CONFERENCE EDITION

THE COST OF NOT EDUCATING GIRLS

EDUCATING GIRLS AND ENDING CHILD MARRIAGE: A PRIORITY FOR AFRICA

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NOVEMBER 2018

CHILDREN'S INVESTMENT FUND FOUNDATION
GLOBAL PARTNERSHIP for EDUCATION
WORLD BANK GROUP

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Acknowledgments and Disclaimer

This study was prepared by a team at the World Bank with support from the Children's Investment Fund Foundation and the Global Partnership for Education ahead of the African Union's African Union's Second African Girls' Summit on Ending Child Marriage in Africa. The work builds on previous studies at the World Bank on the economic impacts of child marriage (jointly with ICRW), the changing wealth of nations, and the cost of gender inequality in earnings. The authors are grateful to Rafael Cortez, Bénédicte de la Brière, Lucia Hanmer, Qaiser Khan, Oni Lusk-Stover, Sameera Maziad Al Tuwaijri, Harry Patrinos, and Jeffrey Waite for valuable peer review comments on this study for Africa and the previous global study on the cost of not educating girls from which part of this study is adapted, and to Omar Arias and Meskerem Mulatu for additional comments and advice. Luis Benveniste provided additional guidance. Weight Creative formatted the study for dissemination. The team is also grateful to Erin McCarthy and Linda Weisert at the Children's Investment Fund Foundation and Louise Banham and Jane Elizabeth Davies at the Global Partnership for Education for support.

Recommended citation for this study: Wodon, Q., C. Montenegro, H. Nguyen, and A. Onagoruwa. 2018, Educating Girls and Ending Child Marriage: A Priority for Africa. *The Cost of Not Educating Girls Notes Series.* Washington, DC: The World Bank.

BACKGROUND TO THE SERIES

This study is part of a series of notes at the World Bank on the potential cost of not educating girls globally. Despite substantial progress over the last two decades, girls still have on average lower levels of educational attainment than boys in many countries, especially at the secondary and tertiary levels. As documented by the World Development Report 2018, when it comes to actual learning, while girls tend to outperform boys in reading, they score lower in math and science tests in many countries. Together with occupational segregation and social norms that discourage women to take full advantage of labor market opportunities, this leads to large gaps in earnings between men and women. In addition, low educational attainment for girls has potential negative impacts on a wide range of other development outcomes not only for the girls themselves, but also for their children, families, communities, and societies. The objective of the series of notes is to document these potential impacts and their economic costs.

Low educational attainment affects girls' life trajectories in many ways. Girls dropping out of school early are more likely to marry or have children early, before they may be physically and emotionally ready to become wives and mothers. This may affect their own health. It may also affect that of their children. For example, children of mothers younger than 18 face higher risks of dying by age five and being malnourished. They may also do poorly in school. Other risks for girls and women associated with a lack of education include intimate partner violence and a lack of decision-making ability in the household.

Through lower expected earnings in adulthood and higher fertility over their lifetime, a lack of education for girls leads to higher rates of poverty for households. This is due to both losses in incomes and higher basic needs from larger household sizes. Data on subjective perceptions also suggest that higher educational attainment is associated with perceptions of higher well-being among women.

Low educational attainment for girls may also weaken solidarity in communities and reduce women's participation in society. Lack of education is associated with a lower proclivity to altruistic behaviors, and it curtails women's voice and agency in the household, at work and in institutions. Fundamentally, a lack of education disempowers women and girls in ways that deprive them of their basic rights.

At the level of countries, a lack of education for girls can lead to substantial losses in national wealth. Human capital wealth is the largest component of the changing wealth of nations, ahead of natural capital (such as oil, minerals, and land) and produced capital (such as factories or infrastructure). By reducing earnings, low educational attainment for girls leads to losses in human capital wealth and thereby in the assets base that enables countries to generate future income. Low educational attainment for girls is also associated with higher population growth given its potential impact on fertility rates. This may prevent some countries from ushering the transition that could generate the demographic dividend. Finally, low educational attainment for girls may lead to less inclusive policy-making and a lower emphasis on public investments in the social sectors. Overall, the message is clear: educating girls is not only the right thing to do. It also makes economic and strategic sense for countries to fulfill their development potential.

EXECUTIVE SUMMARY

BACKGROUND

This study was prepared ahead of the second African girls' summit on ending child marriage organized by the African Union in Ghana. It is adapted from a recent global study on the cost of not educating girls (Wodon et al., 2018), and also relies on previous work on the economic impacts of child marriage (Wodon et al., 2017). While nine in ten girls complete their primary education and three in four complete their lower secondary education globally, the proportions are much lower in Africa. In the case of sub-Saharan Africa especially, despite progress over the last two decades, just over two thirds of girls complete their primary education, and four in ten complete lower secondary school. This is in part because the prevalence of child marriage and early childbearing remains very high in the region.

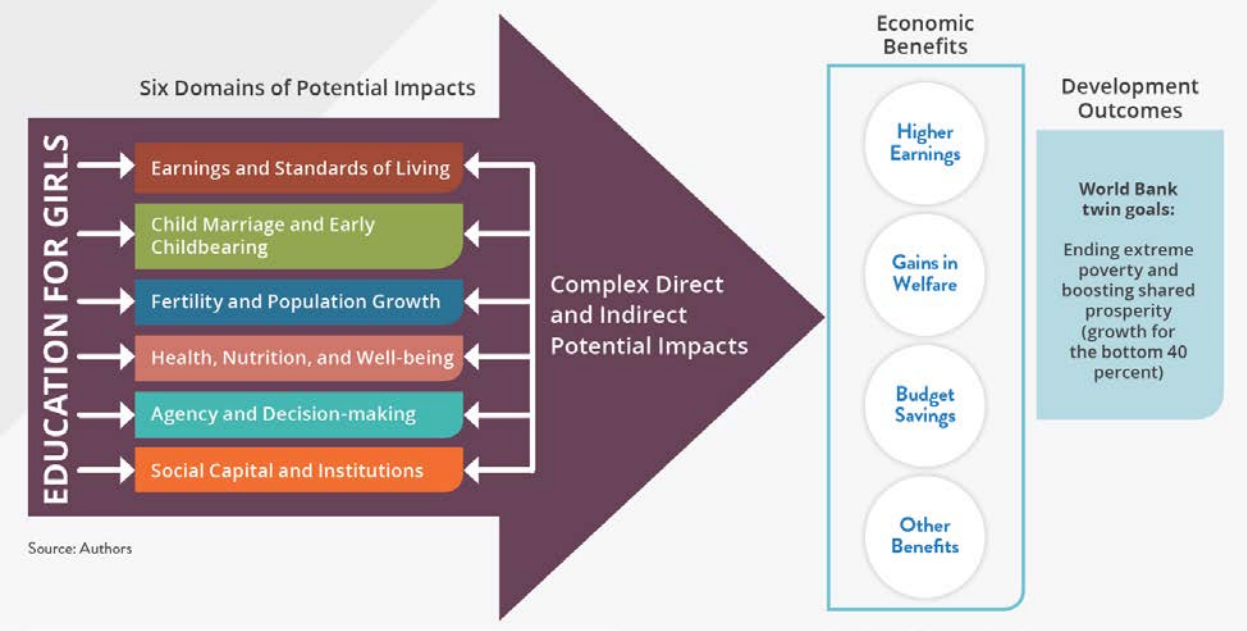
In addition, as documented by the World Development Report 2018 (World Bank, 2018), even when they remain in school, girls just like boys suffer the consequences of a learning crisis by which too many children do not acquire the foundational skills that a functional education system ought to ensure, especially again in Africa. Girls may in some countries outperform boys in reading, but they tend to score lower in mathematics and science tests in many countries. While there is no systematic data on socio-emotional skills across countries, education systems that fail to deliver these basic skills are also likely to underperform in nurturing important socio-emotional skills. When girls do not learn in school, they are more likely to drop out, marry early, or have children early.

More needs to be done to improve educational opportunities for girls. This requires among others putting an end to the practice of child marriage and reducing the risk of early childbearing. To make the case for investments in girls' education and towards ending child marriage, the focus of this study is on the potential impacts and cost of low educational attainment for girls and child marriage as opposed to lack of learning while in school (given data constraints). Specifically, the study documents associations of low educational attainment for girls with six domains of interest: (1) earnings and standards of living; (2) child marriage and early childbearing; (3) fertility and population growth; (4) health, nutrition, and well-being; (5) agency and decision-making; and (6) social capital and institutions.

Apart from looking at the impact of low educational attainment for girls on various outcomes, we also consider separately the impact of child marriage and early childbearing when data are available to do so, since the issues of low educational attainment for girls and child marriage are related. Within the six domains, more than 50 different outcomes are considered. For most outcomes, estimates of correlations are obtained using household survey data for, depending on the indicator, up to 40 countries in sub-Saharan Africa and North Africa. For outcomes measured through Demographic and Health Surveys, results are based on analysis for a core set of 13 countries.

Finally, based on the analysis of the impacts of low educational attainment, child marriage, and early childbearing for girls on a wide range of other domains, selected costs associated with these impacts are measured. For the measurement of such costs, because this study was prepared for the second summit of the African Union on ending child marriage organized in Accra in November 2018, the focus is on costs associated specifically with child marriage. The framework guiding the work is given in Figure 1.

Figure ES1: Conceptual Framework



The goal is that the analysis can illustrate the wide-ranging potential impacts and cost of low educational attainment for girls and child marriage in Africa, and in this way foster greater policy mobilization towards ensuring that the practice of child marriage is ended and that all girls complete secondary school and acquire the foundational skills needed to thrive in the labor market and live more fulfilling lives. While the study pulls together in one place results on potential impacts and costs in many domains, as noted in Box 1, the analysis only provides orders of magnitude of potential impacts and costs, not precise nor definitive values. In order to materialize the potential economic benefits from ending child marriage and expanding girls' education, countries need to make the necessary investments in the inputs required to improve both access to schools and learning, and adopt policy reforms that can not only help end child marriage, but also propel the economy to grow and generate jobs for a more educated workforce. While not all such policies are discussed in this note, specific attention is given to policies and programs that have the potential to reduce child marriage, again because this study was prepared for the second summit of the African Union on ending child marriage.

Box 1: Contribution and Limits of the Study

This note summarizes findings from a research program at the World Bank to document the potential negative impacts of low educational attainment for girls and child marriage, and some of the related economic costs. The fact that investing in girls is essential for development is not news. The contribution of this study is to illustrate the potential negative effects of not investing in girls in a slightly more comprehensive way, with more recent survey data, and for a larger set of countries than done so far. By pulling together evidence on the associations between low educational attainment and child marriage for girls and multiple socio-economic domains in many countries, the analysis can help foster greater mobilization towards girls' education and ending child marriage.

As with any empirical work of this nature, estimates of potential impacts and costs are subject to two important caveats. First, estimates from available observational data do not permit establishing causal relationships. Thus, when referring to potential 'impacts', the analysis should be taken as only suggestive of what might be achieved with higher educational attainment for girls and women, a reduction in child marriage and early childbearing, and related policy changes. What is measured are associations between educational attainment and child marriage and other development outcomes. For several of the outcomes considered, whether these associations reflect casual relationships can be corroborated by evidence from existing empirical studies that are able to more credibly establish causality. But for other outcomes, fewer such studies are available. Second, simulations of the benefits of increasing girls' education or ending child marriage obtained from the estimates of potential impacts do not account for broader effects in the economy arising from an expansion in the number of better educated girls or women, or a sharp reduction in child marriage. The economics literature suggests that these effects can be sizable, particularly lowering the overall returns to schooling in the labor market in the case of higher educational attainment. Thus, estimates only provide orders of magnitude of potential impacts and costs, not precise values of ultimate potential impacts taking into account general equilibrium effects.

KEY RESULTS

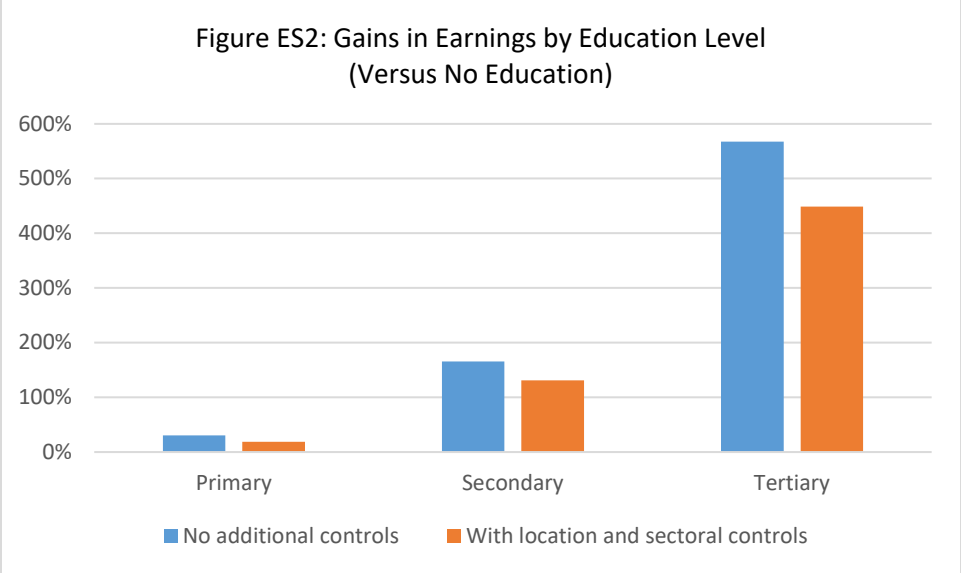
Findings across Domains

- **Education matters for all children, but even more so for girls than boys because of the link for girls between dropping out of school and marrying or having children early:** Many of the potential impacts of education on development outcomes apply to both boys and girls. When a child does not finish secondary school, or does not learn what is needed to function productively as an adult, potential costs are high for boys and girls alike in terms of lost earnings. But not educating girls is especially costly in part because of the close relationships between educational attainment, child marriage, and early childbearing, and the risks that they entail for young mothers and their children. In addition, occupational segregation by gender between paid and unpaid (housework and care) work, and between types of employment and sectors, which is in part due to social norms, also leads to especially high potential costs for girls. Finally, although this is not discussed in this study, it is also worth mentioning that girls and women in contexts of fragility and violence are especially vulnerable to the consequences of low educational attainment.

- **While primary schooling is necessary, it is not sufficient because for many indicators, having a primary education does not make a large difference versus having no education at all.** The gains associated with educational attainment tend to be substantial only with a secondary education. This is likely in part a reflection of the failure of schools to deliver learning of basic skills in the early grades, thus hindering the progression of girls to higher educational attainment. But the implication is that while primary schooling lays the foundation for future learning, it is essential to enable girls to pursue their education through the secondary level and to ensure that learning occurs in order to reap the benefits from more education. This in turn also underscores the importance of ending child marriage and early childbearing since they lead girls to drop out of secondary school.

Findings by Domain of Impacts

- **Earnings and standards of living:** Women with primary education (partial or completed) earn 19 to 30 percent more than those with no education at all depending on the model used for the estimations (Figure 2). By contrast, women with secondary education may expect to make more than twice as much, and women with tertiary education almost five times as much as those with no education. Secondary and tertiary education are also associated with higher labor force participation, and especially full-time work. Finally, women with secondary and tertiary education report higher standards of living compared to those with primary education or lower. For example, women with a secondary education are more likely to state that they have enough money to buy food versus women with primary education or less. When considering the impact of child marriage on earnings for women, estimates suggest that women who married early may have earnings on average eight percent lower across 12 countries than if they had married after 18. This leads to a loss in national earnings (including all men and women) of about one percent for those countries, which is far from negligible.



Source: Authors. The Figure displays average marginal potential impacts.

- **Child marriage and early childbearing:** Each additional year of secondary education is associated with lower risks of marrying as a child and having a child before age 18 by about seven percentage points on average (see Table 1). If universal secondary education were achieved, child marriage could be virtually eliminated, and the prevalence of early childbearing could be reduced by up to three fourths since early childbearing goes hand in hand with child marriage. This also means that when assessing benefits from educating girls at the secondary level, we should include benefits from reducing child marriage and early childbearing. By contrast, primary education is not associated with lower risks of child marriage and early childbearing in most countries.

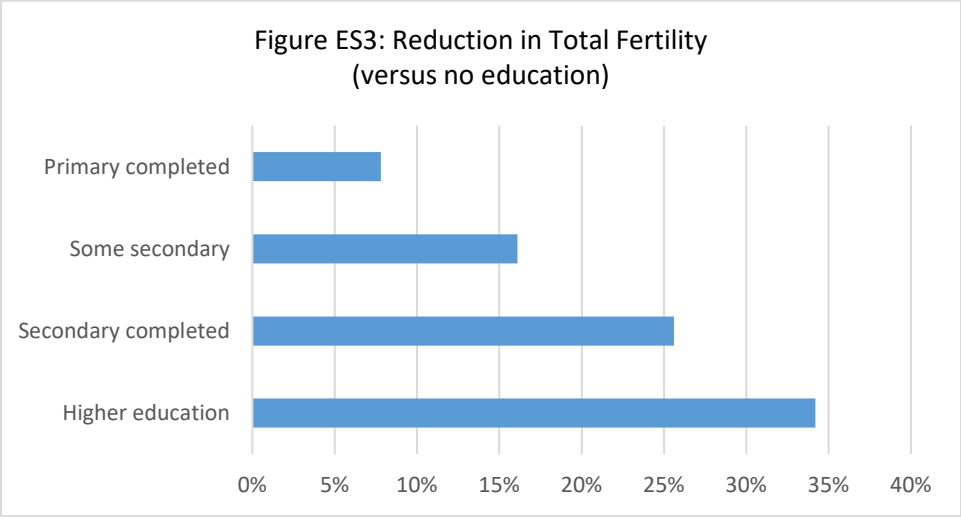
Table ES1: Potential Impact of Educational Attainment on Child Marriage and Early Childbearing

	Reduction in risk per additional year of secondary education
Reduction in risk of child marriage	-7.5
Reduction in risk of early childbearing	-6.6

Source: Authors based on Demographic and Health Surveys.

Note: Estimates based on country-level analysis for 13 African countries. All estimated potential impacts are statistically significant except for one country for early childbearing.

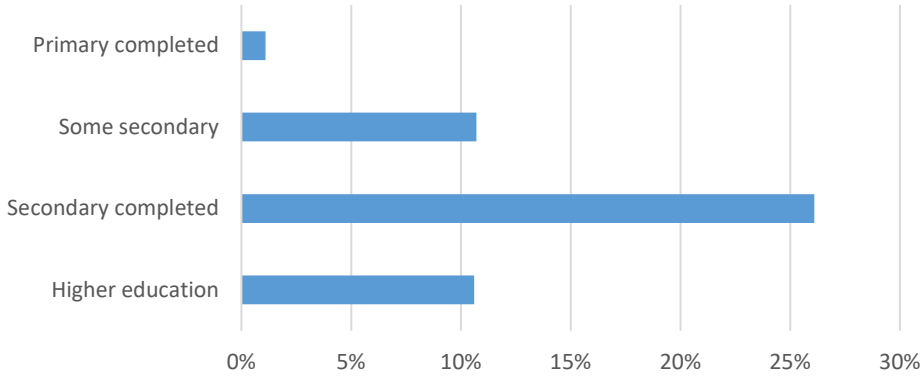
- **Fertility and population growth:** A higher level of education is associated with a substantial reduction in total fertility (see Figure 3). As a result, universal secondary education could reduce total fertility by a third in 18 developing countries considered for the analysis. About two thirds of this potential impact could come from educational attainment itself, and one third from ending child marriage. Universal secondary education could also lead to an increase in modern contraceptive use of a third from the base. If girls were better educated, and if child marriage were to be drastically reduced thanks to universal secondary education, annual rates of population growth could be reduced substantially, with larger impacts in countries that have not yet achieved the demographic transition. This could generate a large demographic dividend. Again, the potential impact of primary education in all these areas is much smaller.



Source: Authors. The Figure displays average marginal potential impacts.

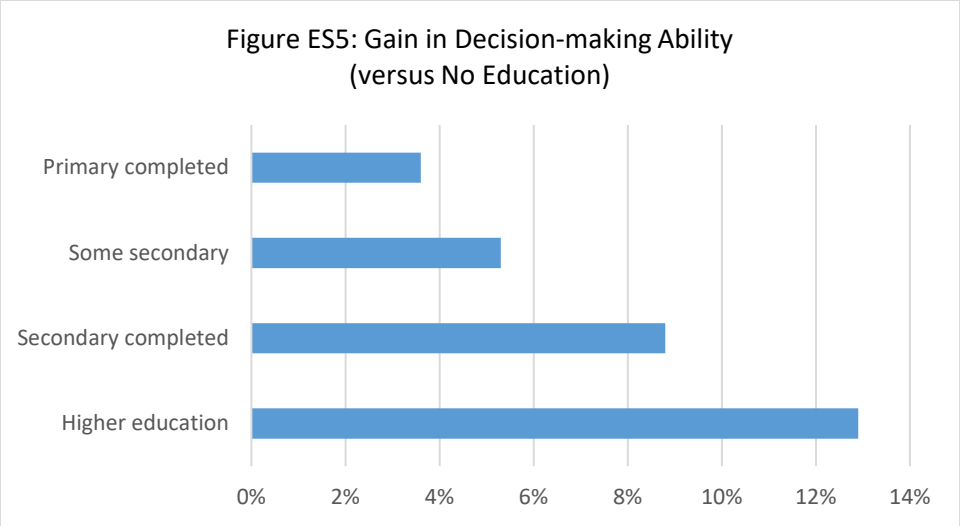
- **Health, nutrition and well-being:** Universal secondary education could increase women's knowledge of HIV/AIDS and their ability to make decisions about their own healthcare by one tenth nationally. Women's psychological well-being could also improve and the risk of intimate partner violence could decrease. In many countries, a higher level of education for mother is associated with a reduction in the risk of stunting for their young children (see Figure 4). As a result, in countries where potential impacts are statistically significant, universal secondary education for mothers could reduce stunting rates for their children by almost half. Reductions in under-five mortality of about one fifth versus baseline rates could also be achieved in those countries. With the important exception of under-five mortality for which in a few countries a substantial decrease is observed when mothers have primary education, the gains from universal primary education in the area of child health appear once again to be limited. In the case of child marriage and early childbearing, gains also tend to be limited nationally given that few children are born of mothers younger than 18, but marginal impacts tend to be large.

Figure ES4: Potential Reduction in Under-five Stunting
(Versus Less than Primary Completed)



Source: Authors. The Figure displays average marginal potential impacts.

- **Agency and decision-making:** A higher level of educational attainment is associated with more decision-making ability for women in their household (see Figure 5). As a result, achieving universal secondary education could increase by more than one tenth women's reported ability to make decisions within the household, from baseline values. Women with secondary education report lower satisfaction rates with basic services than women with no education, which may reflect a more realistic assessment of their quality. Finally, having a secondary education is associated with higher birth registration in some countries. While results are not robust across countries, effects are substantial when statistically significant. As with the other indicators, while some benefits could result from universal primary education, they would be smaller. Benefits from ending child marriage in those areas, while occasionally statistically significant, tend not to be large, and are smaller than for educational attainment.



