The economic impacts of child marriage

ECONOMIC IMPACTS OF CHILD MARRIAGE:

GLOBAL SYNTHESIS REPORT

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By Quentin Wodon, Chata Male, Ada Nayihouba, Adenike Onagoruwa, Aboudrahyme Savadogo, Ali Yedan, Jeff Edmeades, Aslihan Kes, Neetu John, Lydia Murithi, Mara Steinhaus and Suzanne Petroni

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Abstract: The international community is increasingly aware of the negative impacts of child marriage on a wide range of development outcomes. Ending child marriage is now part of the Sustainable Development Goals. Yet investments to end the practice remain limited across the globe and more could be done. In order to inspire greater commitments towards ending child marriage, this study demonstrates the negative impacts of the practice and their associated economic costs. The study looks at five domains of impacts: (i) fertility and population growth; (ii) health, nutrition, and violence; (iii) educational attainment and learning; (iv) labor force participation and earnings; and (v) participation, decision-making, and investments. Economic costs associated with the impacts are estimated for several of the impacts. When taken together across countries, the costs of child marriage are very high. They suggest that investing to end child marriage is not only the right thing to do, but also makes sense economically.

Keywords: child marriage, economic cost, early childbirths, education, health

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EXECUTIVE SUMMARY

MOTIVATION FOR THE STUDY

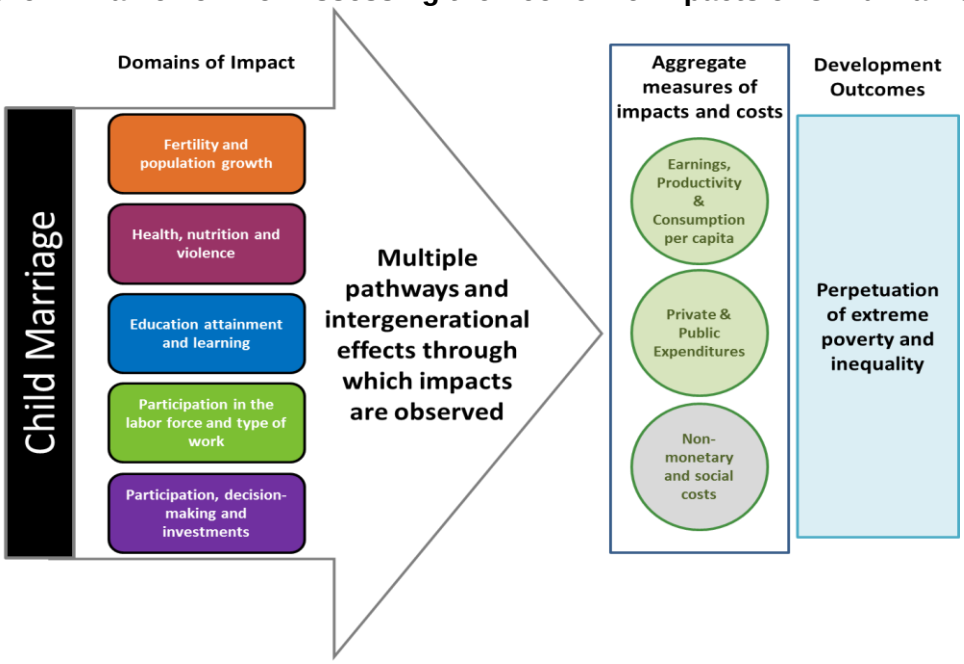
1. **Child marriage is defined as a marriage or union taking place before the age of 18. In many countries, a large share of girls still marry before the age of 18.** According to data from Demographic and Health Surveys (DHS) for about 60 countries, in the past 30 years the prevalence of child marriage has decreased, but not very rapidly (Nguyen and Wodon, 2015; see also UNFPA, 2012, and UNICEF, 2014). Estimates produced for this study for 25 countries accounting for an overwhelming majority of child marriages worldwide also suggests a decline, but the prevalence of child marriage remains high. According to the latest DHS, the share of women between the ages 18-22 who married before the age of 18 in the 25 countries was 36.7 percent. Child marriage is deeply entrenched in many communities, with girls often marrying as soon as they reach puberty. In addition, almost one in five women in the 18-22 age group have their first child before the age of 18 in these 25 countries, a proportion that has also declined over time but remains high. In some countries, many early childbirths (defined as women having a child before the age of 18 or children being born of mothers younger than 18) takes place outside of marriage. In most countries, however, early childbirths are in most cases a direct consequence of child marriage.

2. **The international community and country governments are increasingly aware of the negative impacts of child marriage, yet investments to end the practice remain limited.** Ending child marriage is now part of the Sustainable Development Goals. But few countries have adopted comprehensive strategies to end the practice, and investments in terms of programs and policies to do so remain limited. In Africa, under an initiative of the African Union, and similarly across other regions, many countries are adopting national strategies to prevention and eliminate child marriage. In addition, some countries are investing funding – either their own or in partnership with donors - to delay the age at marriage. One example of such an initiative is the World Bank's Sahel Women Empowerment and Demographic Dividend regional project. Another example is a multi-country initiative by UNFPA and UNICEF to tackle child marriage, with a dozen countries participating, including in Africa and Asia. These efforts should help to drive change, but still, far more could be done given the large negative impacts of child marriage.

3. **In order to inspire greater commitments towards ending child marriage, this study demonstrates the negative impacts of the practice and its economic costs globally.** The study looks at five domains of impacts of child marriage: (i) fertility and population growth; (ii) health, nutrition, and violence; (iii) educational attainment; (iv) labor force participation, earnings, and productivity; and (v) decision-making and other areas. The conceptual framework guiding the study follows in Figure 1 below. For some of these impacts, the economic costs associated with the impacts are estimated. Overall, the impacts and economic costs associated with child marriage are high. They suggest that investing to end child marriage is not only the right thing to do, but also makes sense from an economic point of view. The conceptual framework for the study is displayed in Figure 1. Annex 1 provides a more detailed visualization of the analysis undertaken in order to document the

pathways – both direct and indirect - through which child marriage as well as early childbirths may affect child brides, their children, their community, and society at large.

Figure 1: Framework for Assessing the Economic Impacts of Child Marriage



Source: Wodon et al. (2015).

Box 1: What Do We Mean by "Impacts" and Associated Costs?

The aim of this study is to estimate the impacts of child marriage on a wide range of development outcomes and the economic costs associated with some of these impacts.

The term "impact" is used for simplicity, but one must be careful about not necessarily inferring causality. Estimates of impacts in this study are typically obtained through regression analysis aiming to isolate the potential impact of child marriage or early childbirths on various outcomes, controlling for other factors affecting those outcomes. In the literature, this approach is known as "association studies". What is measured is a statistical association between child marriage or early childbirths and outcomes. This is not necessarily an impact as could be observed with a randomized control trial. Since child marriage cannot be randomized, the study must rely on regression analysis to estimate impacts, but there is always a risk of bias in the measures of likely impacts.

Based on measures of likely impacts, costs associated with some of these impacts are computed. These costs are based on a number of assumptions that could be debated including discount rates. Therefore, cost estimates only represent an order of magnitude of potential costs, as opposed to precise estimations.

Source: Wodon (2017a); see also Annex 1.

IMPACTS OF CHILD MARRIAGE

4. **Child marriage has a large impact on fertility and population growth.** Total fertility is defined as the number of live births that women are (statistically) expected to have over their lifetime under current conditions. Controlling for other factors affecting total fertility, on average across 15 countries, a girl marrying at 13 will have 26 percent more children over her lifetime than if she had married at 18 or later. If a girl marries at 17, she would still have on average 17 percent more children versus marrying at 18 or later. Considering the rate of child marriage in the country and the characteristics of the girls who marry early, ending child marriage would reduce the national rate of total fertility by 11 percent, a rather large effect. A large part of the impact of child marriage on total fertility comes from the fact that women marrying earlier tend to have children earlier. Across 18 countries, child marriage is likely to be the cause of early childbirths for 75 percent of the girls who have their first child before the age of 18. Marrying early also often has a small negative impact on modern contraceptive use later in life (in some countries the impact is positive, perhaps because when women marry early desired fertility is also achieved earlier). Overall, ending child marriage without any associated changes in programs or policies would however not, in itself, have a large effect on contraceptive use nationally. Finally, ending child marriage and early childbirths could reduce population growth, with impacts that depend on each country but reach up to 0.39 percentage points in Niger, which is again a substantial effect, as was observed with total fertility. The magnitude of these various impacts is summarized in table 1.

Table 1: Impacts on Fertility and Population Growth

Indicators	Estimated Impacts
(1) Number of live births over lifetime	Depending on the age at marriage, child marriage increases total fertility for women by 17% to 26%
(2) National rate of total fertility	Ending child marriage would reduce the estimate of the national total fertility rate on average by 11%
(3) Early childbirth (first child before 18)	Child marriage is likely the cause of at least 75 percent of girls having children before the age of 18
(4) National rate of early childbirths	Ending child marriage could reduce the share of girls having a child before 18 by three fourths
(5) Use of modern contraception	Marrying early may reduce the likelihood of using modern contraceptives later, but not in all cases
(6) National rate of contraceptive use	Ending child marriage would not have a large effect nationally on modern contraceptive use
(7) Population growth	Ending child marriage and early childbirths could reduce population growth substantially

Sources: Onagoruwa and Wodon (2017a) for (1) & (2); Wodon, Male, and Onagoruwa (2017) for (3) & (4); Onagoruwa and Wodon (2017b) for (5) & (6); Wodon and Yedan (2017a) for (7).

5. **Through early childbirths, child marriage has large impacts on the health and nutrition of the children of young mothers, but probably less impact on maternal mortality ratios and intimate partner violence.** The literature suggests that adolescent girls have in many countries a higher level of maternal morbidity and mortality than women ages 20-24. At the same time, while avoiding pregnancy at a very young age is essential, it does not follow that ending child marriage and thereby reducing early childbirths would necessarily result in a decrease in maternal mortality ratios at the national level. Other health impacts of child marriage and early childbirths are more clear-cut. First, child marriage is the likely cause of more than

four in five children being born of mothers younger than 18. In turn, when a child is born of a young mother, this increases at the margin (that is, controlling for other factors) the risk for the child of dying by age 3.5 percentage points on average across 15 countries. The impact on under-five stunting is estimated at 6.3 percentage points on average across the 15 countries. However, ending child marriage and early childbirths would not have a large effect on national rates of under-five mortality nor stunting simply because only a relatively small share of children is born of mothers younger than 18 at the time of their birth. Finally, the literature suggests linkages between intimate partner violence (IPV) and marrying at a very early age. This study finds some evidence of impact, especially when marrying at age 15 or earlier. Noting that the study does not address all aspects of health that may be affected by child marriage, such as maternal morbidity, mental health or sexually-transmitted infections (including HIV and AIDS), for example, the magnitude of the impacts on some aspects of health, nutrition, and violence are summarized in table 2.

Table 2: Impacts on Health, Nutrition, and Intimate Partner Violence

Indicators	Estimated Impacts
(1) Maternal mortality	The direct impact that ending child marriage has on maternal mortality ratios is not fully clear
(2) Being born of a young mother	Child marriage is likely the cause of at least 84 percent of births of children from mothers younger than 18
(3) Risk for children of dying by age 5	Being born of a mother younger than 18 increases the risk of under-five mortality by 3.5 percentage points
(4) National rate of under-five mortality	On average, three in 100 deaths among children under five are directly attributable to early childbirths
(5) Risk for children of being stunted	Being born of a mother younger than 18 increases the risk of under-five stunting by 6.3 percentage points
(6) National rate of under-five stunting	On average, one in 100 stunted children under five are stunted directly because of early childbirths
(7) Intimate partner violence	Marrying very early in some countries has a statistically significant direct impact on intimate partner violence. There may also be indirect impacts through lower educational attainment.

Sources: Wodon (2017b) for (1); Wodon, Male, and Onagoruwa (2017) for (2); Onagoruwa and Wodon (2017c) for (3) & (4); Onagoruwa and Wodon (2017d) for (5) & (6); Savadogo and Wodon (2017a) for (7).

6. **Child marriage has a large negative effect on educational attainment for girls and on the educational prospects of children of child brides.** Two approaches can be used to assess the impact of child marriage on educational attainment for girls. The first approach consists of asking parents in household surveys why their daughters dropped out of school. According to these surveys, marriage is one of the main reasons for dropping out of school for adolescent girls. The second approach consists of estimating the impact of child marriage on educational attainment econometrically. Estimates for sub-Saharan Africa, Latin America and the Caribbean, and South Asia suggest a statistically significant impact of child marriage on secondary school enrollment and completion. Together, the two approaches point to a large impact of child marriage on education for girls. This is confirmed by the fact that the option for (or given to) girls in many countries is often to either be married or be in school, and once a girl is married, it is very rare that she is also in school. Finally, child marriage may reduce the education prospects of children (boys

and girls) indirectly by curtailing a mother's education. The impacts of child marriage on education are summarized in table 3. Importantly, estimates also suggest that increasing girls' education is probably one of the best ways to avoid child marriage. Each year of secondary education may reduce the likelihood of marrying as a child or having a first child before the age of 18 by six percentage points on average across 15 countries.

Table 3: Impacts on Educational Attainment

Indicators	Estimated Impacts
(1) Girls dropping out of school	According to parents in national surveys, marriage is a key reason for dropping out of school for girls
(2) Educational attainment for girls	Marrying as a child reduces the likelihood of enrolling in and completing secondary school substantially
(3) Marriage vs. schooling trade-off	Once an adolescent girl is married, it is very rare that she remains in school
(4) Intergenerational effects	Child marriage affects the education of the children of girls marrying early
(5) Education's impact on marriage	Each year of secondary education may reduce the risk of child marriage by six percentage points on average

Sources: Wodon (2017f) for (1), (2) & (3); Wodon and Yedan (2017b) for (4); Wodon and Yedan (2017c) for (5).

Box 2: Child Marriage and Education: A Complex Relationship

For many adolescent girls, the options are to continue formal schooling or to marry, but not both. This comes out clearly not only in household surveys, but also in qualitative work. More generally, support for girls' education remains limited in many areas. A lack of education facilities nearby can force girls to drop out, either because schools are simply too far or because walking long distances to schools represents a risk for adolescent girls to be harassed on the way to school. But low quality in the education provided in schools is also a factor, and there is a perception in some communities that if adolescent girls go to public schools, they are at risk of being harassed. The cost of schooling is also an obstacle for many girls to pursue their education.

Child marriage reduces education prospects for girls, and conversely better education opportunities may reduce the likelihood of marrying early. Estimates (Wodon and Yedan, 2017c) as well as the literature (Kalamar et al. 2016) suggest that keeping girls in schools is one of the best ways to delay marriage. This is why Brown (2012) suggested to look at tipping-point policies in education for ending child marriage, including programs to reduce the cost for girls to transition to secondary school.

7. **While child marriage does not directly affect labor force participation much, it reduces women's education and thereby expected earnings and household welfare.** Child marriage may not necessarily be associated directly with a significant increase or decrease in labor force participation, although through indirect effects, especially through its impact on educational attainment for girls, ending child marriage could lead in some countries to a small reduction in female labor force participation. According to results from wage regressions and simulations of earnings, women who married as children have expected earnings (actual or imputed) in adulthood that are lower than women who married after the age of 18 (the average loss in earnings is nine percent). As a result, taking into account the

earnings of all women and men, ending child marriage could increase earnings and productivity nationally across the population by about one percent on average across 15 countries. In most cases, estimates suggest that child marriage does not itself have a direct impact on household consumption per capita or food adequacy after controlling for household size and the education level of the household head and spouse. However, through its impact on fertility and thereby household size, as well as through its impact on education, child marriage reduces household welfare. The magnitude of the impacts of child marriage on labor force participation, women's earnings, and household welfare and food security are summarized in table 4.

Table 4: Impacts on Labor Force Participation, Earnings, and Welfare

Indicators	Estimated Impacts
(1) Women's labor force participation	In general, child marriage does not have a large statistically significant impact on labor force participation
(2) Impact on women's earnings	Through its impact on education, child marriage reduces earnings in adulthood for women marrying early by 9%
(3) National impact on earnings	Ending child marriage could increase the population's earnings and productivity nationally by 1.0%
(4) Household consumption	Child marriage typically does not affect household welfare directly, but it has an impact through lower education and higher fertility
(5) Household food adequacy	Child marriage typically does not affect food adequacy directly, but it has an impact through education/fertility

Sources: Savadogo and Wodon (2017b) for (1); Savadogo and Wodon (2017c) for (2) & (3); international evidence for (4) & (5).

8. **The impacts of child marriage on various dimensions of women's agency tend to be smaller, and in some cases no direct impacts are observed.** For this study, we consider measures of household decision-making, land ownership, knowledge of HIV and AIDS, and birth registrations as elements of women's agency. While these are not ideal proxies for agency, they are amongst the more widely collected variables that could, together, provide some estimate of women's agency. Controlling for other variables, child marriage has a negative direct effect in some but not all countries on an index of women's household decision-making ability and it may also have indirect effects through its impact on education (given that a higher level of education is associated with higher decision-making ability within the household). The effects are however not necessarily very large at the national level. Child marriage is associated with a higher likelihood of land ownership for women, with the positive impact ranging from one to three percentage points depending on the measure used for most countries. Child marriage is typically not associated directly with a reduction in women's knowledge of HIV/AIDS in adulthood in most countries, nor is it associated with a higher risk of not registering a child's birth in comparison to marrying at age 18 or later. The magnitude of the impacts in these areas is summarized in table 5.

Table 5: Impacts on Women's Decision-making and Other Impacts

Indicators	Estimated Impacts
(1) Women's decision making ability	In some countries child marriage affects decision-making, and it also matters indirectly through education.
(2) Women's land ownership	Child marriage is associated with a higher likelihood of land ownership for women of 1-3 percentage points
(3) Women's knowledge of HIV/AIDS	Child marriage is often not associated with a reduction in adulthood in women's knowledge of HIV/AIDS
(4) Birth registration for children	Child marriage is not associated with a reduction in the rate of birth registrations for young children

Sources: Onagoruwa and Wodon (2017e) for (1); Savadogo and Wodon (2017d) for (2); Onagoruwa and Wodon (2017f) for (3); Onagoruwa and Wodon (2017g) for (4).

9. **Overall, the impacts of child marriage are large for fertility, population growth, and education as well as earnings, but somewhat smaller in other dimensions.** The discussion so far suggests that the impacts of child marriage on fertility and population growth, as well as on educational attainment for girls, tend to be substantial. Impacts on women's earnings and productivity are also fairly large, principally due to the fact that child marriage curtails girls' education, and educational attainment is a key factor affecting earnings. Some of the impacts on health, nutrition, and violence are large at the margin for the girls marrying early or their children. This is especially the case for children born of young mothers, but ending child marriage would not necessarily make a large difference for national level indicators such as under-five mortality and stunting. Other direct impacts of child marriage, including on women's decision-making, intimate partner violence, knowledge of HIV/AIDS and birth registrations are not always statistically significant, but even in such cases child marriage could still have an impact indirectly through the fact that it curtails girls' educational attainment.

ECONOMIC COSTS

10. **The impacts of child marriage and early childbirths on multiple development outcomes have implications for economic well-being.** Child marriage profoundly affects the girls who marry early as well as their children in multiple ways. It leads girls and women to have children earlier and more children over their lifetime than if they had married later. It affects girls' educational attainment negatively, thereby curtailing future opportunities for them to compete for well-paying jobs. Child marriage may also lead to higher health risks for young mothers and especially for their children. Finally, child marriage may in some cases directly or indirectly reduce agency for women and increase other risks such as that of intimate partner violence. These impacts have negative consequences not only for the girls marrying early, but also for their children and for communities and societies as a whole. While it is not feasible to provide a monetary valuation of all costs associated with the negative impacts of child marriage, estimates can be provided for some of the largest impacts/costs. This study provides estimates of selected annual costs associated with the impacts of child marriage (on the difference between annual and lifetime costs, see Box 3).

Box 3: Annual versus Lifetime Costs of Child Marriage

The costs of child marriage can be computed on an annual or lifetime basis. This study focuses mostly on annual costs. For example, we estimate losses in annual earnings for women who married early in comparison to what they might have earned if they had married later. Similarly, we provide estimates of annual as opposed to lifetime benefits from reduced population growth when ending child marriage. The one exception to the reliance on annual losses/benefits is for child mortality and stunting, where lifetime losses are estimated for the number of children avoiding death or stunting each yera.

Instead of relying mostly on annual costs, lifetime costs could be estimated, considering for example the net present value of future earning losses over their lifetime for women marrying early. While such estimates are not provided in this study, they could be the focus of future work relying on new data to be released by the World Bank on the Wealth of Nations, including for the first time human capital wealth. In general, the resulting lifetime costs of child marriage would be substantially larger than annual costs.

Source: Wodon (2017a).

11. **The global economic costs associated with the impacts of child marriage on fertility and population growth, children's health, and education are particularly large.** Given that the impacts of child marriage on fertility and population growth, children's health, and education and earnings tend to be the largest, these are the impacts for which a monetary value is estimated in this study. Tentative global estimates of the annual costs (see Box 3) associated with the impacts of child marriage – or equivalently, estimates of the benefits from ending child marriage - are provided in table 6. These estimates should not be considered as precise given that they depend on (1) econometric estimates of impacts that have themselves standard errors and (2) a range of assumptions for costing that could be debated. Still, the estimates provide an order of magnitude of the potential costs of child marriage. Estimates are provided in terms of annual costs or benefits. For the purposes of this study, we posit the total elimination of child marriage (and in some cases early childbirths) in 2014. This choice of starting date is done in order to be closer to the latest available data sources in the estimations. Estimates of costs/benefits are provided for 2015 and for 2030, as the reference year for achieving the Sustainable Development Goals.

    - Welfare benefits from lower fertility and population growth: The welfare benefits from lower population growth when ending child marriage are estimated globally (for 106 countries) at $22 billion in 2015 and $566 billion in 2030, as shown in table 6. The rapid increase in the benefits stems from the fact that the impact of child marriage and early childbirths on population growth is cumulative. That is, each year the gains become larger because the cumulative reduction in population growth keeps growing from one year to the next. In addition, as standards of living (GDP per capita) improve, the valuations also become larger.

    - Benefits from the reduction in under-five mortality and malnutrition: Ending child marriage would not reduce national rates of under-five mortality and stunting dramatically, but many children would nevertheless survive at least until their fifth

birthday and more would avoid stunting. The benefits from saved lives and children not being stunted are not primarily monetary. But with all necessary caveats, a tentative monetary value can be associated with avoiding the death of young children as well as stunting. The valuation is based on the discounted value of future wages and welfare levels for the children who survive past age five or avoid stunting. Globally, for 106 countries, using a discount rate of five percent, the estimated benefits rise from $42 billion (PPP) in 2015/16 to $82 billion in 2030 in the case of under-five mortality. In the case of stunting estimates the estimated benefits rise from $9 billion (PPP) in 2015/16 to $16 billion in 2030.

Table 6: Order of Magnitude of the Benefits from Ending Child Marriage – Selected Global Estimates

	Annual Benefit in 2015	Annual Benefit in 2030
(1) Welfare benefit from reduced population growth	$22 billion	$566 billion
(2) Benefit from reduced under-five mortality	$42 billion	$82 billion
(3) Benefit from reduced under-five stunting	$9 billion	$16 billion

Sources: Wodon (2017b) for (1); Wodon (2017d) for (2) and (3).

12. **In addition to global cost estimates related to changes in population growth and child health that would result from ending child marriage, the study provides cost estimates for some other impacts for a subset of countries.** These estimates are calculated for budget savings to government education budgets that would result from slower lower population growth and for increased earnings for women if child marriage were ended. As for global estimates, these figures should be considered tentative given that they are based on statistical estimations which have standard errors as well as costing assumptions.

- Budget savings from lower fertility and population growth: Budget savings can be reaped from lower population growth. For the provision of public education, for example, benefits start to be reaped six years after child marriage and early childbirths are ended, since this is the time needed for fewer children to enter primary school. Savings are estimated as the reduction in the anticipated cost of reaching universal secondary education by 2030 in 18 countries. The benefits increase over time and could reach up to $17 billion in current US dollars by 2030 if just these 18 countries were to achieve universal secondary education by then (Wodon, 2017e). While this is an upper bound estimate of potential savings for these countries (as they may not reach universal secondary education by 2030), the estimates globally would be significantly larger since only 18 countries are included. When considering the elimination only of child marriage (as opposed to child marriage and early childbirths), the estimates would be a bit smaller.

- Education and earnings: The costs related to earnings losses for women married as children are high. These costs are related for the most part to the fact that child marriage curtails the educational attainment of some of the girls who marry early, and higher educational attainment leads to higher expected lifetime earnings. The gains in earnings and productivity that would have been observed today if women had not married early for a core set of 15 countries are estimated at $26 billion (Savadogo and Wodon, 017c). These gains would increase over

time due to population growth and higher standards of living and wages in most countries.

Box 4: Why Are Some Impacts and Costs Large and Others Smaller?

In economic terms, the fact that child marriage or early childbirths may only lead to a small reduction in national measures for some outcomes does not imply that the economic costs associated with those impacts are small. For example, across countries, child marriage tends to reduce the earnings of populations as a whole by about one percent on average. One percent may not appear to be a very large proportion, but the associated economic cost is very large, and for the women and households affected, the losses in earnings have even larger impacts.

