooling minus the current average years of schooling completed from Barro-Lee data) and multiplied that with Psacharopoulos and Patrinos (2018) returns to schooling data, WPP population data, LFP, and GNIPC to obtain the aggregate incremental economic benefits of universal secondary schooling in each country. There were 88 LMICs with available data that were included in this analysis.

Data on country-specific estimates of the annual number of child marriages came from a UNFPA study (Liang et al., 2021). The authors used data from the most recent Demographic and Health Surveys and Multiple Indicators Cluster Surveys to estimate the number of child marriages in two ways – survival analysis to calculate age-specific marriage hazard rates among girls under-18, and number of 20-24-year-old women who were married before age 18 in 2020. We considered 64% reduction in child marriages associated with 12 years of education, or 5 percentage point reduction per year of schooling, based on UNESCO (2017) estimates. These were then combined with female education gap (as defined above, for age 15-44 years) data to estimate the potential reduction in child marriages in each country associated with universal secondary education. We included 72 LMICs with available data in this analysis.

We obtained most recently available data (2018) on the rates of IPV – share of 15-49 ever-partnered women who experience any IPV – by country from the World Bank. Due to lack of data on partnering rates in LMICs, we assumed that these IPV rates were also applicable among all 15-49-year-old women. The effectiveness of education in reducing IPV has been examined only in a few LMICs, showing that one extra year of female schooling could reduce IPV rates by 1-9% (Akyol and Kırdar, 2022; Behrman et al., 2017; Erten and Keskin, 2018; Okumu et al., 2022; Weitzman, 2018; Zhou et al., 2021). For this illustrative analysis, we assumed a 5% reduction in IPV associated with one additional schooling year completed. These data were then combined with education gap (among 15-44-year-old women) and WPP population estimates to estimate the aggregate reduction in IPV cases in each country (85 LMICs were included in the analysis).

Country-level estimates of the number of under-5 deaths (2020) were from UNICEF (http://data.unicef.org) and the prevalence of stunting among under-5 children (2020) were from the World Bank. A recent meta-analysis study estimated that children born to mothers with 12 years of schooling had a 31% lower under-5 mortality rate as compared to children born to mothers with no education (Balaj et al., 2021). We assumed that one additional year of maternal education would, therefore, reduce under-5 mortality by 2.6%. These data, which were available for 104 LMICs, were then combined with the education gap data (among 15-44-year-old women) to estimate the aggregate reductions in under-5 deaths. Similarly, we assumed a 1 percentage point reduction in under-5 stunting rates for every year of maternal schooling in LMICs, based on a recent multicountry study (Le and Nguyen, 2020). This was multiplied with the education gap (among 15-44 year-old-women) data to estimate the number of under-5 stunting cases averted in 92 LMICs with available data.

To capture uncertainty in values of the modeling parameters, we conducted a stochastic simulation analysis by varying all parameters within a 75-125% range of the initial value. From the joint uniform distribution of the parameters over this range, 1,000 random samples were drawn, and the outcome values were separately calculated based on each set of drawn parameters. Then, we reported the mean and 95% uncertainty range values from the 1,000 simulated estimates.

References

Ahinkorah, B.O., Hagan, J.E., Ameyaw, E.K., Seidu, A.-A., Schack, T. 2021. COVID-19 Pandemic worsening gender inequalities for women and girls in Sub-Saharan Africa, *Frontiers in Global Women's Health* Jul 29:2:686984. https://doi.org/10.3389/fgwh.2021.686984.

Akresh, R., Halim, D., Kleemans, M. 2023. Long-term and intergenerational effects of education: Evidence from school construction in Indonesia. *The Economic Journal* 133: 582–612.

Akyol, P. and Kırdar, M.G. 2022. Compulsory schooling reform and intimate partner violence in Turkey, *European Economic Review* 150: 104313.https://doi.org/10.1016/j.euroecorev.2022.104313.

Al-Samarrai, S. and Benveniste, L., 2022. "Financing Education at the Bottom of the Pyramid" in *Learning, Marginalization, and Improving the Quality of Education in Low-Income Countries*. Cambridge, U.K.: Book Publishers.

Angrist, N., de Barros, A., Bhula, R., Chakera, S., Cummiskey, C., DeStefano, J., Floretta, J., Kaffenberger, M., Piper, B., Stern, J. 2021. Building back better to avert a learning catastrophe: Estimating learning loss from COVID-19 school shutdowns in Africa and facilitating short-term and long-term learning recovery. *International Journal of Educational Development* 84: 102397. https://doi.org/10.1016/j.ijedudev.2021.102397

Arias, O. and Kheyfets, I. 2023. The Adequacy of Public Expenditure on Education and the Needs Post-COVID-19. Washington DC: The World Bank.

Asadullah, M.N. and Bhattacharjee, A. 2022. Digital divide or digital provide? Technology, time use, and learning loss during covid-19. *The Journal of Development Studies* 58: 1934–1957. https://doi.org/10.1080/00220388.2022.2094253

ASER Centre. 2020. Annual Status of Education Report (Rural) 2018: Young Children. New Delhi.

ASER Centre. 2021. Annual Status of Education Report (Rural) 2021. New Delhi.

Azevedo, J.P., Hasan, A., Goldemberg, D., Geven, K., Iqbal, S.A., 2021. Simulating the Potential Impacts of COVID-19 School Closures on Schooling and Learning Outcomes: A Set of Global Estimates. World Bank Res Obs lkab003. https://doi.org/10.1093/wbro/lkab003

Baird, S., Ferreira, F.H.G., Özler, B., Woolcock, M., 2013. Relative Effectiveness of Conditional and Unconditional Cash Transfers for Schooling Outcomes in Developing Countries: A Systematic Review. Campbell Systematic Reviews 9, 1–124. https://doi.org/10.4073/csr.2013.8

Balaj, M., York, H.W., Sripada, K., Besnier, E., Vonen, H.D., Aravkin, A., Friedman, J., Griswold, M., Jensen, M.R., Mohammad, T., Mullany, E.C., Solhaug, S., Sorensen, R., Stonkute, D., Tallaksen, A., Whisnant, J., Zheng, P., Gakidou, E., Eikemo, T.A., 2021. Parental education and inequalities in child mortality: A global systematic review and meta-analysis. *The Lancet* 398: 608–620. https://doi.org/10.1016/S0140-6736(21)00534-1

Barro, R.J. and Lee, J.W., 2013. A new data set of educational attainment in the world, 1950–2010. *Journal of Development Economics* 104, 184–198. https://doi.org/10.1016/j.jdeveco.2012.10.001