Source: Authors. The Figure displays average marginal potential impacts.

- **Social capital and institutions:** Achieving universal secondary education could enable more women to display altruistic behaviors such as volunteering, donating to charity, and helping strangers, with a change of up to 17 percent from baseline values (this could be because better educated women have more opportunities to display altruistic behaviors). A secondary education is also associated with a higher likelihood for women of reporting being able to rely on friends when in need and it could affect how women perceive their countries' institutions, although in this specific area more work would be needed to confirm the robustness of those relationships. For this set of indicators, the potential gains from primary versus no education at all cannot be measured given data limitations. The effects of child marriage cannot be estimated with the available data.

Economic Costs: The Case of Child Marriage

- **Given that this study was prepared ahead of the African Union's second summit on child marriage, the focus for the analysis of economic costs is on impacts associated with child marriage**, as opposed to the (larger) costs from low educational attainment for girls. While only a small set of economic costs are estimated, the costs are clearly large. Estimates are in terms of losses in human capital wealth defined as the value of the future earnings of the labor force.

    - **Lost human capital wealth due to lower earnings for women:** Lower earnings for women in adulthood due to child marriage lead to losses in human capital wealth defined as the present value of the future earnings of the labor force. The loss in human capital wealth incurred today because women were married early in their youth is estimated at US$63 billion for 12 countries that account for half of the continent's population. For the continent overall, simple extrapolation suggest that losses could be twice as large. For perspective, annual total net Official Development Assistance (ODA), which consists of disbursements of loans made on concessional terms net of repayments of principal, was estimated in 2016 at US$41 billion for Africa, so the loss in wealth may be equivalent to a few years of international aid.

- **Lost human capital wealth due to lower earnings for stunted children:** Stunting in early childhood leads to losses in earnings in adult life. Stunting rates could be reduced if child marriage and early childbearing were eliminated, which could generate gains in human capital wealth. The magnitude of those gains is however likely to be smaller than the direct effect on women's earnings, but it is still likely to be substantial.

- **Loss in total wealth per capita from population growth:** Child marriage is associated with higher rates of fertility and population growth. This in turn reduces levels of total wealth per person, especially in countries that have high population growth. The gains in wealth per capita that could result from lower population growth by ending child marriage could be initially smaller than those estimated for women's earnings. They are estimated at US$ 26 billion in the first year of the elimination of child marriage for 13 countries. Yet these gains would however be cumulative over time, rivalling just within a few years the losses in wealth from women's lower earnings due to the impact of child marriage on educational attainment.

Solutions to End Child Marriage

- **Again, given the aim of this study to inform the African Union's second summit on child marriage, the focus for discussing policies is on interventions needed to end child marriage.** Multiple interventions are likely to be needed to end child marriage, but since keeping girls in school is key, improving education opportunities for girls should be a priority. Typically, various interventions aiming to end child marriage and early childbearing and improve opportunities for girls tend to be managed by different Ministries, including not only Ministries of Education, but also Ministries of Health, Ministries of Population, Ministries of Labor, and Ministries of Gender or Women and Children's Affairs. Strategies may be defined at the Ministry level, or through inter-ministerial committees. Yet since keeping girls in school is essential to end child marriage and early childbearing, providing education opportunities for girls is especially important. In practice, three-pronged strategies are likely needed: (1) General basic conditions must be met for access to education and learning; (2) Targeted interventions must be implemented to reach vulnerable girls; and (3) Efforts must be undertaken to change gender-based social norms.

- **General conditions for access to education and learning**. In many countries, there is a need to build secondary schools closer to where girls live or provide modes of transportation and in some cases boarding to enable them to attend schools, especially at the secondary level. Providing adequate water, sanitation and hygiene facilities for girls is also important, as is the need to address the risk of violence and sexual harassment either at or en route to school. It is also essential to ensure that schools improve learning outcomes and provide girls with appropriate skills. Among various entry points that can be used to that end, the following can be mentioned (1) reducing disadvantages that girls face in remote communities due in part to poor targeting of Government resources; (2) creating a more inclusive school culture for girls; (3) providing girls with role models—including through female teachers; and (4) raising the returns to secondary education for women at the local level through better employment opportunities. This list is by no means exhaustive and the appropriate entry points vary between countries.

- **Targeted interventions to reach especially vulnerable girls:** The literature suggests that targeted interventions especially in the forms of incentives to keep girls in school may have large benefits. Three types of interventions were recently reviewed on the basis of the available evidence from experimental or quasi-experimental studies: (1) There is a need for interventions to expand economic opportunities for adolescent girls who dropped out of school and who are unlikely to be able to return; (2) Imparting adolescent girls with life skills and reproductive health knowledge is also important, whether girls are in school or out of school. Evidence suggests that safe space clubs where girls may discuss issues of sexual and reproductive health as well as other topics with female mentors may be an effective means of achieving this. (3) However, according to the literature, the most effective targeted interventions to delay marriage and childbearing are those that enable girls to remain in school, especially through incentives offsetting the out-of-pocket and opportunity costs of schooling.

- **Efforts to change gender-based social norms:** Child marriage, early childbearing, and low educational attainment for girls are rooted in social norms that perpetuate gender inequality. To tackle this challenge, beyond general conditions that education systems should meet and targeted interventions to reach vulnerable girls, additional community-based interventions that involve all members of the community may be an effective means of changing these norms. Such interventions should target men and community leaders apart from women. Finally, adequate laws – for example on the minimum age for marriage without exceptions for parental and judicial consent, are also essential, but often not sufficient on their own to achieve change.

Summary of Key Findings

Table ES2 below provides the main estimated potential impacts by domain. Potential impacts are summarized by showing gains from a secondary education in comparison to no education at all, factoring in the benefits from the virtual elimination of child marriage that would follow if all girls completed their secondary schooling. In most cases, potential impacts are estimated for the completion of secondary school, but in some cases the potential impacts are for both partial and completed secondary school combined. In virtually all cases, estimates of the potential impacts of low educational attainment for girls – or equivalently of gains associated with higher educational attainment as captured by secondary education, are large. As documented in more detailed in the study, most gains are associated with secondary as opposed to primary education. This is also the case for the gains associated with the elimination of child marriage since they are assumed to follow from universal secondary education. It should again be emphasized that what is measured is associations, not necessarily causal impacts. In addition, for some indicators, especially in the case of agency and decision-making, and social capital and institutions, the data often pertain to reported behaviors and perceptions, thereby making interpretation more tentative.

Table ES2: Selected Potential Benefits from Universal Secondary Education for Girls

Domain	Estimated Potential impacts
Earnings and standards of living	Expected earnings in adulthood more than doubled Increase in labor force participation or working full time by up to one tenth Gain in perceptions of standards of living of up to one tenth
Child marriage and early childbearing	Virtual elimination of child marriage Reduction in early childbearing by up to three fourths
Fertility and population growth	Reduction in total fertility by about one third Increase in contraceptive use by a third from base Reduction in population growth by 0.6 percentage point
Health, nutrition and well-being	Increase in women's knowledge of HIV/AIDS by one tenth Increase in women's decision-making ability for health by more than a fourth Increase in women's psychological well-being Reduction in under-five mortality rate by up a fifth Reduction in under-five stunting rate by almost half
Agency and decision-making	Women more likely to be able to make decisions in the household Women possibly more likely to better assess the quality of basic services Increase in likelihood of birth registration by one third
Social capital and institutions	Women more likely to report altruistic behaviors Women more likely to report ability to rely on friends when in need Women possibly more likely to be more able to assess institutions/leaders

Source: Authors.

Table ES3 provides the valuation of the two potential impacts for which a monetary cost is computed assuming the elimination of child marriage. The analysis focuses on losses in human capital wealth related to (i) lost earnings for women; and (ii) higher fertility rates and thereby annual population growth rates due to child marriage. The estimated costs run in the tens of billions of trillions of dollars. These estimates are only orders of magnitude since they depend on models and assumptions, but they demonstrate that the potential cost of child marriage is high for the girls and societies overall, and the potential cost of not educating girls would be even larger.

Table ES3: Selected Economic Costs of Child Marriage, Selected Countries

Estimates costs	Value
Loss in human capital wealth due to lower earnings (12 countries)	US$ 63 billion
Loss in welfare (total wealth per capita) due to high population growth (13 countries)	US$ 26 billion loss in first year, cumulative and rising over time

Source: Authors.

To conclude, low educational attainment for girls and child marriage can have pervasive potential impacts ranging from lower earnings and standards of living to lower psychological well-being and agency for girls and women. Possibly in part because educational investments at the secondary level provide an option value to continue investing to acquire further skills later in life, the benefits from education are much larger at the secondary than at the primary level. This is even more the case when considering that achieving universal secondary school completion for girls could virtually eliminate the risk of child marriage. Countries need to ensure that child marriage is eliminated and that all girls can go to school and acquire foundational cognitive and socio-emotional skills while in school. While the public and private cost of ending child marriage and providing universal quality primary and secondary education for all girls could be far from negligible, the potential returns to this investment could be much larger. Increasing investments in girls' education clearly makes economic sense. It is also the right thing to do.

INTRODUCTION

This study was prepared ahead of the second African girls' summit on ending child marriage organized in August 2018 by the African Union in Accra, Ghana (see Box 1). The study is adapted from a recent global study on the cost of not educating girls (Wodon et al., 2018), and also relies on previous work on the economic impacts of child marriage (Wodon et al., 2017). Analysis conducted for global studies has been replicated with a focus on African countries only. Many results are similar between this Africa study and the recently released global study on the cost of not educating girls, but some results, estimates, and interpretations differ. Given limited progress in reducing child marriage over time in Africa, and the purpose of this study which is to inform the African Girls' summit on ending child marriage, more emphasis is placed on child marriage in this study than in the global study on the cost of not educating girls. In terms of economic analysis, instead of measuring the benefits from universal secondary education for girls, the focus is on measuring the cost of child marriage. In addition, policy options for ending child marriage are discussed in more details in this study than in the global study of the cost of not educating girls. Still, despite a few differences in emphasis, the structure of this study for Africa follows broadly the structure of the global study on the cost of not educating girls, and the policy messages are also broadly similar.

Box 1: The African Union's Second African Girls' Summit on Ending Child Marriage in Africa

Through the framework of the African Union Campaign to End Child Marriage, the African Union Commission (AUC) promotes quality education for girls and sexual and reproductive health rights (SRHR) services including meeting the unmet needs of married and unmarried adolescents for family planning and strengthening the evidence base needed to design and implement effective policies and programs for reducing child marriage at scale. As a follow-up to the First African Girls' Summit hosted in Zambia in 2015, the AUC is holding a second Summit in Ghana with an emphasis on the need of investing in adolescent education and access to services such as sexual health care, sexuality education, and rights protection.

The objectives of the Summit in Ghana include (i) sharing experiences including best practices and problems affecting the girl-child in Africa to engender the change that needs to prevent violations of the rights of children; (ii) Discussing linkages between child marriage and adolescent SRHR; (iii) Generating interactive discussions of successes, challenges and key recommendations from community, traditional, and religious leaders, as well as girls affected by child marriage and youth advocating against child marriage, including aspects related to sexual and reproductive health services and education; (iv) Renewing commitments to remove legal and policy barriers for adolescent and child brides to gain equitable access to SRHR and institutionalize age–specific comprehensive sexual education and adolescent friendly SRHR services; and (v) Engaging in advocacy for government and donor buy-in.

The African Union strategic directions for 2019-23 consider girls' education as a development priority with a believe that better educated women tend to be healthier, participate more in the formal labor market, earn higher incomes, have fewer children, and consequently marry at a later age. This tallies with Aspiration 1 of the African Union agenda 2063, a prosperous Africa based on inclusive growth and sustainable development is achieved with well-educated and skilled citizens where no child misses school.

Globally, according to data for 2016 from the World Bank's World Development Indicators, nine in ten girls complete their primary education, but only three in four complete their lower secondary education. The proportions are much lower in Africa, and especially in sub-Saharan Africa where despite progress, just over two thirds (67.5 percent) of girls complete their primary education today, and only four in ten (40.4 percent) complete lower secondary school. The fourth Sustainable Development Goal is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The

first target under this goal is to ensure that by 2030 all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. At current rates of progress, most African countries are unlikely to achieve this target. More needs to be done to improve educational attainment and learning for all children, boys and girls alike. But a special focus needs to be placed on girls who remain at a disadvantage versus boys in Africa, especially at the secondary level.

Why do girls remain at a disadvantage for secondary school completion? In African countries, this is in part because of the pressure to marry early. Ending child marriage, defined as a formal or informal union before the age of 18, is also a target adopted under the Sustainable Development Goal. Child and forced marriage are classified as a form of gender-based violence by the international community (Department of Economic and Social Affairs, 2014), but progress towards ending child and forced marriages has been slow on the continent. While gains have been achieved in Africa over the last two decades for primary and lower secondary education completion for girls, less progress has been made towards ending child marriage (see Appendix 1 for aggregate estimates). As a result, sub-Saharan Africa is today the region with the highest prevalence of child marriage, as well as the lowest educational attainment for girls.

The lack of educational attainment and learning for girls together with persistently high rates of child marriage have multiple negative potential effects throughout their lifetime not only for the girls themselves, but also for their children and households, their communities, and societies or countries. This note summarizes findings from a research program at the World Bank to document the potential negative impacts of low educational attainment and child marriage for girls, and some of the economic costs associated with those potential impacts, with a focus on Africa. The fact that investing in girls is smart economics is not news. The point was made in the World Development Report on gender (World Bank, 2012) and in many other studies before that (see for example World Bank, 2001). There has also been substantial research on the factors – including social norms – that keep girls at a disadvantage in many countries (see Box 2 on the Voice and Agency study at the World Bank). The contribution of this study is to document the potential negative effects of not investing in girls in perhaps a slightly more comprehensive way and with more recent survey data than has been done so far. The hope is that by illustrating the wide-ranging potential impacts and costs of low educational attainment for girls and child marriage, the analysis will foster even greater policy mobilization towards improving education opportunities for girls, and ending the practice of child marriage on the continent.

Box 2: Social Norms, Voice, and Agency

In 2014, the World Bank released a study on *Voice and Agency: Empowering Women and Girls for Shared Prosperity* (Kulgman et al., 2014). The report documents constraints facing women and girls worldwide, from high levels of gender-based violence to social norms and laws that curtail their decision-making in multiple areas such as working, owning property, working, or even making simple decisions within the household. Some of the findings in that report are similar to those documented here in terms of the negative impacts of low educational attainment for girls, child marriage, and early childbearing.

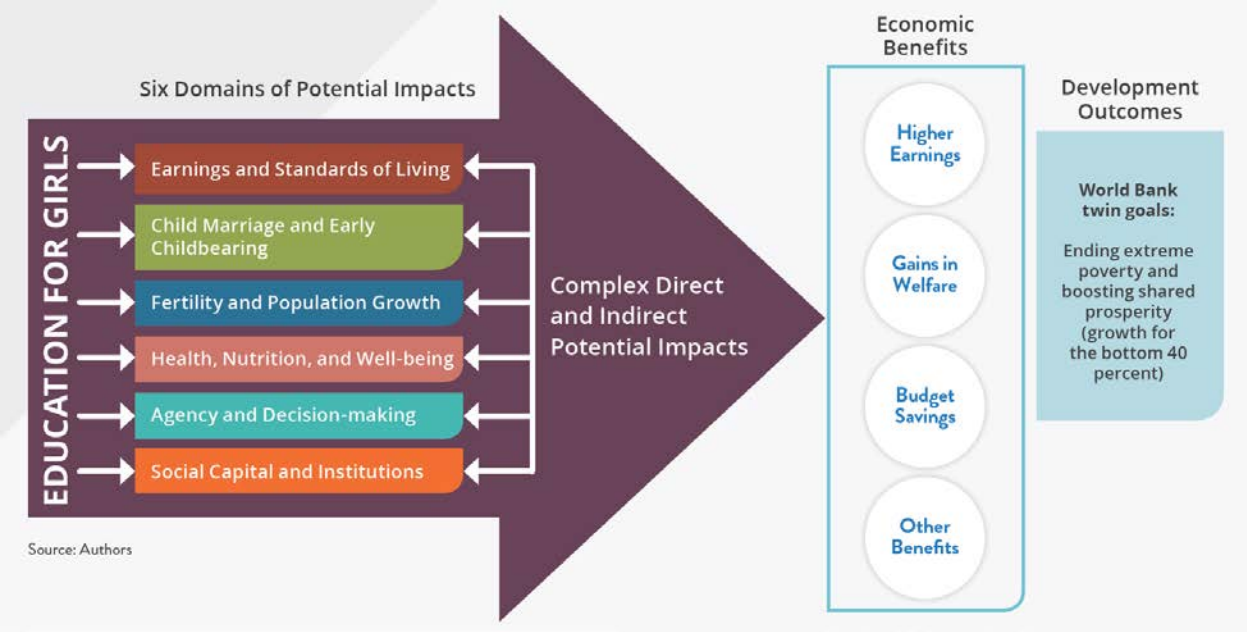
The Voice and Agency report notes that constraints faced by women and girls stem from their limited endowments (health, education, and assets) and economic opportunities. In addition, social norms about gender roles are also limiting. For example, even when women work outside of the home, they typically remain responsible for housework and child care. Social norms often restrict women's mobility and ability to network. They tend to be under-represented in politics and government. Unequal power relationships lead among others to gender-based violence, and legal discrimination remains pervasive, as is the case when women need their husband's consent to work. Lack of protection and discrimination under the law may interact with social norms interact, as is the case when women have limited land rights.

While this report does not discuss the issues of the drivers of low educational attainment for girls, child marriage, and early childbearing in detail, there is no doubt that social norms play an important role.

Social norms tend to be reinforced by the community where girls live, including by teachers, schools, and the education system. This is recognized, among others, by the African union campaign to end child marriage. Even if child marriage were ended, for example if girls are kept in school and married immediately at age 18 and have children soon after that, women's voice and agency would still be curtailed. This is why beyond the necessity to end child marriage, social norms must be tackled.

The framework that guides the analysis is provided in Figure 1. It follows the global study on the cost of not educating girls by Wodon et al. (2018), and in so doing builds on three other recent studies at the World Bank. The first study focused on the economic impacts of child marriage and was implemented jointly with the International Center for Research on Women (Wodon et al., 2017). The other two studies provided an analysis of the changing wealth of nations (Lange et al., 2018) and an estimation of the global cost of gender inequality in earnings (Wodon and de la Brière, 2018). Building on past work, six domains of potential impacts of girls' education are considered: (1) earnings and standards of living; (2) child marriage and early childbearing; (3) fertility and population growth; (4) health, nutrition, and well-being; (5) agency and decision-making; and (6) social capital and institutions. The potential impacts of low educational attainment for girls and child marriage are estimated using regression analysis and a wide range of datasets (see Appendix 2 for a description of the main datasets and an outline of the methodology). The various domains of potential impacts are related to each other as noted in Box 3. For example, domains (2) and (3) are closely linked because the fact that girls marry or have children early is often what leads them to have higher fertility rates. Yet the various domains are considered sequentially because they are based on different indicators, and while they intersect, they remain different.

Figure 1: Conceptual Framework



More than 50 different indicators or outcomes of interest are used for assessing the potential impacts of low educational attainment for girls and child marriage. Some indicators are objective measures. Examples include total fertility rates, women's earnings, rates of under-five mortality and

stunting, and altruistic behaviors. Other indicators are perceptions-based, as is the case with perceptions of standards of living, psychological well-being, institutions, and national leaders. While not all indicators may be equally important for development, poverty reduction, and shared prosperity, conducting analysis for a large set of indicators helps to convey the fact that the consequences of not educating girls and allowing child marriage to persist are truly pervasive and wide-ranging.

Box 3: Interdependence between Domains and Benefits from Qualitative Data

For simplicity, findings on the potential impacts of low educational attainment for girls and child marriage are presented in this study for each domain of potential impact separately. Yet in practice, the various domains are interdependent. To illustrate how this is the case, consider a simple life cycle approach, whereby stages in the life of girls are considered. Social norms may contribute to disadvantage for girls early on, but they emerge in full force in adolescence when in many contexts, girls may have to get married as children if they drop out of school. This contributes to early childbearing and higher total fertility over their lifetime. In turn, having many children may affect women's ability to participate in the labor market in adulthood, and low educational attainment reduces their earnings when working. This may affect decision-making ability within the household, voice, and social capital throughout women's life. Finally, early childbearing, high fertility rate, and income losses also have intergenerational effects, contributing among others to higher risks of child mortality and malnutrition for children of poorly educated mothers.

The challenges and obstacles faced by girls and women due to low educational attainment and child marriage as well as early childbearing are multifaceted. They reinforce each other, leading to a diminished ability to break away from patterns of disadvantages. In this study, the focus is on quantitative analysis to estimate the potential impacts and cost of low educational attainment for girls and child marriage. In some cases, interdependence between domains is explicitly considered. This is the case when considering the potential combined impacts of both low educational attainment and child marriage on other outcomes. But there are limits to the extent to which the interdependence between domains can be considered without making the quantitative analysis overly complex.

Qualitative data and narratives are another way to illustrate interdependence between domains. For this reason, selected quotes from qualitative data collected as part of the work program of which this study is part, as well as quotes from a few other existing studies, are provided. The number of such quotes is however kept quite small in part for space reasons (to keep the study relatively short), but also because this is not the main focus and contribution of the study. While those few quotes do not do justice to the richness of qualitative work being done on the consequences of low educational attainment, it is hoped that they illustrate concretely the hardship faced by girls and women when they drop out of school prematurely or when they marry or have children early.

The term 'cost' in 'the cost of not educating girls' or the 'cost of child marriage' is to be understood in a broad sense. For example, as shown in this study, women with low levels of educational attainment are more likely on average to suffer from feelings of pain, worry, sadness, stress, and anger after controlling for many other factors that could be correlated with these perceptions. This is a true cost associated with low educational attainment even if no monetary value for this cost is provided. These non-monetary costs should not be underestimated when considering programs and policies in various areas. But in addition, we also compute monetary or economic costs for some potential impacts of not educating girls. This is done only for potential impacts on earnings and population growth because of the data and assumptions needed to compute such costs with some level of accuracy.

Conceptually, at least four main types of benefits or costs could be considered: (i) higher earnings; (ii) higher welfare due to lower population growth; (iii) budget savings (or costs); and (iv) other benefits,

including in terms of individual feelings and perceptions, as just mentioned. Given that this study was prepared for the African Union second summit of child marriage, estimates of costs are provided for child marriage (costs would be larger for low educational attainment for girls). Estimates are provided for two first categories only – higher earnings and thereby human capital wealth for women in adulthood, and higher welfare due to lower population growth and thus national higher wealth per capita. On budget savings and costs, additional work would be required to estimate net potential effects, but the study notes that while ending child marriage and providing better education opportunities for girls (and boys) would have a cost, it could also lead in certain areas to budget savings, among others for the provision of basic services thanks to lower population growth. In Figure 1, the framework is presented in terms of the benefits from girls' education, but the approach also holds for benefits from ending child marriage.