This said, when considering costs at the national level, the largest impacts of child marriage in terms of their economic costs tend to be related to fertility and population growth, education and earnings, and the health of the children born of young mothers. These impacts are closely related. Particularly when use of modern contraception is low, child marriage leads to early childbirths, which increases health risks for mothers and the children born of young mothers. The timing of child marriages and early childbirths conflicts with the ability of girls to continue their education, which depresses earnings in adulthood. All those effects are at work at the time of marriage or soon after. By contrast, impacts in other domains – from violence to labor force participation and decision-making, are observed throughout a woman's life and depend on many other factors than whether girls marry early. For example, intimate partner violence and a lack of decision-making ability are the result, at least in part, of widespread gender inequality. Child marriage contributes to perpetuating gender inequality, but delaying marriage by a few years may not be sufficient on its own to fundamentally change gender roles and social norms. This is probably why in these domains, while ending child marriage may help, impacts tend to be smaller.

Source: Wodon (2017a).

CONCLUSION AND IMPLICATIONS

13. **While economic costs should not be the sole rationale for investment decisions related to child marriage, they are an important consideration.** Ending child marriage is the right thing to do from a moral and ethical standpoint. The eradication of child marriage has also been identified as a priority, as exemplified by its inclusion in the Sustainable Development Goals and increasing attention to the issue from a human rights perspective (UN General Assembly 2016). The primary motivation for ending the practice should be the fact that it may lead to substantial risks and suffering for the girls who marry early and their children. Child marriage curtails the opportunities provided to young girls and their children. The evidence of the negative impacts of the practice on a wide range of outcomes is clear. But in addition, the practice has large economic costs. The hope is that the demonstration of these costs will help generate higher investments aiming to end child marriage and early childbirths, and promote instead girls' education.

14. **Importantly, the negative impacts of child marriage tend to be larger for the poor and the likelihood of marrying early is also higher among the poor.**

Although this is not discussed in details in this study, it can be shown that the poor are likely to suffer more from some of the negative impacts of child marriage than the better off due to various constraints they face (such as barriers in access to health and education services). In addition, girls living in poverty are more likely to face child marriage. This implies that ending child marriage would benefit the poor the most. As a result, implementing programs and policies to end the practice would reduce poverty and also be pro-poor.

15. **While this study does not focus on interventions that could be implemented to end child marriage, the literature provides insights in terms of what may work.** A discussion of some potential interventions is provided in Annex 4. In one of the first reviews child marriage prevention programs, Malhotra et al. (2013) identify five types of strategies that can be used to prevent or delay early marriage: (1) Empowering girls with information, skills, and support networks; (2) Educating and mobilizing parents and community members; (3) Enhancing the accessibility and quality of formal schooling for girls; (4) Offering economic support and incentives for girls and their families; and (5) Fostering an enabling legal and policy framework. A more recent review by Kalamar et al. (2016) suggests that interventions to promote education, including cash transfers, school vouchers, free school uniforms, reductions in school fees, teacher training, and life skills curricula, are among the most likely to help. In some cases, the evidence is mixed, but in many cases such interventions are found to reduce child marriage, or at least increase the age at first marriage. This is also underscored under the tipping point approach suggested by Brown (2012).

16. **In practice, interventions must be adapted to the context of each country or even region within a country.** Interventions need to be adapted to country context, but they also need to target specific groups in order to be effective. As an example, Perlman et al. (2017a) propose as a first cut for a typology of potential programs according to four main target groups whose needs tend to differ: (1) younger girls in school and not married; (2) young girls out of school but not yet married; (3) older girls still in school and not married; and (4) Married girls out of school. Many of the interventions proposed by Perlman et al. (2017a) as well as the broader literature are already being implemented or at least tested under projects supported by donors such as the World Bank, UNFPA, and UNICEF. It will be important to learn from these experiences and ultimately scale up the interventions that prove most successful.

Box 5: Economic Impacts of Child Marriage for Boys

This study focuses on the impact of child marriage on child brides, their children, and societies at large. Information related to child marriage among boys is limited, but available data indicate that girls are far more likely to marry before the age of 18 than boys in every region of the world. This does not mean that child marriage does not also affect boys. Boys may have to drop out of school when they marry early, and they may take low-paying jobs in order to support their newly formed family, further perpetuating poverty. While the economic impacts and costs of child marriage for boys are likely to be lower than for girls, they may still be substantial. Estimating their orders of magnitude could be the topic of further work.

CHAPTER I
INTRODUCTION

Ending child marriage is a target under the Sustainable Development Goals, yet investments to end the practice remain limited. In many countries, governments have begun to adopt strategies to end the practice and investments are being made to that effect, including by promoting girls' education. Still, more could be done. In order to inspire greater commitments towards ending child marriage, this study documents the impacts of the practice more comprehensively than existing studies. The study also estimates a number of monetary costs associated with these impacts globally. Separate country reports are being prepared at the country level. This first chapter provides the rationale and framework for this study.

Ethiopia: *"I use to sit and think about building a very big house with brick walls… My grandmother used to take me to Bahir Dar… I used to see the kinds of houses they have there and used to think 'I will have this and I will a build a house like this.' That was my dream, but what made my dream to not come true is this harmful tradition of child marriage. This old outdated culture that took away my dream."* (ICRW, 2017)

Burkina Faso: "*Girls should read and write. But what I consider as a priority is marriage. At 16 years of age, the place of a woman is in the home with her husband and children. If she starts to work she will abandon her family"* (Gemignani and Wodon, 2017).

17. **Child marriage is defined as a marriage or union taking place before the age of 18[1]. The practice has a wide range of negative impacts for girls, their children, and communities.** The practice primarily affects girls and is widely considered a a violation of human rights[2]. It profoundly affects the girls who marry early as well as their children in multiple ways. Child marriage leads women to have children earlier and more children over their lifetime than if they had married later. It affects girls' educational attainment and literacy negatively, thereby curtailing future opportunities for them to compete for well-paying jobs. Child marriage also leads to higher health risks for young mothers and their children. Finally, it may reduce voice and agency for women and it may also increase other risks such as the risks of intimate partner violence and of sexually transmitted infections, including HIV. These impacts have negative consequences not only for girls, but also for their children and for communities and societies as a whole.

[1] The threshold of 18 years to define child marriage is used in a number of conventions, treaties, and international agreements, including the Convention on the Rights of the Child, the Convention on the Elimination of All forms of Discrimination against Women, and the Universal Declaration of Human Rights, as well as resolutions of the UN Human Rights Council and most recently, the UN General Assembly.

[2] As enshrined in UN General Assembly Resolution 71/175 of December, 2016, *"child, early and forced marriage is a harmful practice that violates, abuses or impairs human rights."*

18. **Worldwide, the prevalence of child marriage has been declining slowly over time, but due to population growth, the total number of child brides continues to increase in many countries.** Trends in child marriage worldwide show a decline, although the decline is slow. As a result, today child marriage affects more than 41,000 girls each day, especially in sub-Saharan Africa and South Asia. In a set of 25 countries that account for the bulk of child marriage in the world, estimates from this study suggest that more than one in three girls still marry before the age of 18, and almost one in five have their first child before the age of 18 (this is referred to as an early childbirth). The prevalence at the global level is lower, as countries not included in the table tend to have much lower rates of child marriage on average than the countries included in the table. Still, the trends in table 1.1 suggest that without decisive interventions to end the practice, child marriage is likely to remain high for the foreseeable future.

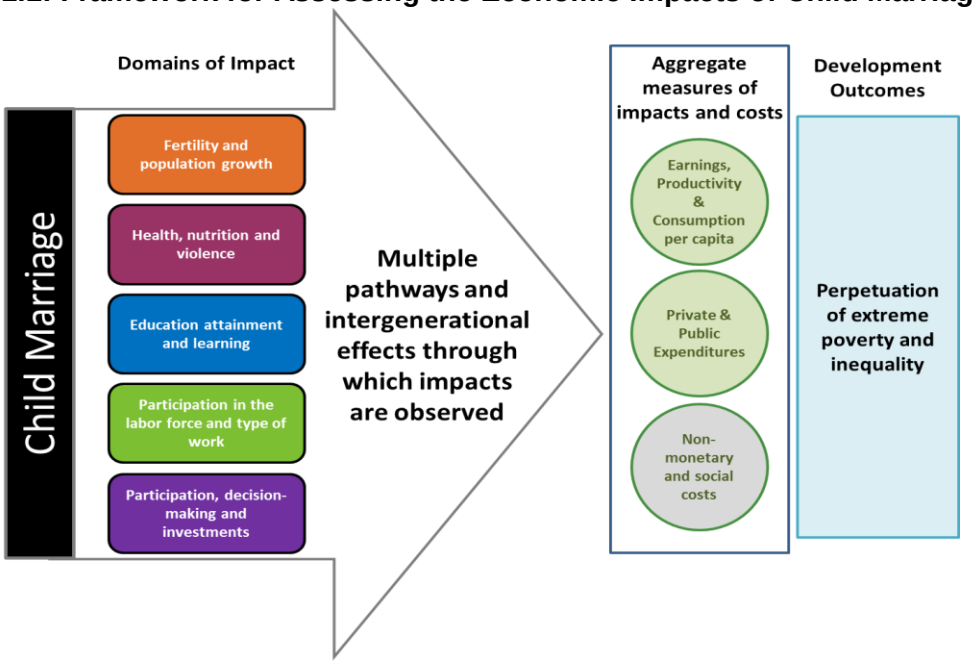
19. **There is broad support to end child marriage on moral and ethical grounds, but while adopting legal provisions for the minimum age at marriage is a first step, this is not sufficient to create lasting change.** Increasing awareness of the negative impacts of child marriage has led the practice to be prohibited by law in many countries. Ending child marriage is a target adopted under the Sustainable Development Goals (Goal 5.3). But laws and policies are not enough. Targeted interventions are needed to end the practice. These must not only to deal with economic constraints contributing to child marriage, but also to tackle social norms and cultural traditions that contribute to the persistence of the practice in many parts of the world. Such interventions require significant and long-term financial investments and political will. While a number of countries have adopted projects and in some cases national strategies to end child marriage, insufficient domestic and donor resources are being allocated to programs and policies that could reduce child marriage over time. In other words, while there is a consensus that child marriage has a wide range of negative impacts, investments to end the practice are limited.

20. **The lack of adequate investments in many countries to end child marriage is likely due in part to the fact that the economic case for ending the practice has not yet been made forcefully.** The fact that child marriage may be primarily perceived as a social or human rights issue, and not necessarily an economic issue, may be one of the reasons why ending the practice has not received sufficiently targeted investment. The objective of this global study is to document in detail some of the main impacts of child marriage and early childbirths on development outcomes as well as the costs associated with those impacts. The study was prepared together with a dozen country studies under the *Economic Impacts of Child Marriage (EICM)* project (see www.costsofchildmarriage.org). By documenting the economic impacts and costs of child marriage, this study supports the case for investments by governments and other stakeholders to reduce child marriage.

21. **A simple conceptual framework guides the analysis.** The framework developed for this study is shown in Figure 1.1 (for information on the actual methodology used for the study, see Annex 1). Five domains of impacts of child marriage are considered: (i) fertility and population growth; (ii) educational attainment and learning; (iii) labor force participation; (iv) participation, decision-making, and investments; and (v) health, nutrition, and violence. In turn, impacts in these

domains may lead to three types of costs or benefits related to (i) earnings, productivity, and household consumption per capita; (ii) public and private expenditures (mostly for education and health); and (iii) non-monetary social and health costs. These impacts and associated costs have broader consequences at the national level in terms of the perpetuation of extreme poverty and inequality. Annex 1 provides a more detailed visualization of the analysis undertaken in order to document the pathways – both direct and indirect - through which child marriage as well as early childbirths may affect child brides, their children, their community, and society at large.

Figure 1.1: Framework for Assessing the Economic Impacts of Child Marriage



Source: Wodon et al. (2015).

22. **Apart from measuring the impacts of child marriage, this study also considers the impacts of early childbirths.** In this study, early childbirth is defined in two different ways. At the level of women, we define early childbirth as having a first child before the age of 18. At the level of children, we define early childbirth as being born of a mother younger than 18. While the framework in Figure 1.1 does not explicitly mention early childbirths, several of the negative impacts of child marriage on girls marrying early and their children are related to early childbirths, which is often but not always a consequence of child marriage. This is especially the case for the impacts of child marriage through early childbirths on fertility and health outcomes, and it may be the case for education outcomes. Therefore, the impacts of both child marriage and early childbirths are discussed in the study. As appropriate, a distinction is made for the impacts of each (child marriage or early childbirths). This also means that for several impacts, an assessment is made of the share of the impacts – when occurring through early childbirths – that can be attributed to child marriage. More details on the methodology used for the analysis are provided in Annex 1.

Box 1.1: What Do We Mean by "Impacts" and Associated Costs?

The aim of this study is to estimate the impacts of child marriage on a wide range of development outcomes and the economic costs associated with some of these impacts. The term "impact" is used for simplicity, but one must be careful about not necessarily inferring causality. Estimates of impacts in this study are typically obtained through regression analysis aiming to isolate the potential impact of child marriage or early childbirths on various outcomes controlling for other factors affecting those outcomes. In the literature, this approach is known as "association studies". What is measured is a statistical association between child marriage or early childbirths and outcomes. This is not necessarily an impact as could be observed with a randomized control trial. Since child marriage cannot be randomized, the study must rely on regression analysis to estimate impacts, but there is always a risk of bias in the measures of likely impacts.

Based on measures of likely impacts, costs associated with some of these impacts are computed. These costs are based on a number of assumptions that could be debated, including in some cases discount rates. Therefore, cost estimates only represent an order of magnitude of potential costs, as opposed to precise estimations.

Source: Wodon (2017a); See also Annex 1.

23. **The study is based fro the most part on existing data, with additional data collection in three countries to document selected impacts.** Demographic and Health Surveys have information on child marriage or early childbirths (Box 1.2) which can be used to measure the impacts of child marriage on a wide range of outcomes as well as (with cost data) associated monetary costs. For the impact of child marriage on earnings, simulations are carried with the World Bank's I2D2 database. In addition, a number of other surveys and data sources are used on a country by country basis, and for Niger and Ethiopia, a complementary survey was implemented specifically for this study. Qualitative analysis is also based on both existing data (including through reference to published qualitative studies) and new data collected for this study in Niger, Nepal, and Ethiopia. More information on data sources and their use for estimations is provided in Annex 2.

24. **The structure of this report broadly follows the conceptual framework, with a chapter providing a rapid contextual analysis of child marriage followed by four chapters on its domains of impacts and a conclusion.** Chapter 2 discusses the extent of child marriage and early childbirths, as well as some of the factors leading to child marriage. The next four chapters consider the five domains of impacts of child marriage listed in Figure 1.1 (education and labor force participation are combined in one chapter because of the close relationship between education and earnings). In each of these chapters, analysis is provided to measure the impact of child marriage and/or early childbirths. For some of the impacts, an assessment of the associated economic costs is provided. In some cases, contemporaneous costs are provided. In other cases, costs from 2015 to 2030 are estimated. The year 2030 is chosen because it corresponds to the target date for the completion of the Sustainable Development Goals. A conclusion summarizes the findings. A series of annexes provide more information on methodology and data, as well as on programmatic approaches to end child marriage.

CHAPTER 2
CHILD MARRIAGE AND EARLY CHILDBIRTHS

This chapter provides estimates of the extent of child marriage and early childbirths in 25 countries. Trends over time in child marriage and early childbirths are estimated, as is the share of early childbirths likely due to child marriage. A brief discussion of some of the factors that may lead to child marriage and early childbirths is also provided. Finally, an assessment is made for the prevalence of child marriage and early childbirths by quintiles of household wealth and, for illustrative purposes, by geographic location for a few countries.

Uganda: *"They get married because they are looking for a way of helping their families, which are poor. [Others] are impregnated by older men [due to sex for money] and they are forced to get married to them because after a girl has produced before getting married, it is hard to get a man for marriage."* (Schlecht et al., 2013).

Niger: *"Age is not a criteria for girls' marriage. There is no tradition that says a girl must be married at a particular age. We judge a girl ready when her mother notices that she is menstruating and her breasts have developed"* (Perlman et al., 2017b).

EXTENT OF CHILD MARRIAGE AND EARLY CHILDBIRTHS

25. **Child marriage has decreased in the developing world fairly slowly but due to population growth, the total number of child brides continues to increase.** According to DHS data for about 60 countries, in the past 30 years the prevalence of child marriage decreased by only 11 percentage points in those countries (Nguyen and Wodon, 2015; see also UNFPA, 2012, and UNICEF, 2014). For this study, new estimates of the prevalence of child marriage were prepared for 25 countries that account for a majority of child marriages globally. As shown in table 2.1, the share of women ages 18-22[3] who married before the age of 18 in those 25 countries was 36.7 percent in the latest period available (the dates of the surveys differ between countries, but estimates are based on population data for 2014). This share is lower than the share observed among older age groups, and the rate of decline that has accelerated in recent years. Yet rates of child marriage remain high. In addition, almost one in five women ages 18-22 have their first child before the age of 18 in those countries. There has also been a decrease in this share in comparison to older

[3] The prevalence of child marriage, sometimes referred to as prevalence, has been estimated in previous reports among others by UNICEF and UNFPA for women ages 20 to 24. In this study, however, the analysis is carried out for women ages 18 to 22, which tracks more closely the conditions prevailing in countries at the time of the survey. Measures of child marriage could also be estimated solely among girls 18 years of age, but using a larger bracket in terms of years provides more robustness in terms of statistical results. In addition to estimating the prevalence of the practice, it is useful to estimate other measures following the approach outlined in Nguyen and Wodon (2012, 2015). These other measures are available in background work.

women. In some countries, a substantial share of early childbirths at the level of women or children (i.e., children born of mothers younger than 18) may take place outside of marriage. In most countries however, as will be discussed below, early childbirths are a direct consequence of child marriage and the two phenomena are closely related. Table 2.1 also provides the share of girls marrying or having their first child before age 15, with overall similar trends over time.

Table 2.1: Trends in Child Marriage and Early Childbirths for Mothers, 25 High Prevalence Countries – Estimates Weighted by Population Size (%)

	Child marriage (women)		Early childbirth (women)	
	Before 18 years	Before 15 years	Before 18 years	Before 15 years
All women ages 18-49	47.01	16.95	26.33	4.90
Age group in 2012				
18-22 years	36.66	10.62	18.92	2.80
23-30 years	45.75	16.29	26.91	4.99
31-40 years	51.63	19.63	29.47	5.92
41-49 years	54.50	21.61	29.31	5.68

Source: Male and Wodon (2017a). Data source: DHS.
Note: The list of countries is provided in table 2.2.

Box 2.1: Defining Child Marriage and Early Childbirths

Child marriage is defined as a marriage or union taking place before a boy or a girl reaches the age of 18. The practice affects mostly girls, so the focus is on girls in this study. The term early childbirth is used in the study in two different ways. At the level of women/mothers, early childbirth is defined as having a first child before the age of 18. At the level of children, early childbirth is defined as a child being born of a mother younger than 18 at the time of the child's birth. Because DHS surveys have been vetted for many years and provide estimates that can be compared to those obtained in other countries, these are the surveys used for measuring child marriage and early childbirths in this chapter.

Source: On the relationship between child marriage and early childbirths, see Wodon, Male, and Onagoruwa (2017).

26. **It is useful for perspective to compare results obtained for various countries.** Depending on the topic, a total of 15 to 25 countries are considered for international comparisons in this study. As mentioned earlier, for comparisons of trends in the prevalence of child marriage, detailed analysis has been conducted for 25 countries. The first four columns in table 2.2 provide trends over time in the prevalence of child marriage among women ages 18 to 22 years in the larger set of 25 countries. The prevalence of child marriage measured among women ages 18 to 22 ranges from 16.5 percent in Egypt to 76.8 percent in Niger, according to the latest publicly available DHS in each country. In most countries, the prevalence of the practice has been reduced over time. This is visualized in Figure 2.1 by comparing the prevalence of the practice among women ages 23-30 with those ages 18-22. Most countries lie below the diagonal (plain line), suggesting a decline over time. On average, the regression through the scatter plot (dotted line) suggests a reduction of 11 percent in prevalence between the two age groups (coefficient of 0.89, not weighted by population shares). But there are exceptions, including for example for several Sahelian countries that have high prevalence rates.

Table 2.2: Child Marriage and Early Childbirth (for Mothers) by Age Group (%)

	Share of women with first marriage before age 18 by age group				Share of women with first child before age 18 by age group			
	18-22	23-30	31-40	41-49	18-22	23-30	31-40	41-49
Bangladesh	59.4	71.9	76.4	82.3	33.7	48.3	49.9	46.3
Burkina Faso	49.8	52	53.5	51	25.2	30.1	29.1	27.7
Chad	68.7	73.5	73.8	69.7	44.8	49	48.9	40.3
Cote d'Ivoire	32	32.9	36.5	42.7	29.7	31.2	33.6	39.9
Dem. Rep. of Congo	35.9	40.3	42	47.9	25.6	26.3	28.6	32.6
Dominican Republic	34.6	40.7	40	35.2	20.4	27.1	25.1	20.9
Egypt	16.5	18.6	23.6	30.3	6.6	7.8	10.9	13.3
Ethiopia	36.4	55	63.8	71	18.7	32.1	39.5	42.5
Ghana	17.2	24.1	28.7	34.2	15.5	18.6	21.5	25.4
Guinea	51.1	56.5	60.1	60.1	41	41.6	43.6	37.7
India	40	51.5	58.6	58.2	17.8	28.5	31.6	28.4
Indonesia	16.2	20.3	27.3	39.4	6.4	9.6	13.8	23.2
Malawi	45.9	51	51.3	55.3	31.7	35.5	35	38.6
Mali	59.9	56.3	46.9	42.8	44.9	42.2	31	31.9
Mauritania	35.2	45	59.6	60.1	19.8	26.5	32.5	33.2
Mozambique	51.5	46.5	39.3	42	39	39.6	31.7	33.8
Nepal	38.5	48.7	56.7	59.4	17.4	23.2	23.7	19.5
Niger	76.8	76.1	76.6	80.1	47.1	47.4	42.7	37.2
Nigeria	42.1	47	47.8	51	28	32.1	31.1	34.4
Pakistan	18.73	27.04	36.83	43.15	6.8	11.7	15.5	18.6
Peru	17.3	21.7	21.3	22.7	14.4	15.4	15.8	16.6
Rep. of Congo	34.0	33.2	33.2	39.6	31.8	28.0	31.7	34.7
Senegal	31.4	33.1	35.2	39.6	17.2	20.4	19.7	22.1
Uganda	36.5	46.3	53.3	52.8	28.6	39.2	42.6	40.4
Zambia	28.5	39.5	44.4	51.5	29.5	33.1	33.8	37.6

Source: Male and Wodon (2017a). Data source: DHS.

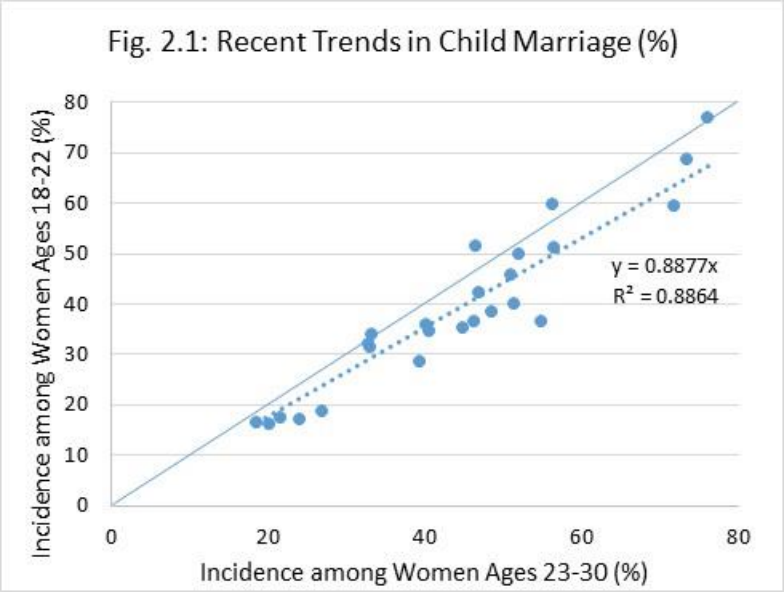
Box 2.2: Measuring Child Marriage and Early Childbirths

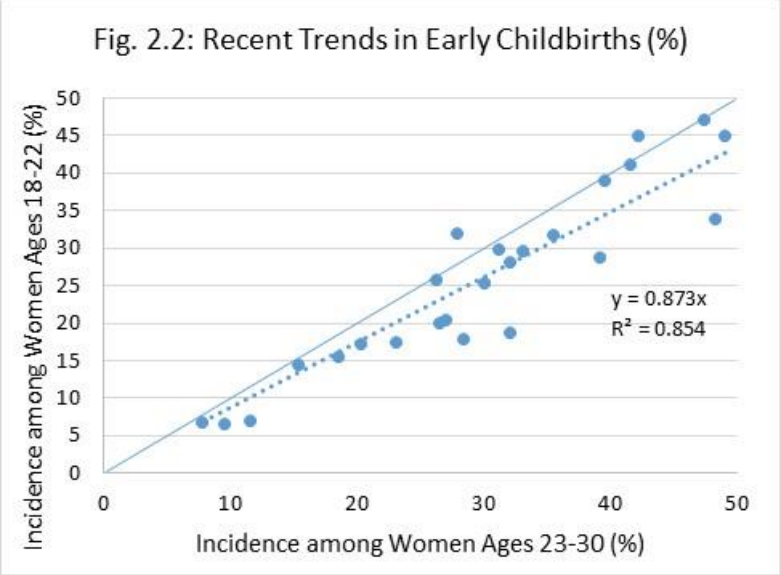
For simplicity, only the share of girls marrying before the age of 18, and the share of girls having their first child before the age of 18 are reported as measures of child marriage and early childbirths in this study. However, the impacts of child marriage and early childbirths on development outcomes tend to be more severe when girls marry very early. Higher order measures of child marriage and early childbirths inspired from the poverty literature can be defined to properly take into account how early girls marry or have a child. These measures are available in the background papers for this study.