Becker, S.O., Cinnirella, F., Woessmann, L., 2010. The trade-off between fertility and education: Evidence from before the demographic transition. *Journal of Economic Growth* 15: 177–204. https://doi.org/10.1007/s10887-010-9054-x

Beeharry, G., 2021. The pathway to progress on SDG 4 requires the global education architecture to focus on foundational learning and to hold ourselves accountable for achieving it. International Journal of Educational Development 82, 102375. https://doi.org/10.1016/j.ijedudev.2021.102375

Behrman, J.A., Peterman, A., Palermo, T., 2017. Does Keeping Adolescent Girls in School Protect Against Sexual Violence? Quasi-Experimental Evidence From East and Southern Africa. Journal of Adolescent Health 60, 184–190. https://doi.org/10.1016/j.jadohealth.2016.09.010

Betthäuser, B.A., Bach-Mortensen, A.M., Engzell, P., 2023. A systematic review and meta-analysis of the evidence on learning during the COVID-19 pandemic. Nat Hum Behav 7, 375–385. https://doi.org/10.1038/s41562-022-01506-4

Bhalotra, S., Clots-Figueras, I., 2014. Health and the Political Agency of Women. American Economic Journal: Economic Policy 6, 164–197. https://doi.org/10.1257/pol.6.2.164

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Bleakley, H., Lange, F., 2009. Chronic Disease Burden and the Interaction of Education, Fertility, and Growth. Rev Econ Stat 91, 52–65. https://doi.org/10.1162/rest.91.1.52

Bloom, D.E., Kuhn, M., Prettner, K., 2017. Africa's Prospects for Enjoying a Demographic Dividend. Journal of Demographic Economics 83, 63–76. https://doi.org/10.1017/dem.2016.19

Bloom, D.E., Williamson, J.G., 1998. Demographic Transitions and Economic Miracles in Emerging Asia. The World Bank Economic Review 12, 419–455. https://doi.org/10.1093/wber/12.3.419

Blum, R.W., Gates, W.H., 2015. Girlhood not motherhood. Preventing adolescent pregnancy.

Centre for Catalyzing Change, 2020. Assessment of Issues Faced by Adolescent Boys and Girls during COVID-19 and the Lockdown. New Delhi, India.

Chae, S., Ngo, T., 2017. The global state of evidence on interventions to prevent child marriage. Poverty, Gender, and Youth. https://doi.org/10.31899/pgy8.1034

Chari, A.V., Heath, R., Maertens, A., Fatima, F., 2017. The causal effect of maternal age at marriage on child wellbeing: Evidence from India. Journal of Development Economics 127, 42–55. https://doi.org/10.1016/j.jdeveco.2017.02.002

Cornelissen, T., Dang, T., 2022. The multigenerational impacts of educational expansion: Evidence from Vietnam. Labour Economics 78, 102243. https://doi.org/10.1016/j.labeco.2022.102243
Crompton, H., Chigona, A., Jordan, K., Myers, C., 2021. Inequalities in Girls' Learning Opportunities Via EdTech: Addressing the Challenge of Covid-19. EdTech Hub Working Paper 31. https://doi.org/10.5281/zenodo.4917252
Darroch, J.E., Woog, V., Bankole, A., Ashford, L.S., 2016. Adding It Up: Costs and Benefits of Meeting the Contraceptive Needs of Adolescents.
Das, U., Singhal, K., 2023. Solving it correctly: Prevalence and persistence of gender gap in basic mathematics in rural India. International Journal of Educational Development 96, 102703. https://doi.org/10.1016/j.ijedudev.2022.102703
Dickerson, A., McIntosh, S., Valente, C., 2015. Do the maths: An analysis of the gender gap in mathematics in Africa. Economics of Education Review 46, 1–22. https://doi.org/10.1016/j.econedurev.2015.02.005
Duncan, G.J., Lee, K.T.H., Rosales-Rueda, M., Kalil, A., 2018. Maternal Age and Child Development. Demography 55, 2229–2255. https://doi.org/10.1007/s13524-018-0730-3
Erten, B., Keskin, P., 2018. For Better or for Worse?: Education and the Prevalence of Domestic Violence in Turkey. American Economic Journal: Applied Economics 10, 64–105.
Evans, D.K., Akmal, M., Jakiela, P., 2021. Gender gaps in education: The long view. IZA Journal of Development and Migration 12, 1–27.
Evans, D.K., Popova, A., 2016. What Really Works to Improve Learning in Developing Countries? An Analysis of Divergent Findings in Systematic Reviews. World Bank Res Obs 31, 242–270. https://doi.org/10.1093/wbro/lkw004
Filmer, D., Rogers, H., Angrist, N., Sabarwal, S., 2020. Learning-adjusted years of schooling (LAYS): Defining a new macro measure of education. Economics of Education Review 77, 101971. https://doi.org/10.1016/j.econedurev.2020.101971
Francis, D.V., Weller, C.E., 2022. Economic Inequality, the Digital Divide, and Remote Learning During COVID-19. Rev Black Polit Econ 49, 41–60. https://doi.org/10.1177/00346446211017797
Galor, O., 2012. The demographic transition: causes and consequences. Cliometrica 6, 1–28. https://doi.org/10.1007/s11698-011-0062-7
Ganchimeg, T., Ota, E., Morisaki, N., Laopaiboon, M., Lumbiganon, P., Zhang, J., Yamdamsuren, B., Temmerman, M., Say, L., Tunçalp, Ö., Vogel, J., Souza, J., Mori, R., Network, on behalf of the W.M.S. on M.N.H.R., 2014. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. BJOG: An International Journal of Obstetrics & Gynaecology 121, 40–48. https://doi.org/10.1111/1471-0528.12630
Global Education Evidence Advisory Panel, 2020. Cost-Effective Approaches to Improve Global Learning : What Does Recent Evidence Tell Us Are "Smart Buys" for Improving Learning in Low and Middle Income Countries? (Text/HTML). The World Bank.
Global Education Evidence Advisory Panel, 2023. Cost-Effective Approaches to Improve Global Learning : What Does Recent Evidence Tell Us Are "Smart Buys" for Improving Learning in Low and Middle Income Countries? (Text/HTML). The World Bank.

Goetz, A.M., 2003. Women's education and political participation, Background paper prepared for the Education for All Global Monitoring Report 2003/4 Gender and Education for All: The Leap to Equality. UNESCO.