Finally, low educational attainment for girls and child marriage have implications not only for individuals and households, but also for nations and the continent. By raising standards of living through higher earnings and lower population growth, educating girls and ending child marriage would lead to reductions in poverty. Furthermore, since girls and women from lower socio-economic backgrounds are the most affected by low levels of educational attainment and child marriage, educating girls and ending child marriage would also contribute to boosting shared prosperity, defined as achieving higher rates of income growth for the bottom 40 percent of the population in terms of socio-economic conditions.

The estimation of the potential impacts of low educational attainment for girls and child marriage is based on regression analysis and is subject to two important caveats. First, estimates from available observational data do not permit establishing causal relationships. Thus, when referring to potential 'impacts', the analysis should be taken as only suggestive of what could be achieved with higher educational attainment for girls, reduced risks of marrying early, and related policy changes. For several of the outcomes considered, the magnitude of the potential effects could be corroborated by evidence from existing empirical studies that are able to more credibly established causal relationships. But for other outcomes, fewer such studies are available.

Second, simulations obtained from the estimates of potential impacts do not account for broader effects in the economy arising from an expansion in the number of better educated girls or women and the elimination of child marriage. The latter could for example happen if the economy fails to grow at a rate that can generate sufficient jobs to absorb the more educated women entering the labor market, and/or if the educational expansion were to negatively affect education quality due to the lack of adequate investments in inputs required to ensure learning. Thus, estimates only provide orders of magnitude of potential impacts and costs, not precise or definitive values of ultimate effects.

One last caveat to the analysis must be mentioned. This study focuses on the potential impacts of low educational attainment for girls and child marriage as opposed to lack of learning on a range of development outcomes for girls and women. This focus is driven by data limitations. Apart from improving educational attainment and ending child marriage, there is an urgent need to improve learning in school, as noted by the World Development Report 2018. Ideally, the analysis should cover not only educational attainment and child marriage, but also how much girls learn in schools, and whether they acquire the skills – cognitive and non-cognitive – that they will need throughout their life. Unfortunately, data sources for conducting such work remain limited, and available only for a handful of countries. Because the focus of this study is regional, the analysis focuses on the potential negative impact of low educational attainment for girls and child marriage, leaving the issue of insufficient learning and skills for future work, even though lack of learning in school is one of the reasons why girls drop out of school (see Box 4).

In what follows, the analysis of the potential impacts of low educational attainment for girls and child marriage on development outcomes is first presented according to the six domains highlighted in Figure 1. Thereafter, estimates of a few monetary costs are provided for some of these potential impacts.

Box 4: Why Do Girls Drop Out of School?

This study is about the potential impacts of low educational attainment for girls and child marriage. It is not about a detailed investigation of the reasons why girls drop out of school prematurely, even if child marriage is one of those reasons. It is useful to note however that these reasons are complex. When parents are asked in surveys why their daughters dropped out of school, issues related to the cost of schooling (which comprises both out-of-pocket and opportunity costs), early marriages and pregnancies, a lack of learning while in school, and a lack of interest in remaining in school often come up. In some countries, some factors play a larger role, while in other countries, other factors may be more prominent. But in many countries, even if this may not appear explicitly in survey responses by parents on reasons for girls dropping out, social norms and gender roles also affect the ability of girls to remain in school. This emerges clearly from qualitative work. In the case of Niger for example, ethnographic work suggest that six main obstacles lead most girls to not pursue their education beyond the primary level.

1. Poor learning outcomes and cost. Rural government schools are so poor in quality and resources that many children graduate from primary school without learning to read. The schools do not charge tuition, but parents complain that the cost of uniforms, guard fees, transport, lunches and the opportunity costs of losing their daughters' labor are hardly worth the poor learning outcomes they see.

2. Failure at examinations. Students can only take the primary school completion exam twice. If they fail, they are ineligible to continue in public education. When girls fail examinations, parents say that they have little choice but to begin looking for a suitable suitor which their daughter could marry.

3. Lack of nearby secondary schools. Few rural communities have their own secondary school and there are few boarding schools serving communities. Parents must send their children to nearby towns and cover the costs of transportation and room and board. Students stay with relatives or contacts and parents are reluctant to leave their daughters without what they consider proper oversight.

4. Forced withdrawal of married adolescents. Once a girl is married, she is likely to be expelled from school. Husbands show little interest in supporting their adolescent wife's education especially if they must enroll in a private school. This is an expense that they cannot afford. Conversely, the fear of not being allowed to withdraw their daughters from school for marriage is a complaint of some parents.

5. Never enrolling in school or enrolling too late. Some families never enroll girls in school, perhaps in part because parents had no educational opportunities themselves. In some cases, teachers may refuse to enroll children that are considered too old to start primary school.

6. Influence of relatives and demands on first daughters. Extended family members may influence parents on the value of educating girls, not always with positive outcomes. Schooling decisions may also depend on household composition and the activities of other children. Being the first daughter lessens a girl's chances of going to school as they are expected to help their mother at home during the day.

While finding solutions to keep girls in school and enabling them to learn while in school is necessarily context-specific, the literature suggests that various types of interventions and policies can work. Some of these interventions are briefly discussed in a subsequent section of this study.

Source: Adapted from Perlman et al. (2018a, 2018b).

DOMAIN 1: EARNINGS AND STANDARDS OF LIVING

Educational Attainment and Earnings

The benefits from work in a person's life go well beyond earnings, but earnings are crucial for standards of living and for measuring the potential cost of low educational attainment for girls and child marriage. We consider first educational attainment and discuss child marriage next.

There is a large literature on the potential impact of educational attainment on earnings that applies to boys and girls alike (see Psacharopoulos and Patrinos, 2018, for a recent review). The benefits from educational attainment are typically measured through regression analysis whereby the potential effect on earnings of educational attainment and experience is estimated. In some models, the focus is the correlation between years of schooling and earnings, and the implicit gain associated with each additional year of schooling. Other models look at the potential impact on earnings of different levels of schooling, such as having a primary, secondary, or tertiary education. Apart from educational attainment, whether measured through years of schooling or in levels, the models may also control for other variables that may affect earnings, such as experience (or age), location, and the sector of activity.

For this study, we provide estimates of the potential impact of educational attainment on earnings using a large database of household and labor surveys available at the World Bank (see Appendix 2 on data sources). Models with years of education as well as educational attainment in levels are considered. When educational attainment is measured in levels, all individuals with some primary education or primary education completed but no education at a higher level are combined in a single category for primary education. The same is done for secondary and tertiary education. In other words, we do not distinguish whether individuals have completed or not a specific cycle of study. This is done due to data limitations and comparability issues between countries, and because the analysis is conducted for 38 countries (with a few variations depending on the model used). When doing work for a single country or a few countries, it is easier and good practice to disaggregate levels of education further (this is what we do in the analysis of Demographic and Health Surveys for this study, as will be shown below).

To test for robustness, we estimate models for men and women together, and only for women. We also estimate models with and without additional controls apart from educational attainment and experience. The additional controls considered for this study are location (urban versus rural) and sector of activity (agriculture, industry, services, and others). These additional controls are limited due to the need to keep comparability across datasets between countries. While estimates obtained with these additional controls are not necessarily superior to those without them, the availability of both types of estimates provides a useful robustness tests for the magnitude of the gains from education.

Table 1 provides the main results when only women are included in the sample. Results with both women and men included in the regression analysis were also obtained, but for this study the gains for the women sample are the most relevant. Average gains from educational attainment are computed treating all countries equally. In other words, a small country has the same weight as a large one, and poor and rich countries are also treated equally. The model with the years of education suggests that each year of additional education is associated with an expected increase in earnings of 14.9 percent when no additional controls are included, and 14.1 percent with controls for location and sector of activity. The estimates are similar to those obtained previously with the same data (Patrinos and Montenegro, 2014), albeit a bit higher than typically observed in the literature, and higher as well for African countries as compared to global estimates. Although this is not shown in the Table, in general across countries the potential impacts of education are slightly higher for women only than for women and men together. This may be in part because the point of comparison – women with no education at all – have low earnings, so gains in percentage terms are computed from a low base.

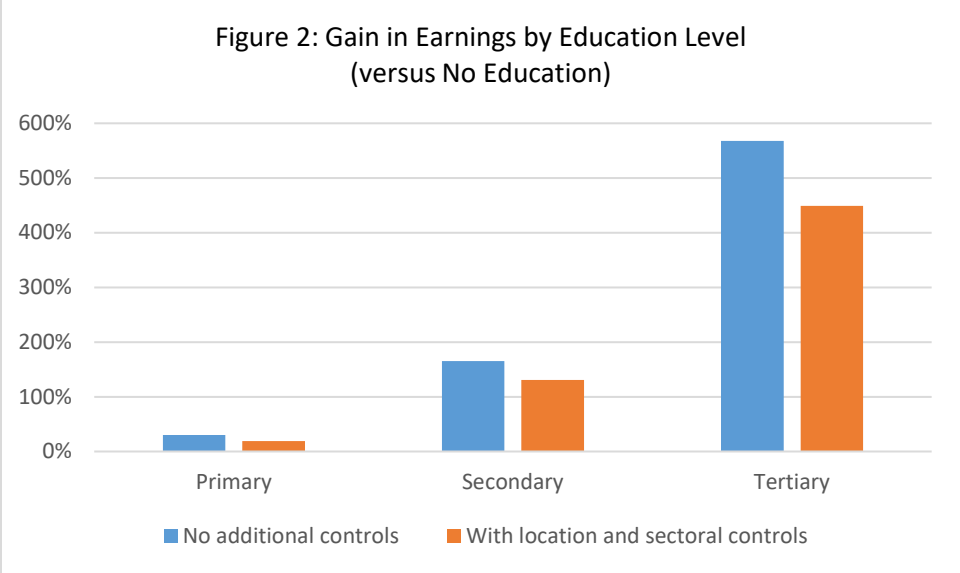
The earnings gain per additional year of education for women is large, but the estimation with the years of education implicitly assumes that all years of education have the same market value. As shown in Table 1, the estimates with educational attainment in levels suggest that this is not the case. For women with primary education (partial or completed), the average expected gain in earnings versus no education is only 30.3 percent when no additional controls are included, and 18.8 percent with additional controls. By contrast, as shown in Figure 2, for women with secondary education, the average gain is much larger at 165.5 percent with no additional controls and 130.9 percent with additional controls. Finally, for women with tertiary education, the average gain is at 567.7 percent without additional controls and 448.8 percent with additional controls. Clearly, women with primary education earn only marginally more than those with no education, while women with secondary education could expect to make almost twice as much as those with no education, and women with tertiary education almost four times as much.

Why are the gains from primary education small? Both demand and supply factors may be at work. On the demand side, employers may require workers to have skills that a primary education does not provide. On the supply side, workers with primary education may not have the skills that they should have, such as basic literacy and numeracy given the failure of education systems in the Africa region to ensure these foundational skills. As noted in the most recent World Development Report (World Bank, 2018), education systems especially in developing countries are witnessing a learning crisis whereby enrollment and attendance in school do not ensure that sufficient learning is taking place.

Table 1: Potential Impact of Educational Attainment on Earnings for Women

Women only sample	Years of Education (up to 126 countries)	Education levels (up to 96 countries)		
	Years of Education	Primary (vs. no education)	Secondary (vs. no education)	Tertiary (vs. no education)
No additional controls	0.149	0.303	1.655	5.677
With location and sectoral controls	0.141	0.188	1.309	4.488

Source: Authors. Regression analysis based on data for 38 countries from the World Bank's I2D2 database.
Note: Reported estimates based on the average value of regression coefficients across counties. The exponential transformation (given that the dependent variable is the logarithm of earnings) is taken for the average coefficient. The model with location and sectoral controls is estimated for a slightly smaller number of countries.



Source: Authors. The Figure displays average marginal potential impacts.

Child Marriage and Earnings

As will be documented in this study, child marriage contributes to girls dropping out of school prematurely. By reducing educational attainment for girls, child marriage curtails their future earnings. Savadogo and Wodon (2018b) estimate the potential gains in expected earnings and productivity that could result from ending child marriage through two channels: lower fertility, and higher educational attainment. The approach again consists of running wage regressions, and simulating earnings with lower fertility and higher education using a parametrization that accounts for the estimated impact of child marriage on both fertility (and thereby household structure) and educational attainment for girls.

Table 2 provides the main results for selected Africa countries. In all countries, the simulated gains in earnings from ending child marriage are positive, as expected. When considering only the women who marry early, the gains in earnings range from 1.4 percent to 15.6 percent of baseline earnings, depending on the country. It can be shown that most of the gains come from a better education level for some of the women who married early (if they had married later, some of these women would have been able to increase their educational attainment), as opposed to the impact of child marriage on fertility. When considering all women – those who did not marry early as well as those who did, the impact as a share of women's total earnings is smaller since only some of the women marry early and thereby have a positive likelihood of gains. The gains in earnings or expected productivity for women as a whole range from 0.5 percent to 4.4 percent of base earnings depending on the country. Finally, when including men as well (whose earnings are assumed not to be affected), the gains in the population's earnings range from 0.17 percent to 1.68 percent of the wage bill. On average, across the 12 African countries for which estimates were obtained in Table 2, the loss in earnings from child marriage is estimated at one percent of earnings. The monetary valuation of those impacts is large, as will be discussed later in the study. Furthermore, gains from ending child marriage would increase over time as economies and their populations grow.

Table 2: Potential Gains in Earnings and Productivity from Ending Child Marriage (%)

	Women who married early	All women (married early or not)	All women and men
Burkina Faso	7.45	3.66	1.13
Democratic Republic of Congo	2.66	0.99	0.44
Egypt	9.20	1.50	0.38
Ethiopia	9.29	4.39	1.50
Malawi	10.10	3.03	1.61
Mali	9.73	4.40	1.00
Mozambique	15.60	4.02	1.68
Niger	4.23	3.03	1.61
Nigeria	7.97	3.31	0.98
Republic of Congo	4.48	0.52	0.17
Uganda	14.48	3.28	1.03
Zambia	1.44	0.49	0.24
Average for 12 countries	8.05	2.72	0.98

Source: Savadogo and Wodon (2018b).

It is worth noting that the estimations reported in Table 2 assume no direct impact of child marriage on earnings controlling for educational attainment and other variables. Said differently, the impacts on earnings suggested in Table 2 results only from the impact of child marriage on educational attainment for girls, and to a lower extent from the impact of child marriage on fertility and household size and the number of children in the household. This assumption that child marriage does not affect

earnings controlling for a household's demographic structure and educational attainment appears to be validated by other datasets. Analysis is carried for Niger and Nepal using other nationally representative surveys that have information on child marriage suggests that in most cases, controlling for other variables, the fact that a woman married as a child or had a child early does not have a statistically significant impact on her earnings. Data are not available for most countries to conduct the same test, but the evidence available for these two specific countries does suggest that the negative impact of child marriage on earnings for women comes mainly from its impact on educational attainment for girls.

Labor Force Participation

Apart from leading to lower expected earnings for working women, low educational attainment for girls and child marriage may also decrease labor force participation or the number of hours that women work. This is in part because for better educated women, the opportunity cost of not working or only working part time increases, which may lead more women to enter the labor force, or work full time instead of part time. Again, the impacts of both educational attainment and child marriage can be considered, and the analysis considers first educational attainment.

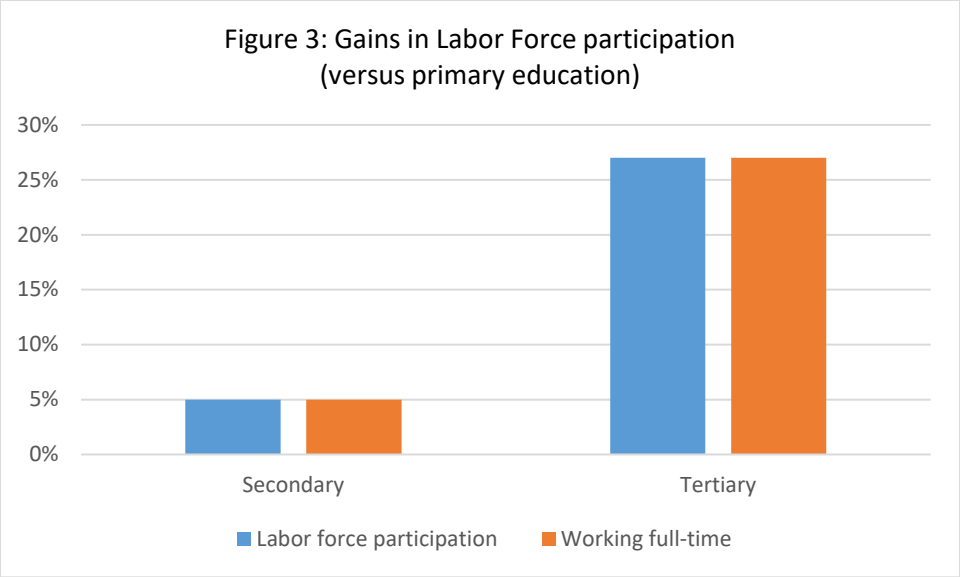
To measure the potential effect of educational attainment on labor force participation, we rely on data from the Gallup World Poll for many countries (see Appendix 2 on data sources). With the Gallup World Poll, we can look at the potential impact on women's employment status of having a secondary or tertiary education in comparison to having primary education or less. Table 3 and Figure 3 provide the potential effects. When women have a secondary education level, they are five percentage points more likely to work than if they only have a primary education or less. With tertiary education, the potential effect on labor force participation is an even larger gain at the margin of 27 percentage points in comparison to a primary education or less. As women with higher levels of education are more likely to enter the labor force, this may result in increases in the likelihood of working full time, working part-time, or being unemployed. In terms of type of employment, the largest increase at the margin from more education is for full-time work. There is also an increase for part time work and unemployment, but to a lower extent and this is not always statistically significant.

Table 3: Potential Impact of Educational Attainment on Labor Force Participation for Women

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Labor force participation	0.05	0.27
Working full-time	0.05	0.27
Working part-time	-0.02	NS
Being unemployed	0.02	0.02

Source: Authors. Regression analysis based on data from the Gallup World Poll.

Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.



Source: Authors. The Figure displays marginal potential impacts with pooled data.

Given the estimates of potential impacts provided in Table 3, what could be the potential effect of universal secondary or tertiary education on labor force participation, and more precisely on full-time work, part-time work, and unemployment? The answer is provided in Table 4. The second column in the Table provides the baseline value of each indicator. The next column provides the simulated value of each indicator under universal secondary education. This is followed in the next column by the increase or decrease in percentage terms of the indicator versus its base. The last two columns reproduce the same calculations under a scenario of universal tertiary education. For Africa overall, with universal secondary education, there could be an increase of 2.6 percentage points in the share of women in the labor force, which could represent an increase of 4.7 percent versus the base. With universal tertiary education, the gain in labor force participation could be at 21.7 percentage points, a jump from the base of 38.9 percent. Most of these gains in labor force participation could translate into full-time work.

Table 4: Simulated Potential Impact of Educational Attainment on Labor Force Participation (%)

Women only sample	Baseline Estimate	Universal Secondary	Proportional Change	Universal Tertiary	Proportional Change
Labor force participation	55.9	58.5	4.7	77.6	38.9
Working full-time	28.3	31.2	10.2	51.1	80.5
Working part-time	19.2	17.9	-6.9	NS	NS
Being unemployed	8.2	9.1	11.1	9.3	13.5

Source: Authors based on Gallup World Poll data.
Note: Simulations reported for the pooled sample that includes data for 48 countries. NS means that a simulation is not shown because the coefficient was not statistically significant at the 10 percent level.

What about the relationship between child marriage and labor force participation? This relationship is complex. We know that child marriage leads to lower educational attainment and higher fertility, as discussed later in this study. These are often cited factors affecting women's labor force participation and the nature of their employment. But the question to be considered here is whether controlling for educational attainment, additional effects are likely to be observed. As noted in Wodon et al. (2017), this is not likely to be the case. Furthermore, the indirect effects of child marriage on labor force participation through educational attainment and fertility may also not be necessarily large, at least

when measured through DHS surveys. Indeed, regression analysis with DHS data suggests in many cases that controlling for other factors, child marriage may not affect labor force participation much, and simulations based on the regression results suggest that the combined direct and indirect impacts of child marriage on labor force participation and the type of job held tend to be small. Given the relatively small impact of secondary education completion on labor force participation suggested in Table 4, this finding is not too surprising, given that only a subset of girls who were married early would have had the opportunity to complete their secondary education if they had married later. When measuring the potential economic cost of child marriage in Africa in this study, we will therefore focus on its impacts on earnings through educational attainment, as opposed to its impact on labor force participation.

Perceptions of Standards of Living

By increasing earnings and labor force participation for women in adulthood, higher levels of educational attainment and a reduction in child marriage should contribute to poverty reduction in the future in several ways. Poverty is usually measured by comparing a household's level of income or consumption per capita (or per equivalent adult) with a poverty line that captures the resources needed by households to meet their basic needs. The most important pathways for potential impact are therefore likely to be related to (1) higher earnings and consumption for women and their household; and (2) a reduction in household size and household needs through lower fertility. Higher educational attainment and ending child marriage for women should help not only by increasing the numerator (higher income or consumption), but also by reducing the denominator (smaller household size).

Due to data limitations to do this well for many countries, this study does not provide measures of the potential impact of low educational attainment and child marriage on monetary poverty in Africa. Yet these potential effects are likely to be large, as suggested by UNESCO (2017) in the case of educational attainment. As already mentioned, not only does low educational attainment reduce earnings for women, but it is also associated with higher fertility. The combination of low earnings and high needs given larger household size can be devastating, and not being able to adequately provide for one's own children is perhaps one of the most severe forms of deprivation for parents.

However, using data from the Gallup World Poll, we do estimate the potential impact of the level of women's educational attainment on two types of perceptions: the perceptions of their own standard of living, and the perceptions of whether economic conditions are improving or favorable. The focus is here solely on educational attainment given that the Gallup World Poll does not include data on child marriage, or at least not yet. The potential effects from higher educational attainment are documented in Table 5. For example, when women have a secondary education level, they are ten percentage points more likely to state that they have enough money to buy food in comparison to women who have only a primary education or less. With tertiary education, the potential effect for the perceived ability to satisfy food needs is a gain at the margin of 20 percentage points in comparison to a primary education or less.

It should be emphasized that individuals with higher levels of educational attainment have on average higher expectations for their own standards of living. This implies that if we had been able to measure potential impacts of educational attainment on objective standards of living, the potential impacts would probably have been larger. This was the case when looking at the potential effect of more years of schooling on earnings in the previous section. Also, the potential effects reported for educational attainment in Table 5 are obtained after controlling for other factors that could affect perceptions of standards of living, including the level of per capita income of the woman and her employment status. We report here only the direct potential effect of educational attainment on perceptions of standards of living, not including additional indirect potential effects that could logically come from higher per capita income as well as a better employment status.

All measured potential effects of secondary or tertiary education in comparison to lower levels of education in Table 5 are positive and statistically significant. The magnitude of the potential effects tends to be larger for perceptions of women's own standards of living than for perceptions of economic conditions more generally. This is what one would expect. But it is interesting that educational attainment affects also perceptions of economic conditions more generally, apart from perceptions of one's own standard of living. This could suggest that when economic conditions are good, better educated women have more opportunities to take advantage of these opportunities than women who have primary education or less.