Source: On higher order measures of child marriage, see Nguyen and Wodon (2012); Male and Wodon (2017a).

27. **For early childbirths as well, there has been a decline in prevalence in many, but not all countries.** Table 2.2 also provides trends in early childbirth at the level of women in the 25 countries. In the age group 18-22, the prevalence of early childbirths at the level of women ranges from just under seven percent in Egypt to 47.1 percent in Niger. As was the case with child marriage, and as shown in Figure 2.2, the prevalence of early childbirths has been reduced in recent years in many countries. The regression through the scatter plot (dotted line) suggests a reduction (not weighted by the population shares of the various countries) of about 13 percent

in prevalence between women ages 18-22 and those ages 23-30. But in some countries, no reduction has been achieved.





Source: Male and Wodon (2017a). Data source: DHS.

SHARE OF EARLY CHILDBIRTHS LIKELY DUE TO CHILD MARRIAGE

28. **Since several negative impacts of child marriage occur through early childbirths, it is important to assess the share of early childbirths that are likely due to child marriage.** While factors leading to early childbirths differ between countries, child marriage is clearly a major factor at play. Table 2.2 shows a strong relationship between the prevalence of child marriage and early childbirths across countries, which varies between countries. If most early childbirths are due to

child marriage, we would expect the measures of early childbirths for women to be lower than those for child marriage since a girl marrying at, say, age 17, is not likely to have her first child before 18. This is typically the case, as expected. But there are a few exceptions[4].

29. **Estimating the share of early childbirths at the level of mothers likely due to child marriage is not straightforward, but simple statistical approaches can be used as an approximation.** The relationships between child marriage and early childbirths are complex. For some girls, having one or more children before the age of 18 may be the consequence of child marriage. For others, marriage may result from an early childbirth or pregnancy. For yet others, early childbirths may not be related to child marriage at all. Still, using simple assumptions, it is feasible to get a rough measure of the share of early childbirths likely due to child marriage (see Box 2.3 for the methodological approach used to derive estimates). It is important however to note that our methodology does not establish causality – only plausibility.

Box 2.3: Measuring the Share of Early Childbirths Due to Child Marriage

A simple statistical approach is used the estimate the share of early childbirths likely due to child marriage. Consider first early childbirths as it is defined at the level of mothers (having a first child before age 18). An upper bound for the share of early childbirths for mothers likely due to child marriage can be defined as one minus the share of mothers who had their first child before the age of 18 but did not marry before 18. A lower bound can be defined by subtracting from the upper bound the share of women who did marry before the age of 18, but had their first child less than nine months after their first marriage, which could suggest that marriage was not the cause of the early childbirth.

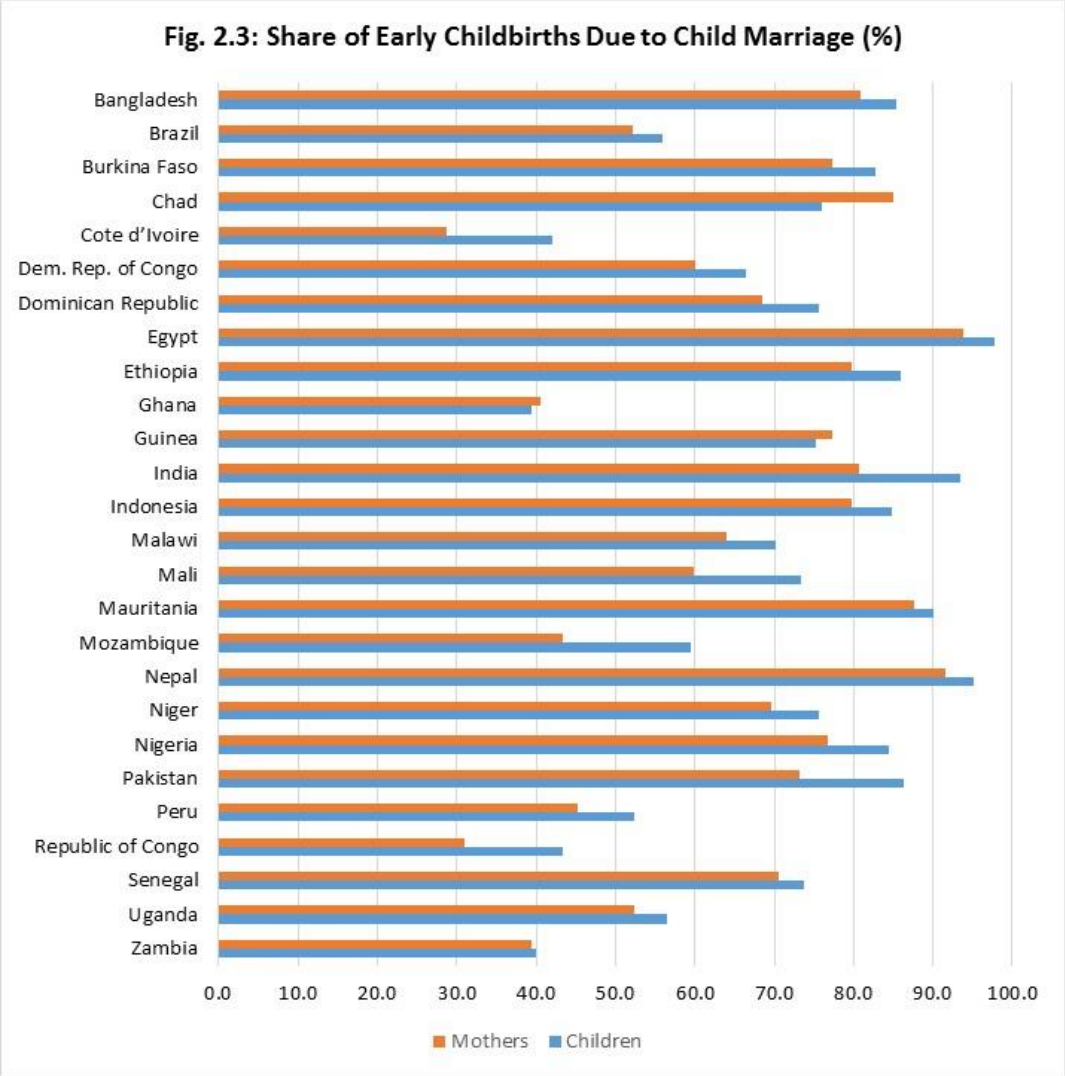
An intermediate estimate could use a threshold of six months instead of nine months for the comparison of the timing of the first birth and first marriage. Indeed, if a girl/woman does not know for sure that she is pregnant, the pregnancy may not affect the decision to marry. In addition, in some countries, even in traditional contexts, cohabitation and sexual activity is permitted before a formal marriage as long as the marriage has been agreed to. The same approach and definitions can be used when looking at the share of early childbirths as defined at the level of children as opposed to mothers.

Essentially, we consider early childbirths as likely to be due to child marriage when they occur within marriage (and more specifically after six months of marriage under the intermediate estimate). While this approach has the benefit of being simple, it remains tentative and additional work would be useful to triangulate the results with a more detailed framework, for example based on Bongaarts' model.

Source: Wodon, Male and Onagoruwa (2017).

[4] In some countries such as Cote d'Ivoire, the prevalence of early childbirth and child marriage are close to each other, suggesting that many early childbirths may take place outside of marriage. In Zambia, the prevalence of early childbirth is higher than that of child marriage. By contrast, in a few countries, early childbirths are rare even if child marriage is not. This is the case in Egypt.

30. **For the 25 countries considered in this chapter, estimates suggest that at the level of mothers, three in four early childbirths may be due to child marriage. At the level of children, 84.4 percent of early childbirths may be due to child marriage.** Across all 25 countries, the share of women having their first child before 18 due to child marriage is 75.2 percent according to the intermediate estimate defined in Box 2.2. In addition, 84.4 percent of children born of mothers younger than 18 are attributed to child marriage. These intermediate estimates are provided in Figure 2.3. These estimates may be affected by how the variables are measured in the DHS as compared to existing practices in the country. But they do suggest that a large majority of early childbirths are likely due to child marriage. Ending child marriage should therefore have a major positive impact towards reducing early childbirths, whether at the level of mothers or that of children.



Source: Wodon, Male, and Onagoruwa (2017). Data source: DHS.

31. **It is however important to note that there are differences between and within countries in the relationship between child marriage and early childbirths.** Especially in Latin America, which is not an area of focus in this study, as well as in 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 less of a direct connection between marriage and sexual activity as well as early childbearing[5]. This trend also suggests the need for policy and programmatic interventions to help meet the needs of adolescents for sexual and reproductive health information and services (which would be important no matter the age at marriage). Indeed, providing adolescents with access to comprehensive sexuality education and adolescent-friendly reproductive health information and services are critical ways to ensure that adolescents do not face unintended pregnancies within or outside of marriage.

FACTORS LEADING TO CHILD MARRIAGE AND EARLY CHILDBIRTHS

32. **Multiple factors contribute to the perpetuation of child marriage and early childbirths.** Factors leading to child marriage and early childbirths include socio-economic factors such as poverty, a lack of educational and employment opportunities for girls, and cultural factors as well as social norms. In some societies, it is often an "either/or" option between getting married or remaining in school. Recent qualitative evidence also indicates that child marriage may also be related to elopement and "love marriages," which often stem from adolescents' desires for sexual relationships in contexts where sex outside of marriage is not culturally permitted (e.g., Human Rights Watch 2016, Murithi, 2016). As noted in multiple reviews (e.g., UNICEF 2005; National Research Council 2005; Santhya et al. 2006; Jain et al. 2007; Malhotra et al. 2011; Vogelstein 2013; UNFPA 2012; UNICEF 2014; Klugman et al. 2014; Parsons et al., 2015; Wodon, 2015a, 2017a), the importance of social and cultural norms that relate to gender roles and gender inequality cannot be understated. When overlaid with a culture that assigns specific gender roles to men and women, poverty and a lack of education and formal employment opportunities often leave few options for girls but to marry early, contributing further to a lack of empowerment for women in adulthood and the perpetuation of child marriage and patterns of gender discrimination.

33. **Causality related to child marriage is complex. This can be illustrated with the relationship between child marriage and poverty.** The drivers of child marriage and early childbirths are complex, and causality often runs both ways, with child marriage affecting various outcomes, but some of those outcomes also potentially affecting child marriage. This can be illustrated in the case of poverty. On the one hand, girls from poorer socio-economic backgrounds are more likely to marry early, but on the other hand, marrying early may lead to a higher likelihood of being poor later in life. The pathways through which poverty may increase the likelihood of marrying early are themselves multiple. When poverty makes it hard for a household to send all children to school, prevailing gender norms may mean that boys receive

[5] In terms of the validity of the estimations, it should also be noted that at the margin ending child marriage could lead to more births among young mothers outside of marriage. The extent to which this could be observed would need to be estimated using more advanced models as opposed to simple statistics. But the simple statistics provided in table 2.3 do suggest that even if such behavioral responses were to be observed in some cases, it is still likely that ending child marriage should lead in most countries to a major reduction in early childbirths. It is important to note, however, that ending child marriage would not be sufficient for avoiding all early pregnancies and childbirths.

preferential treatment for household investments in schooling, at least at the secondary level. Moreover, girls may be kept home from school to help take care of the housework that needs to be completed. Parents in traditional societies may place a lower value on girls than boys simply because the benefits of educating girls are likely to accrue to in-laws, while the benefits of educating boys are more likely to benefit the family of origin. In many cultures, girls are likely to have to marry early because parents prefer not to take the risk of their daughter becoming sexually active outside of marriage. In addition, a lack of formal employment opportunities for young women may mean that secondary education is devalued, such that parents find little benefit to investing in girls' education. Further, in countries where many poor families face food insecurity, having a girl marry early gives that family one less mouth to feed.

34. **Financial transactions around marriage may also contribute to the practice of child marriage, especially in contexts of poverty and vulnerability.** In communities where the groom or his family pays a bride price at the time of marriage, which is often the case in parts of Africa, parents may benefit from marrying their daughters early if waiting increases bride prices. By contrast, in communities where the bride brings resources at the time of marriage (dowry, which is more prevalent in South Asia), the required dowry to be paid by parents may be lower if the bride is younger. Marrying a daughter at a younger age also reduces the investments that a family has to make in her education, without necessarily curtailing future returns to those investments if those returns benefit mostly the groom's family. This may lead parents to reap immediate benefits from an early marriage even if this is not in the long term interest of the girl marrying early.

35. **While poverty and vulnerability may contribute to child marriage, child marriage may also contribute to poverty.** Early marriage leads girls to have children earlier and more children over their lifetime, which may reduce consumption per capita or per equivalent adult in the household in adulthood, thereby increasing the likelihood of being poor. Girls marrying early often must leave school and a lower education level is likely to curtail the girls' earnings potential as adults. These are but two of the channels through which child marriage may lead to higher poverty. Given these relationships between poverty and child marriage, not all girls are equally likely to marry early, or have their first child early. Girls from poorer socio-economic backgrounds as well as girls from rural areas or lagging regions tend to be much more likely to marry early and/or have their first child before reaching 18 than girls from urban or more privileged backgrounds. This is true even if differences in the prevalence of child marriage and early childbirth between areas as well as by socio-economic status are not uniform across countries. The same can typically be said of early childbirths.

36. **Qualitative work helps to understand why child marriage and early childbirths remain so entrenched, with many parents wishing to marry their daughters when they reach puberty.** For example, in the case of Niger, the country with the highest prevalence of child marriage in the world, Perlman et al. (2017b) rely on ethnographic methods with researchers embedded in communities in the Maradi region for several months to better understand the factors leading to child marriage. They suggest that parents see marriage in part as a way to keep their daughters safe. Menarche and the development of secondary sexual characteristics are seen

by girls and parents as key factors in determining readiness for marriage. If she is not enrolled in school—due to disinterest, failing the primary school completion exam, or lack of income to pay school fees—most parents would prefer seeing their daughter married than idle. This is especially true if she is receiving suitors or is perceived by parents to be flirting with boys. As a father expressed it: *"The boys come the moment a girl begins to develop breasts. Even if you tell her not to go out at night, you won't stop her. When she begins to have time for boys and is not interested in school is a clear indication that she wants to be married. The only safe thing to do is to marry her out before she does so herself."* (Perlman et al., 2017b). Other qualitative research in Nepal, Ethiopia and India, for example, also indicate that parents may marry off their daughter because they fear her being sexually active outside of marriage; perceive her the daughter's value to be greater doing housework than studying for a job that does not exist; or to avoid paying the higher dowry that often comes with marrying off their daughter when she is older (Nanda, 2016; ICRW, 2017). In yet other settings, such as Zambia, Uganda and Kenya, for example, a lack of comprehensive sexuality education and access to youth-friendly sexual and reproductive health services contributes to early pregnancies that very often lead to early marriage (Petroni et al., forthcoming).

Box 2.4: Minimum Legal Age for Marriage

The Convention on the Rights of the Child emphasizes the need for full and informed consent for marriage, and notes that children do not have the capability to provide such full and informed consent. This is one of the reasons why the age of 18 is recommended as the minimum age for marriage. However, while many countries have adopted legislation on the minimum age at marriage, often adopting 18 years as the age threshold, enforcement of the legislation often remains week.

Source: Calimoutou and Wodon (2017); see also Calimoutou et al. (2016).

37. **While legal reform on the minimum age at marriage is one of the strategies that can be used to prevent child marriage, support for the legal minimum age at marriage is low in some communities.** In small scale combined qualitative and quantitative work carried in three rural communities in Burkina Faso by Gemignani and Wodon (2017), respondents were asked about their views regarding the country's Family Code. Although not enforced (especially in rural areas), the Family Code includes laws governing marriage, divorce, children, dowry, succession, and inheritance. Many aspects of the Code are seen as controversial. Almost all respondents disagree about prohibitions against bride price which they view as a religious requirement. One of the provisions of the Code is the requirement of consent for marriage. In addition, the minimum age at marriage is set at 17 years for women and 20 years for men. Again respondents often disagree with these laws in two of the three communities in Tenkodogo District and Djibo District, but not in the third. Further, in the majority of countries, customary or traditional law is permitted to supersedes national laws regarding marriage, so religious authorities, for example, are empowered to permit child marriages (Patton, et al., 2016).

38. **There is often heterogeneity within countries on attitudes towards girls' education and marriage.** A study by Wodon et al. (2016) on the relationship between child marriage and education in Uganda relies in part on focus groups and

key informants in 14 districts. In some communities, there is virtually equal support for the education of boys and girls. Support for girls' education in those communities stems from the belief that "*all children are equal so all deserve an equal right to education as vital to all children in the community for the sake of self-independence in the future life*". Education is seen as influencing and shaping character, which motivates parents to give equal attention to all children irrespective of their sex: In some communities, educating girls was also seen as a way to fortify them against the risks and uncertainties of today's volatile and fragile marriage institution. Educated girls were considered more likely to be able to have an independent life if confronted with marriage problems. In another community, the education of girls was considered important for future generations, as community members explained that if you take girls to school, they will become better mothers for their own children. In other communities, however, support for girls' education remains weaker than is the case for boys. In those communities, preference for investing in the education of boys is rooted in cultural frames considering sons as natural heirs. Parents often prefer educating boys because girls must inevitably get married, and the wealth they accumulate benefits in-laws. By comparison, boys remain, even after marriage, within the environment of their parents and help them through life. There is also a perception that girls are diverted from education by men at an early stage, so one would rather educate boys who will stay longer in school: *"We are faced with long distances to primary schools. Girls on their way to school meet men who entice our daughters with money for sex. Later some get pregnant and drop out of school."* Another factor noted was the consequences of HIV-AIDS orphaning children and leaving them under the care of grandparents who are overwhelmed by the responsibility. As a result, some grandparents may exhort girls to *"kula ogende ofumbirwe"*, which means "*grow up and get married quickly".* Overall, girls tend to be more vulnerable than boys in those communities. In Karamoja, the poorest area of the country, daughters may be seen as a source of wealth for parents. In the past, when there were plenty of cattle, bride wealth could reach 100 cows. Although this number has now been reduced considerably, girls are still a source of wealth, and their socialization at home is towards getting married as soon as possible. Puberty also makes it difficult for girls to continue to go to school, as does the division of labor in the home according to which girls tend to do most of the household chores.

39. **Access to quality primary and secondary education is seen by many parents and community members as the most effective way to delay marriage.** Quotes from the qualitative work conducted for this study in Niger illustrate this perception: *"If a girl is getting a quality education her mind will be occupied with school and she won't have time to spend with boys"* (Perlman et al., 2017b). As a woman put it: "*A girl does not reach the age of 20 without marrying, unless she is in school. But if one does not marry a girl before she is 20 years old while she is not in school, there is a problem. If she is not in school, she will marry at 14 years old*" (ICRW, 2017). In some communities, parents know that education may lead to highly valued employment as a teacher or government employee, but in many other communities, such opportunities do not exist. Parents wishing to educate their daughters face an array of economic, social and institutional barriers, especially school costs (including both out-of-pocket and opportunity costs) and the poor quality of the education being provided. Without alternatives, early marriage is attractive to many girls and parents (Perlman et al. 2017b).

40. **Lack of employment opportunities for girls and structural weaknesses in education provision also contribute indirectly to early marriage.** In some communities, girls have few career choices outside of marriage and child rearing. As a result, being a successful wife and mother may be the only life path to which they may be able to aspire. In other communities or countries, girls often have ambitions beyond being a good mother and wife, but a lack of meaningful social and economic alternatives makes it difficult for the girls and their families to envision viable alternatives to early marriage and childbearing. Structural weaknesses in the provision of education play an important role here. The fact that schools are of poor quality, sometimes far away, or costly for families in terms of both fees and lost hours of unpaid work for girls when they go to school may lead to de-prioritizing girls' education and may encourage parents to marry off their daughter, particularly if she is deemed to be of marriageable age and the suitor is acceptable. In Nepal, one woman described the condition of the school she attended before dropping out to get married as follows: *"But there were not any facilities in the school of the village. There was no toilet. There was no desk and benches to sit and study. The students had to sit on the jute rags on the floor and study. The teachers were not good. They used to come as to pass the time and spend the day. They used to teach and go without even bothering students understood or not. They didn't care if the student studies or not, they would make them pass anyways. They would make the students pass without teaching them well.* (ICRW, 2017)

41. **In many societies, polygamy tends to be associated with child marriage statistically speaking.** Data from DHS surveys suggest that the share of women who marry early tends to be higher in polygamous as compared to monogamous households. There is also anecdotal qualitative evidence that polygamy is related to child marriage, at least when husbands take on an additional and younger wife. While additional research would be needed in order to establish the relationships after controlling for a range of other factors affecting child marriage, simple statistics suggest that there may indeed be a link. This is the case in several countries in table 2.3, whether one considers women ages 18-22 or women ages 18-49.

Table 2.3: Child Marriage Rates among Monogamous and Polygamous Unions (%)

	Women ages 18-22		**Women ages 18-49**	
	Monogamous union	Polygamous union	Monogamous union	Polygamous union
Burkina Faso	67.98	72.86	54.40	60.12
DRC	64.74	66.96	48.23	53.12
Ethiopia	68.17	63.53	64.83	67.14
Malawi	54.82	62.65	48.40	54.97
Mali	77.01	79.01	55.68	58.27
Mozambique	67.94	72.5	49.91	50.57
Nepal	62.1	63.85	57.23	62.46
Niger	85.93	89.67	78.35	83.35
Nigeria	70.21	84.7	49.23	70.06
ROC	59.53	69.4	40.58	45.41
Uganda	57.41	63.67	52.49	56.29
Zambia	57.51	71.74	48.3	57.92

Source: Onagoruwa and Wodon (2017h). Data source: DHS.

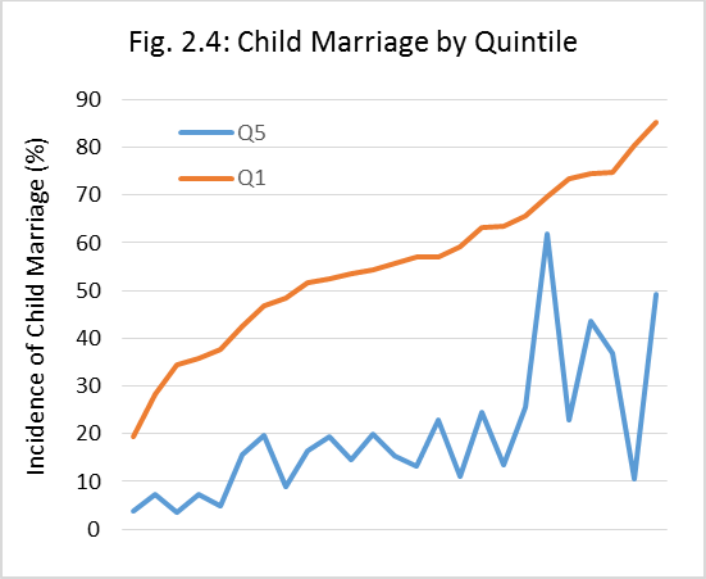
PROFILE OF CHILD MARRIAGE BY LEVEL OF WEALTH

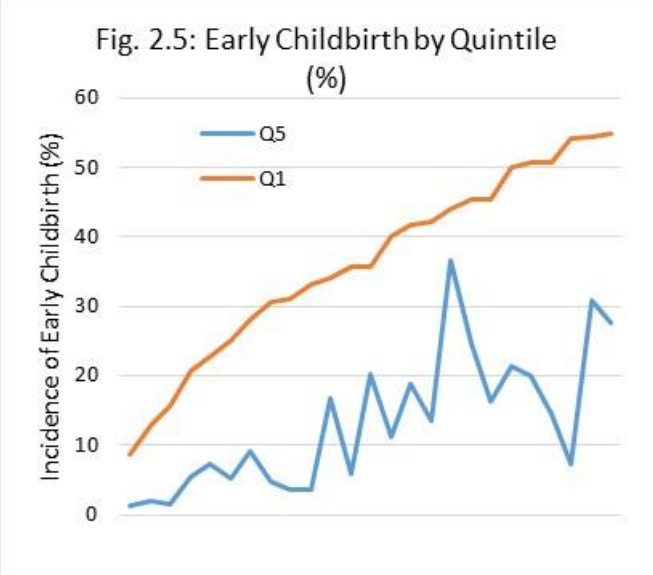
42. **The relationship between poverty and child marriage is clear in a multi-country perspective.** Household welfare can be measured in DHS surveys through a wealth index. In table 2.4, households across a number of countries are categorized in five quintiles from poorest to richest. Both child marriage and early childbirth are more likely among poorer groups, as expected. The differences in prevalence between socio-economic groups are visualized in Figures 2.4 and 2.5 where countries have been ranked on the horizontal axis according to the prevalence of child marriage or early childbirth in the bottom (poorest) quintile of well-being, with this prevalence represented with the top curve in the figure in orange. The bottom curve represents the prevalence of child marriage or early childbirth in the top (richest) quintile. Clearly, the prevalence of child marriage is lower across countries among higher socio-economic groups, but with some differences in ratios between quintiles.