Graetz, N., Woyczynski, L., Wilson, K.F., Hall, J.B., Abate, K.H., Abd-Allah, F., Adebayo, O.M., Adekanmbi, V., Afshari, M., Ajumobi, O., Akinyemiju, T., Alahdab, F., Al-Aly, Z., Rabanal, J.E.A., Alijanzadeh, M., Alipour, V., Altirkawi, K., Amiresmaili, M., Anber, N.H., Andrei, C.L., Anjomshoa, M., Antonio, C.A.T., Arabloo, J., Aremu, O., Aryal, K.K., Asadi-Aliabadi, M., Atique, S., Ausloos, M., Awasthi, A., Quintanilla, B.P.A., Azari, S., Badawi, A., Banoub, J.A.M., Barker-Collo, S.L., Barnett, A., Bedi, N., Bennett, D.A., Bhattacharjee, N.V., Bhattacharyya, K., Bhattarai, S., Bhutta, Z.A., Bijani, A., Bikbov, B., Britton, G., Burstein, R., Butt, Z.A., Cárdenas, R., Carvalho, F., Castañeda-Orjuela, C.A., Castro, F., Cerin, E., Chang, J.-C., Collison, M.L., Cooper, C., Cork, M.A., Daoud, F., Das Gupta, R., Weaver, N.D., De Neve, J.-W., Deribe, K., Desalegn, B.B., Deshpande, A., Desta, M., Dhimal, M., Diaz, D., Dinberu, M.T., Djalalinia, S., Dubey, M., Dubljanin, E., Durães, A.R., Dwyer-Lindgren, L., Earl, L., Kalan, M.E., El-Khatib, Z., Eshrati, B., Faramarzi, M., Fareed, M., Faro, A., Fereshtehnejad, S.-M., Fernandes, E., Filip, I., Fischer, F., Fukumoto, T., García, J.A., Gill, P.S., Gill, T.K., Gona, P.N., Gopalani, S.V., Grada, A., Guo, Y., Gupta, R., Gupta, V., Haj-Mirzaian, Arvin, Haj-Mirzaian, Arya, Hamadeh, R.R., Hamidi, S., Hasan, M., Hassen, H.Y., Hendrie, D., Henok, A., Henry, N.J., Prado, B.H., Herteliu, C., Hole, M.K., Hossain, N., Hosseinzadeh, M., Hu, G., Ilesanmi, O.S., Irvani, S.S.N., Islam, S.M.S., Izadi, N., Jakovljevic, M., Jha, R.P., Ji, J.S., Jonas, J.B., Shushtari, Z.J., Jozwiak, J.J., Kanchan, T., Kasaeian, A., Karyani, A.K., Keiyoro, P.N., Kesavachandran, C.N., Khader, Y.S., Khafaie, M.A., Khan, E.A., Khater, M.M., Kiadaliri, A.A., Kiirithio, D.N., Kim, Y.J., Kimokoti, R.W., Kinyoki, D.K., Kisa, A., Kosen, S., Koyanagi, A., Krishan, K., Defo, B.K., Kumar, M., Kumar, P., Lami, F.H., Lee, P.H., Levine, A.J., Li, S., Liao, Y., Lim, L.-L., Listl, S., Lopez, J.C.F., Majdan, M., Majdzadeh, R., Majeed, A., Malekzadeh, R., Mansournia, M.A., Martins-Melo, F.R., Masaka, A., Massenburg, B.B., Mayala, B.K., Mehta, K.M., Mendoza, W., Mensah, G.A., Meretoja, T.J., Mestrovic, T., Miller, T.R., Mini, G.K., Mirrakhimov, E.M., Moazen, B., Mohammad, D.K., Darwesh, A.M., Mohammed, S., Mohebi, F., Mokdad, A.H., Monasta, L., Moodley, Y., Moosazadeh, M., Moradi, G., Moradi-Lakeh, M., Moraga, P., Morawska, L., Morrison, S.D., Mosser, J.F., Mousavi, S.M., Murray, C.J.L., Mustafa, G., Nahvijou, A., Najafi, F., Nangia, V., Ndwandwe, D.E., Negoi, I., Negoi, R.I., Ngunjiri, J.W., Nguyen, C.T., Nguyen, L.H., Ningrum, D.N.A., Noubiap, J.J., Shiadeh, M.N., Nyasulu, P.S., Ogbo, F.A., Olagunju, A.T., Olusanya, B.O., Olusanya, J.O., Onwujekwe, O.E., Ortega-Altamirano, D.D.V., Ortiz-Panozo, E., Øverland, S., P. A., M., Pana, A., Panda-Jonas, S., Pati, S., Patton, G.C., Perico, N., Pigott, D.M., Pirsaheb, M., Postma, M.J., Pourshams, A., Prakash, S., Puri, P., Qorbani, M., Radfar, A., Rahim, F., Rahimi-Movaghar, V., Rahman, M.H.U., Rajati, F., Ranabhat, C.L., Rawaf, D.L., Rawaf, S., Reiner, R.C., Remuzzi, G., Renzaho, A.M.N., Rezaei, S., Rezapour, A., Rios-González, C., Roever, L., Ronfani, L., Roshandel, G., Rostami, A., Rubagotti, E., Sadat, N., Sadeghi, E., Safari, Y., Sagar, R., Salam, N., Salamati, P., Salimi, Y., Salimzadeh, H., Samy, A.M., Sanabria, J., Santric Milicevic, M.M., Sartorius, B., Sathian, B., Sawant, A.R., Schaeffer, L.E., Schipp, M.F.,

Schwebel, D.C., Senbeta, A.M., Sepanlou, S.G., Shaikh, M.A., Shams-Beyranvand, M., Shamsizadeh, M., Sharafi, K., Sharma, R., She, J., Sheikh, A., Shigematsu, M., Siabani, S., Silveira, D.G.A., Singh, J.A., Sinha, D.N., Skirbekk, V., Sligar, A., Sobaih, B.H., Soofi, M., Soriano, J.B., Soyiri, I.N., Sreeramareddy, C.T., Sudaryanto, A., Babale Sufiyan, M., Sutradhar, I., Sylaja, P., Tabarés-Seisdedos, R., Tadesse, B.T., Temsah, M.-H., Terkawi, A.S., Tessema, B., Tessema, Z.T., Thankappan, K.R., Topor-Madry, R., Tovani-Palone, M.R., Tran, B.X., Car, L.T., Ullah, I., Uthman, O.A., Valdez, P.R., Veisani, Y., Violante, F.S., Vlassov, V., Vollmer, S., Thu Vu, G., Waheed, Y., Wang, Y.-P., Wilkinson, J.C., Winkler, A.S., Local Burden of Disease Educational Attainment Collaborators, 2020. Mapping disparities in education across low- and middle-income countries. *Nature* 577: 235–238. https://doi.org/10.1038/s41586-019-1872-1