Table 5: Potential Impact of Educational Attainment on Women's Perceptions of Standard of Living

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Perceptions of own standard of living		
Having enough money for food	0.10	0.20
Having enough money for shelter	0.04	0.10
Satisfied with standard of living	0.04	0.12
Perceptions of changes in conditions		
Found economic condition better	0.03	0.06
Good time to find jobs	0.01	0.04
Better standard of living	0.08	0.15

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.

Given the estimates of potential impacts provided in Table 5, what could be the potential effect of universal secondary or tertiary education on perceptions of standards of living? The answer is provided in Table 6. As was the case for Table 4, the second column provides the baseline value of each indicator, while the next four columns provide the results of the simulations, both in absolute and proportionate terms. Different orders of magnitudes are observed for the various indicators. For Africa overall, with universal secondary education, there could be an increase of 5.9 percentage points in the share of women declaring that they have enough money for food (an increase of 12.9 percent versus the base). With universal tertiary education, there could be an increase of 15.9 percentage points in the share of women feeling that they have enough money for food, which would represent an increase from the base of 34.7 percent. By contrast, potential effects are smaller on perceptions of whether economic conditions are favorable, but this was to be expected. As mentioned earlier, one would expect potential impacts on perceptions of standards of living to be larger than on perceptions of changes in economic opportunities.

Table 6: Simulated Potential Impact of Educational Attainment on Perceptions of Standard of Living (%)

Women only sample	Baseline Estimate	Universal Secondary	Proportional Change	Universal Tertiary	Proportional Change
Perceptions of own standard of living					
Not having enough money for food	45.7	51.6	12.9	61.6	34.7
Not having enough money for shelter	67.2	70.0	4.1	75.6	12.5
Satisfied with Standard of Living	45.5	48.2	5.8	55.2	21.3
Perceptions of changes in conditions					
Found economic condition better	61.0	62.8	3.0	65.8	7.9
Good time to find jobs	35.9	36.6	2.1	39.0	8.6
Better standard of living	44.9	49.7	10.8	56.2	25.3

Source: Authors based on Gallup World Poll data.

Note: Simulations reported for the pooled sample that includes data for 48 countries. NS means that a simulation is not shown because the coefficient was not statistically significant at the 10 percent level.

DOMAIN 2: CHILD MARRIAGE AND EARLY CHILDBEARING

As already mentioned, there is a strong mutual relationship in Africa between girls' education and child marriage, defined as a girl entering in a formal or informal union before the age of 18. Child marriage is one of the main factors leading girls to drop out of school prematurely in many low-income countries, and this is also the case in Africa (e.g., Field and Ambrus, 2008; Nguyen and Wodon, 2014). Conversely, keeping girls in (secondary) school helps in reducing child marriage. Especially in countries where the prevalence of child marriage is high, parents often have their daughter marry early when they are not in school because of a concern that she may otherwise engage in sexual activity. In many contexts, a pregnancy outside of marriage may lead to ostracism for the girl, thereby fundamentally affecting her prospects in life. For many parents, the decision to marry their daughter is taken to protect her.

For girls themselves, when education and employment opportunities are limited, staying idle at home may not be a good option. Some girls may also drop out of school because they want to get married. Overall, while there is no doubt that many girls are forced to marry early against their will, ending child marriage is probably less a matter of preventing parents from forcing their daughter to marry early, than a matter of providing viable alternatives to an early marriage for parents and girls alike. In this respect, enrollment in school is often the best alternative to early marriage. Recognizing that keeping girls in school is key to end child marriage does not mean that other types of interventions and policies – such as setting the minimal legal age for marriage at 18, are not needed. Child marriage is a deeply rooted social norm. The practice needs to be addressed through multifaceted interventions. But offering alternatives like a quality education for girls is essential.

> *"I felt a sharp pain in my lower abdomen and noticed that my skirt was stained with blood… I rushed to my mother. She smiled and held my hand and explained menstruation. When my father came home that night, he called me and asked if I had a suitor. I told him no. After some days my mother told me that I was to be married. I knew that there would be merriment and that I would be bought clothes, shoes, a bed, and a chest of drawers. I was happy about this but sad that I would be leaving my family to live at my future husband's home. I wanted to stay in school. But I could not disobey my father."* (Perlman et al., 2018b).

Keeping girls in school is also crucial to reduce teen pregnancies (with or without marriage) and early childbearing, defined as a girl having her first child before the age of 18. Previous work on the economic impacts of child marriage at the World Bank (Wodon et al., forthcoming) suggests that for a group of 25 developing countries accounting for most instances of child marriage and early childbearing in the world, three in four women (75 percent) who have their first child before the age of 18 did so because of child marriage. In addition, more than four in five children (84 percent) born of mothers younger than 18 are due to child marriage. In other words, if keeping girls is essential for ending child marriage, it should also be beneficial for reducing teen pregnancies and early childbearing quite substantially[1].

[1] There are differences between and within countries in the relationship between child marriage and early childbirths. Especially in Latin America and parts of sub-Saharan Africa, there appears to be a trend towards earlier sexual activity along with an increase in the average age at first marriage, suggesting a reduction over time in the connection between marriage and sexual activity as well as early childbearing.

Analysis with Demographic and Health Survey (DHS) data confirms the importance of keeping girls in school to end child marriage and reduce early childbearing. The results are provided in Table 7 for 13 African countries. The estimation is based on an instrumental variable technique, and potential impacts are statistically significant for all countries in the case of child marriage, and 12 of the 13 countries in the case of early childbearing. Each additional year a girl completes in secondary school reduces the likelihood of marrying as a child on average by 7.5 percentage points across the 13 African countries. The potential impact on early childbearing is similar with a reduction of 6.6 percentage points for the risk of having a first child before age 18. With several years of education, the reductions in risks of child marriage and early childbearing are larger correspondingly. Keeping girls in school is not the only strategy that is required to end child marriage and early childbearing, but it clearly is a major contributor to both goals.

Table 7: Potential Impact of Educational Attainment on Child Marriage and Early Childbearing

	Reduction in risk per additional year of secondary education
Reduction in risk of child marriage	-7.5
Reduction in risk of early childbearing	-6.6

Source: Authors based on Demographic and Health Surveys.
Note: Estimates based on country-level analysis for 13 African countries. All estimated potential impacts are statistically significant except for one country for early childbearing.

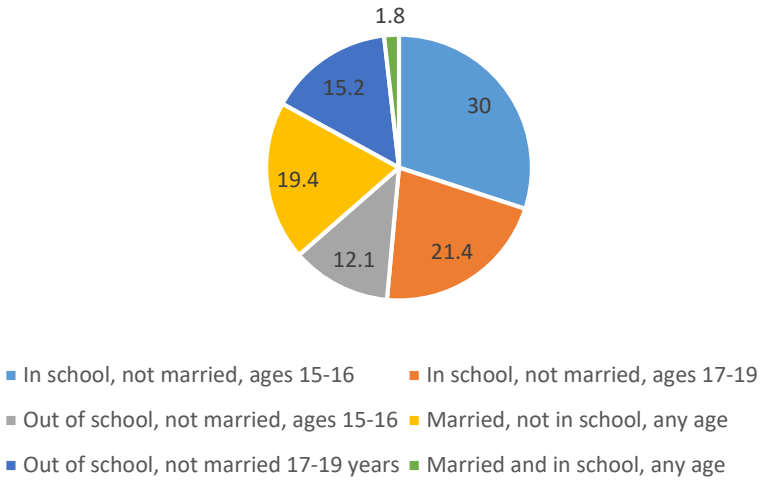
These results should not be too surprising. Reviews of the literature suggests that interventions to promote education are among the most likely to help reduce child marriage and early childbearing (Botea et al., 2017). These interventions tend to work better than interventions focusing only on 'safe spaces' or interventions aiming to empower adolescent girls economically. As an additional piece of evidence on the crucial role of keeping girls in school to reduce child marriage and thereby early childbearing, consider Table 8 and Figure 4 which provide a typology of girls according to various categories. The typology was initially proposed to identify target groups for interventions adapted to the needs of each group. But for this study, simply consider the fact that all groups are mutually exclusive and account for 100 percent of the population of girls age 15 to 19. The last group in the Table is girls who are married and in school. Across 32 African countries for which the typology was estimated, that group accounts for less than two percent of the total, and most of the girls in that group are 18 or 19 years of age. This very simple statistics shows how very few girls get married as children when they manage to remain in school, and conversely how hard it is to remain in school when married. In most cases, this results from social norms and other constraints within households that make it very difficult for girls to go back to school when married or pregnant, but unfortunately in some countries, government or school policies preventing married or pregnant girls to return to school exacerbate the issue.

Table 8: Typology of Adolescent Girls by Age, School Enrollment, and Marriage Status

Group	Share (%)
In school, not married, ages 15-16	30.0
In school, not married, ages 17-19	21.4
Out of school, not married, ages 15-16	12.1
Married, not in school, any age	19.4
Out of school, not married 17-19 years	15.2
Married and in school, any age	1.8
Total	100.0

Source: Authors. Statistical analysis based on data from Demographic and Health Surveys.
Note: Average statistical estimates for 32 African countries.

Figure 4: Typology of Adolescent Girls Aged 15-19



Source: Authors. Average shares for 15 developing countries.

Dropping out of school, having a child at a young age or marrying as a child can all have long lasting negative impacts (see Box 5). The close relationship between educational attainment for girls, child marriage, and early childbearing has implications for the analysis conducted in the rest of this report. Ending child marriage and early childbearing would not be sufficient to ensure that all girls are able to complete their secondary school. However, ensuring that all girls can complete their secondary education could lead to a virtual elimination of child marriage and a dramatic reduction in early childbearing. In subsequent sections, when using DHS data to measure the benefits from educating girls, we will highlight both the direct potential impact of educational attainment on development outcomes, and the additional indirect potential impact that would result from the fact that universal secondary education could virtually end child marriage. Said differently, when considering universal secondary education, we get two benefits: the direct benefit from educational attainment, and the additional benefit from ending child marriage, or in some cases (for child health) the indirect benefit from reduced early childbearing.

Box 5: Long-Lasting Impacts of Dropping Out of School and Early Childbearing

Susan was 18 years old at the time she was interviewed. Her mother had died. With one sister and four brothers, she lived with her father. She started school at six years of age and dropped out last year because she became pregnant at the age of 17. She was still in primary school. She had dropped out previously to help her mother who was bed-ridden just before she died. At that time, she was in the third year of primary school. She now works as a casual laborer in people's gardens, earning about 8,000 shillings a week. Payment is usually in cash, but at times in kind with sorghum or millet to bring back home. She uses her earnings to buy essential things for the home such as soap, salt, sugar, and food. The challenge she faces now is that she cannot work effectively because she is pregnant and sickly. Yet, she is still supposed to look after her siblings. In her assessment, gardening is much tougher than school, but she is emphatic that *"I cannot go back to school any more. I just want to take care of my young siblings and see them through primary school, and if possible up to secondary school."* Support that could help her realize her wish of a better education for her siblings could be seed money to help her start an income generating activity, again to help her siblings complete school.

Source: Wodon et al. (2016).

DOMAIN 3: FERTILITY AND POPULATION GROWTH

Total Fertility

There is a strong relationship between girls' educational attainment, the risk of child marriage, and women's total or lifetime fertility. Women who drop out of school prematurely are more likely to marry as children, as mentioned in the previous section. Low educational attainment and child marriage may both lead women to have children earlier in life, and more children over their lifetime. The potential impact on total fertility – the number of children that women have towards the end of their reproductive age, may be large[2]. The factors leading to fertility are complex. The analysis in this section does not look at all these factors comprehensively, but it provides insights into the specific role that educational attainment and child marriage may play. These roles are estimated using Poisson regressions with DHS data for 13 African countries using a model adapted from Onagoruwa and Wodon (2018). The analysis estimates the potential impact of educational attainment and child marriage on total fertility. It also considers what total fertility could be under better educational outcomes (specifically, universal primary and secondary education scenarios) and if child marriage were to be eliminated. Because the models consider the number of children that women have towards the end of their reproductive life, they account implicitly for desired fertility and substitution effects in the timing of birth when considering the implications of ending child marriage or achieving universal primary or secondary education.

Results are provided in Table 9 for educational attainment and Table 10 for child marriage. In Table 9, the second column indicates the number of countries for which a given level of educational attainment is associated in the regression analysis with a statistically significant reduction in total fertility. The potential effects are measured versus women who have no education at all or less than primary completed. For example, for four out of 13 countries, a primary education completed is associated with a reduction in total fertility that is statistically significant, while this is the case for all 13 countries with higher education. The next column simply provides the share of countries for which a statistically significant potential effect is measured. The following column provides the average potential impact for all countries where the potential effect is statistically significant. For example, having a completed secondary education is associated with a reduction in total fertility in 12 of the 13 countries in comparison to no education or incomplete primary, and on average, the reduction in fertility is estimated at 24.8 percent in these 12 countries. These potential impacts are visualized in Figure 5.

The message from Table 9 is clear: controlling for other factors that may affect total fertility, a higher level of educational attainment is associated with a substantial reduction in lifetime fertility, with the potential impact being larger when the level of educational attainment increases. The last two columns in the Table provide results for expected national fertility rates under two simulations. In the first simulation, for the four countries where primary education is found to have a potential impact on total fertility, all women who did not complete their primary education are assumed to have that level of schooling. This is the universal primary scenario. In the second simulation, all women are assumed to have their secondary education completed – the universal secondary simulation. Under universal primary,

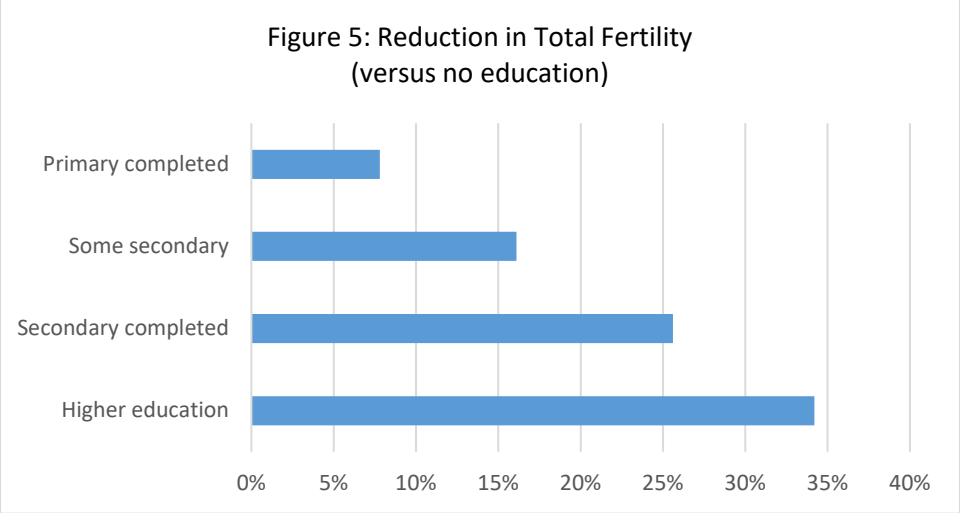
[2] The term "total fertility" is defined in this study as the number of live births that a woman has over her lifetime. This definition is needed for individual-level econometric work to measure the (marginal) impact of child marriage on fertility. By contrast traditional "total fertility rates" are population-level estimates. Our definition of "total fertility" is thus similar, but not exactly the same as "total fertility rates" traditionally measured. The econometric analysis is conducted for women ages 35-49 for sample size considerations (this may underestimate total fertility somewhat, as women may still have children after the age of 49).

there could be a reduction in the average number of children that all women in four countries have (including women with higher levels of education) of 0.39 child over the women's lifetime. This is a reduction from current levels of fertility of 6.4 percent on average in the 13 countries. Under universal secondary education, the reduction in total fertility nationally is estimated at 1.26 child per woman on average in the 17 countries where potential impacts are found to be statistically significant. This could be a reduction from the base of 22.3 percent.

Table 9: Potential Impact of Educational Attainment on Women's Total Fertility and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Primary completed	4	31	-7.8	0.39	6.4
Some secondary	9	69	-16.1		
Secondary completed	12	92	-25.6	1.52	24.8
Higher education	13	100	-34.2	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.



Source: Authors. The Figure displays average marginal potential impacts.

Two conclusions emerge from the analysis. The first conclusion is that completing the secondary education level is found to have a potential impact on total fertility in virtually all countries, while completing primary education is found to have a statistically significant potential impact in only a third of the countries. The second conclusion is that when potential impacts are statistically significant, they are much larger at the secondary than at the primary level. In other words, ensuring universal primary education is unlikely to be sufficient to accelerate the demographic transition in countries with high fertility rates. By contrast, enabling girls to complete their secondary education would probably have a much larger potential impact.

In fact, the difference in the potential impacts of primary and secondary education on lifetime fertility is even higher than suggested in Table 9. This is because if girls could complete their secondary education, they would be unlikely to marry as children. Table 9 provides only the direct potential impacts

of educational attainment on lifetime fertility. For girls completing their secondary education, we should also include the indirect potential impacts through the elimination of child marriage. These indirect potential impacts are shown in Table 10 for the case of child marriage according to the age at first marriage. For example, marrying at age 13 instead of after age 18 leads in all 13 countries to statistically significant increases in total fertility, with the average potential impact across countries estimated at 25.8 percent more children over the woman's lifetime. If child marriage were ended, which could virtually be the case with universal secondary education, there could be an additional reduction in total fertility of 0.56 child per woman nationally, which could lead to an additional reduction in the total fertility rate at the country level of 9.4 percent on average. What the analysis thereby suggests is that universal secondary education could lead to a reduction in total fertility in the 13 countries considered for the analysis of about a third (24.8 percent in Table 9 plus 9.4 percent in Table 10 if child marriage were to be eliminated, for a total of 34.2 percent).

Table 10: Potential Impact of Child Marriage on Women's Total Fertility and Simulations

	Statistically Significant Potential Impacts versus Marrying at 18+			National Simulated Potential Impacts Elimination of Child Marriage	
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Marrying at 12	12	92	24.3		
Marrying at 13	13	100	25.8		
Marrying at 14	13	100	24.0	Combined effect:	Combined effect:
Marrying at 15	13	100	19.8	0.56	9.4
Marrying at 16	13	100	19.3		
Marrying at 17	13	100	16.5		

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

Modern Contraceptive Use

Part of the potential effect of educational attainment and child marriage on total fertility may come from the use of modern contraceptive methods since such use tends to increase with higher educational attainment and when women do not marry as children, at least in some countries. This relates to family planning and issues of sexual reproductive health and rights as well as agency for girls and women.

To measure the potential effect of educational attainment and child marriage on modern contraceptive use, probit regressions are used with DHS data for the same group of 18 developing countries. Results are provided in Tables 11 and 12. The Tables provide estimates of the average potential impact at the margin of educational attainment by level and of child marriage according to the specific age at which women got married. For educational attainment, the coefficients estimates are statistically significant for about half of the countries (depending on the level of education considered), while for child marriage this is the case in about a third of the countries and in some cases less. As done for total fertility in the previous section, the Tables also provide estimates of simulated potential impacts nationally both in absolute and percentage terms if universal primary or secondary education were achieved and if child marriage were to be eliminated.

Consider first the results for educational attainment in Table 11. As was observed for total fertility, the potential impact of primary education is less often statistically significant versus a lower level of education than is the case for secondary education. In addition, when potential effects are statistically significant, they are much larger for secondary than for primary education. This translates into larger

national increases in modern contraception use with higher levels of educational attainment. For example, under universal secondary education, the increase in modern contraception use nationally is estimated at 7.0 percent on average for the five countries where potential impacts are found to be statistically significant. This could be an increase from the base in modern contraceptive use of 35.2 percent in those countries (the baseline estimates of the share of women using modern contraceptives tends to be low in those countries, so that even a limited absolute increase results in a substantial increase in percentage terms from the base).

Table 11: Potential Impact of Educational Attainment on Women's Contraceptive Use and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Primary completed	3	23	3.3	1.39	5.1
Some secondary	9	69	5.0		
Secondary completed	5	38	8.0	7.00	35.2
Higher education	6	46	7.0	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

Recall again that when achieving universal secondary education, child marriage could be drastically reduced, if not eliminated. This could lead to additional potential effects, but in the case of modern contraceptive use, the direction of these potential effects is not clear à priori. Marrying early may reduce contraceptive use if women are not able to rely on contraception in their household. There may however also be cases where child marriage may be associated with an increase in contraceptive use later in life, presumably because when women have reached their desired fertility (which may be earlier if they marry early), they may want to rely on contraception more. As shown in Table 12, both potential effects are observed, in that the average potential impacts are sometimes negative, and sometime positive. When girls marry very early, this is associated with a reduction in contraceptive use, but when they marry at age 15 or 17, this is associated with an increase in contraceptive use later in life. Overall, the estimates of the combined potential effects suggest that ending child marriage could result in a very small increase in contraceptive use across the 13 countries. These potential effects are small in comparison to those observed for educational attainment in Table 11.

Table 12: Potential Impact of Child Marriage on Women's Modern Contraceptive Use and Simulations

	Statistically Significant Potential Impacts versus Marrying at 18+			National Simulated Potential Impacts Elimination of Child Marriage	
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Marrying at 12	8	62%	-4.8		
Marrying at 13	3	23%	-4.7		
Marrying at 14	6	46%	-3.7	Combined effect:	Combined effect:
Marrying at 15	2	15%	1.0	0.22	0.98
Marrying at 16	2	15%	-1.5		
Marrying at 17	2	15%	3.0		

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

Population Growth

Through their potential impact on total fertility, a lack of educational attainment for girls and child marriage may contribute to higher population growth. In some contexts, especially in low income countries with limited arable land or water, high population growth may threaten long-term prosperity and exacerbate competition for access to scarce natural resources. High population growth may also weaken the ability of governments to provide basic services of sufficient quality to their growing population, among others in the areas of education, health, nutrition, and basic infrastructure (including electricity, water and sanitation, transport, connectivity, and more).

To what extent do low educational attainment for girls and child marriage contribute to high population growth? This is a complex question as the potential impact of educational attainment and child marriage may change over time depending among others on the age structure of the population and age-specific fertility rates that may also change over time. Demographic projection tools can however help in providing a tentative answer. Building on previous work on the potential impact of child marriage and early child-bearing on population growth, estimations are based on a parametrization of demographic projection tools (DemProj and FamPlan) using data from the most recent DHS surveys. The advantage of these tools is that they rely on age-specific fertility rates, which is exactly what is needed when simulating the potential impact of ending child marriage and early childbearing since these are age-specific, affecting girls aged below 18.