Table 2.4: Child Marriage and Early Childbirth by Wealth Quintile, Ages 18-22 (%)

	Share of women with first marriage before age 18 by age group					Share of women with first child before age 18 by age group				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Bangladesh	74.4	67.1	60.7	57.1	43.6	50.6	41.0	36.1	27.5	19.9
Burkina Faso	65.7	63.8	59.9	52.9	25.5	40	32.7	27.4	26.8	11.3
Chad	69.7	68.2	76.8	68.6	61.9	44.1	48.1	49.5	46.4	36.7
Cote d'Ivoire	55.8	39.2	31.4	31.1	15.4	50.6	45.3	28.8	22.9	14.5
Dem. Rep. Congo	51.6	40.1	44.8	34.2	16.5	34.1	26.6	30.3	24	16.7
Dominican Republic	59.1	51.7	31.6	23.5	11	35.6	32.2	16.5	13.8	6.0
Egypt	19.4	21.4	24.2	13.8	3.7	0.8	0.81	0.64	0.64	0
Ethiopia	52.5	50.9	42.8	32.2	19.5	28	28.6	20	16.7	9.1
Ghana	28.2	21.7	16.2	15.2	7.3	20.7	24.4	14.4	14.6	5.5
Guinea	73.4	70.6	59.7	46.7	22.8	50	59.9	47	38.5	21.4
India	63.4	54.6	43.8	30	13.5	31.1	26.7	18.9	12.1	3.6
Indonesia	34.4	21.1	16.1	11.4	3.6	15.6	7.7	5.9	3.9	1.6
Malawi	57	56.9	53.8	43.5	22.9	35.8	36.4	36.2	32.3	20.3
Mali	74.9	68.7	72.4	57.7	36.8	54.8	50.5	50.2	48.2	27.7
Mauritania	42.6	45.1	35.6	28.7	15.6	22.8	26.3	18.3	20	7.3
Mozambique	63.2	60.1	65.4	54.5	24.4	45.4	36.9	49.3	43	24.7
Nepal	53.6	49.1	47.9	32	14.5	25.1	24.2	20.9	14.3	5.2
Niger	85.2	85.8	86.3	85.1	49.2	54.5	54.5	52.8	48.1	30.9
Nigeria	80.5	63.4	36.3	25.3	10.4	54.1	40.1	26	15.6	7.4
Pakistan	35.74	27.63	17.03	11.43	7.31	12.8	10.6	7.4	3.3	2
Peru	37.8	29.6	13.3	9.7	4.8	30.6	24.7	12.2	6.8	4.7
Rep. of Congo	46.7	44.6	37.8	27.2	19.8	45.4	39.8	36.0	27.3	16.2
Senegal	56.9	44.2	32.8	21	13.3	33.1	25.6	20.2	11.2	3.5
Uganda	54.4	49.9	40.5	29.9	19.9	41.6	36.6	31.3	21.8	18.9
Zambia	48.4	42.3	34.5	21.9	8.8	42.1	42.7	34.2	25.9	13.5

Source: Male and Wodon (2017a). Data source: DHS.





Countries ranked by increasing prevalence of child marriage in Q1
Source: Male and Wodon (2017a). Data source: DHS.
Note: Q5 = richest quintile, Q1 = poorest quintile.

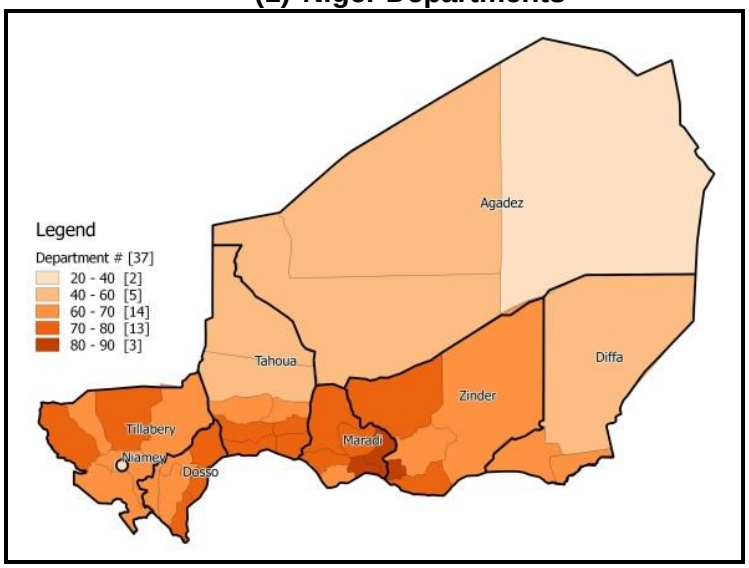
43. **An important implication of patterns by wealth status is that a substantial share of the benefits of ending child marriage and early childbirths would accrue to the poor.** The costs associated with the impacts of child marriage and early childbirths on development outcomes are borne principally by the girls marrying early and their children, simply because child marriage are early childbirths are most prevalent among the poor. This also means that the benefits from ending child marriage and early childbirths would also accrue in large part to the poor. Ending child marriage and early childbirth are thereby pro-poor policies.

GEOGRAPHIC PROFILE OF CHILD MARRIAGE

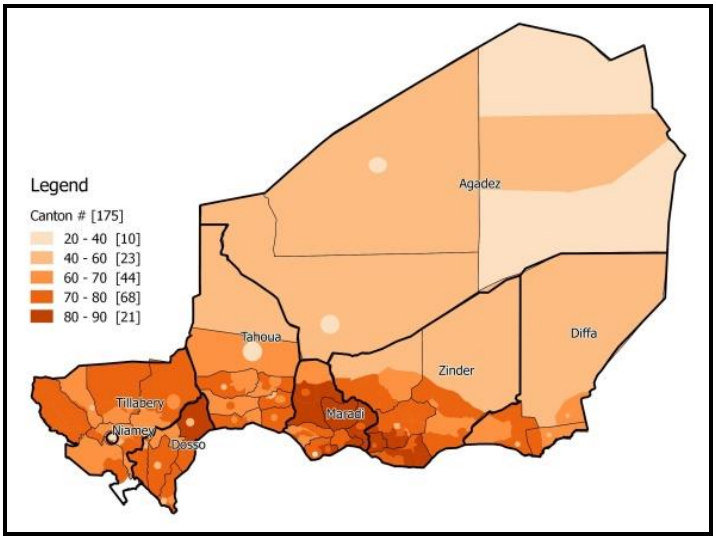
44. **There are also differences in the prevalence of child marriage according to geographic areas which can be exploited when considering interventions to end child marriage.** These differences can be measured finely using census data. While measurement of child marriage and early childbirths at the national or regional level is best conducted with DHS surveys, the surveys cannot be used due to their limited sample size to assess the extent of child marriage according to precise geographic locations, especially at the level of municipalities. This type of measurement can however be conducted using census data, acknowledging that measures of child marriage obtained with census data tend to be lower than with DHS surveys because what is available in the census is only the marital status of girls, not their first age at marriage. Still, differences in measures based on marital status by age 17 are likely to mirror differences in the prevalence of child marriage (as measured through the age at first marriage/union) by geographic areas. With census data, estimates can be obtained for rather small areas since the whole population is included, so that survey sample sizes are not an issue. For illustrative purposes, maps of the prevalence of child marriage as measured through marital status at age 17 are provided at the level of departments/provinces as well as municipalities/other entities in Figure 2.6 for Niger using data from the 2012 census. Niger was chosen for this illustration because it is widely believed to have the highest prevalence of child marriage in the world. The maps suggest that even in high prevalence countries, there are typically substantial differences in child marriage rates between areas, as one might expect. As a result, this type of information can in principle be useful to target programs or interventions to geographic areas with high prevalence.

Figure 2.6: Prevalence of Child Marriage by Age 17 in Niger, Census Data

(1) Niger Departments



(2) Niger Smaller Entities



Source: Male and Wodon (2017b). Data source: Census.

45. **It is also important to recognize that in many countries, the population is heterogeneous by ethnicity, demographic profile, caste, religion, socio-economic status and other characteristics.** This can contribute to differences in child marriage rates and trends. Because this report focuses on the aggregate impacts and costs of child marriage at the national and global levels, we do not provide here any detailed analysis of the prevalence and drivers of child marriage by ethnicity, caste, religion, or other characteristics. Consideration of differences in culture and practices as well as context is however critical when designing policies and programs to end child marriage.

CHAPTER 3
IMPACTS ON FERTILITY AND POPULATION GROWTH

Child marriage contributes to women both having children earlier and having more children over their lifetime than if they had married later. In turn, the effects of child marriage on fertility have implications for population growth, economic welfare, and state budgets, for example for education. This chapter documents the impact of child marriage and early childbirths on total fertility and population growth, as well as some of the economic costs associated with those effects. (For details on estimation methodologies and how results should be interpreted as order of magnitudes as opposed to precise estimates, please refer to Annex 1.)

Nepal: *"I was very small and I feared of my husband so we never discussed about the number of children we wanted. When I told him that I don't want more children he did not agree. He did not allow me to use any contraceptives. I had to give birth to many children because we did not have mutual decision."* (ICRW, 2017).

Uganda: *"Why is family planning being made a very important issue? Did God proclaim it? Is this not a ploy to divert us from important issues in society like poverty that need urgent attention?" "The government is trying to destroy our manhood by limiting our ability to give birth."* (Tsimpo and Wodon, 2017).

IMPACT OF CHILD MARRIAGE ON TOTAL FERTILITY

46. **Child marriage contributes to higher total fertility as women marrying earlier tend to both have children earlier and more children over their lifetime than if they had married later.** The factors leading to fertility are complex, as illustrated in Bongaarts' model. The analysis provided in this section does not look at all these factors comprehensively, but it provides insights into the role that child marriage may play. Onagoruwa and Wodon (2017a) provide an analysis of the impact of child marriage on total fertility, which is defined here as the number of live births that women are (statistically) expected to have over their lifetime goes a bit further than work conducted in the field so far. The analysis not only estimates the marginal impact of child marriage on total fertility, but it also considers what total fertility would be if child marriage were to be eliminated. The analysis consists of detailed regressions as well as simulations based on the results from the regression analysis[6]. Because we model econometrically the number of children that women have towards the end of their reproductive life, we account implicitly

[6] 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 in order 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 35). More details on the methodology are available in Onagoruwa and Wodon (2017a).

for desired fertility and substitution effects in the timing of birth when considering the implications of delaying marriage in the simulations. Table 3.1 provides the main results for 15 countries. The first three columns show the marginal impact of marrying before 18 on the number of children that women have over their lifetime. While effects have been computed for marrying at ages 17, 16, 15, 14, or 13 and under, in comparison to marrying at age 18 or later, the impacts are shown only for girls marrying at age 13 and age 17 in order to reduce the size of the table. The estimates represent percentage increases in lifetime live births due to early marriage at a particular age after controlling for a wide range of other individual and household characteristics that affect fertility.

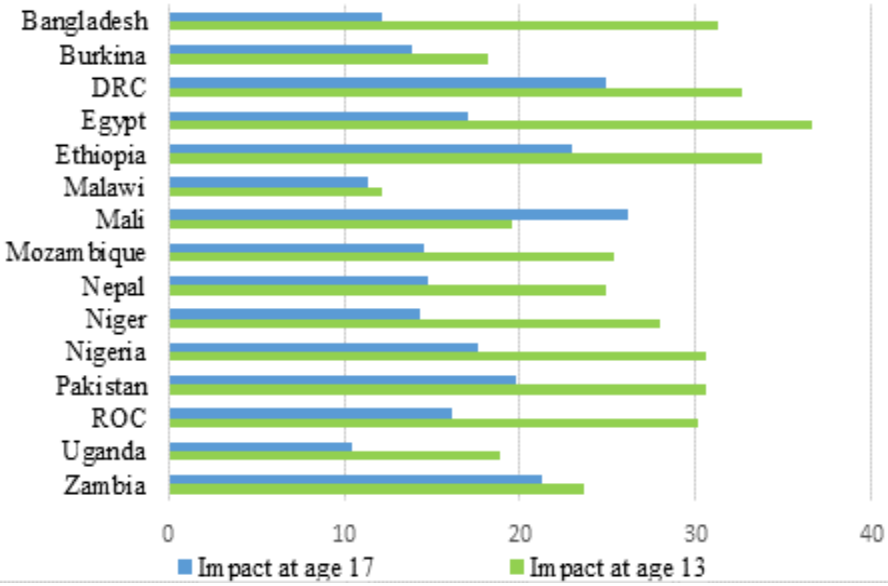
47. **In all countries, the impact at the margin of child marriage on total fertility tends to be large.** The average estimate across countries in table 3.1 of 26.4 for marrying at age 13 means that on average, after controlling for other factors affecting fertility, marrying at age 13 increases the number of children that women are expected to have over their lifetime by 26.4 percent in comparison to marrying at age 18 or later. If a girl marries at age 17, this increases average lifetime total fertility by 17.2 percent across the 15 countries in comparison to marrying at 18 or later. Typically, and as expected, estimates suggest larger impacts for girls marrying earlier (this can be seen by comparing the estimates for the impact of marrying at 13 versus 17 in table 3.1). The next column indicates whether the effects being observed are statistically significant, and if so, at what level. All effects are statistically significant and the observed marginal impacts are large.

Table 3.1: Marginal and National Impacts of Child Marriage on Total Fertility

	Marginal impacts on total fertility when marrying early			**National impacts on fertility rates for the country of ending child marriage**			
	Impact of marrying at 13 (%)	Impact of marrying at 17 (%)	Stat. Sign. (p)	Predicted Total Fertility	Predicted w/o Child Marriage	Absolute Difference	Reduction in Total Fertility (%)
Bangladesh	31.3	12.2	<0.01	3.92	3.22	0.70	18%
Burkina Faso	18.2	13.9	<0.01	6.34	5.79	0.55	9%
Dem. R. Congo	32.6	24.9	<0.01	6.14	5.51	0.63	10%
Egypt	36.6	17.1	<0.01	3.67	3.42	0.25	7%
Ethiopia	33.8	23.0	<0.01	6.33	5.36	0.97	15%
Malawi	12.2	11.3	<0.01	6.10	5.62	0.48	8%
Mali	19.5	26.1	<0.01	5.62	5.05	0.57	10%
Mozambique	25.3	14.5	<0.01	5.26	4.86	0.40	8%
Nepal	24.9	14.8	<0.01	4.00	3.55	0.45	11%
Niger	28.0	14.3	<0.01	7.40	6.30	1.10	15%
Nigeria	30.6	17.6	<0.01	5.98	5.26	0.72	12%
Pakistan	30.6	19.8	<0.01	5.29	4.76	0.53	10%
Rep. of Congo	30.1	16.1	<0.01	4.69	4.34	0.35	7%
Uganda	18.9	10.4	<0.01	6.87	6.31	0.56	8%
Zambia	23.6	21.3	<0.01	5.92	5.33	0.59	10%
Average	26.4	17.2	-	5.57	4.98	0.59	11%

Source: Onagoruwa and Wodon (2017a). Data source: DHS.

Figure 3.1: Percentage Increase in Live Births When Marrying at Age 13 or 17 versus Marrying At 18 or Later (15 Countries, %)



Source: Onagoruwa and Wodon (2017a). Data source: DHS.

48. **If child marriage were eliminated, this would reduce total fertility on average by 0.59 live births across countries, the equivalent of a reduction of 11 percent versus current values.** Results from the regression analysis can be used to simulate the potential impact of ending child marriage on total fertility. The last four columns in table 3.1 provide results from simulations of total fertility at the national level that would result from ending child marriage. The predicted values for total fertility are the expected number of live births per woman under current conditions. The predicted values without (w/o) child marriage are the expected number of live births per woman if child marriage were to be eliminated. Note that both predictions are for all women on average, including those marrying before age 18 and those marrying later. The difference between the two columns captures the reduction in total fertility that would result from ending child marriage. These differences are large. Across the 15 countries, total fertility under current conditions is estimated – on the basis of the regression analysis – at 5.57 live births per woman. If child marriage were eliminated, this would be reduced to 4.98 live births per woman. The reduction of 0.59 live births is equivalent to a reduction in total fertility of 11 percent from current conditions. In general, the reductions in total fertility from ending child marriage tend to be higher in countries with a higher prevalence of child marriage simply because when a higher share of women marry as children, the marginal impact of ending child marriage on total fertility affect more women. This suggests that ending child marriage would significantly speed up the transitions to lower fertility rates in many countries.

49. **Child marriage has a large impact on fertility in part because contraceptive use remains low, but in turn modern contraceptive use may be affected by child marriage.** If contraceptive use were higher in countries with a high prevalence of child marriage, the impact of marrying early on fertility might be lower, as women would be able to manage their fertility better. In addition, child

marriage itself may affect contraceptive use. To test whether this is the case, regression analysis is again used with DHS data. Results are provided in table 3.2. The table provides estimates of the impact at the margin of child marriage on modern contraceptive use by year at first marriage. Most coefficients are not statistically significant, but some coefficients are, and in most countries, at least one of the coefficients is statistically significant, typically with a negative sign as expected. Marrying early tends to reduce contraceptive use by a few percentage points in some of the countries for the age groups where coefficients are statistically significant. There are however cases where impacts are positive, as is observed for Burkina Faso, Nepal, and Pakistan, possibly because when women have reached their desired fertility (which may be earlier if they marry early), they may rely on contraception more.

Table 3.2: Marginal Impact of Child Marriage on the Use of Modern Contraception

	Married at 12/less	Married at 13	Married at 14	Married at 15	Married at 16	Married at 17
Bangladesh	NS	NS	-0.03	NS	NS	NS
Burkina Faso	0.08	NS	0.03	NS	0.03	0.03
Dem. R. Congo	-0.04	NS	NS	NS	NS	NS
Dominican	NS	NS	NS	NS	NS	0.07
Egypt	NS	-0.07	NS	NS	NS	NS
Ethiopia	-0.09	NS	NS	-0.07	-0.06	NS
Malawi	-0.12	NS	-0.05	NS	NS	NS
Mali	NS	-0.04	NS	NS	NS	NS
Mozambique	-0.03	NS	NS	NS	NS	NS
Nepal	0.14	NS	0.05	0.06	0.04	0.05
Niger	-0.08	-0.03	-0.03	NS	NS	NS
Nigeria	-0.01	NS	NS	NS	NS	NS
Pakistan	NS	0.09	0.06	0.04	NS	NS
Rep. Congo	NS	NS	NS	NS	-0.06	NS
Uganda	NS	NS	NS	NS	NS	NS
Zambia	NS	NS	-0.07	NS	NS	NS

Source: Onagoruwa and Wodon (2017b). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

50. **Ending child marriage would not make a major difference in national modern contraceptive prevalence rates.** While some impacts in table 3.2 are statistically significant, simulations in table 3.3 suggest that ending child marriage would not fundamentally change contraceptive use in most countries. In most countries, modern contraceptive use would increase nationally by less than two percentage points if child marriage were eliminated, and in some cases, there could be a decrease in contraceptive use. Overall, while ending child marriage would tend to yield higher or lower contraceptive use depending on the country, overall contraceptive use would remain fairly low in most countries, suggesting that additional steps to promote voluntary contraceptive use – and not just eliminating child marriage – would be needed to increase contraceptive use rates.

Table 3.3: National Change in Contraceptive Use When Ending Child Marriage

	Predicted contraceptive use	Simulated use w/o child marriage	Absolute change vs. base	Percentage change vs. base (%)
Bangladesh	55.85	56.23	0.38	0.68
Burkina Faso	15.63	14.40	1.23	7.87
Dem. Rep. Congo	8.35	8.46	0.11	1.32
Dominican Rep.	72.00	71.47	0.53	0.74
Egypt	59.28	59.36	0.08	0.13
Ethiopia	29.23	31.69	2.46	8.42
Malawi	62.55	63.12	0.57	0.91
Mali	10.47	10.73	0.26	2.48
Mozambique	12.19	12.28	0.09	0.74
Nepal	44.19	41.60	2.59	5.86
Niger	14.21	15.50	1.29	9.08
Nigeria	10.44	10.53	0.09	0.86
Pakistan	27.01	26.21	0.8	2.96
Rep. Congo	22.06	22.63	0.57	2.58
Uganda	28.11	28.11	0.00	0.00
Zambia	48.22	48.59	0.37	0.77

Source: Onagoruwa and Wodon (2017b). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

IMPACT OF CHILD MARRIAGE AND EARLY CHILDBIRTHS ON POPULATION GROWTH

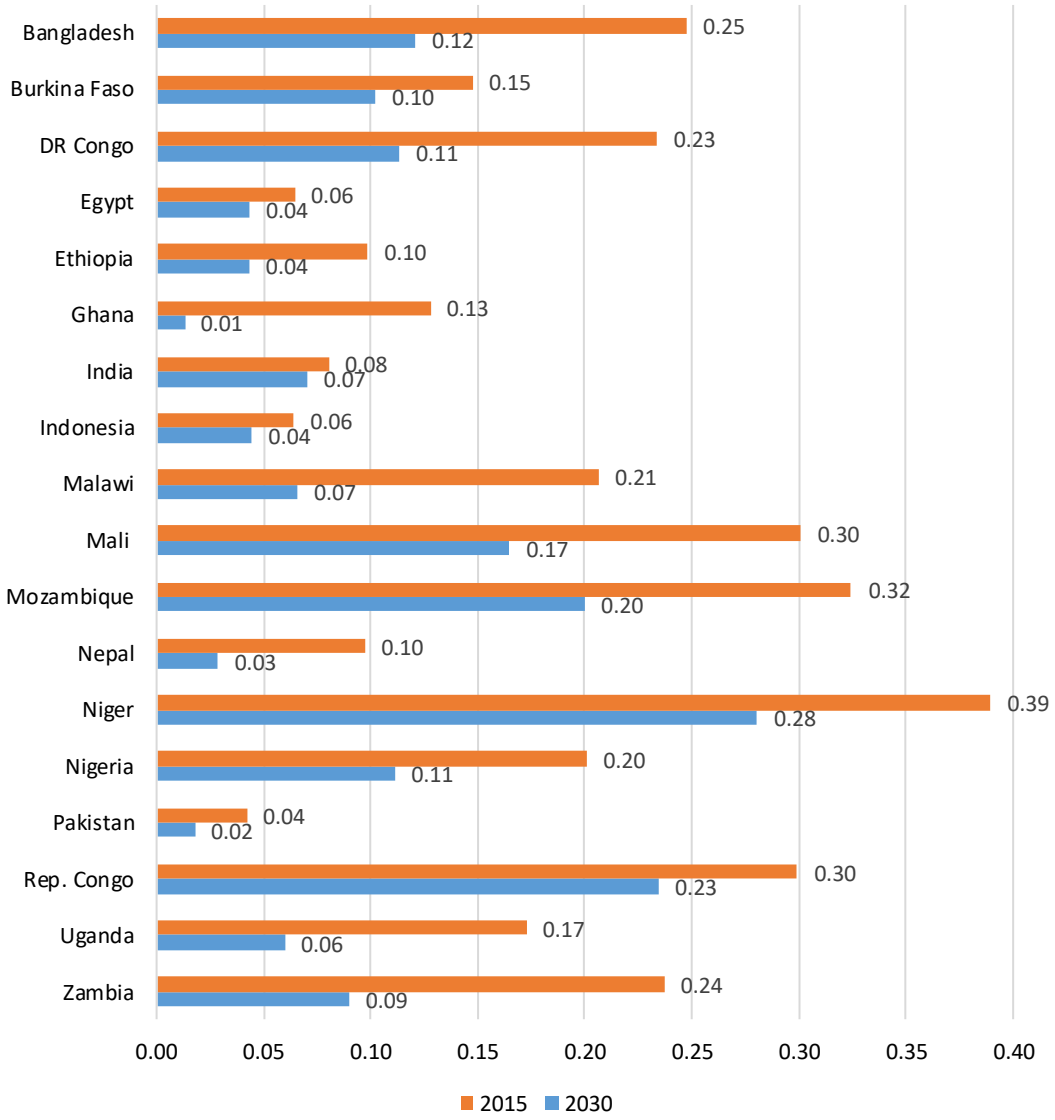
51. **Through its impact on total fertility, child marriage may contribute to higher population growth.** In some contexts, high population growth may threaten long-term prosperity and exacerbate competition for access to scarce resources. High population growth may also weaken the ability of governments to provide basic services of quality to their population, among others in the areas of education, health, nutrition, and infrastructure. This section considers the extent to which child marriage as well as early childbirths contribute to high population growth. Comparisons with other countries are provided for additional perspective.

52. **Simulation tools can be used to assess the reduction in population growth that would result from ending child marriage and early childbirths.** Many factors affect the relationship between child marriage, early childbirths, and population growth. As already mentioned, if a country has a high prevalence of child marriage and early childbirths, the impact of ending child marriage and early childbirths on total fertility and population growth is likely to be larger than otherwise. But this impact may change over time as it depends, among other factors, on the structure of the population and age-specific fertility rates that may also change over time for other reasons. Even if the attention is focused on child marriage and early childbirths, the prevalence of both is likely to decline in the future, and therefore so should the part of population growth that is due to child marriage and early childbirths. Given that the purpose of this analysis is to assess how ending child marriage and early childbirths could affect population growth over time, business-as-usual counterfactual scenarios must be specified carefully. The simulations are based on a parametrization of demographic projection tools (DemProj and FamPlan) using data from the most recent DHS surveys as well as other data (for details, see Wodon and Yedan, 2017a). It should be noted that the simulations assume no

displacement over time in fertility which could take place due to desired fertility. Thereby the analysis may lead to a slight overestimation of impacts on population growth (the estimation procedure is different from that used for the fertility analysis).