Grossman, M., 2006. Chapter 10 Education and Nonmarket Outcomes, in: Hanushek, E., Welch, F. (Eds.), Handbook of the Economics of Education. Elsevier, pp. 577–633. https://doi.org/10.1016/S1574-0692(06)01010-5

Haberland, N.A., McCarthy, K.J., Brady, M., 2018. A Systematic Review of Adolescent Girl Program Implementation in Low- and Middle-Income Countries: Evidence Gaps and Insights. Journal of Adolescent Health 63, 18–31. https://doi.org/10.1016/j.jadohealth.2017.11.294

Hamad, R., Elser, H., Tran, D.C., Rehkopf, D.H., Goodman, S.N., 2018. How and why studies disagree about the effects of education on health: A systematic review and meta-analysis of studies of compulsory schooling laws. Soc Sci Med 212, 168–178. https://doi.org/10.1016/j.socscimed.2018.07.016

Hervé, J., Mani, S., Behrman, J.R., Nandi, A., Lamkang, A.S., Laxminarayan, R., 2022. Gender gaps in cognitive and noncognitive skills among adolescents in India. Journal of Economic Behavior & Organization 193, 66–97. https://doi.org/10.1016/j.jebo.2021.11.011

IHME, 2020. Intimate partner violence — Level 2 risk [WWW Document]. Institute for Health Metrics and Evaluation. URL https://www.healthdata.org/results/gbd_summaries/2019/intimate-partner-violence-level-2-risk (accessed 5.15.22).

Kaushal, N., 2014. Intergenerational Payoffs of Education. The Future of Children 24, 61–78.

Kim, J., 2016. Female education and its impact on fertility. izawol 10. https://doi.org/10.15185/izawol.228

Le, K., Nguyen, M., 2020. Shedding light on maternal education and child health in developing countries. World Development 133, 105005. https://doi.org/10.1016/j.worlddev.2020.105005

Liang, M., Simelane, S., Chalasani, S., Snow, R., 2021. New estimations of child marriage: Evidence from 98 low- and middle-income countries. PLoS One 16, e0258378. https://doi.org/10.1371/journal.pone.0258378

Macmillan, R., Shofia, N., Sigle, W., 2018. Gender and the Politics of Death: Female Representation, Political and Developmental Context, and Population Health in a Cross-National Panel. Demography 55, 1905–1934. https://doi.org/10.1007/s13524-018-0697-0

Mazumder, B., Rosales-Rueda, M.F., Triyana, M., 2023. Social interventions, health and wellbeing: The long-term and intergenerational effects of a school construction program. J. Human Resources 0720. https://doi.org/10.3368/jhr.59.2.0720-11059R1
McMahon, W.W., 2009. Higher Learning, Greater Good: The Private and Social Benefits of Higher Education, Johns Hopkins University Press. Johns Hopkins University Press.
McMahon, W.W., 2018. The total return to higher education: Is there underinvestment for economic growth and development? The Quarterly Review of Economics and Finance 70, 90–111. https://doi.org/10.1016/j.qref.2018.05.005
McMahon, W.W., Oketch, M., 2013. Education's Effects on Individual Life Chances and On Development: An Overview. British Journal of Educational Studies.
Means, M.L., Voss, J.F., 1996. Who Reasons Well? Two Studies of Informal Reasoning Among Children of Different Grade, Ability, and Knowledge Levels. Cognition and Instruction 14, 139–178. https://doi.org/10.1207/s1532690xci1402_1
Montenegro, C.E., Patrinos, H.A., 2021. A data set of comparable estimates of the private rate of return to schooling in the world, 1970–2014. International Journal of Manpower ahead-of-print. https://doi.org/10.1108/IJM-03-2021-0184
Mueller, I., Tronick, E., 2019. Early Life Exposure to Violence: Developmental Consequences on Brain and Behavior. Frontiers in Behavioral Neuroscience 13.
Murphy, T.E., 2015. Old habits die hard (sometimes). J Econ Growth 20, 177–222. https://doi.org/10.1007/s10887-015-9111-6
Murtin, F., 2013. Long-Term Determinants of the Demographic Transition, 1870–2000. The Review of Economics and Statistics 95, 617–631. https://doi.org/10.1162/REST_a_00302
Nandi, A., Haberland, N., Kozak, M., Ngô, T.D., 2023. The gendered effects of the COVID-19 pandemic on adolescent literacy and schooling outcomes in India. npj Sci. Learn. 8, 1–12. https://doi.org/10.1038/s41539-023-00193-8
National Center for Education Statistics, 2023. Status Dropout Rates. U.S. Department of Education, Institute of Education Sciences.
OECD, 2019. PISA 2018 Results (Volume II): Where All Students Can Succeed. Organisation for Economic Co-operation and Development, Paris.
OECD, 2023. Gender, Education and Skills: The Persistence of Gender Gaps in Education and Skills. Organisation for Economic Co-operation and Development.
Okumu, M., Orwenyo, E., Nyoni, T., Mengo, C., Steiner, J.J., Tonui, B.C., 2022. Socioeconomic Factors and Patterns of Intimate Partner Violence among Ever-Married Women in Uganda: Pathways and Actions for Multicomponent Violence Prevention Strategies. J Interpers Violence 37, NP16397–NP16420. https://doi.org/10.1177/08862605211021976
Patrinos, H., Vegas, E., Carter-Rau, R., 2023. An Analysis of COVID-19 Student Learning Loss, in: Oxford Research Encyclopedia of Economics and Finance. https://doi.org/10.1093/acrefore/9780190625979.013.893
Population Council, 2023. Power in Numbers- EGER: Evidence for Gender and Education Resource [WWW Document]. URL https://egeresource.org/power-in-numbers/ (accessed 11.30.23).

Psacharopoulos, G., Collis, V., Patrinos, H.A., Vegas, E., 2021. The COVID-19 Cost of School Closures in Earnings and Income across the World. Comparative Education Review 65, 271–287. https://doi.org/10.1086/713540

Psacharopoulos, G., Patrinos, H.A., 2018. Returns to investment in education: a decennial review of the global literature. Education Economics 26, 445–458. https://doi.org/10.1080/09645292.2018.1484426

Psaki, S., Haberland, N., Kozak, M., Woyczynski, L., 2021. Girls' Education Roadmap: 2021 Report, EGER Report. The Population Council, New York, NY.