The approach used for this study consists of reporting results obtained for child marriage and early childbearing, and simply scaling those results up or down to account for the potential impact on total fertility rates of universal primary or secondary education in comparison to the potential impact of child marriage. The analysis is conducted for 13 countries and average results across those countries are reported. The results are provided in Table 13. On average across the 13 countries, the annual rate of growth in those countries could be reduced by 0.22 percentage point if child marriage and early childbearing were eliminated. In some countries, the potential effect is larger, as is the case in Niger for example. In other countries, such as Egypt, the potential effect is smaller. Given the comparative potential effects on total fertility of child marriage and universal primary or secondary education documented earlier, a straight extrapolation for those countries suggests that the average potential impact of universal primary education on population growth across the 13 countries could be at 0.14 percentage point. For universal secondary education, the average potential effect could be at 0.57 percentage points. As with other estimates, this is meant to provide only an order of magnitude of potential effects. The potential effects could be larger or smaller using alternative estimation methods, but they are clearly large and could help usher the demographic dividend (see Box 6) in countries that have not yet benefited from it.

In a subsequent section in this study, a valuation of the potential benefits from lower population growth will be provided. This valuation is based not only on the 13 countries for which estimates are provided in Table 13, but more generally for a larger set of countries using extrapolations, and thereby for the region. As will be discussed later, the impact of universal secondary education for this larger set of countries is a bit smaller than the estimate in Table 13 in part because when considering a larger set of countries, the prevalence of child marriage and low educational attainment is lower.

Table 13: Simulated Potential Impact of Educational Attainment on Population Growth

	Absolute Reduction in Annual Rate of Population Growth (Percentage Points)
Estimates with demographic projection tools	
Ending child marriage and early childbearing	0.22
Estimates based on comparative potential impacts on fertility	
Universal primary education	0.14
Universal secondary education	0.57

Source: Authors.
Note: Estimates based on analysis for 13 African countries.

Box 6: The Demographic Dividend

While different definitions of the demographic dividend have been proposed, the term is associated with improvements in standards of living and accelerated economic growth when a developing country achieves a population structure that is favorable thanks to a reduction in birth (and death) rates that is followed by rapid fertility decline. As a result, the share of the population of working age individuals may increase sharply for a period of time, which tends to generate faster economic growth (e.g., Canning et al., 2015; World Bank, 2015). In addition, with lower dependency ratios, households are better able to support themselves and invest among others in education, nutrition, and health (or human capital broadly conceived). These investments in turn may lead younger generations to be better educated and more productive in adulthood. This demographic and human capital transition may help reduce poverty rates dramatically. Achieving universal secondary education for girls should help reduce population growth and improve skills levels in countries where fertility rates remain high, thereby helping to usher in the demographic dividend.

DOMAIN 4: HEALTH, NUTRITION, AND WELL-BEING

Women's Health

A lack of educational attainment for girls and child marriage may have potential negative impacts on women's health, in part because women may be less aware of how to take care of themselves when sick or injured. Low educational attainment and child marriage may also be associated with a lack of knowledge about sexually transmitted diseases such as HIV/AIDS. In addition, through its potential impact on child marriage and early childbearing, a lack of educational attainment may lead girls to give birth at a young age, which in turn increases the risk of maternal mortality and morbidity (see Box 7). For example, a lack of physical maturity when giving birth may lead to complications such as obstructed or prolonged labor as well as fistula. Other risks related to low educational attainment and its implications for child marriage may include malnutrition, isolation, depression and an inability to negotiate sexual and reproductive behaviors with partners. This last risk can lead not only to exposure to sexually transmitted infections, but also to lower rates of modern contraceptive use which may lead to insufficient birth spacing, unwanted pregnancies, and abortions. Finally, as also noted in Box 7, lower educational attainment for girls and child marriage are also associated with substantially higher risks of suffering from intimate partner violence, which can itself have severe health consequences for women.

Box 7: Maternal Mortality and Intimate Partner Violence

There is a clear association between giving birth at a very early age and a higher risk of maternal mortality. This association emerges from quantitative analysis (Nove et al., 2014). It also emerges from qualitative work, as this quote for an ethnographer embedded in a village in Niger illustrates: *"Maternal mortality is high. Two young women died in childbirth during the first week of our stay in the community. The first woman married at fourteen and had three children. She had complications during each previous delivery and died from post-partum hemorrhage a few hours after being rushed to the health center. The second was twelve years old when she married. She lost her first child at age fourteen and was advised to wait several years before trying again. Her last pregnancy came with a series of complications that finally claimed her life a week after delivery."* (Perlman et al., 2018b).

Another way not explored in this specific study in which low educational attainment and child marriage may influence health outcomes is through intimate partner violence (IPV). Estimates of the correlates of the risk of IPV by Savadogo and Wodon (2018a) suggest that low educational attainment and child marriage tend to increase risks of IPV for women, with the potential impact on the risk of IPV being larger in the case of low educational attainment than for child marriage.

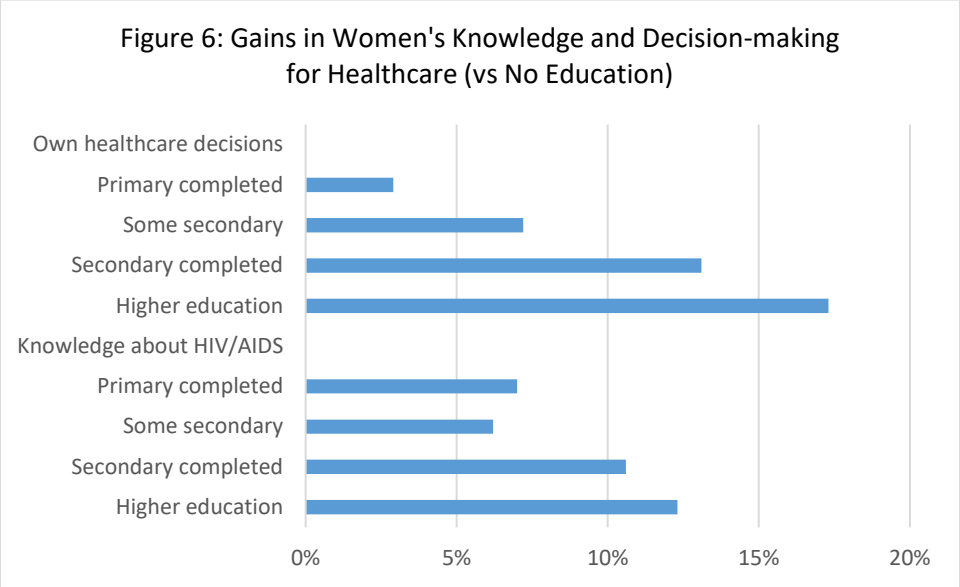
For this study, the focus is only on a few specific aspects of women's health using both DHS data and the Gallup World Poll. First, using DHS data, we look at whether low educational attainment for girls and child marriage are associated with a more thorough knowledge of HIV/AIDS. To conduct the analysis, an index of knowledge of HIV/AIDS is created through principal component analysis using a range of questions available in DHS surveys. The values of the index are normalized to take a value between zero and 100. Results from the estimations for educational attainment are provided in Table 14 with a visualization of potential impacts in Figure 6. The potential effects of educational attainment on knowledge of HIV/AIDS are statistically significant in most of the countries, and again higher when women have completed their secondary education than is the case for primary education. Under universal secondary education, there could be an increase in the index of knowledge of HIV/AIDS nationally of 7.9 percentage points in the nine countries where the potential effect is statistically significant. This is equivalent to an increase of 11 percent from the base value of the index. The potential effect is thus relatively large and it underscores the value of education for knowledge.

Still with DHS data, we also look at whether women can make their own decision on whether to seek healthcare when sick or injured, as opposed to asking permission to their husband or partner for obtaining such care. The literature suggests that women's choices are often constrained, for example in terms of how/where to deliver a baby. Sometimes the husband or partner may make these decisions, or it may be made by the mother in law in some cultures. The same can be said about decisions for antenatal care, which impacts the health and well-being of the mother and the future newborn. Table 14 suggests that again, potential effects of educational attainment on decision-making are statistically significant in many countries. For secondary completion, potential effects are statistically significant in just above half of the countries. In these countries, universal secondary education could increase the ability of women to make their own healthcare decisions by 10.8 percentage points or 28.6 percent from the base values.

Table 14: Potential Impact of Educational Attainment on Women's Knowledge about HIV/AIDS and Decision-making Ability Regarding their Own Healthcare, and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Knowledge about HIV/AIDS					
Primary completed	10	83	7.0	4.50	6.3
Some secondary	12	100	6.2		
Secondary completed	9	75	10.6	7.94	11.1
Higher education	10	83	12.3	-	-
Own healthcare decisions					
Primary completed	7	54	2.9	1.06	0.1
Some secondary	8	62	7.2		
Secondary completed	7	54	13.1	10.81	28.6
Higher education	12	92	17.3	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 12 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.



Source: Authors. The Figure displays average marginal potential impacts.

Could universal secondary education generate additional benefits for the above two indicators through the dramatic reduction in child marriage that could ensue? While this was the case for some of the indicators considered previously, it does not seem to be as much the case for knowledge of HIV/AIDS and the ability for women to make their own healthcare decisions. As shown in Table 15, in most countries, child marriage does not appear to have a direct statistically significant potential impact on knowledge of HIV/AIDS and in none of the countries is this the case for the ability for women to make their own healthcare decisions. Furthermore, even when statistically significant potential impacts are observed, their magnitude is much smaller than what is observed for secondary completion in Table 14.

Table 15: Potential Impact of Child Marriage on Women's Knowledge about HIV/AIDS and Decision-making Ability Regarding their Own Healthcare, and Simulations

	Statistically Significant Potential Impacts versus Marrying at 18+			National Simulated Potential Impacts Elimination of Child Marriage	
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Knowledge about HIV/AIDS	3	25	-3.6	1.26	1.70
Own healthcare decisions	0	0	-	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

Turning to data from the Gallup World Poll, the potential impact of educational attainment on psychological well-being is estimated for a dozen indicators. A total of five positive and six negative outcomes are considered. As shown in Table 16, in comparison to women with only a primary education or less, secondary education is systematically associated with an increase in positive outcomes, and a decrease in negative outcomes. For tertiary education as well, virtually all estimated potential impacts are statistically significant, and they are larger as expected with a tertiary education. The largest potential impact is observed for the question on whether women learned or did something interesting in the day preceding the interview. The likelihood that this is the case increases by 12 percentage points when a woman has a tertiary education as opposed to a primary education or less. A tertiary education is also associated with a decrease in the likelihood of feeling pain of eight percentage points versus primary education or less. Note again, as was the case for perceptions of standards of living, that all these potential effects are obtained after controlling for a wide range of other factors that may affect psychological well-being, including age, per capita income and employment status. Note also that the Poll does not have data on child marriage except for a few pilot countries, so that only the direct potential effects of higher educational attainment on psychological well-being is reported here.

Table 16: Potential Impact of Educational Attainment on Women's Perceptions of Well-being and Simulations

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Positive Outcomes		
Felt well-rested yesterday	0.02	0.03
Had enjoyment yesterday	0.04	0.06
Laughed yesterday	0.03	0.04
Treated with respect yesterday	0.02	0.05
Learned/Did something interesting yesterday	0.09	0.12
Negative Outcomes		
Felt pain yesterday	-0.05	-0.08
Felt worried yesterday	-0.03	-0.03
Felt sad yesterday	-0.03	-0.05
Felt stressed yesterday	-0.01	NS
Felt anger yesterday	-0.02	-0.03

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.

What could be the potential effect of universal secondary or tertiary education on psychological well-being for women? The results are reported in Table 17 in a format similar to what was done for

perceptions of standards of living and labor force participation earlier. Different orders of magnitudes are again observed for the various indicators. For positive outcomes, the largest potential effects are observed with tertiary education for women who learned or did something interesting in the day preceding the interview. With universal tertiary education, there could be an increase of one sixth in the likelihood of learning or doing something interesting in the day preceding the interview. This is substantial given that the regression controls for a wide range of other factors that could affect such feelings. For some of the negative outcomes listed in the table, the potential impacts are also large in proportional terms, as is the case for feeling pain or feeling sad in the day preceding the interview.

Table 17: Simulated Potential Impacts of Educational Attainment on Perceptions of Well-being

Women only sample	Baseline Estimate	Universal Secondary	Proportional Change	Universal Tertiary	Proportional Change
Positive Outcomes					
Felt well-rested yesterday	68.7	70.1	2.0	70.8	3.1
Had enjoyment yesterday	65.4	68.1	4.1	70.3	7.6
Laughed yesterday	73.9	75.8	2.6	76.4	3.3
Treated with respect yesterday	82.4	84.0	2.0	87.1	5.8
Learned/Did something interesting	54.0	59.4	10.1	62.2	15.2
Negative Outcomes					
Felt pain yesterday	33.6	30.5	-9.4	27.5	-18.1
Felt worried yesterday	33.6	31.6	-6.1	31.8	-5.6
Felt sad yesterday	22.1	20.0	-9.6	17.8	-19.5
Felt stressed yesterday	32.1	31.6	-1.5	NS	NS
Felt anger yesterday	19.5	18.2	-6.9	17.2	-11.7

Source: Authors based on Gallup World Poll data.

Note: Simulations reported for the pooled sample that includes data for 48 countries. NS means that a simulation is not shown because the coefficient was not statistically significant at the 10 percent level.

Children's Health and Survival

Early childhood is critical for a child's development (Black et al., 2017). Poor conditions early in life affect brain development and capabilities, with lasting consequences in adulthood, including for the ability to earn a decent wage. A lack of educational attainment for mothers may affect children's health simply because better educated mothers may have a better understanding of what they need to do to care for their child when sick or injured. Through early childbearing, child marriage may also affect the health of both mothers and their children. When girls have not matured yet, giving birth is risky. Furthermore, when mothers are poorly nourished, this may put their children at higher risk of intrauterine growth restriction. A mother herself may be stunted due to lack of food rather than the choice of it, and it is important to recall that stunting for young children may start during pregnancy.

> *"My wife cannot control urine since her first delivery that resulted in the death of our first baby… She started labor at 5.00 pm. She spent the whole night at a local birth attendant's home, who tried to assist but failed... We were very poor and had nothing… We used engozi [stretcher carried by four men] to the nearest road. The baby was lying with the head up and the legs coming first. As she pushed, the baby's legs kept kicking her urinary bladder. Finally, there came a vehicle carrying charcoal and we hired it. We travelled about 40 km on top of the charcoal to Hoima hospital where she was operated promptly but the baby had already died."* (Barageine et al., 2016, from work in Uganda).

When girls are not physically, emotionally, or even financially ready to give birth, this may affect them, as is the case when they suffer from obstetric fistula, but it may also affect their children (see the text box with a quote from a study of men living with wives suffering from obstetric fistula). Furthermore, as low education attainment for mothers affects their risk of exposure to intimate partner violence and may result in mental health issues, this may generate spillover effects for children. In harsh conditions, toxic stress responses on the part of children can have damaging effects on learning, behavior, and health later in life. There is even evidence that when children are exposed to intimate partner violence in utero, they tend on average to have worst health at birth and increased mortality rates.

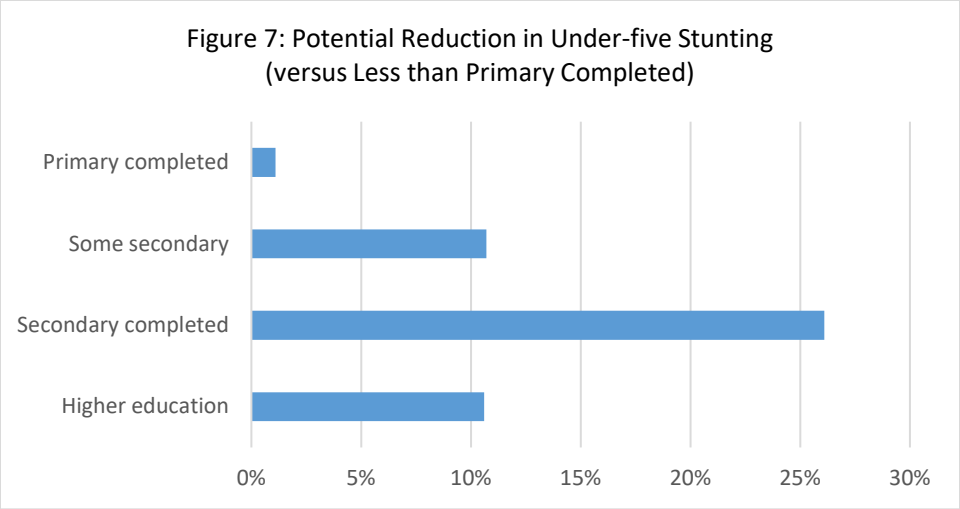
For this study, we measure the potential impact of educational attainment for mothers and early childbearing (which as mentioned often results from child marriage in many developing countries) on the risks for young children of dying by age five and being stunted. A child is considered stunted if she has a height more than two standard deviations below the median reference height for her age. Stunting often results from persistent insufficient nutrient intake and infections. It may lead to delayed motor development and poor cognitive skills that can affect school performance and productivity later in life. For this study, stunting is an important measure given its potential impact on earnings in adulthood.

Estimates of the potential impacts of a mother's education level on the risks of under-five mortality and stunting are provided in Table 18 after controlling for a wide range of other factors that may affect those risks (see also Figure 7 in the case of stunting). The analysis is based on DHS data for the same 13 African countries as before. In the case of under-five mortality, potential effects are statistically significant for primary and secondary education only in a handful of countries, and the magnitude of those potential effects when statistically significant is similar for primary and secondary education. In the case of stunting, potential effects at the secondary level are statistically significant slightly more often than is the case at the primary level, but they are also much larger. For example, the estimates suggest that universal secondary education for girls could reduce stunting rates by almost half (47.1 percent) in the countries for which the estimations generated statistically significant potential impacts. Unexpectedly, for stunting the potential impact for higher education is smaller than for secondary education.

Table 18: Potential Impact of Educational Attainment for Mothers on Young Children and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Under-5 mortality					
Primary completed	3	23	-1.7	1.39	20.3
Some secondary	2	15	-2.2		
Secondary completed	2	15	-1.7	1.32	21.3
Higher education	6	46	-2.8	-	-
Under-5 stunting					
Primary completed	2	15	0.1	-0.40	-0.7
Some secondary	2	15	-17.5		
Secondary completed	4	31	-35.5	16.12	47.1
Higher education	6	46	-9.5	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.



Source: Authors. The Figure displays average marginal potential impacts.

Universal secondary education for girls could virtually eliminate child marriage, leading to a large reduction in early childbearing in African countries. As done for other indicators, when assessing the potential impact of universal education for girls, it therefore makes sense to consider the additional benefit from ending child marriage and reducing early childbearing. In the regression analysis for under-five mortality and stunting, the variable of interest is whether a child was born of a very young mother since the literature suggests that this may affect the child's health. Table 19 shows that in 11 of the 13 countries considered for this analysis, an early childbirth (being born of a mother younger than 18) is associated with a statistically significant risk of dying by age five. For stunting, statistically significant effects are observed for nine countries. After controlling for a wide range of other factors affecting those risks, when effects are statistically significant, being born to a mother younger than 18 increases the risk of under-five mortality by 4.1 percentage points on average, while the risk of stunting increases by 7.6 percentage points on average when potential effects are statistically significant. These are rather large potential effects at the margin versus baseline values, especially for under-five mortality.

The potential impacts of early childbearing on under-five mortality and stunting have dramatic implications for the children exposed to those risks. At the same time, nationally, ending early childbearing would not have a large potential impact on under-five mortality or stunting. This is because only a relatively small share of children is born to mothers who are younger than 18 at the time of their birth. This is why in Table 19, the national potential impacts of ending early childbearing tend to be relatively small, although still noticeable.

Table 19: Potential Impact of Early Childbearing for Mothers on Young Children and Simulations

	Statistically Significant Potential Impacts versus Mother Aged 18+			National Simulated Potential Impacts Elimination of Child Marriage	
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Under-five mortality	11	85	4.1	0.30	4.58
Under-five stunting	9	69	7.6	0.42	1.12

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

DOMAIN 5: AGENCY AND DECISION-MAKING

Women's Decision-making Ability

The fifth domain of potential impact considered is women's agency and decision-making ability. A woman's capacity for choice depends on agency, access to resources, and past achievements. Low educational attainment and child marriage clearly may have a potential impact on resources, for example by reducing opportunities for women's ability to earn a living on the labor market. Educational attainment and child marriage also affects past achievements as well as capabilities, as is the case when a lower level of education reduces the types of employment that women have access to. Finally, educational attainment and child marriage may also affect agency if they reduce girls and women's decision-making ability in the household, among others. The question is whether the potential effects are large or small.

To measure the potential impact of educational attainment and child marriage of the ability of women to make decisions within their household, an index is created using variables available in DHS datasets. The variables pertain to (i) women's decision-making in regard to health care (as mentioned in the previous section), household purchases, visits to friends and relatives, and the use of husband's earnings; (ii) women's ability to refuse to have sex with her husband or to negotiate their husband's use of a condom; (iii) whether women feel that a husband is justified in beating his wife under the certain circumstances; and finally (iv) whether women needed their husband's permission to get medical assistance if needed. The values of the index are normalized to take a value between zero and 100, as was done for knowledge of HIV/AIDS.

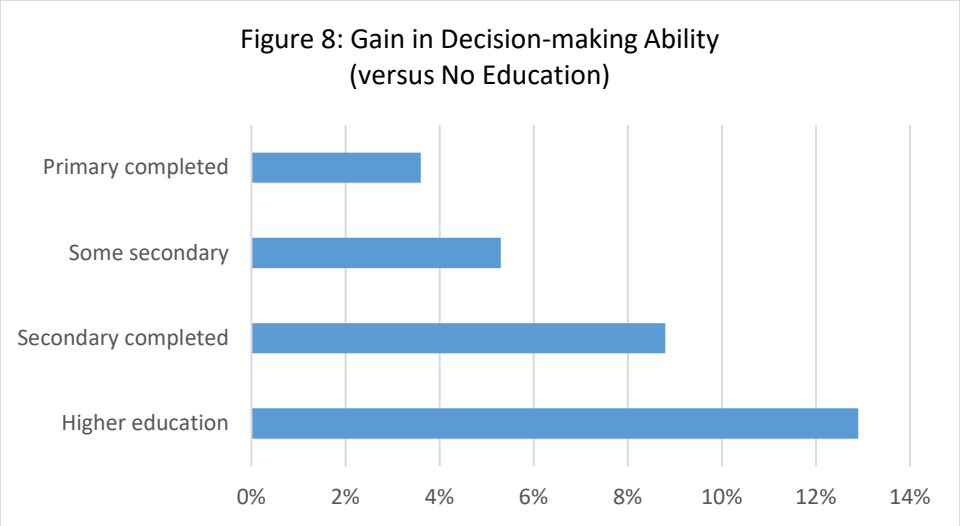
Results from the estimations are provided in Table 20 with potential impacts visualized in Figure 8. The potential effects of educational attainment on the index of decision-making ability are statistically significant in virtually all countries when considering secondary education, and higher as expected when women have higher levels of schooling. Under universal secondary education, there could be an increase in the ability of women to make decisions within the household nationally of 7.8 percentage points in the 12 countries where the potential effect is statistically significant, which corresponds to an increase of 12.7 percent from the base value. The potential effect is at one third of that for primary education.