53. **Across countries, ending child marriage and early childbirths would reduce population growth substantially under current conditions.** The simulation analysis is conducted for 18 countries for the purpose of international comparisons. Figure 3.2 provides the main results (note that the start date for the simulations is 2014 due to data availability, so impacts are observed beginning in 2015). The effects depend on the country, ranging from fairly small impacts in the case of Pakistan to very large impacts in the case of Niger. Note that estimated rates of reduction in annual population growth rates are lower in 2030 than in 2015. The reason for the reduction over time of the impact on population growth in virtually all countries lies in assumptions based on recent DHS data on trends in other variables. As conditions in the counterfactual scenario are expected to improve, including in terms of the prevalence of child marriage and early pregnancy, the impact of ending child marriage and early childbirths is smaller in 2030 than 2015. A distinction can also be made (not shown on the figure) between ending all child marriages and early childbirths versus ending only child marriages, which would result in some early childbirths still taking place. Over time, the annual reductions in population growth are cumulative. This means that the reduction in the populations of many countries by the year 2030 from ending child marriage and early childbirths is far from negligible. In Niger, which is the country with the largest impacts, the population by 2030 could be 5.4 percent smaller if child marriage and early childbirths had been eliminated beginning in 2014. This is a large effect with important implications in terms of both standards of living and the provision of public services. The same is observed for many other countries, even if the overall reduction in population growth is smaller than in the case of Niger.

Figure 3.2: Reduction in Population Growth Rate from Ending Child Marriage and Early Childbirths



Source: Wodon and Yedan (2017a). Data source: DHS.

WELFARE BENEFITS FROM REDUCED POPULATION GROWTH

54. **The link between population growth and development is getting renewed attention among policy makers under the broader concept of the demographic dividend.** At the World Bank, the 2015-2016 Global Monitoring Report was devoted to the demographic dividend (World Bank, 2015), and so was a major report completed for the Africa region (Canning et al., 2015). In January 2017, the Africa Union organized a key meeting in Addis Ababa on harnessing the demographic dividend for the realization of Sustainable Development Goals. These are just a few examples of the recognition of the importance of demography for development as well as growth. Countries in the earlier stages of the demographic transition are

especially well placed to take advantage of the demographic dividend (see Box 3.1), though first must reduce fertility – which eliminating child marriage can play a major role in.

Box 3.1: The Demographic Dividend

While different definitions of the demographic dividend have been proposed in the literature, the term is commonly associated with the improvements in standards of living and accelerated economic growth that can result when a developing country achieves a population structure that is favorable in terms of economic growth thanks to a reduction in birth (and death) rates that is followed after a short period by rapid fertility decline. As a result, the share of the population of working age individuals increases sharply for a period of time, which tends to generate faster economic growth. 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. Ending child marriage should help reduce population growth and improve education in countries where fertility rates remain high, thereby helping to usher in the demographic dividend.

55. **Cross-country analyses demonstrate a one-to-one relationship between population growth and growth in GDP per capita.** Growth in GDP per capita is mathematically the difference between GDP growth and population growth. This relationship holds not only as an accounting identity, but also when estimating the correlates of economic growth using cross-country panel data. For example, it has been demonstrated that demographic change has been an important factor contributing to the Asian miracle (Bloom and Williamson, 1998; Bloom and Finlay, 2008). By contrast, demography has contributed to Africa lagging behind (Bloom and Sachs, 1998; Bloom et al., 2007), although there are now opportunities for this to change (Canning et al., 2015).

56. **The relationship between economic and population growth can be used to assess benefits from a reduction in population growth from ending child marriage and early childbirths.** Regression analysis suggests that controlling for other variables including population growth, child marriage does not have a direct impact on growth in GDP per capita (Nayihouba and Wodon, 2017a). However, child marriage does have an impact on growth in GDP per capita through its impact on population growth. Following Wodon (2017b), a simple way to measure the welfare benefits that could accrue from ending child marriage and early childbirths consists of comparing the level of GDP per capita that countries would achieve between now and 2030 with and without both child marriage and early childbirths. The comparison is based on estimates of the impact of child marriage and early childbirth on population growth presented above[7]. Under simplifying assumptions, the measure of

[7] Assume for simplicity that GDP does not change between 2015 and 2030 if child marriage and early childbirths are eliminated. Between 2015 and 2030 there is essentially no negative impact on the labor force from ending child marriage and early childbirths in 2015 simply because none of the children who would have been born in a business as usual scenario would have reached

the welfare benefits from ending child marriage and early childbirths is based on the transfer that would have to be provided to a population in order to reach the level of GDP per capita that could have been reached if child marriage and early childbirths had been eliminated. This transfer is the product of a country's population times GDP per capita times the impact of child marriage on population growth[8].

57. **Globally (for 106 countries), the welfare benefits that would be reaped through lower population growth from ending child marriage reach $566 billion per year in 2030.** The benefits are valued at $22 billion in 2015 and $566 billion in 2030 (see table 3.4). The rapid increase in the benefits stems from the fact that the impact of child marriage and early childbirths on population growth is cumulative. That is, each year the gains become larger because the cumulative reduction in population growth keeps growing from one year to the next. In addition, as standards of living (GDP per capita) improve, the valuations also become larger. The combined effect is a 25-fold increase in the welfare benefits of ending child marriage between 2015 and 2030. These are annual welfare benefits that would continue to increase in the future. It should be noted however that the estimates are tentative. They should not be considered as precise given that they depend on: (1) estimates of impacts that may have biases; (2) assumptions for costing that could be debated. Still, the estimates provide an order of magnitude of the potential costs of child marriage and early childbirths in terms of their impact on population growth. The benefit of ending all early childbirths are even larger at US $27.8 billion initially and $708 billion by 2030. The difference with the benefits from ending child marriage stems from the fact that some women who have children before the age of 18 (early childbirth) are not married or married after having their first child, so that not all early childbirths can be attributed to child marriage. Importantly, most of those benefits would accrue to the poorer segments of the population since young girls in poverty are more likely to marry early than girls from better off socio-economic backgrounds. Cumulatively, for the period from 2014 to 2030, the welfare gains from ending child marriage could be more than US $4 trillion, and when adding early childbirth, could be above US $5 trillion in PPP terms.

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adulthood and would be working. After 2030, there would be a small negative impact on the labor force from ending child marriage and early childbirths and this impact would progressively increase over time, but it would remain fairly modest for many years. So the gains in GDP capita that would arise simply from reducing population growth can be measured without worrying too much in first approximation about changes in GDP. In fact, GDP may increase, for example through better education for girls and higher future lifetime earnings and possibly investments. Yet for simplicity these benefits are not included (they are discussed in chapter 6).

[8] Consider a country with 100 million people and GDP per capita of US $10,000 in purchasing power parity in a given year. The size of the economy is one trillion dollars. If ending child marriage and early childbirths leads to a reduction in the population for that year of three percent versus a counterfactual business as usual scenario, then GDP per capita would have been three percent higher if child marriage and early childbirths had been eliminated. The transfer needed to keep the population as well off is three percent of one trillion dollars ($30 billion).

Table 3.4: Welfare Cost of Child Marriage and Early Childbirths Due to Population Growth (Order of Magnitudes at the Global Level for more than 100 Countries)

Year	Cost of child marriage in billion US$ (Purchasing Power Parity)	Cost of early childbirth in billion US$ (Purchasing Power Parity)
2015	22.1	27.8
2016	44.8	56.3
2017	68.6	86.2
2018	93.8	117.9
2019	120.8	151.8
2020	149.5	187.8
2021	179.9	225.9
2022	211.9	266.1
2023	245.8	308.5
2024	281.7	353.4
2025	319.6	400.9
2026	360.4	451.9
2027	405.1	507.7
2028	454.0	568.5
2029	507.6	634.9
2030	566.3	707.5
Total	4,031.9	5,053.1

Source: Wodon (2017c).

EDUCATION BUDGET SAVINGS FROM REDUCED POPULATION GROWTH

58. **Another economic benefit from reduced population growth is the reduced pressure for state budgets to provide services to the population.** The reduction in population growth from ending child marriage and early childbirths is most significant for young cohorts, with major implications for state budgets in areas such as education and health. As an illustration, consider the results of simulations for education. In the first few years after the elimination of child marriage and early childbirths, there is no impact on the size of new cohorts entering school. However, soon thereafter there is a reduction of the size of the cohorts that increases over time. This pattern is observed with a lag for secondary schools as well.

59. **By reducing the size of cohorts, ending child marriage and early childbirth would provide significant savings for the education budget of many countries.** In order to estimate those savings, a number of assumptions are needed. First, trends in enrollment and completion rates by grade must be assumed over time. Second, assumptions are needed about the efficiency of the education system, for example in terms of repetition rates, since efficiency affects costs of delivery for given outcomes. Third, assumptions are needed about recurrent unit costs of delivery at various levels of schooling, and how these may change over time with economic growth and improvements in standards of living. Again, this is rather complex since unit costs depend on a large number of parameters, including teacher salaries and pupil-teacher ratios by level of schooling. Fourth, assumptions are needed about likely needs for capital investments, including for the construction of schools and classrooms to accommodate a growing student population. Fifth, other factors may also play a role, such as changes in the market share of public schools at various education levels in comparison to private schools. These many assumptions call for using simulation models.

60. **A costing model prepared for the 2015 Education for All (EFA) Global Monitoring Report can be used for measuring potential savings from smaller cohorts of students.** The model was commissioned by UNESCO in order to assess the cost of achieving universal school enrollment by 2030 at the preschool, primary, and secondary levels (Wils, 2015). The EFA costing model was developed to estimate total costs and external finance needs to reach full primary and secondary education in low- and lower-middle income countries. The model is parametrized for 82 countries. It projects pupils, literacy, costs, and public education budgets by level, up to the upper secondary level. The projection horizon is to 2030, in line with the Sustainable Development Goals. Projections of pupils are based on parameters for their progressions through grades and cycles over time in order to reach universal enrollment and completion by 2030. Repetition, promotion, and transition rates are assumed to converge towards user-set target levels[9].

61. **In a set of 18 countries, simulations suggest that by 2030, cost savings could reach $17 billion annually versus the cost of achieving universal secondary education.** Table 3.5 provides the estimates of budget savings with respect to the cost of achieving universal secondary education in 18 countries in three different years: 2018, 2024, and 2030. The analysis is for the benefits of ending child marriage and early childbirths. The table also provides the estimated share of the budget savings in the total education budget by 2030 from ending early childbirth and child marriage. By 2030, the budget savings range from only 0.3 percent of the baseline budget in Pakistan to 11.7 percent in Bangladesh. In absolute terms, budget savings increase substantially over time. Three main factors lead to these results. First, the impact of early childbirth and child marriage on population growth is small in terms of the reduction in the population of children in age of schooling in the first few years, but rises over time. Second, the counterfactual scenario includes rising budget expenditures meant to cover the cost of progressively achieving universal secondary education and thereby progressively reducing the share of children out of school. Finally, the unit costs for each child to be in school also increase alongside economic growth in the countries. These three factors are the main reasons why budgets savings in 2030 are much larger than in, say, 2024. For the 18 countries combined, the budget savings from ending early childbirths and child marriage that could be achieved in terms of the cost of reaching universal secondary education by that year amount to nearly $17 billion (constant dollars) in 2030, which is a substantial amount. India accounts for more than half of those savings due to the sheer size of the country. Nigeria comes in second in the sample of countries considered.

[9] Cost estimations are provided by considering unit costs based on the level of teacher salaries and pupil-teacher ratios, with additional parameters for material costs as a share of recurrent costs and investment costs for classrooms. Convergence assumptions lead countries to gradually move towards an average class size and a level of teacher salaries corresponding to their level of economic development. Details are available in Wils (2015). Three reasons led to the choice of this model as counterfactual. The first is practicality: the UNESCO team has made available the simulation tool used to estimate the cost of reaching universal education; using this tool simplifies greatly the simulations. The second is comparability: the same approach is used for estimating needs in all countries included in the UNESCO analysis, which brings some level of comparability in results between countries. The third is replicability: the availability of the UNESCO simulation tool make it easier for others to replicate the analysis or carry their own.

62. **It should be noted on the other hand that ending child marriage could entail a cost for households and governments assuming that some of the girls who delay marriage are also able to pursue their education further.** If girls who do not marry as children pursue their education further, this would entail costs for both families (out-of-pocket and opportunity costs) and governments (given that many girls would attend public secondary schools). These additional costs would offset some of the benefits from the reduction in the size of future cohorts of students thanks to lower population growth.

Table 3.5: Potential Education Budget Savings from the Elimination of Early Childbirths and Child Marriage, 18 Countries

	Budget Savings ($Million)			Share saved (%)
	2018	2024	2030	2030
Bangladesh	26	505	1,366	11.7%
Burkina Faso	11	68	116	4.4%
Dem. R. Congo	14	139	300	5.7%
Egypt	16	211	479	2.3%
Ethiopia	20	136	288	3.0%
Ghana	8	61	118	1.6%
India	905	4,936	10,020	6.4%
Malawi	9	70	108	6.3%
Mali	7	104	219	7.6%
Mozambique	25	172	305	9.1%
Nepal	11	50	72	4.1%
Niger	16	158	327	9.2%
Nigeria	78	1,464	2,382	5.4%
Pakistan	26	22	77	0.3%
Rep. Congo	21	17	39	1.5%
Uganda	14	131	257	4.6%
Zambia	7	98	200	5.8%
All 18 countries	1,213	8,342	16,671	5.4%

Source: Wodon (2017e).

CHAPTER 4
IMPACTS ON HEALTH, NUTRITION, AND VIOLENCE

Child marriage and early childbirths can have dramatic health consequences for the girls who marry early. Child marriage may increase the risk of exposure to sexually transmitted infections, including HIV/AIDS. It may also be associated with lower psychological well-being. Deliveries at a young age lead to higher risks of complications during childbirth, such as obstructed or prolonged labor, as well as obstetric fistula, which may – among other factors - contribute to higher maternal morbidity and mortality rates. Early childbirths also have health complications for the children born of young mothers. While there are other health factors at play, the focus in this chapter is on three types of impacts: the impact of child marriage through early childbirth on the risk of maternal mortality; the impact of early childbirths on the risk of mortality and stunting for children born of young mothers; and the impact of child marriage on the risk of intimate partner violence, which can itself lead to health consequences for women and children. (For details on estimation methodologies and how results should be interpreted as order of magnitudes as opposed to precise estimates, please refer to Annex 1.)

Uganda: *"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).

Nepal: "*At that time [referring to when she had her first child at 15 years], I had problems in my uterus. My mother-in-law scolded me. She called my husband and complained about me not doing any works. She told him that I didn't do any works and all I did was only sleep. She told him that I make excuses about having stomach pain. She complained to my husband and my husband used to shout at me on phone. I cried a lot at that time. I used to cry alone in my room. Nobody will take me for treatment. I didn't even have enough milk for my daughter [referring to the baby]. She was very thin and cried a lot. I asked for money with my neighbors at that time." (*ICRW, 2017)

CHILD MARRIAGE, EARLY CHILDBIRTHS, AND HEALTH

63. **Child marriage and early childbirths may be associated with higher health risks for girls having children early.** Deliveries at a young age may lead to higher risks of complications such as obstructed or prolonged labor as well as fistula. This may contribute to higher maternal morbidity and mortality rates (Xu et al. 2003; Nove et al., 2014), although actual empirical tests of the impact of early childbirths on maternal mortality controlling for socio-economic and other characteristics are rare. Other potential health effects include risks of malnutrition, isolation, and depression

for young brides (Nour 2009; Le Strat et al. 2011), and possibly higher rates of suicidal ideation and attempts (Khanna et al., 2013; Gage, 2013). In addition, young brides may not be able to negotiate sexual and reproductive behaviors within their household. As a result, they have increased exposure to sexually transmitted infections (UNFPA 2013; Walker et al. 2013), and, as discussed, are less likely to use modern contraception, which in turn can lead to higher rates of unintended pregnancies, abortion, and insufficient birth spacing (Kaye et al. 2004; Raj 2010; UNFPA 2013).

64. **Deliveries by young mothers also carry risks for their children.** A review of some of these impacts is provided by Wodon (2016). Children born of young mothers tend to have higher risks of under-five malnutrition and mortality than children born of older mothers (e.g., Raj and Boehmer, 2013; Raj et al., 2014; Fall et al., 2015; Degarege et al., 2015). Part of the reason is that some young mothers may simply not yet be ready to give birth. When mothers are poorly nourished, this may put their children at higher risk of intrauterine growth restriction (Sawant and Venkat, 2013). These effects have implications for the children not only as they grow up, but also in adulthood. In the case of stunting for example, research suggests a loss in productivity of two percent or more for each percent loss in adult height (Caulfield et al. 2006, Strauss and Thomas 1998), with similar results observed for micronutrient deficiencies. Horton and Steckel (2013) estimate that undernutrition may lead to a loss of one-tenth of Gross Domestic Product in sub-Saharan Africa and Asia due to lost productivity.

65. **By weakening conditions for early childhood development, child marriage and early childbirths may have additional negative impacts on young children.** Early childhood is critical for a child's development (Nelson, 2000; Shonkoff, et al., 2012). Poor conditions early in life affect brain development and capabilities, with lasting consequences in adulthood (Black et al., 2016). To the extent that child marriage affects intimate partner violence and mental health for young women, 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 (Duvvury et al. 2013; UNICEF 2014). There is 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 (Aizer, 2011). Violence at home may also affect schooling (Anand et al. 2012) as well as increase the risk of future violence in adulthood (Kishor and Johnson 2004).

POTENTIAL IMPACT OF EARLY CHILDBIRTHS ON MATERNAL MORTALITY

66. **Estimating the impact of child marriage and early childbirths on maternal mortality ratios is difficult due to limitations in controlling for other factors.** Datasets from Demographic and Health Surveys typically used to measure maternal mortality ratios do not provide data on the characteristics of mothers who died. This makes it difficult to isolate the impact of age at delivery versus confounding factors such as the socio-economic background of women giving births or their geographic location, including proximity to health centers. For example, a higher rate of maternal mortality among young mothers could be due to the fact that many of the mothers giving births at a young age tend to be poor and live proportionately more in areas

located further away from health facilities. Therefore, simple comparisons of maternal mortality rates by age group may not indicate that early childbirths, and thereby indirectly child marriage, are themselves some of the causes of potentially higher rates of maternal mortality among young mothers.

67. **While across countries maternal mortality is higher among young mothers, this is not the case in all countries, and it may depend on the age considered.** In a recent study, Nove et al. (2014) estimate maternal mortality ratios for women aged 15–19 years in a large sample of countries. They compare these ratios to the ratios observed for women in other five-year age groups. Their results are displayed in table 4.1 for the core set of countries considered in this study. Estimates are adjusted to take into account under-reporting of maternal deaths, and deaths during pregnancy from non-maternal causes. Across 144 countries and territories, Nove et al. (2014) find that a slightly increased risk of mortality in adolescents (260 per 100,000) as compared to women aged 20–24 years (190 per 100,000), but the confidence intervals for both estimates overlap significantly. There is also a lot of heterogeneity between countries. The authors conclude that excess mortality risks for adolescent mothers are smaller than often believed, but still present. For several of the core countries considered in this study, estimates suggest a lower risk of maternal mortality among girls aged 15-19 years in comparison to women 20-24 years old. However, if very young mothers (i.e., under 15 years of age) were considered, maternal mortality ratios would probably be higher for that age group.

Table 4.1: Maternal Mortality Ratios by Age Bracket

	Surveys	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Bangladesh	2007–10	93	180	270	680	860	660	2,300
Burkina Faso	2003–10	330	430	330	460	570	760	2,500
D. R. Congo	2002–06	350	370	720	790	450	3,400	3,500
Egypt	2000–09	18	27	40	65	120	180	360
Ethiopia	2003–10	760	610	610	1,200	2,300	2,400	4,500
Malawi	2003–10	240	260	710	1,200	3,200	4,300	5,700
Mali	1999–06	720	580	910	720	1,000	2,100	8,000
Mozambique	2004–11	520	560	910	880	1,200	1,800	2,300
Nepal	1999–06	390	230	190	850	780	2,400	0
Niger	1996–06	600	650	830	770	1,200	2,900	7,300
Nigeria	2001–08	780	720	770	1,300	1,900	2,400	1,900
Pakistan	2003–06	220	190	200	200	520	690	400
Rep. Congo	1998–05	550	580	800	740	1,700	2,300	510
Uganda	2004–11	400	330	640	1,100	1,800	3,200	5,300
Zambia	2000–07	150	300	630	1,300	1,600	1,600	4,000

Source: Nove et al. (2014). Data source: DHS and other data.

68. **Considering desired fertility, ending child marriage and early childbirths may not necessarily reduce maternal mortality ratios substantially.** The estimates presented in table 4.1 for the 15 core comparator countries included in this study do not suggest systematically higher levels of maternal mortality among mothers ages 15-19 in comparison to mothers ages 20-24. If data were available for younger age groups, a larger difference could be observed between mothers younger than 18, or even 15, and mothers ages 18-22. Such data are however not readily available, and in some countries estimations could be complex due to small sample sizes. It is important to note also that basic statistical comparisons of maternal mortality ratios such as those in table 4.1 do not imply causality since they do not control for other

factors that affect maternal mortality. Levels of maternal mortality could be higher among young mothers due to (on average) less access to health care and lower socio-economic status among girls giving birth earlier. In addition, if early childbirths were delayed, while this would have many benefits as documented in this study, it would not necessarily reduce maternal mortality ratios, because it could lead some women to have more children later at ages where maternal mortality ratios are higher. Overall, while avoiding pregnancy at a young age is desirable, it does not necessarily follow that ending early childbirths would result in a decrease in maternal mortality ratios at the national level. Further simulation analysis would be needed to establish a stronger link between ending early childbirths and reducing maternal mortality ratios, noting that this study did not estimate the impacts of child marriage or early childbirths on maternal morbidity.

IMPACT OF EARLY CHILDBIRTHS ON UNDER-FIVE MORTALITY AND STUNTING

69. **The analysis in this section focuses on the impact of early childbirths on under-five mortality and stunting. It proceeds in two steps.** The first step consists of estimating the marginal impacts of early childbirths on the risks of mortality and stunting, and the national rates of under-five mortality and stunting that would result from ending all early childbirths. This is done using the latest available Demographic and Health Survey. The second step consists of measuring economic benefits from improved survival and reduced stunting for young children.

Box 4.1: Stunting as the Preferred Indicator of Under-five Malnutrition

A child is underweight if s/he has a weight more than two standard deviations below the reference median weight for the child's age. A child is wasted if s/he has a weight to height ratio more than two standard deviations below the median weight for height for the reference population. A child is stunted if s/he has a height more than two standard deviations below the median reference height for that age. If a child on any of these measures is below three standard deviations of the norm, s/he is severely underweight, wasted, or stunted. Among the three measures, stunting and wasting tend to be used the most. 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 as well as productivity and earnings later in life. Wasting tends to result more from acute food shortage or disease and may lead to death. For this study, stunting is the appropriate measure, given its impact on earnings potential in adulthood.

70. **At the margin, the impact of early childbirths on under-five mortality and stunting are large in many countries, but the impacts at the national level are much smaller.** The analysis was carried by Onagoruwa and Wodon (2017c, 2017d). Controlling for a wide range of other factors, when a child is born of a mother younger than 18, the risk of under-five mortality increases on average by 3.5 percentage points in the 15 countries, while the risk of under-five stunting increases by 6.3 percentage points. However, the impacts at the national level are smaller because relatively few children are born of mothers younger than 18 at the time of their birth (most children are born of older mothers). Nationally, the reduction in stunting that would result from ending all early childbirths is estimated on average at -0.39 percentage points. For under-five mortality, the reduction is estimated at -0.23

percentage points. Said differently, given prevailing rates of under-five mortality, for every 100 children who die before the age of five, only 3.4 can be said to die directly because of an early childbirth on average in the 15 countries. Similarly, for every 100 stunted children, only 1.1 can be said to be stunted directly because of the impact of early childbirth. It is important to note that the reductions in the rates of under-five mortality and malnutrition are not driven by fewer births due to the elimination of early childbirths. They are due to higher health risks when children are born to young mothers.

Table 4.2: Increase in Under-five Mortality and Malnutrition Due to Early Childbirth

	Marginal impact (%)	Statistical significance (p)	National impact (%)	National reduction vs. baseline
		Under-five mortality		
Bangladesh	0.1	NS	-	-
Burkina Faso	6.0	<0.01	0.30	3.4%
D. Rep. Congo	3.9	<0.01	0.24	3.4%
Egypt	0.9	NS	-	-
Ethiopia	3.8	<0.05	0.20	3.0%
Malawi	1.4	NS	-	-
Mali	6.9	<0.01	0.61	8.7%
Mozambique	4.8	<0.01	0.48	6.9%
Nepal	2.0	NS	-	-
Niger	3.0	<0.05	0.22	2.7%
Nigeria	4.8	<0.01	0.34	4.0%
Pakistan	4.6	NS	-	-
Rep. of Congo	1.6	NS	-	-
Uganda	4.7	<0.05	0.27	4.1%
Zambia	3.4	<0.01	0.27	5.0%
Average	3.5	-	0.23	3.4%
		Under-five stunting		
Bangladesh	5.2	<0.05	0.75	1.8%
Burkina Faso	1.6	NS	-	-
D. Rep. Congo	7.2	<0.05	0.32	0.7%
Egypt	7.5	<0.05	0.17	0.8%
Ethiopia	5.5	NS	-	-
Malawi	-4.4	NS	-	-
Mali	10.3	<0.01	0.74	1.9%
Mozambique	7.8	<0.01	0.57	1.3%
Nepal	9.5	<0.10	0.64	1.6%
Niger	6.9	<0.10	0.45	1.0%
Nigeria	4.3	<0.05	0.44	1.2%
Pakistan	-1.0	NS	-	-
Rep. of Congo	6.8	NS	-	-
Uganda	22.0	<0.01	1.03	3.1%
Zambia	4.7	<0.10	0.25	0.6%
Average	6.3	-	0.39	1.1%

Source: Onagoruwa and Wodon (2017c, 2017d). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level. The average for all countries includes estimates that are not statistically significant.