Psaki, S., Haberland, N., Mensch, B., Woyczynski, L., Chuang, E., 2022. Policies and interventions to remove gender-related barriers to girls' school participation and learning in low- and middle-income countries: A systematic review of the evidence. Campbell Systematic Reviews 18, e1207. https://doi.org/10.1002/cl2.1207

Psaki, S.R., McCarthy, K.J., Mensch, B.S., 2018. Measuring Gender Equality in Education: Lessons from Trends in 43 Countries. Population and Development Review 44, 117–142. https://doi.org/10.1111/padr.12121

Reinders, S., Dekker, M., Falisse, J.-B., 2021. Inequalities in higher education in low- and middle-income countries: A scoping review of the literature. Development Policy Review 39, 865–889. https://doi.org/10.1111/dpr.12535

Sardinha, L., Maheu-Giroux, M., Stöckl, H., Meyer, S.R., García-Moreno, C., 2022. Global, regional, and national prevalence estimates of physical or sexual, or both, intimate partner violence against women in 2018. The Lancet 399, 803–813. https://doi.org/10.1016/S0140-6736(21)02664-7

Snilstveit, B., Stevenson, J., Menon, R., Phillips, D., Gallagher, E., Geleen, M., Maxwell Stamp, Jobse, H., Schmidt, T., Geelen, M., Pastorello, M.G., Eyers, J., 2016. The impact of education programmes on learning and school participation in low- and middle-income countries. International Initiative for Impact Evaluation (3ie). https://doi.org/10.23846/SRS007

Sosu, E.M., Dare, S., Goodfellow, C., Klein, M., 2021. Socioeconomic status and school absenteeism: A systematic review and narrative synthesis. Review of Education 9, e3291. https://doi.org/10.1002/rev3.3291

UNESCO, 2017. Accountability in education: meeting our commitments; Global education monitoring report, 2017.

UNESCO, 2023. The Right to Education [WWW Document]. URL https://www.unesco.org/en/right-education/campaign (accessed 10.31.23).

UNESCO Institute for Statistics, 2015. Fixing the Broken Promise of Education for All – Findings from the Global Initiative on Out-of-School Children. Montreal.

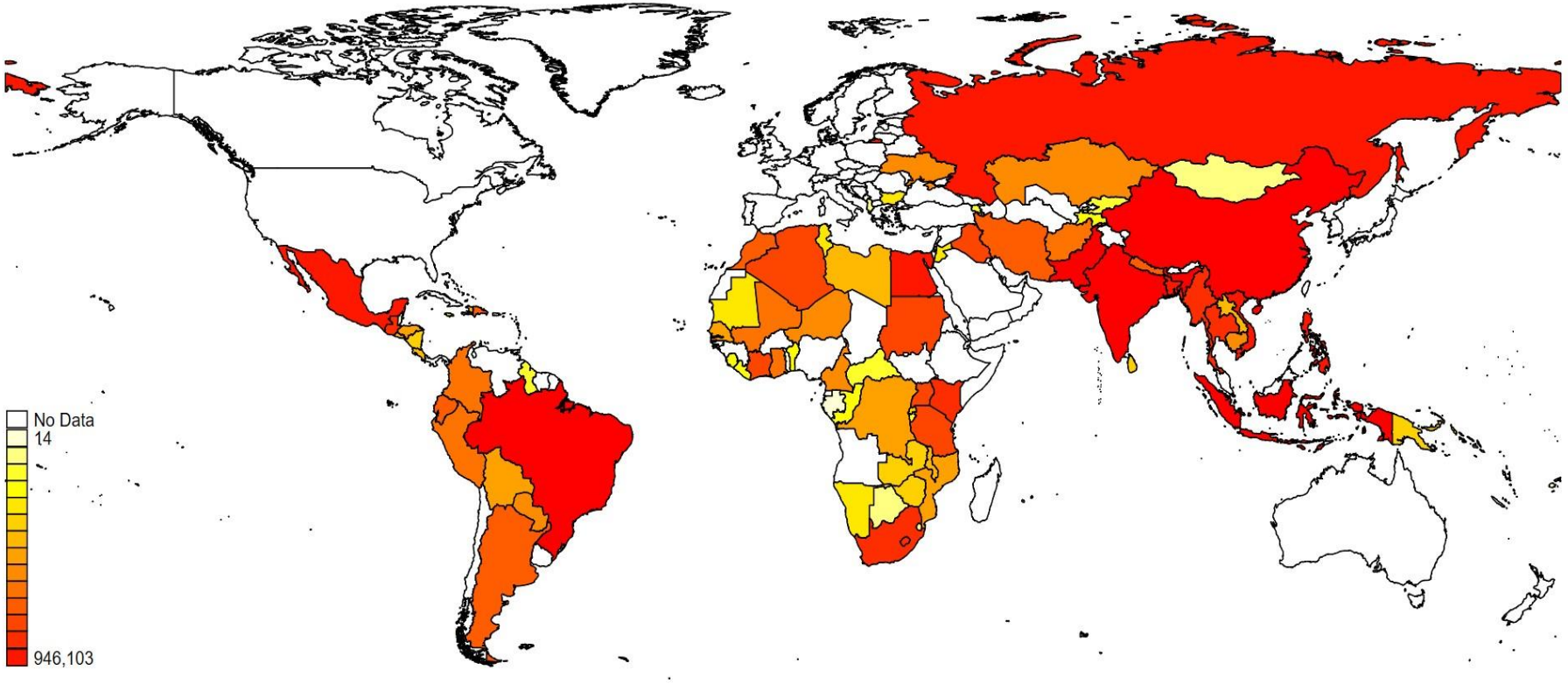
UNESCO Institute for Statistics, 2023a. Data for the Sustainable Development Goals: Education and Literacy [WWW Document]. URL https://uis.unesco.org/en/home#tabs-themes_tab-center-1 (accessed 10.31.23).

UNESCO Institute for Statistics, 2023b. Education Data Release 2023 [WWW Document]. URL https://uis.unesco.org/en/news/education-data-release (accessed 10.31.23).

UNESCO, UNICEF, World Bank, 2021. The State of the Global Education Crisis: A Path to Recovery. The World Bank, New York.