Table 20: Potential Impact of Educational Attainment on Women's Decision-making Ability and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Primary completed	7	54%	3.6	2.42	3.8
Some secondary	12	92%	5.3		
Secondary completed	12	92%	8.8	7.75	12.7
Higher education	13	100%	12.9	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.

Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.



Source: Authors. The Figure displays average marginal potential impacts.

What about the potential impact of child marriage? Table 21 suggests that the additional benefit from virtually ending child marriage through universal secondary education could be smaller. We find that the direct potential impact of child marriage on women's decision-making ability is statistically significant in only a few cases, and when potential effects are statistically significant, they tend to be small in magnitude. It could be that in contexts where women have limited decision-making capacity in general, those married as children may not necessarily show statistically significantly lower decision-making ability as compared to those who marry one or a few years later, when they reach the age of 18. However, child marriage itself is often a reflection of the lack of decision-making ability of women (see Box 8).

Table 21: Potential Impact of Child Marriage on Women's Decision-making Ability and Simulations

	Statistically Significant Potential Impacts versus Marrying at 18+			National Simulated Potential Impacts Elimination of Child Marriage	
	Number of Countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Marrying at ≤15	4	31%	-2.1		
Marrying at 16	2	15%	1.1	Combined effect:	Combined effect:
Marrying at 17	2	15%	2.0	0.26	0.62

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 13 African countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

Box 8: Lack of Decision-making for Girls and Women May Start with Child Marriage

The question of whether girls and women have a say in key decisions affecting their life starts with the decision to marry and whom to marry. Findings on this decision depend on context. The study by Perlman et al. (2018b) in Niger suggests that some girls do not object to marrying early as this is the practice in their community. As one girl expressed it: *"I was already twelve and most of my friends were married. I just knew I was ready too. The boys started coming to the motor park where I hawked to talk with me. Some brought gifts. The next year the number of boys coming to visit me increased, though none of them mentioned marriage until this man from another community came along. He's now my husband."* But other girls clearly do not want to marry early and may be forced to. Parents can exert a great deal of pressure on their daughters to marry, as illustrated by the following quote: *"Years ago a wealthy man*

gave my neighbor 17,000 Franc CFA twice without any reason. My neighbor accepted it happily as poverty is his problem. The next time the wealthy man visited, he told my neighbor he wanted to marry his daughter. My neighbor said his daughter was in school and that he didn't want to marry her out yet. The wealthy man then asked for his money back. My neighbor had nothing to sell and had no wealthy friends or family members to lend him money. In the end he decided to give his daughter out without completing her education. We used to face these kinds of problems more often as a result of poverty and ignorance."

Satisfaction with Services

One aspect of agency is the ability for women to properly assess the quality of the basic services that they rely on in their daily life. The Gallup World Poll includes interesting data on the satisfaction with a wide range of services. Especially in developing counties, the quality of these basic services is often low. For example, while children may be enrolled in school, they may learn little while in school. One would expect well-informed individuals to be more critical about the quality of the services they receive, and one would also expect that individuals with higher levels of education would be better informed of potential issues with those services. However, less educated individuals are likely to have access to lower quality services. Thus, in a given cross-section of data the educational attainment of women could be negatively or positively correlated with their level of satisfaction with basic services.

As shown in Table 22, a higher level of educational attainment is associated with a lower satisfaction with various types of services after controlling for a wide range of other variables that could affect satisfaction levels. This is the case for most services for which data are available, including roads and highways, education, air quality, water quality, and healthcare. It is also the case for some levels of schooling for women's satisfaction with the city they live in and their perception of the availability of good affordable housing. The potential effects are as expected larger with a tertiary education. Note that we refer in the title of Table 22 to 'associations' as opposed to 'potential impacts' to note that for these specific indicators, one should be especially careful about not necessarily inferring causality.

A negative correlation is not necessarily a bad thing. Indeed, lower levels of satisfaction with basic services could lead women to exercise their agency and require better services, which could in turn lead to some improvements. When women are not satisfied with a service provider, they could also turn to another provider, and thereby through competition in local provision drive the various providers towards improving services. It also seems that well educated women are especially discerning about the quality of the education systems in their country, since the largest potential impacts are observed for the education system. Although this is not shown in the Table, it is also worth noting that the baseline levels of satisfaction with services are not very high, with typically only two thirds of women satisfied with any given service, and sometimes less. The only exceptions are for the satisfaction of individuals with the city or area they live in and for air quality where satisfaction rates are much higher (for air quality this is not surprising given that most people still live in areas with limited air pollution).

Table 22: Associations between Educational Attainment and Women's Satisfaction with Services

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Satisfied with public transportation system	NS	NS
Satisfied with the roads and highways	-0.02	NS
Satisfied with education system	-0.02	-0.04
Satisfied with the quality of air	-0.02	-0.03
Satisfied with the quality of water	-0.01	-0.02
Satisfied with the quality of health care	0.01	0.02
Satisfied with the city you live in	-0.03	NS
Availability of good affordable housing	NS	0.02

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.

Simulations could be carried to assess the potential impact of universal secondary and tertiary education on satisfaction rates. These simulations would suggest, based on the potential impacts provided in Table 22, that satisfaction rates could be lower if women were better educated. The results would however need to be interpreted with caution, given that confounding factors are likely to be present especially for those subjective outcomes, so that inferring any causality and assuming that any bias in estimates may be limited is more problematic. Therefore, while we do note the interesting associations suggested by Table 22, simulations for universal secondary and tertiary education are not provided here.

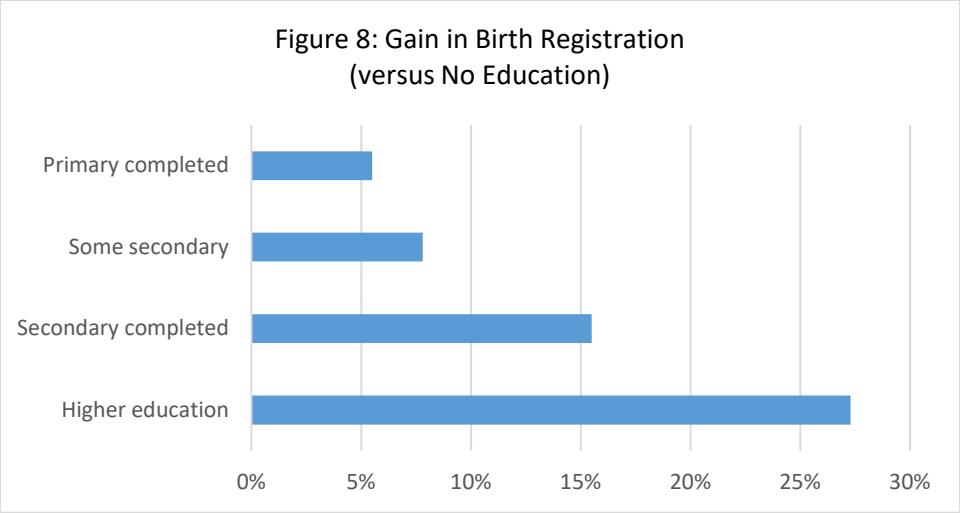
Birth Registration

The last illustrative example of analysis of agency is for birth registrations. The benefits of birth registration are important for children, and one would expect a higher level of educational attainment for mothers to be positively correlated with the likelihood of registering their child at birth. This could also be considered as an indirect indicator of agency for women. Table 23 and Figure 9 provide the results from the analysis. In four of the 13 countries for which the analysis was implemented, a higher level of educational attainment for mothers is associated with an increase in the likelihood of birth registration for their children. In the case of universal secondary education, in the countries where statistically significant potential effects are observed, the gains in registrations could be at close to 11 percentage points, which is equivalent to an increase of a third from the baseline registration rates. Potential effects for primary education tend to be substantially lower, as observed for many other indicators in this study.

Table 23: Potential Impact of Educational Attainment for Mothers on Birth Registration and Simulations

	Statistically Significant Potential Impacts versus Less than Primary Completed			National Simulated Potential Impacts	
				Universal Primary	Universal Secondary
	Number of countries	Share of countries (%)	Average Impact	Absolute reduction	Proportional change from base (%)
Primary completed	4	40	5.5	3.25	6.4
Some secondary	4	40	7.8		
Secondary completed	4	40	15.5	10.96	33.3
Higher education	4	40	27.3	-	-

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 17 developing countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.



Source: Authors. The Figure displays average marginal potential impacts.

What about the potential impact of child marriage, or rather in this case early childbearing, on the likelihood of birth registration? When mothers have children below the minimum legal age for marriage, legislation aimed at delaying the age at marriage could potentially lead to lower birth registration rates if women are fearful that having a child at a young age suggests that marriage took place before the minimum legal age. Whether such disincentives are at work depends on the context of each country, and whether the legal minimum age for marriage is enforced, which is not necessarily the case in developing counties. Table 24 provides estimates of the potential impact of early childbearing on birth registrations. In most cases, potential impacts are not statistically significant, and in the few cases where statistically significant potential impacts are observed, they tend not to be large.

Table 24: Potential Impact of Early Childbearing for Mothers on Birth Registration and Simulations

	Statistically Significant Potential Impacts versus Mother Aged 18+			National Simulated Potential Impacts Elimination of Early Childbearing	
	Number of countries	Share of countries (%)	Average Impact	Absolute increase	Proportional change from base (%)
Birth Registration	2	20	-4.7	0.23	0.35

Source: Authors. Regression analysis based on data from Demographic and Health Surveys.
Note: Estimates are based on country-level analysis for 17 developing countries. Average potential impacts and simulation results reported for countries where coefficients for the variables of interest are statistically significant.

DOMAIN 6: SOCIAL CAPITAL AND INSTITUTIONS

Altruistic Behaviors

Altruistic behaviors are fundamental for the well-being of individuals – both those who benefit from altruism and those who practice it. The behaviors also matter for social cooperation and trust at the level of communities and societies. As with other indicators, multiple factors are likely to affect individual altruistic behaviors. For this study, we look again at the potential impact of women's educational attainment on the likelihood that they engage in altruistic behaviors using data from the Gallup World Poll. Three indicators of altruistic behaviors are considered: (1) whether a woman made in the past month

a monetary contribution to a charity; (2) whether she volunteered her time with any organization in the past month; and (3) whether she helped a stranger or someone she did not know who needed help.

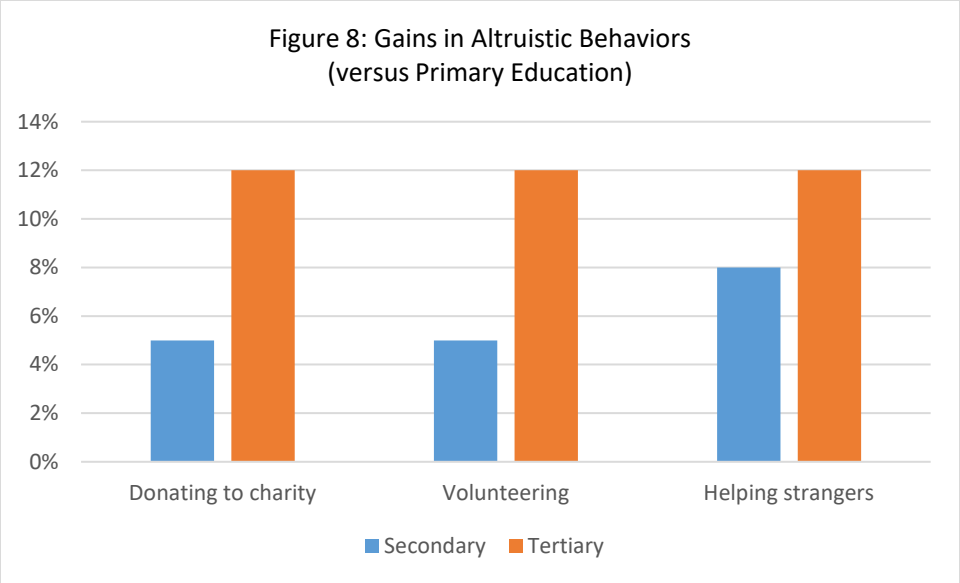
Table 25 and Figure 10 provide the estimates of the association between educational attainment with each behavior. Controlling for many other factors that affect these behaviors including levels of per capita income, a secondary education level is associated with an increase in the likelihood of engaging in the three behaviors of five to eight percentage points. For tertiary education, the increase is at 12 points for all three indicators. As done for Table 22, we refer in the title of Table 25 to associations as opposed to potential impacts to emphasize that for these specific indicators, one should again be especially careful about not necessarily inferring causality. The same terminology is used for other indicators in this section.

Why is a higher level of educational attainment associated with a higher likelihood of altruistic behaviors? Research has found that social exclusion decreases the likelihood of prosocial behavior, and this may be one of the channels underlying the correlation between low educational attainment and the measured altruistic behaviors. Another hypothesis is that women with higher levels of education tend to in a better position in life, and thereby are more able to help others. Even though we control among others for household per capita income and women's employment status in the regressions, a higher level of educational attainment is likely to be associated with a position in life where women have a higher ability to help others. By contrast, women who are less educated tend to be poorer and they may struggle just to make ends meet. They may not have the social networks nor the resources that would enable them to volunteer, donate to charity, or help strangers. In other words, it is not that women who are better educated are intrinsically more altruistic than those who are less well educated. Rather, those who are better educated are on average likely to be in a better position to help others. This is a conjecture, but a reasonable one to interpret the results from the analysis.

Table 25: Associations between Educational Attainment and Women's Altruistic Behaviors

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Donating to charity	0.05	0.12
Volunteering	0.05	0.12
Helping strangers	0.08	0.12

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.



Source: Authors. The Figure displays marginal potential impacts with pooled data.

What could be the potential effect of universal secondary or tertiary education on altruistic behaviors? The estimates are provided in Table 26. Universal secondary education could lead to an increase in altruistic behaviors of three to five percentage points, an increase of up to one sixth versus the baseline values. Indeed, while only one in five women volunteers or donates to charity in the baseline estimates, the proportion is at more than half for helping strangers. For universal tertiary education, the increase could be at about ten percentage points, leading to larger gains versus baseline values. These various gains are again substantial.

Table 26: Simulated Potential Change in Altruistic Behaviors by Educational Attainment

Women only sample	Baseline Estimate	Universal Secondary	Proportional Change	Universal Tertiary	Proportional Change
Donating to charity	19.8	23.0	16.2	29.5	49.0
Volunteering	19.4	22.7	16.7	29.3	51.1
Helping strangers	54.1	58.9	8.9	63.1	16.8

Source: Authors based on Gallup World Poll data.
Note: Simulations reported for the pooled sample that includes data for 48 countries. NS means that a simulation is not shown because the coefficient was not statistically significant at the 10 percent level.

Friendships and Support Networks

Increased education can be important for nation-building and for social cohesion. At the individual level, friendships made in late secondary school and in tertiary education can be very important for girls' transition to adulthood. Two interesting questions are asked in the Gallup World Poll in this area. The first is whether women are satisfied with their opportunities to make friends, and the second whether they can rely on these friends when in need. As shown in Table 27, in comparison to women with only a primary education or less, a higher level of educational attainment is not associated with an increase in the opportunity to make friends, but it is associated with a higher ability to rely on such friends when in need. The gain is at nine percentage points with secondary education and 12 points with tertiary education.

Table 27: Associations between Educational Attainment and Women's Friendships

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Having friends that help you	0.09	0.12
Satisfied with opportunities to make friends	NS	NS

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.

What could be the potential effect of universal secondary or tertiary education on psychological well-being for women? The results from the simulations are reported in Table 28. With universal tertiary education, there could be an increase of more than a tenth from the base in the reported ability to have friends on which to rely on when in need. This is again high given that the regression analysis controls for a wide range of other factors that could affect the ability to have friends that can help. One potential explanation is that individuals often become friends with others from a similar socio-economic background. Therefore, friends of better educated women may have the (financial) ability to help them especially when they are in need, while friends of women with lower levels of educational attainment may not have that ability.

Table 28: Simulated Potential Change in Women's Friendships and Support Networks by Educational Attainment

Women only sample	Baseline Estimate	Universal Secondary	Proportional Change	Universal Tertiary	Proportional Change
Having friends that help you	74.0	79.6	7.5	83.5	12.7
Opportunities to make friends	70.2	NS	NS	NS	NS

Source: Authors based on Gallup World Poll data.
Note: Simulations reported for the pooled sample that includes data for 48 countries. NS means that a simulation is not shown because the coefficient was not statistically significant at the 10 percent level.

Social Institutions

The last set of indicators considered in this study pertains to trust in social institutions, trust in a country's leaders, and perceptions of one's community. For the three categories of indicators combined, a total of 15 perceptions are considered. The results are provided in Table 29 for the potential impacts of secondary and tertiary education controlling for a wide range of other factors that could affect these perceptions. There are indications that a higher level of educational attainment is associated with less confidence in institutions, a perception that corruption is widespread, a concern that freedom of the press may be limited, and lower approval ratings for leaders.

The story here may be similar to that mentioned for the satisfaction of women with basic services. One would expect well-educated women to be more critical about core institutions or their leaders as they may be better informed of potential issues with those institutions or leaders. As was the case for satisfaction rates for basic services, this is not a bad thing as concerns may lead women to exercise their agency and require better functioning institutions, less corruption, and better leaders. At the same time, for their own community, women with higher levels of educational attainment tend to be more satisfied in terms of how welcoming the communities are to various types of individuals that could face hardship or discrimination such as racial and ethnic minorities, immigrants, gay and lesbian people, or people with intellectual disabilities. These perceptions may reflect the women's own attitudes as opposed to the actual reality in communities, but the fact that the measured associations are positive is encouraging.

Table 29: Associations between Educational Attainment and Women's Perceptions of Institutions and Leaders

Women only sample	Secondary (vs. Primary)	Tertiary (vs. Primary)
Perceptions of Institutions		
Confidence in local police force	-0.05	-0.05
Confidence in military	-0.04	-0.06
Confidence in judicial system and courts	-0.06	-0.09
Confidence in national government	-0.07	-0.09
Confidence in the honesty of elections	-0.07	-0.08
Afraid to express political views	0.01	0.02
Perceptions of Corruption and Leaders		
Corruption is widespread across government	0.04	0.05
Approving job performance of the leader	-0.06	-0.07
Approving way the President handling his job	-0.06	-0.10
Your country's media has a lot of freedom	-0.06	-0.11
Satisfaction with Community		
Good place to live for racial and ethnic minorities	NS	0.04
Good place to live for immigrants	0.02	0.07
Good place to live for gay and lesbian people	NS	0.01
Good place to live for people with intellectual disabilities	NS	NS
Recommend your city to others	NS	0.03

Source: Authors. Regression analysis based on data from the Gallup World Poll.
Note: Regression estimates reported for the pooled sample that includes data for 48 countries. NS means that an estimate is not statistically significant at the 10 percent level.

If simulations for the potential changes in these perceptions under universal primary or secondary education were conducted, the potential effects would follow readily from the above potential impacts. As was the case for perceptions related to the satisfaction with basic services, we do not provide here the simulations. This is again because for issues related to trust in institutions, the coefficient estimates provided in Table 29 are likely the result of several factors. This includes not only potentially higher expectations for service quality or integrity in the management of institutions among women with higher levels of education, but also possibly differences in the actual quality of the services provided or in the integrity of institutions at the local level, with possibly lower quality services in poorer and less well-educated areas. The complexity of the factors at play make inferences that could suggest causality more problematic, even if again we note the interesting relationships that the coefficient estimates in Table 29 suggest between educational attainment and indicators of trust in national institutions that are constitutive of social capital.

POTENTIAL ECONOMIC COSTS: FOCUS ON CHILD MARRIAGE

Measurement Approach

Low educational attainment for girls and child marriage have major potential negative impacts for themselves, their children and their households, their communities, and societies. These potential impacts have been documented in previous sections for more than 50 different indicators, and many more could have been considered. What are some of the economic costs associated with those potential impacts? For many potential impacts, this is a hard question to answer, but for a few potential impacts, estimations can be provided. This is done in this section for the losses in earnings for women and the

welfare losses for populations from high rates of population growth in countries with high fertility rates. In addition, we discuss briefly the potential for losses in earnings in adulthood for children who are stunted. As mentioned in the introduction, the objective is not to provide precise costs, but rather to give an order of magnitude of expected potential costs, simply to show that these potential costs are indeed likely to be very large.

Given that this study was prepared ahead of the African Union's second summit on child marriage in Ghana in August 2018, the focus is on measuring the economic costs of child marriage, as opposed to the (larger) costs from low educational attainment for girls. But before providing costs, a bit of background on the measurement approach is in order.

Typically, researchers looking at the potential impact of a lack of educational attainment or child marriage on development focus on annual measures of income losses or gains, or measures of growth in income. These analyses focus on the potential losses in earnings or Gross Domestic Product (GDP) from low educational attainment and child marriage. This was also the approach used by Wodon et al. (2017) in previous work on the economic impacts of child marriage globally. This focus on annual incomes is natural since GDP is the standard measure according to which the economic performance of countries is measured today. Yet GDP growth is a short-term measure of performance, which may be misleading about the health of an economy because it does not reflect whether a country is investing in the assets base that will sustain its long-term growth – including the education of its workforce and especially girls. For example, a country could deplete its natural capital base or fail to invest in the human capital of its people and still be able generate high rates of GDP growth in the short run, although probably not in the long-run.

In this study for Africa as in recent work at the World Bank on the global cost of not educating girls (Wodon et al., 2018) and work on the cost of gender inequality (Wodon and de la Brière, 2018), we take advantage of newly available data and rely on a different approach to measure the losses that result from low educational attainment for girls and child marriage, or equivalently, the gains associated with higher attainment. Instead of measuring losses or gains as annual flows (the GDP or annual earnings approach), we focus on losses in human capital (the wealth approach). Following Lange et al. (2018), human capital wealth is defined as the present value of the future earnings of today's labor force, considering individuals aged 15 and above. When the analysis is done by gender, human capital wealth can be estimated separately for men and women, and the losses in human capital wealth from not educating girls or allowing child marriage to persist can be measured accordingly.

At least three arguments justify using a wealth (stock) approach as opposed to a GDP or earnings (flow) approach to measure the economic losses from not educating girls. First, using a flow approach does not reveal the full magnitude of the losses faced by women throughout their working life. Estimates of losses from low educational attainment and child marriage based on human capital wealth are substantially larger than those based on annual earnings or GDP simply because wealth is much larger than GDP. The full magnitude of the losses from low educational attainment for girls and child marriage appears only when considering women's human capital wealth, that is the present value of women's future earnings over their lifetime.

Second, a flow approach tends to emphasize losses for individuals at the peak of their earnings, since they account for a larger share of the labor earnings in GDP. Again, it seems more appropriate to look at women's lifetime earnings to better reflect expected losses from low educational attainment and child marriage. This should give a higher weight to younger women than with the flow approach.