71. **Based on estimates of marginal and national impacts, estimates can be computed for the numbers of children avowing death or stunting when ending child marriage.** Table 4.3 provides estimations of the number of children who could survive beyond age five and the number of children who could avoid stunting

globally if early childbirths were avoided, or alternatively if child marriage were to be ended. For the countries in table 4.2, estimates for those countries are used. For other countries, extrapolations based on the estimates for the 15 countries in table 4.2 are used. Over the period from 2016 to 2030, some 2.1 million children could avoid dying by age five globally if child marriage were eliminated, with an additional 400,000 surviving to age five if early childbirths alone were included The smaller estimate for ending child marriage as compared to the estimate when ending all early childbirths comes from the fact that not all early childbirths can be attributed to child marriage. In terms of under-five malnutrition, 3.6 million children could avoid stunting if all child marriages were eliminated, reaching 4.4 million if early childbirths were ended. The estimates in table 2 are for the 15-year period between 2016 and 2030. For estimates on a yearly basis, the figures have to be divided by 16. This would mean that 155,000 children would be saved each year on average (the number of lives saved does not change much across years due to compensating effects at work, including the growth in the population under age five on the one hand and secular trends towards lower rates of child marriage and early childbirths on the other).

Table 4.3: Children Avoiding Death by Age Five or Stunting, 2016 to 2030

	Children Not Dying (Million)	Children Not Stunted (Million)
Ending early childbirth	2.5	4.4
Ending child marriage	2.1	3.6

Source: Wodon (2017d).

72. **The second step in the analysis consists of valuing lives lost due to under-five mortality as well as earnings losses associated with stunting.** For the children and their families, the cost of lives lost are not primarily economic, and the same is true for stunting. At the same time, when considering the economic rationale for ending child marriage, providing an economic valuation of the impact of child marriage on under-five mortality and stunting through early childbirths is useful. There is no unique way to conduct the analysis, but the assumptions are as follows:

- *Cost of lives lost:* One of several approaches used in the literature consists of valuing a child's life in terms of GDP per capita, acknowledging that this implicitly values a life in a poorer country at a much lower value than in a richer country. For example, in a study on nutrition, Shekhar et al. (2016) value lives at the discounted stream of future GDP per capita in adult life. This approach is followed here, but with some modifications.
- *Cost of stunting:* Research suggests that stunted children are likely to have lower earnings in adulthood. In a study for Guatemala, per capita consumption in adulthood were reduced by 21 percent if they were stunted (Hoddinott, 2013). Estimates of losses in wages in other studies have been of a similar order of magnitude. Therefore, the benefits from avoiding stunting are based on expected future GDP per capita multiplied by the approximate share of wages in GDP and the share of wages lost due to stunting. This approach was used by Shekhar et al. (2016) and is used here with a few modifications in order to better account for individual countries' likely growth path (see Wodon, 2017d).
- *Discount rates:* Discount rates are used to value future incomes. The choice of discount rate affects the valuations, and it is good practice to conduct estimations for multiple discount rates. Using a discount rate of five percent is common practice, so this is the discount rate used for results shown here, but

both lower and higher discount rates have been used in the background work.

73. **The global benefits that could be reaped through a reduction in under-five mortality when ending child marriage are large.** Table 4.4 provides results for the economic benefits that would result from a reduction in under-five mortality and stunting from ending all child marriages, as well as early childbirths. The estimates are tentative. They should not be considered as precise given they depend on (1) econometric estimates of impacts that have themselves standard errors and (2) a range of assumptions for costing that could be debated. Still, the estimates provide an order of magnitude of the potential costs of child marriage and early childbirths in terms of their impact on young children. With a discount rate of five percent, the economic benefits from reduced deaths among children are estimated at $46.2 billion (in purchasing power parity) in 2016 and $90.2 billion in 2030 when all early childbirths are avoided. The benefits from ending child marriage are slightly smaller since for each country individually, while many early childbirths can be attributed to child marriage, this is not the case for all. The increase over time in benefits is mainly due to higher valuations for each life saved due to rising GDP per capita resulting from economic growth. Estimates do depend on the discount rate. A higher discount rate reduces benefits, while a lower discount rate increases them.

74. **For the reduction in stunting, benefits are lower at about one-fifth of those obtained with the reduction in under-five mortality.** For example, with a five percent discount rate, the benefits are valued at about $10 billion in 2016, rising to $19.1 billion in 2030. The reasons for lower benefits associated with the reduction in stunting in comparison to the reduction in mortality are simple. While the number of children avoiding stunting is almost twice the number of children surviving past age five, as shown in table 4.3, two more parameters (each of which is a share that is lower than one) are used for the valuation of the benefits from avoiding stunting, namely the share of wages in GDP and the share of wages lost in adulthood due to stunting. As a result, the valuation for each child of the benefits from avoiding stunting is only at about a tenth of the valuation of a life saved. All in all, the benefits from reduced stunting are therefore about five times lower than those related to the prevention of mortality among young children.

Table 4.4: Global Annual Benefits from Reduced Under-five Mortality and Stunting, 2016 and 2030

	2016	2030
	Reduced Mortality ($ Billion, purchasing power parity)	
Ending early childbirth		
Discount rate 3%	104.2	204.8
Discount rate 4%	68.6	134.3
Discount rate 5%	46.2	90.2
Discount rate 6%	31.9	62.0
Ending child marriage		
Discount rate 3%	94.1	185.7
Discount rate 4%	61.9	121.7
Discount rate 5%	41.6	81.6
Discount rate 6%	28.7	56.0
	Reduced Stunting ($ Billion, purchasing power parity)	
Ending early childbirth		
Discount rate 3%	22.1	43.8
Discount rate 4%	14.5	28.6
Discount rate 5%	9.7	19.1
Discount rate 6%	6.7	13.4
Ending child marriage		
Discount rate 3%	18.3	35.8
Discount rate 4%	12.0	23.5
Discount rate 5%	9.1	15.8
Discount rate 6%	5.6	10.8

Source: Wodon (2017d).

IMPACT OF CHILD MARRIAGE ON INTIMATE PARTNER VIOLENCE

75. **Child marriage may be associated with higher risks of intimate partner violence (IPV).** Child marriage can itself be considered as one of many forms of violence experienced by women and girls across their lifespans. This violence is related to the lack of voice and agency young girls face when their marriage is decided by others, as discussed in chapter 6. In this section however, the focus is on the impact of child marriage on the risk of IPV. Multiple studies have suggested that child marriage may increase risks of IPV (Clark et al. 2006; Carbone-Lopez, 2006; Solotaroff and Pande, 2014; Le et al., 2014). In turn, the health implications of these impacts can be serious (Campbell 2002; Lamb and Peterson 2012; World Health Organization 2014), as can be their cost implications for women and households (Duvvury et al. 2004; Centers for Disease Control and Prevention 2003; Snow-Jones 2006; Morrison and Orlando 2004; Bott et al. 2005). In a recent paper, Kidman (2016) finds that after adjusting for socio-demographic characteristics, child marriage remains associated with higher risks of IPV in many but not all countries. The type of violence affected was also not the same between countries. It is also worth noting that as mentioned earlier, IPV witnessed by children may have intergenerational effects, leading to intergenerational impacts. Research also suggests that IPV reduction interventions among child brides may not be as effective as IPV interventions among women married at an older age.

76. **Analysis suggests that across countries, marrying early does have an impact on IPV, which in some cases is large, but not always so.** In order to assess the potential reduction in IPV that could be achieved by ending child marriage,

Savadogo and Wodon (2017a) use DHS data for eight sub-Saharan countries. For Ethiopia and Niger, given that the module on violence was not included in the latest DHS, the analysis is based on the surveys implemented for this project (Steinhaus et al., 2017; John et al., 2017). The intensity of IPV is captured through an index taking values between zero (no violence at all) and 100 (worst cases of violence). While an alternative approach could have been used to consider different types of IPV separately, the results for the purpose of this report are not very different when doing so. The benefit of an overall index is that it provides a single summary measure of IPV as well as the impact of child marriage on that measure. For more detailed work on IPV, it is however recommended to also consider different types of IPV separately. Note also that we are measuring reported lifetime IPV, not actual IPV. DHS surveys are presumed to underreport IPV. On the other hand, since we measure lifetime IPV, a (probably small) part of the impact of child marriage may be related to the fact that child brides may have been married for longer. Table 4.4 provides estimates of the impact at the margin of child marriage on the IPV index after controlling for other variables also likely to affect IPV. The analysis is conducted for all married women in the sample, as well as for married women ages 18-24. In the majority of countries in the table, when marrying at 15 or earlier, the impacts are statistically significant This is less the case when marrying later. The magnitude of the effects is however not necessarily large given that the index takes on values between zero and 100. Still, some effects are clearly present.

Table 4.4: Impact of Child Marriage on Intimate Partner Violence, Women Ages

	Married women ages 15-49			Married women ages 18-24		
	Married at 15 or less	Married at 16	Married at 17	Married at 15 or less	Married at 16	Married at 17
Burkina Faso	0.77	NS	NS	1.78	NS	NS
Dem. Rep. of Congo	NS	NS	NS	-	-	-
Ethiopia	2.39	NS	NS	NS	NS	NS
Malawi	1.42	NS	NS	NS	NS	NS
Mali	1.04	NS	NS	NS	NS	NS
Mozambique	NS	NS	NS	2.14	0.70	NS
Niger	NS	NS	NS	NS	NS	NS
Nigeria	0.73	0.73	1.23	NS	0.89	NS
Uganda	6.34	5.87	NS	12.13	10.16	NS
Zambia	1.14	NS	NS	3.89	NS	NS
Pooled data set	0.56	NS	NS	1.70	1.54	1.25

Source: Savadogo and Wodon (2017a); see Steinhaus et al. (2017) for Niger and John et al. (2017) for Ethiopia. Data source: EICM for Ethiopia and DHS for other countries. Estimates for the Democratic Republic of Congo not provided for married women ages 18 to 24 due to small sample size to run the regression analysis for that bracket.
Note: NS = Not statistically significant at the 10 percent level.

77. **At the national level, while ending child marriage would help reduce IPV, the magnitude of the impacts depends on the country being considered.** The next step in the analysis consists of estimating the difference in the IPV index that would result at the national level from ending child marriage. The results are provided in table 4.5. In some countries, such as Nigeria and Uganda (which is an outlier), the effect of ending child marriage on the base line value of the IPV index is sizable (note that baseline values are at the lower range of the interval because

few women are subjected to extreme forms of violence when the index takes values close to 100). In the other countries as well as in the pooled sample, the effects tend to be smaller. This suggests that while in some countries ending child marriage could make a major difference in reducing IPV, this is not necessarily the case in all. Note that in a few countries, the simulated effects at the national level are zero because the coefficients for the child marriage variables in the regressions for factors affecting IPV are not statistically significant. There may also be indirect effects through the impact of child marriage on girls' educational attainment and the reduction in IPV often observed for women with a higher level of education.

Table 4.5: Simulated Changes in National IPV Indices from Ending Child Marriage

	Absolute change from base		Percentage change from base (%)	
	All women ages 15-49	Women ages 18-24	All women ages 15-49	Women ages 18-24
Burkina Faso	-0.18	-0.20	-7.33	-10.26
Democratic Republic of Congo	0.00	0.00	0.00	0.00
Ethiopia	-0.92	0.00	-10.37	0.00
Malawi	-0.35	-0.37	-4.78	-5.58
Mali	-0.37	-0.46	-5.49	-6.89
Mozambique	0.00	0.00	0.00	0.00
Niger	0.00	0.00	0.00	0.00
Nigeria	-0.46	-0.56	-12.57	-18.70
Uganda	-2.63	-2.47	-18.04	-20.84
Zambia	-0.23	-0.22	-2.81	-3.29
Pooled	-0.17	-0.18	-5.83	-3.36

Source: Savadogo and Wodon (2017a); see Steinhaus et al. (2017) for Niger and John et al. (2017) for Ethiopia. Data source: EICM for Niger and Ethiopia and DHS for other countries.

CHAPTER 5
IMPACTS ON EDUCATION, LABOR, AND EARNINGS

Child marriage and early childbirths may also have substantial impacts on the ability of adolescent girls to go to school. In some countries, there is evidence of almost a binary option of either going to school, or getting married early. This chapter uses two different approaches to assess the impact of child marriage on schooling and educational attainment for girls. In addition, the impact of additional years of education on the risk of child marriage is also estimated. For measures of earnings, the impact of child marriage on earnings and productivity in adulthood is simulated on the basis of wage regressions. Finally, issues related to household consumption and food security are also discussed. (For details on estimation methodologies and how results should be interpreted as order of magnitudes as opposed to precise estimates, please refer to Annex 1.)

Nepal – "*I liked going to school with my friends and playing with them. I really liked studying. If my parents had allowed me to study, I would have studied very sincerely. My friends could continue their study and now they have become wiser and clever. If I had studied I would have been working. But my parents held my marriage. I could not do anything after marriage. I now have children to look after"* (ICRW,2017).

Uganda – *"We are faced with long distances to primary schools. Girls on their way to school meet men with money who entice our daughters with money for sex. Later some get pregnant and drop out of school. Also we have no vocational school that will train our girls after P7 and S4, so we see it as a waste of resources to educate a girl"* (Wodon et al., 2016).

CHILD MARRIAGE, EARLY CHILDBIRTHS, AND EDUCATION FOR GIRLS

78. **Child marriage reduces education prospects for girls, and conversely better education and employment opportunities for girls may reduce the likelihood of marrying early.** This is why Brown (2012) suggests looking at 'tipping-point' policies in education for ending child marriage, including programs to reduce the cost for girls to transition to secondary school. At the same time, relatively few studies have attempted to carefully measure the impact of child marriage on education. The main difficulty is that the decision by a girl (or her parents) to marry early and possibly drop out of school are often jointly determined. Child marriage may, for example, depend on a girl's education prospects, whatever the mechanisms affecting those prospects are[10]. Put simply, the fact that for many girls, the options in some countries are to continue formal schooling or to marry, but not both, implies that

[10] Education prospects are influenced by traditional gender roles and expectations, particularly in countries without mandatory education requirements. They may also be affected by a girl's academic skills and interests. For example, girls who may be weaker academically could face smaller negative effects (for example in terms of future earnings) from not pursuing their education and thereby may have lower incentives to continue to study as compared to girls who are academically stronger. These girls may be more willing to marry early or their parents may be more inclined to have them marry early. Girls less interested in pursuing their education for other reasons may also marry earlier and might have dropped out of school in the absence of marriage.

causality between marriage and schooling goes both ways. There is also a risk (as with any estimation) of omitted variable bias. For example, poor education quality may lead to both dropout and child marriage. A lack of appropriate sanitation facilities for menstruating girls at school may impede their continuing education. Cultural practices may also play a role and not be observed in surveys. Secondary schools are often less accessible geographically to girls. Transportation to and from school may cost money that the girls or their families don't have. It may also take them out of the perceived safety of their communities, as they transit through unfamiliar villages and towns, something parents may not approve of (Nanda et al., 2015). If such factors lead to both child marriage and lower educational attainment and are not controlled for (because data are not available in surveys), there is a risk of omitted variable bias. The impact of child marriage on attainment could be overestimated without proper controls, but what can be done depends on the data available in surveys[11].

79. **A first approach to assessing the impact of child marriage and early childbirths on educational attainment consists of looking at responses to questions on why girls dropped out of school.** Two approaches have been used in the literature to try to assess the impact of child marriage on education. The first approach consists of relying on the reasons mentioned by parents in surveys for why their children have dropped out of school. The share of drop-outs that appear to be due to child marriage or early pregnancies can then be computed. Using data from the late 1990s for Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, and Togo, Lloyd and Mensch (2008) find that for girls aged 15 to 24, child marriage and early pregnancies directly account for between 5 percent and 33 percent of drop-outs, depending on the country. Using similar data for Nigeria for 2006, Nguyen and Wodon (2017a) find that child marriage (and to a lower extent pregnancies) account for 15 percent to 20 percent of drop-outs at the secondary level, which is broadly of the same order of magnitude. In addition, they show that if child marriage and early pregnancies could be eliminated, this could potentially reduce the gender gap in education by about half.

80. **A second approach relies on regression techniques with instrumental variables to measure the impact at the margin of child marriage on girls' education.** The objective of using instrumental variables is use variables that affect the decision to marry, but not education outcomes conditionally on the decision to marry in order to control for bi-directional causality (endogeneity).[12] Field and Ambrus (2009) used variation in the timing of menarche (puberty) as the

[11] In much of South Asia and parts of Africa, social norms around age at marriage and expected gender roles of a girl as wife/mother are likely to have a more significant role in determining the decision (most often by the parents, not the girl) to marry than invest in her education. But this does not mean that in the absence of child marriage, educational attainment would automatically increase – or as importantly, that higher educational attainment would have among others a large effect on future earnings, because the same social norms that led to child marriage may also constrain employment opportunities later in life, even in the absence of child marriage.

[12] Some authors rely on matching techniques to estimate the impact of child marriage on educational attainment (e.g., Sakellariou and Zheng 2014), but those techniques do not correct for endogeneity and may be overestimating impacts. They also tend to treat all girls marrying early similarly independently of the actual age at marriage.

instrumental variable for the age at first marriage, given that in many cultural and religious traditions, including in Bangladesh, girls often are not allowed to marry before reaching puberty. They found that each additional year of delay in the age of marriage increases schooling by 0.22 year and the likelihood by literacy of 5.6 percentage points. Nguyen and Wodon (2017b) use the contemporaneous and past prevalence of child marriage in the area where a girl lives as instruments, and also find that in Africa each year of early marriage reduces the probability of literacy by 5.6 percentage points, and the probability of secondary school completion by 6.5 points, with the impact on the probability of having at least some secondary education being slightly larger.

81. **Ideally, both approaches should be used for triangulation and robustness tests, but it is important to recognize that effects may vary within a country.** For Uganda, Wodon et al. (2016) use both approaches and find that child marriage has a large impact on secondary educational attainment with both the statistical approach based on the perceptions of both parents (as well as principals), and the econometric approach on the correlates of attainment. At the same time, it must be recognized that national estimates may mask heterogeneity at the local level. This emerges from the analysis for three rural and majority Muslim villages in Burkina Faso by Gemignani and Wodon (2017). In one village the inability to afford school is the main issue for households not sending girls to secondary school. But in the other two villages, apart from the affordability issues, the interactions between gender roles, faith, and culture play a fundamental role in limiting girls' education opportunities. There is a widespread perception in those two villages that adolescent girls should simply not go to public secondary schools. This heterogeneity also suggests that the desire to marry girls may lead to drop-outs in these two villages, while drop-out for economic reasons may in some cases lead to marriage at a young age in the first village.

IMPACT OF CHILD MARRIAGE AND EARLY CHILDBIRTHS ON GIRLS' EDUCATION

82. **Reasons mentioned by parents (or sometimes principals) in surveys for why their children have dropped out of school suggest that child marriage is a major factor.** The share of drop-outs that appear to be due to child marriage or early pregnancies can then be computed. Typically, these analyses, including country-level estimates for this study, suggest that 10 to 30 percent of the girls dropping out of school may do so because of an early marriage or a pregnancy, depending on the country. Table 5.1 provides a few illustrations of such measures in a subset of the core countries for which detailed work has been conducted for this study. While the definition of the variables differs slightly between countries, in part due to differences in survey questionnaires, child marriage and/or pregnancies (in the case of Uganda child marriage is not listed as a reason to drop out in the survey questionnaire, so pregnancies is used as a proxy) accounts for a substantial share of adolescent girls dropping out or not enrolled in school.

Table 5.1: Child Marriage and Pregnancies as Reasons for Not Being in School or Dropping Out

	Sample/Question	Share (%)
Egypt, 2012	Reason for dropping out, secondary/TVET level	Child marriage: 28%
Mali, 2013/14	Reason for not being in school, girls ages 14-17	Child marriage: 7%
Nepal, 2011	Reason for dropping out of school, girls ages 12-17	Child marriage: 32%
Niger, 2015	Reason for dropping out, secondary level	Child marriage: 23%
Nigeria, 2011	Reason for not being in school, secondary level	Child marriage: 11%
Uganda, 2012	Reason for dropping out, upper secondary level	Pregnancy: 23%

Source: Multiple studies by the authors.

83. **Subjective parental perceptions on the reasons to drop out of school may understate the role of child marriage.** Indeed, survey questionnaires on the reasons why a girl may have dropped out of school often include response modalities such as parents not willing to let a daughter continue her studies (which may mask a desire to have the daughter married), or the child herself not being interested in further studies (which may mask a desire on the part of a girl to get married). As an example of complementary data on the reasons for girls to drop out that suggests a larger impact of child marriage and pregnancies in leading girls to drop out, a separate question was asked in Uganda surveys about the main reasons for dropping out to school principals through a Community Facility Questionnaire. Pregnancies and child marriage account together for two thirds of the main reasons to dropout at the secondary level (27.6 percent for child marriage, and 40.2 percent for pregnancies). As noted by Wodon et al. (2016), this is not strictly comparable to the estimate for Uganda based on parental responses provided in table 5.1, because in the community module, questions were asked to principals about the main reasons for dropping out for boys and girls overall, and not the reason for each child. This may inflate the role of pregnancies and child marriage in drop-outs since the main reason declared by a principal need not be the reason applying to all girls leaving a principal's school. But it does confirm that child marriage and pregnancies are key factors for dropping out in Uganda as in many other countries.

84. **Qualitative data confirm that multiple factors lead girls to drop out or never enroll.** Cost, whether out-of-pocket or through the need to help at home (opportunity costs) remain serious obstacles to schooling in many countries. But in addition, marriage and pregnancies are also at play. In Uganda, the story of Susan in Wodon et al. (2016) illustrates the hardship that extreme poverty brings. Susan was 18 years old at the time she was interviewed. Her mother died. With one sister and four brothers, she lives with her father. She started school at six years of age and dropped out last year at the age of 17. She was still in primary school. She dropped out because she became pregnant. She had dropped out before in 2008 when she was in the third year of primary to help her mother who was bed-ridden just before she died. She now works as a causal laborer in people's gardens, earning about 8,000 shillings a week, which is not much (US $2.25). Payment is usually in cash, but at times in kind (she is given 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 since 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."*

85. **Typologies of adolescent girls according to their marriage and schooling status can be helpful to assess whether after a certain age, girls or their parents must essentially choose between marriage and schooling.** The idea of such typologies was suggested for Niger by Perlman et al. (2017a). Typologies can help to outline the type of programs that could be helpful for adolescent girls to continue to learn, whether in school or out of school (see also annex 4). The typology from Perlman et al. (2017a) considers four target groups, and it can be applied to various data sets in slightly different ways depending on the age groups available. When using data from DHS surveys, it makes sense to define the groups as follows: (1) Girls ages 15-16 still in school and not married; (2) Girls ages 15-16 out of school but not yet married; (3) Girls ages 17-19 still in school and not married; and (4) Married girls out of school. These four target groups are not exhaustive of the population of girls ages 15-19, but they stem from the fact that in many countries with a high prevalence of child marriage, relatively few girls not in school and older than 16 are not married, and even fewer girls of any age who have married are in school (in practice could benefit from programs targeted to the other groups). In most countries, the results suggest that once a girl is married, it is often difficult for her to remain in school as the share of married girls in school is typically very low.

86. **Econometric analysis using instrumental variables also suggests that child marriage may have a negative effect on schooling, although more at the primary than secondary level.** As mentioned earlier, a second and better approach to look at the impact of child marriage on educational attainment for girls relies on regression techniques. Estimates prepared for this study using this approach are provided in table 5.2 for the sub-Saharan Africa region, the Latin America and Caribbean Region, and the South Asia region (in each case, DHS data for multiple countries are pooled together for regional estimates). Consider the example of sub-Saharan Africa. The estimate of -0.078 for secondary enrollment in the table suggests that marrying at age 16 reduces the likelihood of completing secondary education by 7.8 percentage points. The earlier a girl marries, the larger the negative impact tends to be. Estimates in table 5.2 for the Latin American and Caribbean region and for South Asia are larger than for Africa in part because rates of enrollment and completion in secondary school are also higher. All estimates in this table are statistically significant. Estimates at the level of individual countries have also been obtained for this study, and in some cases are larger than the estimate for the region as a whole, especially for sub-Saharan African countries. Econometric estimates thus confirm the findings suggested by the reasons mentioned by parents as to why their daughters dropped out of school: child marriage plays a major role.

Table 5.2: Impact of Child Marriage on Secondary School Completion for Girls

	Latin America and Caribbean	Sub-Saharan Africa	South Asia
Married at 17	-0.045	-0.046	-0.049
Married at 16	-0.087	-0.078	-0.095
Married at 15	-0.124	-0.099	-0.137
Married at 14	-0.158	-0.112	-0.176
Married at 13	-0.187	-0.119	-0.210
Married at 12/earlier	-0.213	-0.123	-0.240

Source: Nguyen and Wodon (2017b, 2017c, 2017d).
Note: NS = Not statistically significant at the 10 percent level.