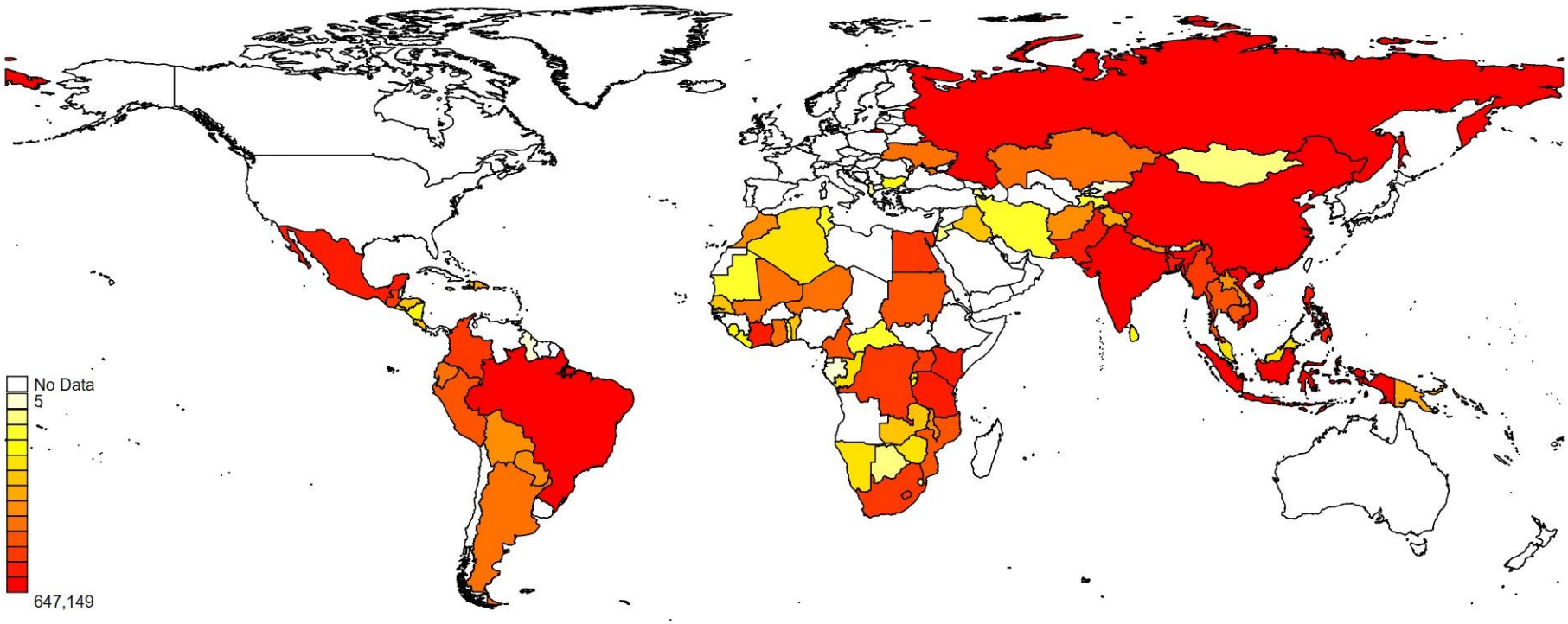
UNICEF, 2016. The State of the World's Children 2016: A fair chance for every child. New York.
UNICEF, 2020. Addressing the learning crisis: An urgent need to better finance education for the poorest children.
UNICEF, 2022a. UNICEF Data Warehouse.
UNICEF, 2022b. Levels & Trends in Child Mortality. United Nations Inter-agency Group for Child Mortality Estimation, New York.
UNICEF, 2023. Is an End to Child Marriage within Reach? UNICEF, New York.
United Nations, 2015. Sustainable Development Goals [WWW Document]. URL https://sustainabledevelopment.un.org/sdgs (accessed 8.16.16).
United Nations, 2020. World Population Prospects. Department of Economic and Social Affairs, United Nations Secretariat.
Weitzman, A., 2018. Does Increasing Women's Education Reduce Their Risk of Intimate Partner Violence? Evidence from an Education Policy Reform. Criminology 56, 574–607. https://doi.org/10.1111/1745-9125.12181
World Bank, 2014. Voice and Agency: Empowering women and girls for shared prosperity. Washington D.C.
World Bank, 2022. The State of Global Learning Poverty: 2022 Update. Washington DC World Bank, 2023a. DataBank | The World Bank [WWW Document]. URL https://databank.worldbank.org/home.aspx (accessed 9.23.21).
World Bank, 2023b. World Bank Education COVID-19 School Closures Map [WWW Document]. World Bank. URL https://www.worldbank.org/en/data/interactive/2020/03/24/world-bank-education-and-covid-19 (accessed 11.2.23).
World Bank, 2023c. Education Finance Watch 2023. Washington DC.
.
World Economic Forum, 2021. Global Gender Gap Report 2021.
Zhou, D., Li, X., Su, Y., 2021. The Impacts of Education on Domestic Violence: Evidence from China. Applied Economics 53, 6702–6720. https://doi.org/10.1080/00036846.2021.1937504

Figure 5: Projected aggregate increase in male earnings in LMICs from universal 12 years of schooling (Millions of 2019 $)