Third, and perhaps most fundamentally, a wealth approach is forward-looking as it emphasizes sustainability. As already mentioned, countries' economic development has traditionally been assessed through GDP per capita, a measure of the income produced by a nation in a given year. Similarly, economic performance has been traditionally assessed through growth in GDP per capita. But with which resources is GDP produced? GDP, or more precisely the consumption component of GDP, is essentially is the annual

return that a country reaps from its wealth, the assets base that it uses for production. Wealth consists of natural capital such as agricultural land, forest, oil, gas and minerals, to give a few examples. It also consists of produced capital – think about infrastructure, machinery, factories, or buildings. Finally, wealth consists of human capital, such as a well-educated and productive labor force. These three categories – produced, natural, and human capital, are considered the three main components of the changing wealth of nations, that together with net foreign assets, provide the assets base that countries rely on to produce GDP capita from year to year. The wealth approach thus emphasizes sustainability.

Given the advantages of wealth accounting over annual earnings or GDP measures to measure losses in earnings due to low educational attainment for girls and child marriage, we rely in this note on research recently completed by the World Bank on the Changing Wealth of Nations study (Lange et al., 2018). Building on two previous reports (World Bank, 2006, 2011), the study covers the period 1995 to 2014. It includes not only estimates of produced capital and natural capital, as did previous reports, but also estimates of human capital following the approach suggested by Jorgensen and Fraumeni (1992a, 1992b). The estimations of human capital are based on household survey data. They represent a significant improvement over past estimates where total wealth included a large unexplained residual called 'intangible capital'. This residual, it turns out, consists for the most part of human capital wealth.

Losses in Earnings and Human Capital Wealth Due to Child Marriage

The methodology for estimating human capital wealth is explained in Appendix 3. Before discussing losses in human capital wealth from child marriage, it is useful to provide the baseline estimates of human capital and total wealth in absolute value and in per capita terms. The estimates are from Lange et al. (2018). Globally, the analysis is based on data for 141 countries accounting for 95 percent of the world's population. All estimates are in constant US dollars of 2014. Most African countries are included.

As shown in Table 30, estimated wealth in sub-Saharan Africa stood at US$ 22.2 trillion in 2014. Human capital wealth was at US$ 11.0 trillion, accounting for just under half of total wealth, versus just under slightly more than a third for natural capital and only 16 percent for produced capital. In per capita terms, total wealth stood at US$ 25,562 per person, with human capital wealth estimated at US$ 12,680 per person. Table 30 provides the same data for North Africa where higher levels of per capita wealth are observed but total wealth is lower given a smaller population (North Africa in Table 30 includes Djibouti, Egypt, Morocco, and Tunisia, but not Algeria and Libya for which wealth estimates are not available).

Table 30: Estimates and Components of the Changing Wealth of Nations for 2014

	Sub-Saharan Africa (most countries included)		**North Africa (Algeria and Libya not included)**	
	Total Wealth (US$ trillions)	Per Capita Wealth (US$)	Total Wealth (US$ trillions)	Per Capita Wealth (US$)
Total wealth	22.2	25,562	5.3	39,423
Produced capital	3.5	4,017	1.1	8,371
Natural capital	8.0	9,225	1.5	11,391
Human capital	11.0	12,680	2.9	21,177
Net foreign assets	-0.3	-360	-0.2	-1,517

Source: Lange et al. (2018).

To measure the potential cost of child marriage in lost earnings and thereby lost human capital wealth, simulations are based on estimates provided previously of the impact of child marriage on national earnings (see Table 2). Table 2 provides estimates of the losses in national earnings due to child marriage for 12 countries. Combining the country-specific estimates with estimates of human capital wealth for these countries leads to an estimated loss in human capital wealth of $63 billion in constant

US dollars of 2014. The 12 countries taken together account for just over half of the population of the continent. As a very simple first approximation, assuming similar losses in the other countries that account for just under half of the population, this could generate losses in human capital wealth of possibly twice that $120 for the continent (depending on the prevalence of child marriage in other countries and their levels of human capital wealth), or about one percent of the continent's total human capital wealth. The actual losses could be higher given that the African countries not included in the detailed analysis tend to have higher levels of earnings and human capital per capita. But they could also be lower given that these countries also tend to have lower levels of child marriage. In practice, these estimates of losses in human capital wealth from child marriage are only orders of magnitude – they are not meant to be precise or definitive given assumptions involved. But they do suggest that losses are likely to be large.

Box 9: Considering Potential General Equilibrium Effects When Estimating Costs

The estimation of the potential lost in human capital wealth from child marriage, or equivalently gains in human capital wealth that could result from ending child marriage implicitly assumes that labor markets would be able to absorb a larger supply of better educated women. Specifically, the assumption is that gains from educational attainment for women thanks to the elimination of child marriage would not lead to a decrease in the returns to education once more women become better educated. If ending child marriage were to lead to a large increase in the proportion of better educated women, the assumption may be problematic, especially in low and lower middle-income countries where many women have low levels of educational attainment. The estimation also does not consider potential effects on men of rising educational attainment for women. Men's earnings may decrease if more women become better educated and have access to the same employment opportunities as men, resulting in reductions in occupational segregation by gender that has traditionally led to higher earnings for men.

There is evidence that over time, labor market premiums associated with higher levels of educational attainment may be reduced once more workers have those higher levels of education. Angrist (1995) showed that the expansion of access to education in the Palestinian territories led to a reduction in the skills premium. Acemoglu et al. (2004) note that during World War II, higher labor force participation by women depressed wages for low skilled workers. Duflo (2004) suggests similar effects in Indonesia after a large school construction program. These are just a few examples of studies that document general equilibrium effects which, as noted by Acemoglu (2010), may be large. In the recent World Bank study on the cost of not educating girls globally, this was considered by providing a range of estimates, with and without general equilibrium effects. This seems less necessary here, because only a portion of women marrying early are assumed to complete secondary education in the absence of child marriage, given other constraints to secondary schooling such as cost or the distance to schools. As shown in Table 2, changes in earnings due to the elimination of child marriage are of a limited, at about one percent on average of aggregate wages. This may not lead to large general equilibrium effects.

Still, if general equilibrium effects are at work, the estimates provided above may be overstating the cost of child marriage in terms of lost earnings and thereby lost human capital wealth. At the same time, other factors could lead to larger costs than those reported here, for at least two reasons. First, the estimation does not factor in the potential effect of ending child marriage on labor force participation or hours worked. In addition, through multiplier effects, increasing women's earnings potential through better educational opportunities linked to the elimination of child marriage could generate larger gains for both men and women than suggested here. We also do not account for intergenerational benefits from higher earnings for women through better education for their children. In the long run, gains from ending child marriage could be larger than suggested by wage regressions capturing current conditions.

Losses in Human Capital Wealth from Under-five Stunting

For stunted children and their families, the cost of stunting may not be primarily economic. At the same time, when considering the potential impact on human capital wealth of stunting due to low educational attainment for mothers, the focus must be on potential monetary costs. What is the loss in human capital wealth from higher stunting rates among children due to a lack of educational attainment for their mothers? Research suggests a loss in productivity in adulthood associated with lower height. It has been suggested that undernutrition may lead to economic losses equivalent to four to 11 percent of Gross Domestic Product in sub-Saharan Africa and Asia (Horton and Steckel, 2013). Results from an experiment in Guatemala suggest that children who benefited from nutrition supplements were less likely to be stunted and had better cognitive abilities and higher levels of per capita consumption in adulthood, making the intervention highly cost effective (Hoddinott et al., 2013).

The analysis of nutrition outcomes presented earlier suggests that in countries where the potential impact was found to be statistically significant, universal secondary education for mothers could help reduce stunting rates by almost half. By contrast, the impact of child marriage through early childbearing was much smaller, in part because few children are born of mothers younger than 18. In practice, this means that the economic cost of child marriage due to early childbearing and its impact on stunting rates is likely to be substantially smaller than the cost related to lost earnings for women.

Losses in Human Capital Wealth Per Capita Due to Population Growth

The earlier analysis demonstrated that child marriage has a large potential impact on their lifetime fertility and population growth. In 13 African countries for which simulations were carried with demographic projection tools, the average reduction in population growth from ending child marriage and early childbearing was estimated at -0.22 percentage points when all counties are weighted equally. When the countries' population sizes and human capital wealth are factored in, the aggregate effect turns out to be slightly smaller, at -0.18 percentage point. How much is this worth in terms of human capital wealth per capita? In the medium term, since children who would not be born would have taken at least 15 years to enter the labor force if not more, lower population growth results in an increase in human capital wealth per capita. This is because the denominator (population) becomes smaller when ending child marriage while the numerator (human capital wealth) does not change for at least 15 years (it could actually increase if lower fertility rates lead to higher labor force participation by women).

Accounting for the levels of overall wealth of each of the 13 countries (including not only human capital, but also produced and natural capital since we are considering with population growth the size of the denominator), the reduction in population growth associated with ending child marriage could generate in those countries a gain in wealth per capita equivalent to $26 billion in the first year for which effects would be observed. This is computed as the value of the transfer that would be needed in the absence of a reduction in population growth to keep human capital wealth per capita at the expected level that would be reached if child marriage were ended and population growth were reduced. Over time, the effects of lower population growth would grow since the reductions in population growth from ending child marriage would be cumulative over time (that is, each year population growth would be lower than would have been the case without the elimination of child marriage). Recall that in the case of losses in earnings, the cost in terms of human capital wealth was estimated for those countries at $63 billion. This suggests that within a few years, given the cumulative nature of the reduction in population growth, the benefits of ending child marriage associated with lower population growth should become as large as the benefits associated with lost earnings. The approaches used to measure both benefits are different, but this suggests that the impact through population growth is also large, and likely larger.

The 13 countries for which detailed analysis of impacts on population growth was undertaken

account for 54 percent of the continent's population and 58 percent of the continent's human capital wealth (based on the estimates in Table 30). Scaling up the estimate for the continent as a whole could generate economic costs of child marriage about twice as large as those observed for these 13 countries, as was the case when considering losses in human capital wealth associated with lost earnings. Again, the benefits from lower population growth would increase from one year to the next since the reduction in population growth is cumulative. To summarize, while the cost of child marriage from higher population growth would probably be initially smaller than the cost related to women's earnings, costs from high population growth are far from being negligible and they would rapidly increase over time, quickly catching up and probably in a few years exceeding costs associated with women's earnings.

POLICY INTERVENTIONS: FOCUS ON CHILD MARRIAGE

Comprehensive Approaches

Given that this study was prepared ahead of the African Union's second summit on child marriage in Ghana, the focus in this section on policy options is again on child marriage. Multiple interventions are likely to be needed to provide better opportunities to girls, but since keeping girls in school is key to ending child marriage and early childbearing, improving education opportunities for girls should be a priority. Typically, various interventions tend to be managed by different Ministries, including not only Ministries of Education, but also Ministries of Health, Ministries of Population, Ministries of Labor, and Ministries of Gender or Women and Children's Affairs. Strategies may be defined at the Ministry level, or through inter-ministerial committees. Yet since keeping girls in school is essential to end child marriage and early childbearing, providing education opportunities for girls is especially important. In practice, three-pronged strategies are likely needed: (1) General basic conditions must be met for access to education and learning; (2) Targeted interventions must be implemented to reach especially vulnerable girls; and (3) Efforts must be undertaken to change gender-based social norms.

- **General conditions for access to education and learning**. In many countries, there is a need to build secondary schools closer to where girls live or provide modes of transportation and in some cases boarding to enable them to attend schools, especially at the secondary level. Providing adequate water, sanitation and hygiene facilities for girls is also important, as is the need to address the risk of violence and sexual harassment either at or en route to school. It is also essential to ensure that schools improve learning outcomes and provide girls with appropriate skills. Among various entry points that can be used to that end, the following can be mentioned (1) reducing disadvantages that girls face in remote communities due in part to poor targeting of Government resources; (2) creating a more inclusive school culture for girls; (3) providing girls with role models—including through female teachers; and (4) raising the returns to secondary education for women at the local level through better employment opportunities. This list is by no means exhaustive and the appropriate entry points vary between countries.

- **Targeted interventions to reach especially vulnerable girls:** The literature suggests that targeted interventions especially in the forms of incentives to keep girls in school may have large benefits. Three types of interventions are reviewed in the next section based on a review by Botea et al. (2017): (1) There is a need for interventions to expand economic opportunities for adolescent girls who dropped out of school and who are unlikely to be able to return; (2) Imparting adolescent girls with life skills and reproductive health knowledge is also important, whether girls are in school or out of school. Evidence suggests that safe space clubs where girls may discuss issues of

sexual and reproductive health as well as other topics with female mentors may be an effective means of achieving this. (3) However, according to the literature, the most effective targeted interventions to delay marriage and childbearing are those that enable girls to remain in school, especially through incentives offsetting the out-of-pocket and opportunity costs of schooling.

- **Efforts to change gender-based social norms:** Child marriage, early childbearing, and low educational attainment for girls are rooted in social norms that perpetuate gender inequality. To tackle this challenge, beyond general conditions that education systems should meet and targeted interventions to reach vulnerable girls, additional community-based interventions that involve all members of the community may be an effective means of changing these norms. Such interventions should target men and community leaders apart from women. Finally, adequate laws – for example on the minimum age for marriage without exceptions for parental and judicial consent are essential but not sufficient on their own to achieve change (Box 10).

Box 10: Child Marriage Laws and their Limitations

The Convention on the Rights of the Child emphasizes the need for full and informed consent for marriage. It notes that children typically do not have the ability to provide full and informed consent. This is one of the reasons why 18 is recommended as the minimum age for marriage. In Uganda for example, the 1995 Constitution sets the minimum age of marriage at 18 years (Article 31), but national laws have other provisions. The Marriage Act of 1904 sets the minimum age for consent at 21 years but allows written consent of the father, mother, guardian, or registrar for the marriage of minors. The Marriage and Divorce of Mohammedans Act of 1906 is silent on the minimum age for consent. Both the Hindu Marriage and Divorce Act of 1961 and the Customary Marriages (Registration) Act 1973 set the minimum age for consent at 16 years for girls and 18 years for boys. They allow marriage of minors upon consent of parents or a guardian. As discussed by Wodon, Tavares et al. (2017), such exceptions allowing girls to be married early with parental or judicial consent should be avoided.

Review of Targeted Interventions

Economic and other incentives may be needed for girls to remain in school, go back to school if they dropped out, or expand their livelihood opportunities if they cannot go back to school in order to delay marriage and childbearing. While the literature on these interventions is too large to be reviewed comprehensively here, subsets of this literature can be synthetized. Without aiming to be comprehensive, this is the objective of this section. As for the previous section, given that this study was prepared ahead of the African Union's second summit on child marriage, the focus is on programs to delay marriage. Building on a recent review by Botea et al. (2017), three types of interventions for adolescent girls are discussed: (1) programs providing life skills and reproductive health knowledge; (2) programs expanding economic opportunities; and (3) programs keeping girls in school or enabling them to return to school.

The focus on these three types of interventions stems from a body of evidence showing that they can have positive impacts. Each of these three types of programs is hypothesized to potentially delay marriage/childbearing and increase educational attainment in different ways, hence they have different theories of change (Box 11). Close to 40 interventions are reviewed by Botea et al (2017). To be included in the review, interventions had to fulfill the following selection criteria: (1) Target girls aged 10-19, either exclusively or as part of a broader target group; (2) Provide life skills and sexual and reproductive health (SRH) knowledge, economic opportunities, or education opportunities; (3) Demonstrate results in terms

of improving the health of young women, especially for SRH, or delay marriage or childbearing; and (4) Have been tested in a developing country, usually in sub-Saharan Africa or in other low income settings.

Box 11: Theories of Change for Interventions Targeting Adolescent Girls

Life skills and SRH knowledge: By increasing knowledge and awareness, life skills can increase young women's perceived risk of becoming pregnant at an early age and the desire to avoid early pregnancies (through family planning). Through these channels, life skills may lead to better health outcomes for the girls and their children. By increasing girls' confidence and self-esteem, life skills may also increase girls' aspirations. With increased aspirations, girls may have a greater desire to delay marriage and childbearing. Finally, life skills can increase young women's communication and decision-making skills, leading to increased abilities to negotiate their preferences for delayed marriage and childbearing. At the same time, while life skills and SRH knowledge may empower girls, they may not be sufficient to delay marriage and childbearing if social norms curtailing agency for girls are not also addressed at the same time.

Life skills together with economic opportunities: Programs increasing earnings potential for young women may increase their ability to plan marriage and childbearing decisions in three ways. First, the ability to make an economic contribution expands the role of women beyond that of sex and reproduction. This can increase their desire to limit or space childbearing. The transformation of girls from economic liabilities into assets in the eyes of their societies and families can also alleviate external pressures on girls to marry or have children early. Second, the loss in earnings associated with childrearing is an opportunity cost which may increase women's desire to limit or space births and exercise reproductive control. Third, a young women's increased earnings may improve her bargaining power within the household and allow her to effectively exercise reproductive control by negotiating delays in sexual debut or marriage, and negotiating the terms of sex including the use of contraceptives. Creating income-generating opportunities for women can therefore contribute to female empowerment beyond the economic realm by widening personal choice and control over SRH outcomes.

Incentives for schooling or delayed marriage: In many communities, the economic, cultural, and social environment does not provide viable alternatives to marriage for adolescent girls. Once girls drop out of school, possibly because of poor quality or high cost, it may be difficult for parents not to get their daughter married. In those communities, improving the provision of quality and affordable primary and secondary education may be one of the best way to delay marriage and childbearing as parents often see schooling as a viable alternative to marriage for their daughters. Incentives and programs to keep girls in school may also lead to "tipping points" in communities whereby more and more girls remain in school and are able to delay marriage. A few interventions have also aimed to delay marriage through financial incentives conditional on not marrying early, with additional schooling often as an additional benefit.

Source: Botea et al. (2017).

The first category of programs emphasizes the empowerment of girls by providing life skills and reproductive health knowledge. The typical intervention is that of a "safe space club" for adolescent girls. These clubs are delivery platforms for convening girls with a trusted adult mentor at a specific time and place. The approach was pioneered by BRAC in South Asia and the Population Council in Africa and Latin America. The clubs have proven effective when implemented well. By combining socializing, fun, and access to mentors, the clubs are attractive for girls to attend.

Without other incentives, safe space programs may not be sufficient to delay marriage and childbearing or improve schooling. Still, they achieve important intermediary outcomes related among others to aspirations and self-esteem, confidence, and SRH knowledge.

From there, other services are delivered. Clubs can be held in a variety of settings, including schools or community centers. Girls meet regularly and are able with the help of the mentors to discuss a range of issues, including those related to SRH. They learn "life skills" in those meetings, including "soft" or socio-emotional skills such as critical thinking and problem solving, communication and negotiation (for example within one's household). One of the objectives is often to boost the girls' self-awareness and self-esteem, so that they can explore and fulfill their own aspirations. In many cases, safe space clubs are also used to impart "hard" skills, such as basic literacy and numeracy, or basic business skills.

These programs have helped improve SRH knowledge and behaviours. This includes an increase in girls undergoing HIV testing or counseling; an increase in the use of modern contraception or other methods of family planning; a reduction in the desire for practicing female genital mutilation for daughters in countries where the practice is prevalent; a reduction in the risk of intimate partner violence when the program also reaches out to men; an increase in self-esteem; and gains in specific skills taught during safe space sessions, for example in the areas of financial literacy or basic literacy and numeracy. At the same time, without additional interventions related to schooling or employment and livelihoods, it is not clear that safe spaces are sufficient to delay marriage and childbearing (though that may not have been a primary goal of these projects). Therefore, it is important to consider programs whereby safe spaces have been combined with livelihood opportunities and incentives to remain in school, usually with larger impacts on the age at marriage and childbearing.

The second category of programs combine an emphasis on empowering girls, often through safe spaces, with in addition a focus on providing livelihood opportunities. These programs are appropriate for girls who are not in school. For these girls, building skills for income-generation may provide an alternative to early marriage and childbearing. Two groups of interventions are distinguished: livelihood interventions and financial literacy/access to financial services. Impacts on the age at marriage and early childbearing tend to be larger than with life skills/SRH knowledge alone, but not in all cases. Given their focus on economic opportunities, the programs often have some success in increasing earnings, employment, and/or savings. Several of the programs also succeed in increasing the use of modern contraceptives and SRH knowledge, which may help delay childbearing. In some cases, the programs also succeed in delaying the age at marriage and reducing teen pregnancies (see Box 12). The message from the review is that adding a livelihood dimension to life skills and SRH knowledge programs may help delay marriage and childbearing, but not in all cases. The focus on economic opportunities may also help in ensuring regular participation by girls in the programs.

Interventions combining an emphasis on empowering girls, often through safe space clubs, with livelihood opportunities may improve reproductive health outcomes and delay marriage or childbearing. This has been the case in some countries, but not systematically so. Since these are often the only option available for out-of-school girls, more research is needed to figure out what works and what doesn't.

Box 12: BRAC Uganda Empowerment and Livelihoods for Adolescent Girls (ELA)

The ELA project in Uganda aimed to increase economic empowerment for adolescent girls in rural areas by providing life skills training, skills related to income-generation, and access to microfinance. The program has demonstrated strong positive impacts on economic, health, and agency outcomes for girls. Among other outcomes, the program (1) increased the likelihood of engaging in income-generating activities by 32 percent; (2) increased self-reported routine condom use by those sexually active by 50 percent; (3) reduced fertility rates by 26 percent; and (4) reduced reporting of unwanted sex by 76 percent. There were also reductions in teenage pregnancies and child marriage. To gather further evidence on the effectiveness of the intervention in promoting entrepreneurship, the evaluation looked at the impact of the program on the willingness to compete in an experimental setting, including for the girls' brothers. The results suggest that programs that target adolescent girls' empowerment such as ELA may also have spillover effects on their brothers and shift gender dynamics in the community.

Source: Bandiera et al. (2014) and Buehren et al. (2016).

The third set of programs focuses on keeping girls in school or enabling them to return if they dropped out. A few programs directly aim at delaying marriage. The literature, including a recent review by Kalamar et al. (2016), suggests that there are multiple intervention options available to keep girls in school and delay marriage. In a few cases, evaluations are also available for programs focusing directly on delaying marriage through financial incentives, often with the additional benefit of enabling girls to remain in school. The programs providing incentives for schooling succeed quite often in keeping girls in school and sometimes delay marriage and childbearing. Some of these programs enable girls who dropped out of school to go back. Not all programs succeed in all areas, but the evidence is broadly convincing that in comparison to the other two types of programs reviewed above, those focusing on schooling for girls, or in some cases on delaying marriage with financial incentives, may be more successful in indeed delaying marriage and childbearing. At the same time, however, all three intervention types hold promise and multiple interventions are needed to reach different profiles of girls.

Of the three types of interventions reviewed in this study, interventions to promote education, including by reducing out-of-pocket and opportunity costs for schooling, are the most likely to help delay marriage and childbearing.