87. **The fact that child marriage curtails a girl's education can have a number of consequences, including for her children.** One such consequence is related to lifetime earnings. But beyond the importance of schooling to acquire knowledge and improve lifetime earnings, it is also essential to develop social skills and networks, with girls marrying early potentially missing on those opportunities (UNICEF 2014). A better education for mothers is also essential for their children, with clear impacts on early childhood development (Denboba et al., 2014). As mentioned in chapter 4, child marriage affects under-five malnutrition and mortality by contributing to early childbirths. A mother's educational attainment also has large impacts on child health (Smith and Haddad 2014). There are also intergenerational effects at work, with girls of mothers who married early possibly being less likely to complete secondary education themselves.

88. **Importantly, estimates also suggest that increasing girls' education is probably one of the best ways to avoid child marriage.** A recent review of the literature by Kalamar et al. (2016) suggests that interventions to promote education, including cash transfers, school vouchers, free school uniforms, reductions in school fees, teacher training, and life skills curricula, are among the most likely to help. In some cases, the evidence is mixed, but in many cases such interventions are found to reduce child marriage, or at least increase the age at first marriage. This is also underscored under the tipping point approach suggested by Brown (2012). Estimates of the impact of education on child marriage using the same instrumental variables methodology as that used to measure the impact of child marriage on education suggest that keeping girls in school may indeed have a large beneficial effect (Wodon and Yedan, 2017c). Key results are provided in table 5.3. For example, the estimates of -0.041 and -0.060 for Bangladesh suggest that each year of additional secondary education reduces the risk of marrying before the age of 18 by 4.1 percentage points and the risk of having a first child before the age of 18 by 6.0 percentage points in that country. All estimates in the table but one are statistically significant, leaving little doubt that effects are indeed at work. The implication is that keeping girls in school longer can be an effective way to delay the age at which girls marry or have their first child.

Table 5.3: Impact of Girls' Education on Child Marriage and Early Childbearing

	Impact of an Additional Year of Educational Attainment (Beyond Primary) on child marriage	Impact of an Additional Year of Educational Attainment (Beyond Primary) on early childbearing
Bangladesh	-0.041	-0.060
Burkina Faso	-0.071	-0.107
Democratic Rep. of Congo	-0.046	-0.031
Egypt	-0.054	-0.024
Ethiopia	-0.054	-0.060
Malawi	-0.037	NS
Mali	-0.126	-0.075
Mozambique	-0.070	-0.030
Nepal	-0.039	-0.032
Niger	-0.054	-0.126
Nigeria	-0.031	-0.036
Pakistan	-0.034	-0.028
Republic of Congo	-0.082	-0.089
Uganda	-0.072	-0.070
Zambia	-0.108	-0.046

Source: Wodon and Yedan (2017c).
Note: NS = Not statistically significant at the 10 percent level.

IMPACT OF CHILD MARRIAGE ON LABOR FORCE PARTICIPATION

89. **The relationship between child marriage and labor force participation is complex.** Child marriage leads to lower educational attainment and higher fertility. These are often cited factors affecting women's labor force participation and the nature of their employment. Yet while in some countries a higher education is associated with a higher likelihood of working (in part due to higher opportunity costs of not working), in other countries this is not the case. Specifically, in middle income countries, secondary and post-secondary education is often associated with higher participation in the labor force (Cameron et al. 2001; Mammen and Paxson 2000). But in low income countries, where labor markets tend to be informal and many women must work simply for the household to survive, impacts may be less salient. In comparison to broader gender roles that affect labor force participation, child marriage itself may not have a large direct impact on whether women work or not and the type of job held, even if there may be indirect effects at work.

90. **Indirect effects of child marriage on labor force participation may work through several channels, but they may not necessarily be large.** Women who marry early may have lower agency, limiting their bargaining power in households, including and possibly with regards to the decision to enter labor force. Through its impact on educational attainment, child marriage may affect labor force participation by reducing the opportunity cost of not working. In addition, through higher fertility and thereby a higher domestic workload, child marriage may affect the number of hours worked by women, although not necessarily whether they work or not and the type of job held. Note that in some cases, the direct and indirect (through fertility and educational attainment) effects of marriage may work in opposite directions, thereby compensating each other. Overall, the impact of child marriage on labor force participation may be positive or negative, and small or large depending on the

country or community. Assessing the direction and magnitude of the impact must be done empirically.

91. **Regression analysis with DHS data suggests in many cases that controlling for other factors, child marriage may not affect labor force participation much.** Table 5.4 provides estimates of the marginal impact of child marriage on labor force participation controlling for other factors that could affect labor force participation. In most countries (Bangladesh is an exception), marrying as a child versus marrying later appears to increase the likelihood of labor force participation as an adult. The same is true when considering work with payments in cash. In other words, reducing child marriage could lead (in terms of direct effect) to a reduction instead of an increase in women's labor force participation, including in terms of work with cash earnings. Child marriage also affects other variables, including the number of children women have and their education level. Indirect effects of child marriage on labor force participation through these variables may matter, especially in the case of educational attainment. In many countries, regression results suggest that a secondary education is associated with a higher likelihood of working in comparison to having no education at all, as well as a higher likelihood of being paid in cash. Therefore, through its effect on educational attainment, child marriage may reduce labor force participation. Given the multiple effects at work, the question is which type of effect matters most, and whether marrying early makes any difference.

Table 5.4: Impacts of Child Marriage on Labor Force Participation

	Marginal impacts		Simulated total impacts of ending child marriage			
			Labor force participation		Work with cash earnings	
	Labor force Partici-pation	Work with cash earnings	Women marrying early	All women	Women marrying early	All women
Burkina Faso	NS	0.0442	-0.75	-0.32	-2.27	-0.98
Bangladesh	-0.0136	-0.0142	3.54	1.80	-1.43	-0.73
DRC	0.0454	NS	-1.16	-0.37	0.59	0.19
Egypt	NS	NS	1.10	0.24	1.55	0.34
Ethiopia	NS	NS	0.83	0.45	0.91	0.50
Malawi	0.0250	0.0262	-1.29	-0.21	-1.36	-0.22
Mali	0.0484	0.0401	-3.50	-1.93	-4.03	-2.22
Mozambique	0.0592	NS	-2.81	-1.09	0.27	0.11
Nepal	0.0391	NS	-1.84	-0.57	0.89	0.27
Niger	NS	NS	0.23	0.17	0.12	0.09
Nigeria	0.0504	0.0201	-3.08	-1.61	0.13	0.07
Pakistan	0.0284	0.0249	-1.85	-0.80	-1.31	-0.57
Rep. Congo	0.0238	NS	-1.46	-0.68	0.46	0.21
Uganda	NS	NS	1.23	0.20	2.96	0.49
Zambia	NS	0.0357	1.04	0.24	-2.92	-0.68

Source: Savadogo and Wodon (2017b). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

92. **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 are small.** In order to simulate the overall effect of child marriage on the likelihood of labor force participation and the type of job held, three different effects are taken into account. First, child marriage may have direct effects on the likelihood

of work, as shown in table 5.4. Second, child marriage may have indirect effects on labor force participation through its effect on women's fertility. Third, child marriage may affect labor force participation through its impact on educational attainment. Table 5.4 provides estimates of the overall effects for the women who married early, as well as for women as a whole (these effects are smaller given that only some women married early, and for those who did not, no effects are simulated). The overall effects tend to be small. In most countries, ending child marriage would result in only a small increase or decrease in labor force participation, with similarly limited impacts on estimates of the likelihood of working with positive earnings. Note that increases in labor force participation across countries are from different bases since in some countries labor force participation by women is high while in others it is low.

IMPACT OF CHILD MARRIAGE ON EARNINGS AND PRODUCTIVITY

93. **By reducing educational attainment for girls, child marriage curtails their earnings.** Savadogo and Wodon (2017c) 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 consists of running wage regressions, and simulating earnings with lower fertility and higher education using a parametrization taking into account the impact of child marriage on both fertility (and thereby household structure) and educational attainment. Table 5.5 provides the main results from the estimations. In all countries, the 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 1.44 percent to 15.60 percent of baseline yearly earning spending on the country. Most of the gains come from a better education level for some of women who marry earlyif they are assumed to marry later, 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 some likelihood of gains. The gains in earnings or expected productivity for women as a whole range from 0.49 percent to 4.58 percent of base earnings depending on the country. Finally, when including men as well (whose earnings are not affected), the gains in the population's earnings range from 0.17 percent to 1.68 percent of the wage bill. The monetary valuation of those impacts is large. Ending child marriage could generate, depending on the country, from $19 million in the Republic of Congo to $7.6 billion in Nigeria in additional earnings and productivity in 2015 (in purchasing power parity). These gains would increase over time as the economy and population grow. As discussed in background work, the valuation of the benefits is based on a share of national consumption, which leads to a slightly higher estimate than would b the case with a share of labor earnings. At the same time, since no multiplier effects are considered as would be the case with a general equilibrium model, this seems to be a reasonable middle point (Savadogo and Wodon, 2017c).

94. **As mentioned in chapter 3, ending child marriage would entail costs for households and governments due to higher educational attainment for girls, but these costs would be small in comparison to expected benefits.** For households, both out-of-pocket and opportunity costs would need to be absorbed if girls are able to pursue their education further. For governments, budget allocations

would need to be provided in order to be able to absorb a higher number of girls in public secondary schools. At the same time, the magnitude of these costs would typically be small in comparison to the expected benefits from better educational attainment for girls, including through higher expected labor earnings and a range of other positive outcomes in adulthood.

Table 5.5: Gains in Earnings/Productivity from Ending Child Marriage (%)

	Women who married early	All women (married early or not)	All women and men	Cost (US$ million in 2015)
Bangladesh	11.85	4.58	1.23	4769.8
Burkina Faso	7.45	3.66	1.13	178.5
DRC	2.66	0.99	0.44	168.9
Egypt	9.20	1.50	0.38	2892.9
Ethiopia	9.29	4.39	1.50	1581.4
Malawi	10.10	3.03	1.61	167.4
Mali	9.73	4.40	1.00	174.8
Mozambique	15.60	4.02	1.68	374.9
Nepal	12.70	4.30	1.41	710.6
Niger	4.23	3.03	1.61	188.4
Nigeria	7.97	3.31	0.98	7607.7
Pakistan	13.28	3.21	0.88	6299.9
Republic of Congo	4.48	0.52	0.17	19.1
Uganda	14.48	3.28	1.03	513.9
Zambia	1.44	0.49	0.24	68.2

Source: Savadogo and Wodon (2017c). Data source: I2D2.

95. **The estimations assume no direct impact of child marriage on earnings controlling for education and other variables, an assumption that is validated by other datasets.** The estimations reported in table 5.5 are based on the World Bank's I2D2 database which does not include variables measuring early childbirths and child marriage. Therefore, the simulations assume implicitly no direct impact of child marriage on earnings controlling for education and other variables included in the wage regressions. Said differently, the impacts on earnings documented in table 5.5 result from the impact of child marriage on educational attainment for girls, and to a lower extent on the impact of child marriage on fertility and household size as well as the number of children in the household. This is a limit of the analysis, but other datasets tend to support this assumption. For example, analysis is carried for Niger and Nepal using existing large scale nationally representative living standards measurement surveys that have information on child marriage (in is the case of Nepal, see Wodon and Yedan, 2017d) and early childbirths (as in the case of Niger, see Nayihouba and Wodon, 2017b). The analysis suggests that in most cases, controlling for other variables including education, the fact that a woman married as a child or had a child early does not have a statistically significant impact on her earnings, considering both hourly and monthly or yearly earnings. Data are not available for most countries to conduct the same test, but the evidence available for other countries suggests that the negative impact of child marriage on earnings for women comes mainly from its impact on educational attainment for girls.

IMPACT OF CHILD MARRIAGE ON HOUSEHOLD WELFARE

96. **In most cases child marriage also does not seem to have a direct impact on household welfare measures after controlling for education and fertility, but indirect impacts are likely.** Again, while national surveys for many countries do not have information on child marriage and early childbirths, data from existing living standards measurement surveys for Niger and Nepal suggest that by and large, after controlling for other factors, child marriage or early childbirths do not directly affect household total consumption as well as food consumption very much (see Wodon and Yedan, 2017d for Nepal, and Nayihouba and Wodon, 2017b for Niger). The same is often observed for other measures of well-being such as perceptions of food security, perceptions of poverty, and asset level. There are however indirect effects of child marriage at work through fertility (a higher number of children in the household is associated with higher levels of poverty) and through girls' education (when mothers are less educated, household welfare is often reduced at the margin). These effects are probably due in large part to the negative impact of child marriage on earnings and productivity, as documented in the previous section.

97. **A lack of education for girls due in part to child marriage may however have other negative effects on productivity and investments.** If young brides are seen by their husbands as unable to make financial decisions for the household, this may reduce their ability to do so (World Bank 2012; Haddad et al. 1997). Lack of earnings may also have a negative effect on social capital and networks, further reducing earnings potential (Duflo 2011). In turn, lack of earnings for women in the household may reduce household investments in human capital, for example in terms of investing in education and health care for children (Hoddinott and Haddad 1995; Bussolo et al. 2011, Backiny-Yeta and Wodon 2010). Lack of resources for women may also reduce agricultural productivity (World Bank and ONE 2014).

INTERGENERATIONAL IMPACT OF CHILD MARRIAGE ON EDUCATION

98. **Through the educational attainment of mothers, child marriage has a negative impact on the educational attainment of the children of women married as children.** Apart from curtailing girls' education, child marriage may also affect the education of their children. Both direct and indirect effects could be at work. Controlling for other factors, child marriage could have a direct negative effect on the education of the children of mothers who marry early, although data are not available to test this hypothesis in many countries. When observed in other countries such as Niger and Nepal using large living standards measurement with information on child marriage or early childbirths, these effects are not always statistically significant, and they tend to be limited. However, indirectly, by curtailing the education of girls, child marriage does affect the education of the children of girls marrying early. This is because a mother's educational attainment is one of the factors that affect her children's educational attainment (the same could probably be said for learning).

CHAPTER 6
SELECTED OTHER IMPACTS

Apart from the impacts discussed in previous chapters, child marriage may have a wide range of other impacts on the girls marrying early, their children, and their communities. This chapters considers among others the impacts of child marriage on women's decision-making ability, land ownership, knowledge of HIV/AIDS, and birth registrations. (For details on estimation methodologies and how results should be interpreted as order of magnitudes as opposed to precise estimates, please refer to Annex 1.)

Niger: *"We never properly discussed [family planning]. It's my husband who used to say that he wants twenty children. In response, I told him that he wants to kill me: even goats can't have that number of kids. In the end, God decided otherwise very early and I did not have any more children. The spacing between my two children is large: four years. Despite everything, I wanted to have more [children]"* (ICRW, 2017).

Nigeria: *"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., 2017b).

IMPACT OF CHILD MARRIAGE ON WOMEN'S DECISION-MAKING

99. **Decision-making starts with the question of whether girls have a say in the decision to marry and whom to marry.** Child marriage results in part from the unequal power relationships between men and women and harmful social norms that emphasize and maintain an inferior, less valued place for women and girls in society. Child marriage not only impacts women's voice, agency and decision making in the household after they are married, but it is also an expression of the lack of these characteristics for women in these societies. In terms of the process and decisions leading to child marriage, in some cases, girls are forced to marry early by their family parents or close relatives. In other cases, they may be consenting to a marriage, even though international law raises concern about the ability of adolescent girls to consent to a lifelong contract like marriage. Examples of girls forced to marry early abound in qualitative studies, as evidenced by some of the quotes provided at the start of this chapter. Apart from the timing of marriage, in some cases, girls have a say in whom to marry. In others, they may not. Even when they are happy with the choice of groom, they may not have much choice in the matter.

100. **Child marriage may be associated with losses in agency and decision-making for women later in life.** As noted among others by Parsons et al. (2015),

child brides are often vulnerable—they are young, often poorly educated, and from disadvantaged socio-economic backgrounds. When they marry early, they may fall even more under the control of their husband and in-laws than would be the case if they had married later. This may limit their aspirations, as well as agency (Klugman et al., 2014), possibly limiting their decision-making ability, including in regard to access to health care during pregnancy and delivery. According to Kabeer (2008), a woman's capacity for choice depends on agency, access to resources, and past achievements. Child marriage clearly has an impact on resources, for example by contributing to girls' premature school drop-out and future limitations on learning. 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, child marriage may also affect agency if it reduces girls and women's decision-making ability in the household. However, the magnitude of these effects is not necessarily clear.

101. **Econometric analysis suggests that child marriage has a direct negative impact on decision-making ability in only a minority of countries. However, child marriage may also have an indirect impact through lower educational attainment.** Onagoruwa and Wodon (2017e) analyze the correlates of an index of agency or decision-making for women constructed using data from DHS surveys. The index is created through principal component analysis. The variables included in the index are of four types. First, women currently married are asked in the surveys about who makes decisions in the household in four areas: health care, household purchases, visits to friends and relatives, and the use of the husband's earnings. For each question, women may typically respond according to four modalities: they alone make decisions, they make decisions with the husband/partner, the husband makes decisions alone, or another person makes the decisions (or the husband has no earnings for the question pertaining to use of earnings). Second, women are also asked if they can refuse to have sex with their husband and if they can request their husband to use a condom when having sex. In addition, women respond to four different circumstances assessing if a husband is justified in beating their wife in those instances: if the wife goes out without telling her husband, if she neglects her children, if she argues with her husband, or if she refuses to have sex with him. Finally, women are asked whether getting their husband's permission to get medical help for themselves is a major problem or not. The index takes a value between zero and 100 after normalization. While an alternative approach could have been used to consider different types of decision-making separately, the results for the purpose of this report are not very different when doing so. The benefit of an overall index is that it provides a single summary measure of decision-making ability as well as the impact of child marriage on that measure. For more detailed work on decision-making, it is however recommended to also consider different types of decision-making separately. Table 6.1 provides the main results in terms of the marginal effects of child marriage as well as education on the index. The interpretation of the coefficients is in terms of gains/losses in the indices. The marginal impact of child marriage is statistically significant for only about a third of the countries. By contrast, effects through education tend to be larger as well as statistically significant in most countries. Therefore, in some cases directly, and in most cases indirectly (through its impact on educational attainment), child marriage may have a negative impact on decision-making ability. However, the impact that could be attributed to child marriage through education is likely to be limited, because only a subset of women

marrying early would have continued their schooling substantially. Note finally also that the marginal impacts of child marriage across countries fo not change very much when considering young women (and thereby focusing on the first few years after marriage) or all women in the survey samples.

Table 6.1: Impact of Child Marriage and Education on Decision-Making Ability

	Child marriage	Education (vs. none)		
		Primary	Secondary	Post-secondary
Bangladesh	NS	NS	2.971	5.725
Burkina Faso	-1.551	2.495	8.727	15.48
DRC	NS	1.918	4.345	15.37
Egypt	NS	1.370	7.800	11.61
Ethiopia	NS	5.664	11.88	21.61
Malawi	NS	NS	2.443	3.310
Mali	-2.226	NS	6.819	15.58
Mozambique	NS	1.595	4.068	4.160
Nepal	NS	NS	0.362	0.333
Niger	NS	NS	3.785	20.44
Nigeria	-1.128	1.500	3.007	6.388
Pakistan	2.041	4.827	8.028	11.19
Rep. of Congo	NS	4.861	9.097	14.26
Uganda	NS	NS	4.186	13.73
Zambia	-1.222	NS	5.622	11.37

Source: Onagoruwa and Wodon (2017e). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

IMPACT OF CHILD MARRIAGE ON LAND OWNERSHIP

102. **Child marriage could affect productivity through land ownership for women. In most countries, child marriage is associated with higher land ownership.** Limited work has been conducted on the relationship between child marriage and land ownership, so it is not clear whether such a relationship would be expected. DHS surveys provide data not on the amount of land owned by women, but whether they own land by themselves, jointly with their husband or partner, or under both types of ownership. Regression analysis is used to measure the potential impact of child marriage at the margin on land ownership controlling for other factors that may affect ownership. Different regressions are used for the various categories of ownership: alone, jointly, both, and all types of ownership combined. Table 6.3 provides the results. The interpretation of the coefficients is in terms of percentage point gains in the likelihood of ownership. For Burkina Faso for example, the coefficient of 0.0185 suggests that marrying early actually increases the likelihood of land ownership alone by about two percentage points for women in comparison to marrying later. A similar effect is observed for joint ownership, but not for women who have both types of ownership. In most countries, when the effects are statistically significant, they tend to be positive (the exception is Mali). While further research is needed to better understand the effects at work, there does not seem to be a negative effect of child marriage on land ownership. There are also limits to the analysis of land ownership that can be conducted, especially with DHS data[13].

[13] The positive impact of marrying early on land ownership may seem surprising since land ownership is often associated with agency for women, and child marriage is often associated with

Table 6.3: Impact of Child Marriage on Land Ownership by Category of Ownership

	Ownership alone	Joint ownership	Both types of ownership	All types combined
Burkina Faso	0.0218	NS	0.0043	0.0349
DRC	0.0100	NS	NS	NS
Egypt	NS	NS	NS	NS
Ethiopia	0.0240	NS	NS	0.0427
Mali	-0.0121	NS	NS	NS
Mozambique	0.0111	NS	NS	0.0320
Nepal	0.0145	NS	NS	0.0157
Niger	0.0185	0.0180	NS	0.0439
Nigeria	0.0097	NS	NS	0.0144
Pakistan	NS	0.0049	NS	NS
Rep. Congo	0.0121	0.0150	NS	0.0310
Uganda	0.0258	NS	NS	NS
Zambia	NS	NS	NS	0.0305

Source: Savadogo and Wodon (2017d). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

IMPACT OF CHILD MARRIAGE ON WOMEN'S KNOWLEDGE OF HIV/AIDS

103. **Child marriage may also have a direct or indirect impact on other forms of knowledge than the knowledge acquired mostly through school.** An example is that of knowledge related to HIV/AIDS. Onagoruwa and Wodon (2017f) analyze the correlates of an index of women's knowledge about HIV/AIDS. The index is created through principal component analysis using a range of questions available in DHS surveys such as responses from women on whether they agree or disagree with statements regarding HIV/AIDS preventive measures, transmission modes and symptoms. Specifically, the index accounts for responses to questions related to: the risk of getting HIV can be reduced by abstaining from sexual intercourse; the risk of getting HIV can be reduced by always using a condom when having sexual intercourse; the risk of getting HIV can be reduced by restricting sexual intercourse to one faithful partner; HIV can be transmitted by mosquito bites; HIV can be transmitted by sharing food with an infected person; a healthy-looking person can have HIV; HIV can be transmitted by witchcraft or supernatural means; HIV infected persons can live longer with drugs; HIV can be transmitted during pregnancy; HIV can be transmitted during delivery; HIV can be transmitted through breastfeeding; HIV can be transmitted by sharing sharp materials; HIV can be transmitted through unsafe blood transfusion; HIV can be transmitted by using unsterilized needle or syringe; and HIV can be transmitted by touching an infected person. The values of the index are normalized to take a value between zero and 100.

a loss in agency. Various factors could be at work. It could be that marrying early brings benefits for women in terms of bride price paid at the time of marriage which may contribute to higher land ownership. It may be that girls who marry early live in settings that are more traditional, leading to more women working the land, and possibly owning the land, than if there were engaged in other types of occupation. These and other facts may not be controlled for sufficiently in the regression, but what the results suggest is that marrying early may not lead to a loss in land ownership, at least when land ownership is measured as a yes/no variable.

104. **In most countries, child marriage does not appear to have a direct impact on knowledge of HIV/AIDS, but it may have an indirect impact through educational attainment.** Table 6.4 provides the main results of the regression analysis. The coefficient estimates suggest that the marginal direct impact of child marriage is statistically significant for only about a third of the countries. But as mentioned in the previous chapter, and as was the case for decision-making ability, child marriage has an impact on educational attainment, and educational attainment in turn has an impact on knowledge of HIV/AIDS. Therefore, indirectly (through its impact on educational attainment), child marriage does appear to have a negative impact on knowledge related to HIV/AIDS, with the impacts increasing as educational attainment increases. However, because only some of the girls who marry early would under current conditions complete a higher level of schooling, the indirect impact that could be attributed to child marriage through education may be relatively small in some countries, but possibly larger in others.

Table 6.4: Impact of Child Marriage and Education on Knowledge of HIV/AIDS

	Child marriage	Education (vs. none)		
		Primary	Secondary	Post-secondary
Bangladesh	NS	14.50	32.59	37.76
Burkina Faso	NS	NS	4.06	6.32
DRC	NS	NS	7.32	8.52
Egypt	-5.45	NS	26.99	44.86
Ethiopia	NS	6.67	7.29	5.29
Malawi	NS	2.38	4.11	4.09
Mali	NS	NS	11.00	6.17
Mozambique	-2.55	3.17	4.32	5.46
Nepal	NS	14.95	23.89	26.83
Niger	NS	8.00	12.14	19.94
Nigeria	NS	5.51	7.06	9.27
Pakistan	2.70	10.24	29.86	46.52
Rep. of Congo	-2.65	8.58	12.79	17.39
Uganda	NS	NS	4.91	4.17
Zambia	NS	5.02	6.85	9.13

Source: Onagoruwa and Wodon (2017f). Data source: DHS.
Note: NS = Not statistically significant at the 10 percent level.

IMPACT ON CHILD MARRIAGE ON BIRTH REGISTRATIONS

105. **Legislation related to the minimum age at marriage could potentially provide disincentives for registering birth, but this does not appear to be the case.** 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 actually enforced, which is rarely the case in many counties. Still, it is useful to use household survey to test whether such effects may be at work. As shown in table 6.5, the impact of child marriage on birth registration is not statistically significant in the set of countries for which Demographic and Health Surveys have information on birth registrations and/or certificates.