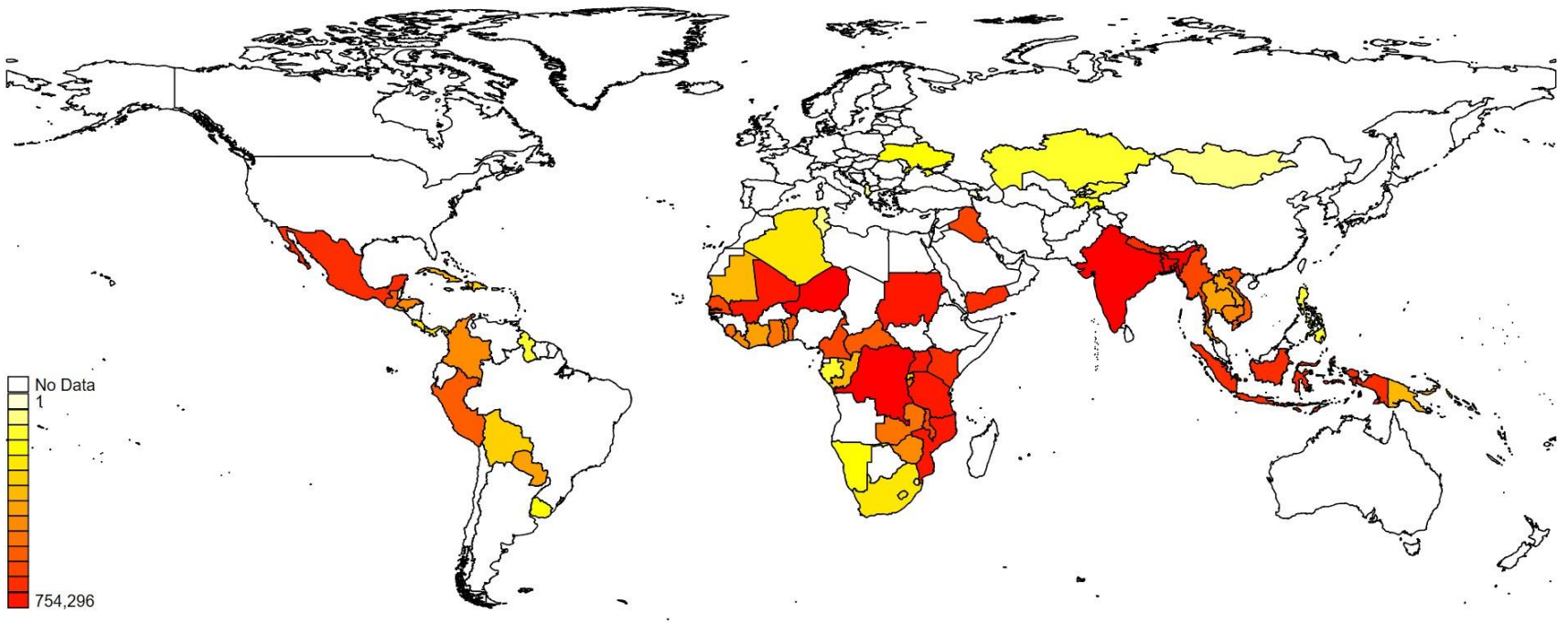
Note: Estimates are in millions of 2019 $ (purchasing power parity) and represent the potential gains in earnings among 15-24-year-old males, assuming no change in labor force participation rates. Countries with no data are marked in white.

Figure 6: Projected aggregate increase in female earnings in LMICs from universal 12 years of schooling (Millions of 2019 $)



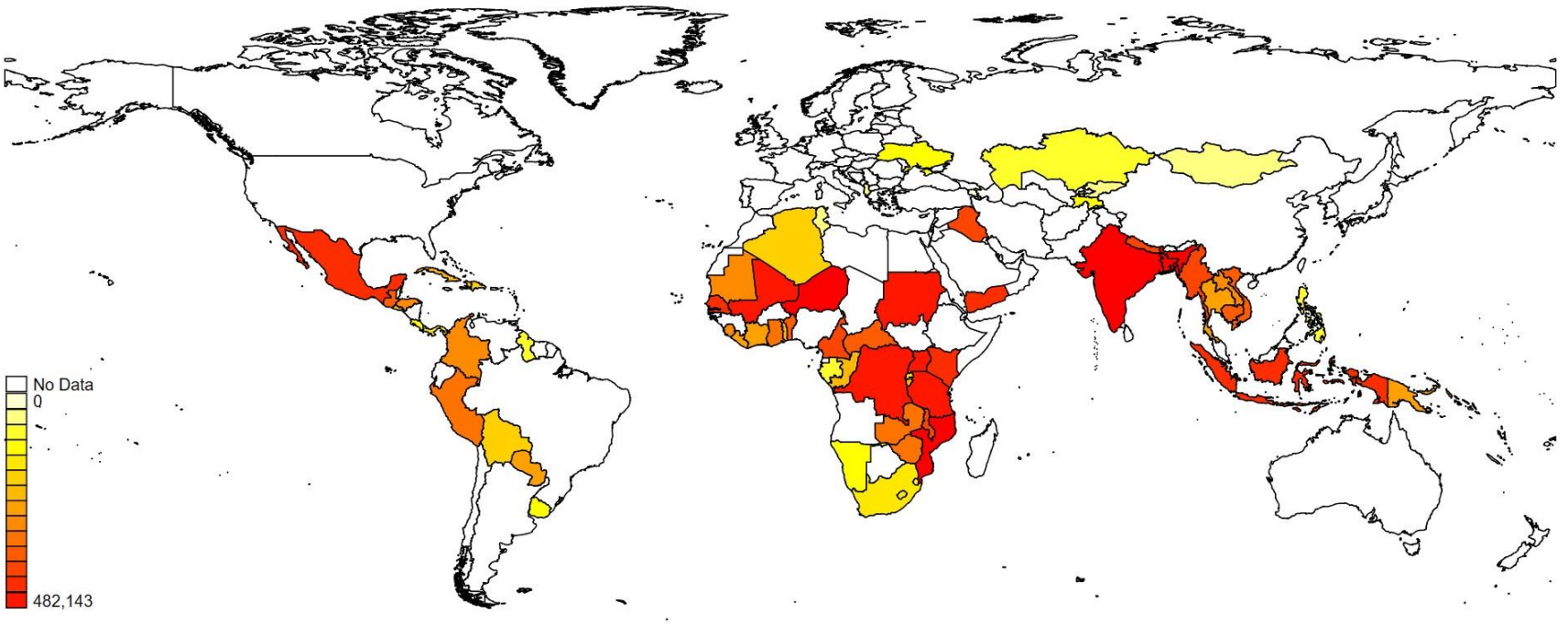
Note: Estimates are in millions of 2019 $ (purchasing power parity) and represent the potential gains in earnings among 15-24-year-old females, assuming no change in labor force participation rates. Countries with no data are marked in white.