The interventions mentioned above are not meant to be exhaustive. For example, to improve educational attainment for girls, additional interventions are needed. The three types of interventions listed above were selected because their evaluations looked at changes in SRH knowledge, child marriage, and/or early childbearing. In the case of educational attainment, there is a much broader literature on what is needed to achieve gains (see Box 13). Basic conditions need to be in place, and they matter quite a bit, especially in low income countries. First, there is a need to build new schools closer to where children (boys and girls) live. In many countries, access to lower secondary education remains extremely low in part because there just are not enough secondary schools. Building schools closer to populated areas means that girls do not have to walk too far to go to school and parents can be more comfortable with their daughters' safety on their way to and from school. In cases where schools cannot be built nearby, providing modes of transportation for girls to go to school is an option. Second, access to water, latrines and hygienic facilities are important for adolescent girls. Building and upgrading schools with separate water, sanitation and hygiene (WASH) facilities is also an important intervention that should be pursued. Third, an unacceptably high percentage of girls in many countries are at risk of violence and sexual harassment in school. There is a need for specific interventions to deal with these risks too.

Box 13: Improving Educational Attainment and Learning for Girls

Because multiple reasons may contribute to gender gaps in educational attainment and learning, the types of interventions that could be implemented to reduce these gaps are multiple. Should the distance to schools be reduced, whether this is done by building new schools in remote areas or reducing travel time through modes of transportation? Should scholarships be provided to girls? Should more female teachers be hired? Should the priority be to make separate toilet blocks available for boys and girls? Should more focus be placed on understanding and changing cultural practices? Should pedagogical interventions targeting girls be implemented? The right choice between potential interventions depends on a country's or a community's context. But reviews of the evidence can help, and such reviews are becoming available thanks to a substantial increase in rigorous impact evaluations in recent years.

A team at the World Bank is preparing a review of the available evidence that should be available in a few months (Evans and Yan, 2018). Another such review was conducted a few years ago by Unterhalter et al. (2014). That review assessed the evidence on the impact of interventions for girls' education focusing on (i) providing resources (including transfers) and infrastructure, (ii) changing institutions, and (iii) changing norms and including the most marginalized in education decision making. The review summarized the impact of different types of interventions on three outcomes: participation, learning, and empowerment. For each type of intervention and category of outcome, the evidence on the likelihood of impact was classified as strong, promising, limited, or needed (i.e., weak). For participation, the evidence on the impact of conditional cash transfers, information about the potential employment returns to education, and the provision of additional schools in underserved and unsafe areas was found to be strong. This was also the case for the evidence on some interventions related to teacher training, group-learning, and measures to promote girl-friendly schools, as well as learning outside the classroom, for example through tutoring. Several of these interventions (group-learning, programs for learning outside the classroom, and scholarships linked to student performance) were also found to have impacts on learning. The evidence on the impact of interventions on empowerment was generally weaker.

Source: Unterhalter et al. (2014).

For specific challenges, such as gender-based violence, additional specific interventions may also be needed. Some African countries have high levels of intimate partner violence (IPV). International evidence suggests that prevention programs can help in reducing the prevalence of IPV, especially when they address the harmful social norms that are leading to gender-based violence. The most successful interventions tend to be community-based and have multiple components to work with men, women, leaders and service providers. There is also promising evidence to recommend economic empowerment interventions for women that are combined with gender transformative training and engagement of male partners and family members. Lessons can be learned from existing programs such as SASA! (see Box 14).

Box 14: Interventions to Reduce Intimate Partner Violence

SASA! means "Now!" in Kiswahili. The program was developed by Raising Voices and it has been implemented in Uganda by the Center for Domestic Violence Prevention. It appears to be the first community-based violence prevention program in sub-Saharan Africa to be rigorously evaluated. The program employs multiple strategies to build a critical mass of engaged community members, leaders, and institutions, including local activism, media and advocacy, communication materials, and training. The Activist Kit that is central to SASA! community engagement and mobilization involves four phases: Start, Awareness, Support, and Action. The content evolves with each phase, with power as a central theme.

Results from a randomized controlled trial suggest positive effects after three years of programming. In comparison to control communities, SASA! communities reported (i) a reduction in levels of violence against women of 52 percent; (ii) an increase in the share of women and men who believe it is acceptable for women to refuse sex of 28 percent; and (iii) an increase of 50 percent in the share of men and women who believe that physical violence against a partner is unacceptable.

Source: Abramsky et al. (2014).

CONCLUSION

Globally, three in four girls complete their lower secondary education. In Africa, the proportion is lower. In sub-Saharan Africa especially, only four in ten girls complete their lower secondary education. Low educational attainment for girls and child marriage, which itself leads many girls to drop out of school prematurely, have negative consequences not only for girls, but also for their children and household, as well as for their community and society. This study has documented the potential impacts of low educational attainment for girls and child marriage in multiple domains. The results are sobering: the potential economic and social costs of not educating girls and allowing child marriage to persist are large.

Key findings are summarized in Table 31. The Table provides the main estimated potential impacts by domain. Potential impacts are summarized by showing gains from a secondary education in comparison to no education at all, factoring in the virtual elimination of child marriage that would follow if all girls complete their secondary schooling. In most cases, potential impacts are estimated for the completion of secondary school, but in some cases the potential impacts are for both partial and completed secondary school combined. In virtually all cases, estimates of the potential impacts of low educational attainment for girls – or equivalently of gains associated with higher educational attainment as captured by secondary education, are large. As documented in more detailed in the study, most gains are associated with secondary as opposed to primary education. This is also the case for the gains associated with the elimination of child marriage since they are assumed to follow from universal secondary education.

Specifically, low educational attainment reduces expected earnings in adulthood, and it depresses labor force participation, leading to lower standards of living. When girls drop out of school prematurely, they are much more likely to marry as children, and have their first child before the age of 18 when they may not yet be ready to be wife and mothers. This in turn is associated with higher rates of fertility and population growth, which in low income countries are major impediments for reaping the benefits of the demographic dividend. Low educational attainment as well as child marriage are also associated with worse health and nutrition outcomes for women and their children, leading among others to higher under-five mortality and stunting. Girls who drop out of school and marry early also suffer in adulthood from a lack of agency and decision-making ability within the household, and in society more generally. They are less likely to report engaging in altruistic behaviors such as donating to charity, volunteering, or helping others. Finally, when girls and women are better educated, they may be better able to assess the quality of the basic services they rely on and the quality of their country's institutions and leaders.

These various impacts lead to large economic costs. Two such costs were estimated with a specific focus on child marriage, given that this report was prepared for the African Union's second summit on ending child marriage. The loss in human capital wealth associated with child marriage is estimated US$ 63 billion for 13 countries that account for half of the continent's population. If child marriage were eliminated, benefit from lower population growth through higher total wealth per capita are estimated at US$ 26 billion in first year for the same 13 countries, and would be cumulative over time.

Table 31: Selected Potential Benefits from Ensuring a Secondary Education for Girls (including through Ending Child Marriage) and Estimated Economic Costs of Child Marriage

Domain	Estimated Potential impacts
Earnings and standards of living	Expected earnings in adulthood more than doubled Increase in labor force participation or working full time by up to one tenth Gain in perceptions of standards of living of up to one tenth
Child marriage and early childbearing	Virtual elimination of child marriage Reduction in early childbearing by up to three fourths
Fertility and population growth	Reduction in total fertility by about one third Increase in contraceptive use by a third from base Reduction in population growth by 0.6 percentage point
Health, nutrition and well-being	Increase in women's knowledge of HIV/AIDS by one tenth Increase in women's decision-making ability for health by more than a fourth Increase in women's psychological well-being Reduction in under-five mortality rate by up a fifth Reduction in under-five stunting rate by almost half
Agency and decision-making	Women more likely to exercise decision-making in the household Women possibly more likely to better assess quality of basic services Increase in likelihood of birth registration by one third
Social capital and institutions	Women more likely to report altruistic behaviors Women more likely to report ability to rely on friends when in need Women possibly more likely to better assess institutions and leaders
Potential economic costs from child marriage	Loss in human capital wealth from US$ 63 billion for 13 countries Benefit from lower population growth through higher total wealth per capita of US$ 26 billion in first year for 13 countries, cumulative over time

Source: Authors.

This study also provided a brief discussion of interventions and policies that could provide better opportunities for girls, with a focus on ways to delay marriage. Promising interventions have now been implemented for some time in many countries. These interventions have been evaluated rigorously, and useful lessons can be learned from those evaluations, whether for educating girls (Unterhalter et al., 2014; Evans and Yan, 2018) or for delaying marriage and childbearing (Botea et al., 2017). For educating girls, the literature suggests that interventions specific to girls may help increase access and thereby educational attainment. By contrast, to improve learning, successful interventions don't necessarily need to be targeted to girls, although there may be exceptions depending on context. For delaying marriage and childbearing, education interventions tend to be the most successful, and more so than safe space programs that do not provide incentives for girls to remain in school. Beyond interventions to improve education opportunities and delay marriage as well as early childbearing, programs providing economic opportunities for women help in making investments in education more attractive to girls and their families. Some of these interventions are reviewed in a separate World Bank study on the cost of gender inequality in earnings and programs to achieve equality (Wodon and de la Brière, 2018). Improving education and employment opportunities for girls and women could have substantial budget costs, but the benefits from higher educational attainment for girls could also generate budget savings (see Box 15).

Box 15: Budget Costs and Savings from Achieving Universal Secondary Education and Ending Child Marriage

Achieving universal quality secondary education for girls and ending child marriage would have a cost, both for state budgets and for households (out-of-pocket and opportunity costs). The costs for households could be computed from household surveys, and those for states could be computed from budget simulation tools, such as the tool created by Wils (2015). In the case of educational opportunities for girls, apart from increasing access for girls to secondary education, it is also important to increase quality, which could also lead to costs that should not be underestimated.

However, as mentioned in the conceptual framework for this study, budget savings could also be realized with universal secondary education for girls and the elimination of child marriage, for example through lower population growth from smaller fertility rates. In the case of the cost of providing education for example, lower fertility would reduce the size of new cohorts of children, with the reduction becoming larger over time in comparison to business-as-usual projections since the potential effect of lower population growth would be cumulative over time (Wodon, 2018b). Savings in the provision of basic services from lower rates of population growth would also be observed in other areas such as healthcare and basic infrastructure. It is beyond the scope of this study to compare the cost of achieving secondary education for girls and ending child marriage to the savings that would result from lower population growth and other potential effects (such as an improvement in the health status of young children). But it is important to note that some budget savings for governments could be achieved, if not immediately, at least in the medium term with universal secondary education and the elimination of child marriage.

To conclude, the potential negative impacts of low educational attainment for girls and child marriage are both substantial and wide-ranging. Monetary estimates of a few of the potential impacts of have been provided in the case of child marriage using measures of human capital wealth. These estimates should be considered as illustrative only, since they rely on many assumptions, and different estimation approaches would lead to different estimates. What is clear however is that the potential economic costs are large, running in the tens of billions of dollars just with the two potential impacts for which tentative costs were estimated. These estimates would be even larger if instead of considering the case of child marriage, the analysis of costs had focused on low educational attainment for girls.

Finally, an important message from the analysis is that ensuring universal primary education is not enough. The benefits from education are much larger at the secondary and tertiary levels than at the primary level. This is even more the case when it is acknowledged that universal primary education would not necessarily lead to large reductions in the prevalence of child marriage. Investing in proven programs and policies for adolescent girls will be key to ensure a better future for them and enable countries to fulfill their development potential. This makes economic sense. It is also the right thing to do.

APPENDIX 1: TRENDS IN CHILD MARRIAGE

Estimates of trends over time in child marriage are typically obtained using DHS or MICS data for developing countries, but in some countries recent DHS or MICS surveys may not be available. In addition, estimates between surveys may suffer from comparability issues, among others due to sampling errors or differences in survey design. Le Nestour et al. (2018) suggest simple ways to expand the coverage and quality of estimates of child marriage trends. The authors use aggregation techniques to use the full information available in repeated household surveys through cohort analysis instead of relying only on point estimates of child marriages. Projection techniques are used to update estimates when recent or past data are not available. Relying on other sources of data when DHS or MICS surveys are not available, the authors are able to provide estimates for almost 100 percent of the world's population.

The Appendix Table below presents global and regional trends in child marriage from 1990 to 2017. These estimates are not meant to replace official measures prepared by UNICEF as part of monitoring related to the Sustainable Development Goals – they simply provide aggregate trends updated to 2017 by region and income group for analytical purposes in order to compare Africa – and especially sub-Saharan Africa, to other regions. While little progress was achieved towards ending child marriage globally between 1990 and 2000, the prevalence of child marriage decreased from 24.8 percent in 2000 to 19.1 percent in 2017. The decrease observed over the last decade in India according to the latest DHS survey implemented in 2015/16 accounts for a substantial share of the global decrease.

Prior to 2010, South Asia had the highest prevalence of child marriage. Today, sub-Saharan Africa has the highest prevalence at 35.1 percent in 2017. Child marriage is decreasing only slowly in the region. There is a clear association between income levels and the prevalence of child marriage, with much higher child marriage rates in poorer countries. At the same time, there are large differences between countries within income groups, pointing to the role of social norms and policies play in influencing child marriage.

The number of girls marrying as children peaked globally at about 13.0 million around 2005. Due to progress in India and other countries, it declined to 10.9 million in 2017. Because of its population size, South Asia still has the largest number of child marriages (4.1 million in 2017), but sub-Saharan Africa is not far behind with 3.4 million girls marrying as children each year. While the number of girls marrying as children has declined over the last decade in South Asia, it is still increasing in sub-Saharan Africa.

Appendix Table: Trend in the Prevalence of Child Marriage by Region and Income Group (%)

	1990	1995	2000	2005	2010	2017
Regions						
East Asia & Pacific	9.4	8.9	8.6	7.8	6.5	7.5
Europe & Central Asia	9.4	9.3	9.0	7.3	6.4	5.6
Latin America & Caribbean	23.7	26.3	26.7	27.1	26.2	25.8
Middle East & North Africa	26.6	21.7	17.8	15.7	14.6	13.4
North America	7.2	6.2	6.6	6.2	3.7	2.2
South Asia	58.9	54.7	50.8	46.0	38.0	27.0
Sub-Saharan Africa	44.2	41.6	39.5	39.1	36.8	35.1
Total	24.9	24.7	24.8	23.6	20.5	19.1
Income Groups						
Low income	31.5	31.2	42.9	42.0	41.0	37.4
Lower middle income	20.2	20.6	9.8	13.2	29.5	24.2
Upper middle income	18.2	21.7	19.2	12.8	9.9	11.9
High income	4.4	3.4	3.7	3.6	2.6	2.1
Total	24.9	24.7	24.8	23.6	20.5	19.1

Source: Le Nestour et al. (2018).

Note: Income group classification based on World bank thresholds.

APPENDIX 2: DATA AND METHODOLOGY

Data Sources

Three main types of surveys are used for the quantitative analysis. Estimates of the gains from education and losses in earnings due to low educational attainment for women are based on nationally representative household and labor force surveys from the World Bank's International Income Distribution Database (I2D2). The analysis builds on previous work at the World Bank to measure human capital wealth for 141 countries as part of an analysis of the changing wealth of nations. In a nutshell, human capital wealth is defined as the present value of the future incomes of the labor force, and it can be compared to other sources of wealth such as natural or produced capital. The estimates of human capital wealth have been disaggregated by gender. When using surveys from the I2D2 database and when estimating human capital wealth, the regression analysis is conducted for each country separately.

The second key source of data for the estimations is a set of publicly available Demographic and Health Surveys (DHS). Building on previous work on the economic impacts of child marriage, detailed analysis of the correlates of selected development outcomes was implemented with the most recent DHS for 13 African countries: Burkina Faso, Democratic Republic of Congo, Egypt, Ethiopia, Malawi, Mali, Mozambique, Niger, Nigeria, Republic of Congo, Tanzania, Uganda, and Zambia. The choice of these countries was guided by policy considerations and the fact that most have low levels of educational attainment for girls and high levels of child marriage. As with surveys from the I2D2 database, regression analysis is conducted for each country separately when using DHS data.

The third main source of data is the Gallup World Poll which covers more than 150 countries, including close to 50 African countries. The Poll typically surveys 1,000 individuals in each country, using a standard set of core questions that has been translated into the major languages of the respective country. Because the samples at the country level are relatively small, the regression analysis for this study is conducted with the pooled dataset. While survey data or specific questions are not available for all years for all countries, the pooled data set used for the analysis is large. While some regions have better representation than others, most of Africa's population is included because large counties in terms of population are covered. Because of the large sample size of the pooled dataset, it is easier to obtain statistically significant coefficients in the regression analysis with those data. While for this study regression estimates are obtained for Africa, estimates could be obtained for specific countries.

In addition to relying on surveys, the team conducted qualitative work on the constraints faced by girls to continue their education. Qualitative data were obtained for countries in West Africa, Central Africa, and East Africa. While these data are not used systematically for this note, excerpts from respondents in focus groups or in-depth qualitative interviews are provided to illustrate findings that emerge from the quantitative analysis.

Methodology

The study aims to estimate the potential impacts of low educational attainment for girls and child marriage on development outcomes and the economic costs associated with some of these potential impacts. The term potential 'impact' is used for simplicity and for the study to be readable to non-technical audiences, but one must be careful about not necessarily inferring causality. Estimates of potential impacts are obtained through regression analysis to control for other variables that may affect the outcomes of interest. Different types of regression techniques are used depending on the outcomes of interest. In some cases, simulations or statistical analysis are used. What is measured are thus statistical

associations, and not necessarily impacts as could be observed with randomized control trials or quasi-experimental methods. Said differently, the regression analysis provides estimates of likely potential impacts, but there is always a risk of bias (and in some cases upward bias) in the measures of the likely potential impacts being reported due for example to the risk of omitted variables bias.

To reduce the risk of bias in coefficient estimates, different specifications for the regressions have been used, and we typically report results obtained with the largest number of controls. In addition, we report only the direct potential impact of educational attainment and child marriage on outcomes of interest. Because educational attainment and child marriage may affect other variables included in the controls, we tend to underestimate total potential effects. This is done on purpose to be conservative in the claims made about the benefits of educating girls and ending child marriage. For example, in the regressions with the Gallup World Poll, per capita income as well as the employment status of women are included in the controls. Apart from the direct potential effect of educational attainment and child marriage on many outcomes, additional beneficial potential impacts would normally be observed through the indirect potential impacts on per capita income and employment status. These indirect potential effects are not reported. The key exception is for child marriage and early childbearing under the assumption supported by the data that achieving universal secondary education could reduce dramatically the rates of child marriage and could also reduce substantially early childbearing.

Based on measures of likely potential impacts, potential costs associated with selected potential impacts are then computed. Note that we provide such cost estimates only for a few potential impacts. These potential costs rely on assumptions and are thus tentative. The estimated costs represent an order of magnitude of potential costs rather than precise estimations. More details on the data sources and methodologies used for estimations and how they relate to key findings are available from the authors.

Presentation of Results

An explanation may be helpful as to why results are reported slightly differently for work based on DHS and I2D2 data and work based on the Gallup World Poll. Two differences are worth mentioning.

First, the Gallup World Poll does not include data on child marriage, but it provides data on educational attainment in three categories: primary and below, secondary, and tertiary. This means that we can only report the potential impact of a secondary or tertiary education in comparison to having a primary education. We cannot distinguish those who have some primary education or a completed primary education from those who have no education at all. By contrast, with DHS surveys, we can disaggregate education levels more finely, and we also have data on child marriage or early childbearing. This is why potential impacts are reported for five different education levels in comparison to having no education at all, and for either child marriage or early childbearing. The five levels are no education at all or some primary education, a completed primary education, some secondary education, a completed secondary education, and finally higher education. When using data from the I2D2 surveys, we either consider the number of years of education of the individual, or four levels: no education at all, primary education, secondary education, and tertiary education, in each case whether the cycle was completed or not. In addition, I2D2 data also do not include information on child marriage and early childbearing.

A second difference relates to the fact that when using DHS or I2D2 data, as mentioned above, regressions are estimated with each individual country. By contrast, when using the Gallup World Poll, only one regression is estimated per indicator of interest for the full dataset. For results based on the Gallup World Poll, there is thus only one regression coefficient to report. But for results based on DHS and I2D2 data, we have different regression coefficients for each country. For analysis with DHS data where estimations were done in most cases for 13 countries, the option adopted for presenting results is to report the number and share of countries where statistically significant potential impacts are observed, and the average value of those potential impacts when the coefficients in the regression analysis are

statistically significant. For I2D2 data, because of the much larger number of countries involved, we simply report average values across countries (most coefficients in wage regressions are statistically significant).

APPENDIX 3: HUMAN CAPITAL WEALTH ESTIMATES

The estimation of the potential economic costs of low educational attainment for girls and child marriage provided in this study for earnings and population growth rely on previous estimates of human capital wealth (Lange et al., 2018). Human capital wealth is defined as the discounted value of future earnings for a country's labor force. In practice, we estimate how likely it is that various types of individuals will be working, and how much they will earn when working. By "various types" of individuals, we mean individuals categorized by age, sex, and level of education. Essentially, we use household surveys to construct a dataset that captures (1) the probability that individuals are working depending on their age, sex, and years of education; and (2) their likely earnings when working, again, by age, sex and years of schooling. This is done separately for men and women, and results in estimates of human capital wealth by gender. Typically, women earn significantly less than men on average, whether this is due to lower labor force participation, fewer hours of paid work when working, or lower earnings per hour worked.

Estimates of the likelihood of working for individuals are based on observed values in household and labor force surveys. Estimates of expected earnings are based on wage regressions. The regressions are used to compute expected earnings throughout individuals' working life, considering their sex, education level, and assumed experience (computed based on age and the number of years of education completed). Expected earnings are computed for all individuals in the surveys from age 15 to age 65, noting that some individuals may go to school beyond age 15. The analysis also considers the life expectancy of the labor force. In countries with high life expectancy, workers are expected to work until age 65, but in other countries they may not be able to. For simplicity, when estimating the present value of future earnings, the same discount factor for future earnings is applied to all countries.

The household surveys used for the computation of the earnings profiles—as well as the probability of working—are nationally representative. The surveys are in most cases of good quality, but they may still generate estimates that are not consistent with either the system of national accounts or population data for the countries. Therefore, two adjustments are made. First, to ensure consistency of the earnings profiles from the surveys with published data from national accounts, earnings estimates from the surveys are adjusted to reflect the share of labor earnings (including both the employed and the self-employed) in GDP as available in the Penn World Tables. Second and separately, the estimations also rely on two variables obtained from data compiled by the United Nations Population Division: (1) population data by age and sex (so that the data in the household surveys can be better calibrated); and (2) mortality rates by age and gender (so that the expected years of work can be adjusted, accounting for the fact that some workers will die before age 65). Again, we adjust data from the surveys to population estimates from the United Nations to ensure that estimates are adequate. For individuals in the 15-to-24 age group, the probability of remaining in school is also considered.

Given the estimation of human capital wealth based on wage regressions, the measure accounts not only for the number of years of schooling completed by workers, but also for the earnings gains associated with schooling (which implicitly factors in the quality of learning in school), whether individuals work (labor force participation), and for how many years they work (accounting for health conditions through life expectancy). Estimations of human capital wealth are done separately for men and women. This means that once we have estimates of human capital wealth by gender, we can estimate losses in human capital wealth due to low educational attainment for girls specifically.

When considering gains in wealth per capita from lower population growth, total wealth estimates are used instead of estimates of human capital wealth. This is because lower population growth would result in higher wealth per capita for other categories of wealth too (produced and natural capital).

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