Figure 7: Projected aggregate reduction in child marriages in LMICs from universal 12 years of female schooling (direct method)



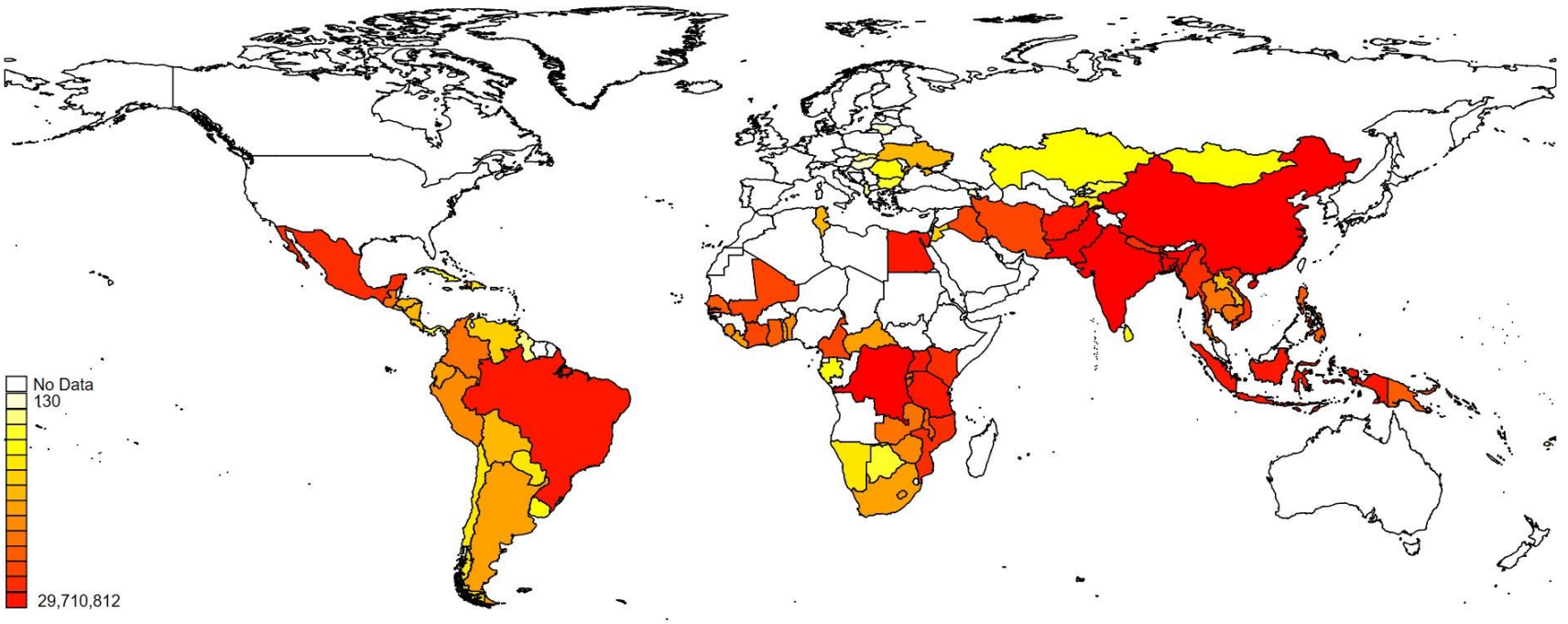
Note: Estimates are the number of child marriages (20-24-year-old women who are married before the age of 18) averted. Countries with no data are marked in white.

Figure 8: Projected aggregate reduction in child marriages in LMICs from universal 12 years of female schooling (survival method)



Note: Estimates are the number of child marriages (calculated using age-specific hazard of marriage before the age of 18) averted. Countries with no data are marked in white.

Figure 9: Projected aggregate reduction in intimate partner violence in LMICs from universal 12 years of female schooling



Note: Estimates are the number of 15-49-year-old women who will not experience any form of intimate partner violence in their lifetime. Countries with no data are marked in white.

Figure 10: Projected aggregate reduction in under-5 deaths in LMICs from universal 12 years of female schooling

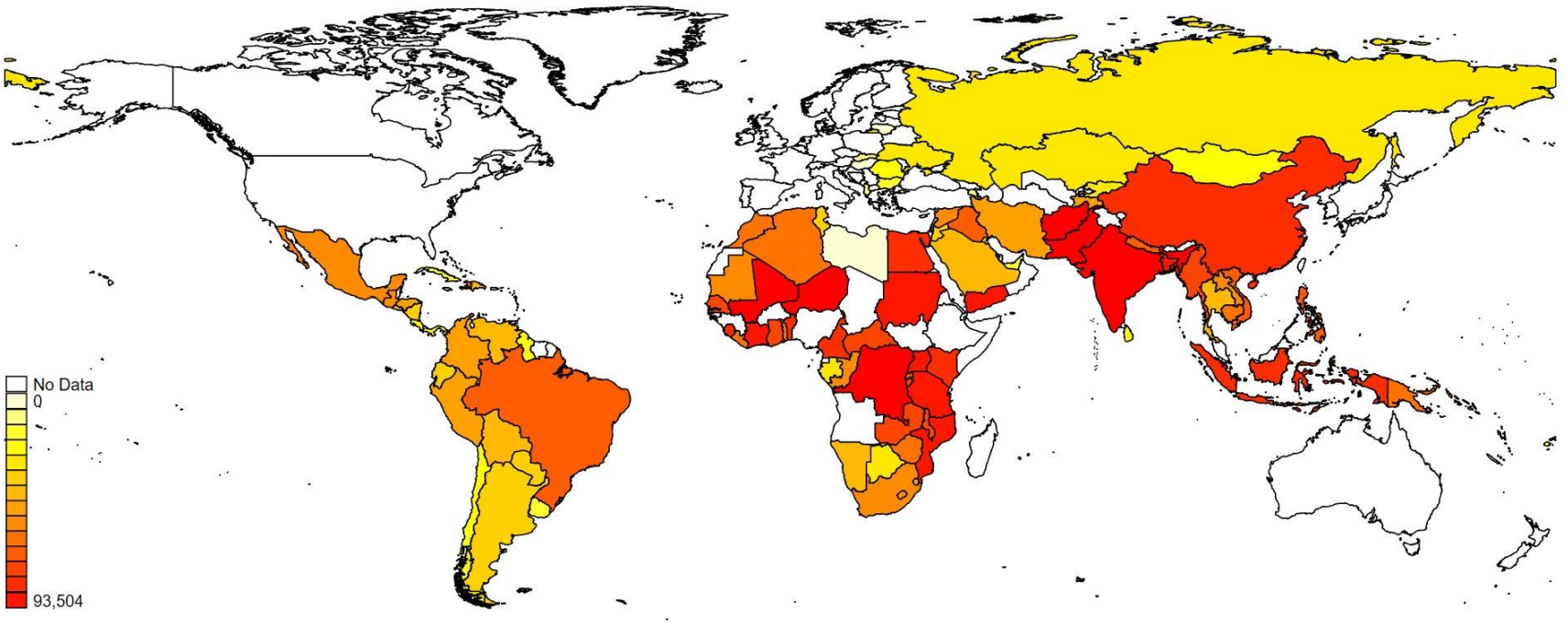


Figure 11: Projected aggregate reduction in the number of stunted under-5 children in LMICs from universal 12 years of female schooling