Table 6.4: Impact of Child Marriage on Birth Registrations

	Share of children under-five with registration or certificate (%)	Impact of child marriage
Burkina Faso	76.9	NS
Democratic Republic of Congo	24.6	NS
Egypt	99.4	-
Mozambique	47.9	NS
Nepal	42.3	NS
Niger	63.9	NS
Nigeria	29.8	NS
Republic of Congo	90.8	NS
Uganda	29.9	NS
Zambia	11.3	NS

Source: Onagoruwa and Wodon (2017g). Data source: DHS.
Note: In Egypt, virtually all children are registered, so that the regression analysis does not apply.

CHAPTER 7
CONCLUSION

To provide new evidence and inspire greater commitments towards ending child marriage, this study has estimated the impacts of the practice and its economic costs. The study looked at five domains of impacts: (i) fertility and population growth; (ii) health, nutrition, and violence; (iii) educational attainment; (iv) labor force participation, earnings, and productivity; and (v) decision-making and other areas. The results of the analysis indicate that child marriage has a wide range of negative impacts on girls, their children, families, communities, and national societies and, through a variety of costs, on economies at large.

106. **In many domains, the negative impacts of child marriage and early childbirths are large.** Table 7.1 summarizes the main findings from the study. The largest impacts of child marriage are related to fertility and population growth, education and earnings, and the health of the children born of young mothers. As noted in Wodon (2017a), these impacts are all closely related in terms of their timing in the life of adolescent girls. Particularly when use of modern contraception is low, child marriage leads to early childbirths, which increases health risks for mothers and the children born of young mothers. The timing of child marriages and early childbirths conflicts with the ability of girls to continue their education, which depresses earnings in adulthood. All those effects are at work at the time of marriage or soon after. By contrast, impacts in other domains – from violence to labour force participation decision-making, are observed throughout a woman's life and depend on many other factors than whether girls marry early. For example, intimate partner violence and a lack of decision-making ability are the result, at least in part, of widespread gender inequality. Child marriage contributes to perpetuating gender inequality, but delaying marriage by a few years may not be sufficient on its own to fundamentally change gender roles and social norms. This is probably why in those areas, while ending child marriage may help, impacts tend to be smaller and in some cases are not statistically significant.

107. **Even when the direct impacts of child marriage and early childbirths are not statistically significant, they may still be detrimental through their indirect impact on girls' education.** In table 7.1, a number of direct impacts of child marriage and early childbirths are not found to be statistically significant for some or even all countries. For example, after controlling for other variables including a woman's education level, child marriage is often not associated directly with a loss in decision-making ability, a reduction in knowledge of HIV/AIDS, or a lower likelihood of birth registration for children. At the same time, in all of those areas, higher educational attainment for women tends to have a beneficial impact. Therefore, through its negative impact on girl's educational attainment, child marriage is likely to have a negative effect indirectly in those areas as well.

Table 7.1: Impacts of Child Marriage (CM) and Early Childbirths (ECBs)

Fertility and Population Growth
Ending CM could reduce the total fertility rate by 11% across 15 countries
Ending CM could reduce the share of girls having a child before age 18 by three-fourths
Ending CM could increase national use of modern contraceptives slightly in some countries
Ending CM and ECBs would reduce population growth substantially
Health, Nutrition, and Violence
Ending ECBs would help save the life of three of every 100 children dying by age five
Ending ECBs would help avoid stunting for one of every 100 stunted children under five
CM is associated directly with higher risks of intimate partner violence for women
The impact of ending CM on maternal mortality and morbidity is not fully clear
Educational Attainment
CM is cited as a primary reason for dropping out of secondary school for girls
CM reduces substantially the likelihood of secondary school enrolment and completion
Each year of secondary school education reduces the risk of CM by 4 to 6 percentage points
Work, Earnings, and Welfare
Through education, CM reduces women's earnings in adulthood by 9%
Ending CM could increase national earnings by 1.0%
CM affects consumption and food adequacy through household sizes and educational attainment
Decision-making and Other Impacts
CM is directly associated with a loss in decision-making ability in a third of countries
CM is associated with higher land ownership for women
CM reduces women's knowledge of HIV/AIDS through its impact on educational attainment
CM is not directly associated with a reduction in the rate of birth registrations for young children

Sources: See the references provided in this study.

108. **The global economic costs associated with the impacts of child marriage and early childbirths are very large.** Tentative estimates of the global costs associated with the impacts of child marriage, or equivalently estimates of the benefits from ending child marriage (and in some cases early childbirths) are provided in table 7.2. These are annual estimates of costs or benefits from ending child marriage as of 2015, depending on the estimate. The estimates should not be considered as precise given that they depend on (1) econometric estimates of impacts that have themselves standard errors and (2) a range of assumptions for costing that could be debated. Still, they provide an order of magnitude of the potential costs of child marriage. By far, the largest economic cost of child marriage is the welfare loss associated with population growth. By reducing the annual rate of population growth, ending child marriage and associated childbirths could lead to welfare benefits globally of $566 billion (in purchasing power parity terms) by the year 2030. Substantial additional economic benefits would result from reductions in under-five mortality and stunting rates, valued at close to $100 billion in 2030 with a five percent discount rate.

Table 7.2: Order of Magnitude of the Benefits from Ending Child Marriage – Selected Global Estimates

	Annual Benefit in 2015	Annual Benefit in 2030
Welfare benefit from reduced population growth	$22 billion	$566 billion
Benefit from reduced under-five mortality	$42 billion	$82 billion
Benefit from reduced under-five stunting	$9 billion	$16 billion

Sources: See the references provided in this study.

109. **In addition to global cost estimates related to changes in population growth and child health that would result from ending child marriage, the study provides some cost estimates for other impacts for a subset of countries.** These estimates are calculated for budget savings to government education budgets that would result from slower population growth and from increased earnings gains for women, if child marriage were ended. As with the global estimates discussed above, these figures should be considered tentative given that they are based on statistical estimations which have standard errors as well as costing assumptions.

- Budget savings from lower fertility and population growth: Budget savings can be reaped from lower population growth. For the provision of public education, savings could reach up to $17 billion in current US dollars by 2030 in a set of 18 countries for which estimates were computed if universal secondary education were achieved by then. While this is an upper bound estimate of potential savings for these countries, the estimates globally would be significantly larger since only 18 countries are included. When considering the elimination only of child marriage (as opposed to child marriages and early childbirths), the estimates would be a bit smaller.

- Education and earnings: The costs related to earnings losses for women married as children are high. These costs are related for the most part to the fact that child marriage curtails the educational attainment of some of the girls who marry early, and higher educational attainment leads to higher lifetime earnings. The gains in earnings and productivity that would have been observed if women had not married early for a core set of 15 countries are estimated at $26 billion in 2015. These gains would increase over time due to population growth and higher standards of living and wages in most countries.

110. **By demonstrating the economic impacts of child marriage, this study provides further evidence to support ending child marriage.** Child marriage is widely considered a violation of girls' human rights. It curtails the opportunities provided to girls and their children. The evidence of the negative impacts of the practice on a wide range of outcomes is clear, and this study demonstrates that the practice has large economic costs as well. Some countries have supported efforts to end child marriage in recent years. Interventions being developed, tested, and implemented in those countries have the potential to make a difference. Even as these experiences will generate evidence that can be used for adaptation and scale up, it is clear that countries would benefit from increased support for such interventions and broader policies to end child marriage.

ANNEX 1
METHODOLOGICAL NOTE

111. **The results provided in this study rely on a number of methodological assumptions that have limits.** The methodology used for the estimations, as well as the links between the various components of the analysis are explained in Wodon (2017a). The aim of this study is to estimate the impacts of child marriage on a wide range of development outcomes and the economic costs associated with some of these impacts. Caveats are needed in terms of both what "impact" means in this study, and how the economic costs associated with impacts are computed.

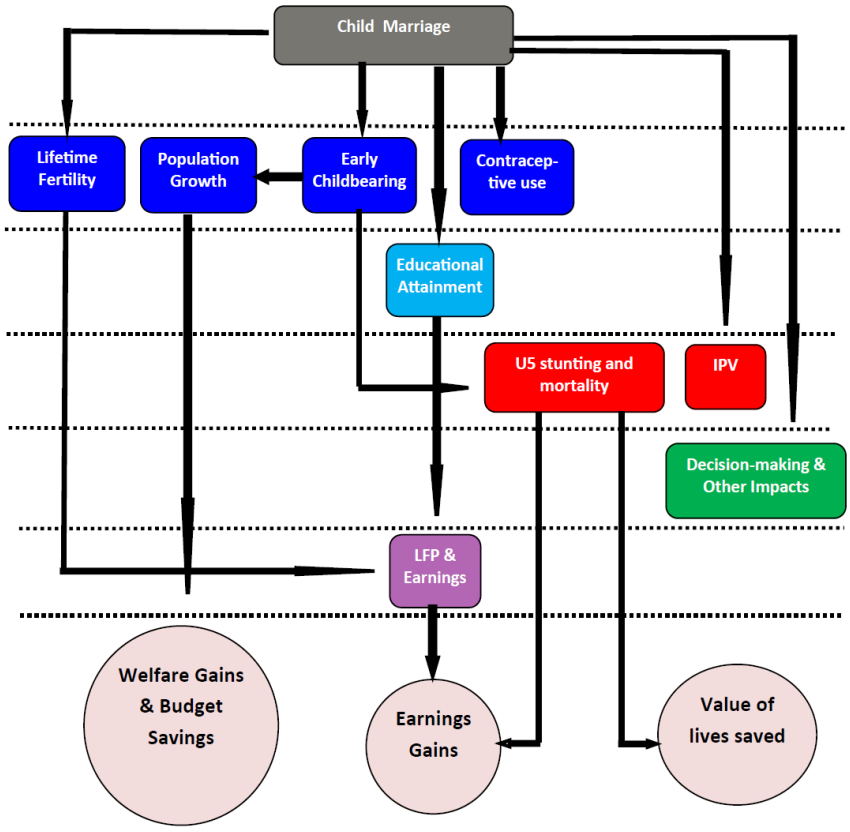
112. **The term "impact" is used loosely and for simplicity, but one must be careful about not necessarily inferring causality.** Estimates of impacts in this study are typically obtained through careful regression analysis aiming to isolate the potential impact of child marriage or early childbirths on various outcomes controlling for other factors affecting those outcomes. In the literature, this approach is known as "association studies". What is measured is a statistical association between child marriage or early childbirths and outcomes. This is not necessarily an impact as could be observed with a randomized control trial. Since child marriage cannot be randomized, the study must rely on regression analysis to estimate likely impacts, but there are always risks of bias in the measures of likely impacts.

113. **The estimation of the economic impacts of child marriage considers both direct and indirect effects.** Estimates of impacts are based on regression analysis. By direct effect, we simply mean the coefficient estimate for the child marriage variable as an explanatory variable in a regression setting (in some cases, such as under-five mortality and malnutrition, the direct effect refers to the coefficient estimate for an early childbirth, namely a birth to a mother younger than 18 at the time of the birth of the child). By indirect effect, we mean the coefficient estimate of another explanatory variable in the regression analysis that could itself be affected by child marriage or early childbearing. A good example is that of the educational attainment of a woman or mother. To illustrate, child marriage may not be considered as having a direct effect on knowledge of HIV/AIDS if the coefficient for the child marriage variable in that regression is not statistically significant. But child marriage may still have an indirect effect on knowledge of HIV/AIDS given that (1) child marriage tends to reduce on average the educational attainment of child brides, and (2) educational attainment tends to be associated in regression analysis with better knowledge about HIV/AIDS. In the case of education, given endogeneity between educational attainment and child marriage (as discussed below), the distinction between direct and indirect effects is not fool proof, but it is still useful to discuss pathways through which child marriage may have impacts.

114. **The estimation of several impacts and costs is undertaken in a sequential manner.** As mentioned in the introduction, this study looks at five domains of impacts of child marriage: (i) fertility and population growth; (ii) health, nutrition, and violence; (iii) educational attainment; (iv) labor force participation, earnings, and productivity; and (v) decision-making and other areas. For some of these impacts, the economic costs associated with the impacts are estimated. The conceptual framework for the study was provided in Figure 1 in the introduction. In practice, a

large number of estimations are needed for the analysis. The most important estimations are displayed in Figure A1.1. In that Figure, the five domains of impacts are highlighted in different colors, while the main cost estimates are listed at the bottom of the figure. In a number of cases, multiple estimations are needed in order to obtain cost estimates. For example, in order to measure the impact of child marriage on earnings for women, we must first estimate the impact of child marriage on total fertility, since the number of children that women have may affect their labor force participation, Next, we must estimate the impact of child marriage on educational attainment for child brides, since educational attainment affect the level of earnings that women are expected to have. More details on the estimations are provided in Wodon (2017a).

Figure A1.1: Principal Estimations for the Measures of Impacts and Costs



Source: Wodon (2017a).

115. **Two main types of bias could be at work in the regression analysis. The first risk is that of omitted variable bias.** The first type of bias is related to the risk of omitted variables that have an impact on the dependent variables. Omitted variables lead coefficient estimates to be biased. Typically, for the estimation of the relationship between child marriage or early childbirths and various outcomes, one would expect omitted variables to lead to an overestimation of the impact of child marriage or early childbirths on these outcomes, which would in turn lead to overestimating costs. This is because child marriage or early childbirths variables may capture broader gender effects at work. To the extent feasible, the use of

variables estimated at the level of communities in the specification of the regressions mitigates the risk of omitted variable bias, but not perfectly.

116. **The second risk is that of endogeneity, especially for the relationship between child marriage and educational attainment for girls.** Endogeneity is at work when two variables influence each other. For example, child marriage depends on a girls' education prospects, but in turn her education prospects depend on whether she marries as a child or not. Said differently, the decision to marry or go to school are jointly determined. As is the case for omitted variables, endogeneity may lead to bias (most likely an overestimation) in estimated impacts and costs. In order to deal with the issue of endogeneity, instrumental variables can be used, but such variables are not always easy to find. The econometric analysis of the relationship between education and child marriage in this study relies on instrumental variables. Still, despite care in the specification of the regressions, it could still be that the impact of child marriage on education outcomes are overestimated.

117. **While the two types of bias in the regression analysis may lead to overestimating impacts and costs, the fact that the discussion focuses mostly on direct impacts may lead to underestimation of impacts and costs.** For most impacts, the analysis focuses only on the direct impact of child marriage on outcomes controlling for other independent variables included in the regression analysis. This implies that indirect impacts of child marriage, including through the education of girls, are in most cases not factored in the assessment of impacts (the exception is the analysis of wages that incorporates indirect impacts). Possibly, the risk of overestimating direct impacts in the regression analysis due to omitted variables bias and in some cases endogeneity is compensated by the fact that for most estimations, potential indirect impacts and associated costs are not factored in.

118. **Based on measures of likely impacts, costs associated with some of the likely impacts are computed.** These costs are based on a number of assumptions that could be debated, so they only represent an order of magnitude of potential costs, as opposed to precise estimations. For example, some estimations factor in discount rates. These discount rates are somewhat arbitrary, and as shown in the case of the monetary valuation of the impacts of child marriage on under-five mortality and stunting, changing the discount rate can have a large impact on the cost estimates. Other assumptions, including in terms of expected growth rates in GDP per capita and trends in population growth, could also be debated.

119. **Keeping these caveats in mind, the study provides orders of magnitude of impacts and associated costs, as opposed to precise estimations.** While the study makes a strong case that child marriage and early childbirths have a wide range of negative impacts, the estimates of impacts and costs are approximate only.

ANNEX 2
DATA SOURCES

120. **The primary data sources for much of the analysis in this study are Demographic and Health Surveys (DHS).** The DHS surveys have four important advantages for the analysis of the impact of child marriage on various outcomes:

- The surveys are available for many countries. This makes it feasible to assess the impact of child marriage on knowledge or more precisely decision-making ability in different contexts.
- The surveys have been vetted extensively over many years in terms of questionnaire design and data collection, thus ensuring high quality data.
- Because estimations are conducted for many countries with comparable data, the statistical risk across countries of mistaken conclusions about the impact of child marriage is significantly reduced in comparison to conclusions that would be based on analysis for a few countries only.
- The surveys are publicly available, so other researchers can conduct similar analyses not only for the countries included in this brief but also for many other countries; this can provide additional validation of the main results.

121. **In addition to DHS surveys, the study relies on a few other data sources.** Table A2.1 provides the data sources used for the various parts of the analysis, focusing on the quantitative estimations. Beyond DHS surveys, the study also relies on (1) the World Bank's I2D2 database for wage regressions; (2) census data for geographic maps of child marriage; and (3) other country-specific data sources, including surveys implemented in Niger and Ethiopia for this study. Beyond these data sets, both ICRW and the World Bank undertook qualitative research for this study in selected countries using in-depth interviews, focus groups, and ethnographic methods.

122. **In a few cases, analytical results are based on the use of simulation tools parametrized with survey data**. DemProj and FamPlan (parametrized using DHS data) are used for simulating future population growth in the absence of child marriage and early childbirths. Separately, for the estimation of education budget savings from the reduction in population growth, a UNESCO model providing estimates of the cost of achieving universal secondary education is used.

Table A2.1: Data Sources Used for the Quantitative Analysis by Chapter/Section

Topic	Primary Data Sources
Chapter II – Child marriage and Early Childbirths	
Extent of Child Marriage and Early Childbirths	DHS
Share of Early Childbirths Likely Due to Child Marriage	DHS
Factors Leading to Child Marriage and Early Childbirths	DHS
Profile of Child Marriage by Level of Wealth	DHS
Geographic Profile of Child Marriage	Census
Chapter III – Impacts on fertility and Population Growth	
Impact of Child Marriage on Total Fertility	DHS
Impact of Child Marriage and Early Childbirths on Population Growth	DemProj/FamPlan
Welfare Benefits from Reduced Population Growth	DHS
Education Budget Savings from Reduced Population Growth	UNESCO Model
Chapter IV – Impacts on Health, Nutrition and Violence	
Child Marriage, Early Childbirths, and Health	NA
Impact of Early Childbirths on Maternal Health	DHS
Impact of Early Childbirths on Under-five Mortality and Stunting	DHS
Impact of Child Marriage on Intimate Partner Violence	DHS
Chapter V – Impacts on Education, Labor, and Earnings	
Child Marriage, Early Childbirths, and Education for Girls	NA
Impact of Child Marriage and Early Childbirths on Girls' Education	DHS & others
Impact of Child Marriage on Labor Force Participation	DHS
Impact of Child Marriage on Earnings and Productivity	I2D2
Intergenerational Impact of Child Marriage on Education	NA
Chapter VI – Selected Other Impacts	
Impact of Child Marriage on Women's Decision Making	DHS
Impact of Child Marriage on Land Ownership	DHS
Impact of Child Marriage on Women's Knowledge of HIV/AIDS	DHS
Impact of Child Marriage on Birth Registrations	DHS

Source: Wodon (2017a).

Note: NA indicates that the section of the report does not rely on empirical data extensively

ANNEX 3
CORE SET OF COUNTRIES FOR THE ESTIMATIONS

123. **This study provides estimates for 15 core countries for comparison purposes and to draw inferences at the global level.** For comparison purposes, when assessing the impact of child marriage on multiple outcomes in various settings, it is useful to estimate impacts for multiple countries since these impacts are not necessarily the same in different countries. Estimates for multiple countries are also needed in practice in order to be able to infer potential impacts at the global level through extrapolation.

124. **The core countries chosen for the estimations represent a wide variety of settings, including in terms of the prevalence of child marriage.** Table A3.1 lists the 15 core countries included in the analysis. The sample includes three South Asian countries (Bangladesh, Nepal, and Pakistan), one country from the Middle East (Egypt), six countries from West and Central Africa (Burkina Faso, Democratic Republic of Congo, Mali, Niger, Nigeria, Republic of Congo), and five countries from East and Southern Africa (Ethiopia, Malawi, Mozambique, Uganda, and Zambia). For all countries, the main surveys used for estimations (Demographic and Health Surveys) were implemented in 2010 or later and the results are based on the latest DHS survey available at the time of the analysis. Priority was given to countries with a relatively high prevalence of child marriage and early childbirths, but some of the countries such as Egypt have a much lower prevalence. In addition, demand at the World Bank for the analysis to be conducted in particular countries as part of on-going policy dialogue was also taken into account in the choice of the core countries for the estimations. Overall, while the countries are not a representative sample of the world as a whole, they represent quite diverse settings in regions of the world where the prevalence of early childbirth is high (sub-Saharan Africa and South Asia).

Table 3: List of Countries and DHS Data for the Main Estimations

Country	DHS survey year	Country	DHS survey year	Country	DHS survey year
Bangladesh	2011	Malawi	2010	Nigeria	2013
Burkina Faso	2010	Mali	2012-13	Pakistan	2012-13
DR Congo	2013-14	Mozambique	2011	Rep. Congo	2011-12
Egypt	2014	Nepal	2011	Uganda	2011
Ethiopia	2011	Niger	2012	Zambia	2013-14

Source: Wodon (2017a).

ANNEX 4
STRATEGIES TO END CHILD MARRIAGE

125. **While this report focuses on the economic and human costs of child marriage, and not how to implement strategies to do so, pointers on how to end the practice can be provided from the literature.** As noted in Perlman et al. (2017a), a useful starting point for thinking of potential interventions to end child marriage is to summarize findings from reviews of the literature on successful interventions. Malhotra et al. (2013) identified more than 150 programs and assessed the strategies used by 23 of these to change child marriage-related attitudes, behaviors and practices. The study, which included 15 programs in Asia, four in East Africa, three in North Africa/Middle East, and one in West Africa, identified five types of strategies utilized to prevent or delay early marriage: (1) Empowering girls with information, skills, and support networks; (2) Educating and mobilizing parents and community members; (3) Enhancing the accessibility and quality of formal schooling for girls; (4) Offering economic support and incentives for girls and their families; and (5) Fostering an enabling legal and policy framework. Examples of programs related to each of these five areas are provided in table A4.1 (a few programs have been added on top of the programs identified by Malhotra et al., 2013). Not all of these interventions are necessarily applicable or should be considered as priorities in all countries, but the list is a good start to consider options.

(1) *Empowering girls.* Many of the interventions reviewed by Malhotra et al. (2013) aimed to empower girls with information, skills and support networks. The idea is to help girls know themselves, their context, and their options by providing them with valuable information and training in a “safe space” environment while also reducing their isolation. The interventions mentioned in table 7.1 could be – and have been - considered in many countries, including life skills training, vocational and livelihoods skills training, mentored learning spaces to facilitate the acquisition of core academic skills, and safe spaces that allow girls to connect and socialize outside the home.

(2) *Engaging parents and communities.* Programs aiming to empower girls are typically implemented together with efforts to engage parents and communities so that an “enabling environment” is created and the stigma associated with delaying marriage is reduced. The interventions in this group aim to change social norms and reduce the pressure to marry early. Engaging parents and communities is also important to mitigate any potential unintended negative consequences of girls’ participation in the programs. A number of programs have found that such activities are useful when introducing a new program for girls. At the same time however, such type of community engagement alone rarely has impact. Rather it is the concrete and tangible benefits of the girls programming that facilitates change.

(3) *Improving the quality of formal schooling and education opportunities for girls.* This is a challenge in many countries where many girls drop out of secondary school in part because of concerns about quality. Unless schools improve, become affordable, and provide credible alternatives to early marriage for the

girls most at risk, hoping that schooling will work as a mechanism to reduce early marriage may not work as well as expected. It is therefore important to improve the quality of education systems.

(4) *Providing incentives and economic support.* The issue of the opportunity costs and out-of-pocket costs associated with schooling are major issues for girls not to pursue their education. Education in public schools is in principle free until junior secondary, but costs remain for households. Various incentives such as conditional cash transfers could help in making sure that girls do pursue their secondary education. Economic support through microfinance and other programs fostering employment also holds promise, and may have benefits in other areas such as sexual and reproductive health behaviors[14].

(5) *Enacting laws and policies.* Finally, in some countries enacting laws to prevent marriage before the age of 18 should be part of the enabling environment to eliminate the practice. In many countries such laws already exist, but they may not have the desired effect if not accompanied by mechanisms to enforce or accompany laws with appropriate complementary interventions. This means that multi-strategy approaches that combine laws with raising awareness among national decision-makers and local leaders of the importance to eliminate early marriage are more likely to be successful.

126. **A more recent review of interventions with high quality evidence for their impacts on child marriage suggests that interventions related to education should be priorities.** This review was conducted by Kalamar et al. (2016). It confirms that interventions to promote education, including cash transfers, school vouchers, free school uniforms, reductions in school fees, teacher training, and life skills curricula, are most likely to help. In some cases, the evidence is mixed, but in most cases interventions are found to reduce child marriage, or at least increase the age at first marriage. This is also underscored under the tipping point approach suggested by Brown (2012). Further studies, including those conducted by ICRW (Petroni et al, forthcoming), suggest the critical importance of providing comprehensive sexuality education and youth-friendly sexual and reproductive health services in ensuring that adolescents understand their sexuality and have

[14] In addition to dealing with the out-of-pocket and opportunity costs of education, programs aimed at increasing the earning potential of young women may affect their demand for reproductive services in three ways. First, the ability to make an economic contribution expands the role of women beyond that of sex and reproduction, which can increase their own desire to marry, or limit or space their childbearing. The transformation of girls from economic liabilities into assets in the eyes of their societies and families can alleviate external pressures on girls that shape their demand for reproductive control. Second, the loss in earnings associated with childrearing represents an opportunity cost to having another child which may increase young women's desire to limit or space births and also increase their desire to exercise reproductive control. And third, a 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 marriage and sexual reproductive health outcomes.

access to the information and services they need to avoid early pregnancies that often – in many settings – contribute to child marriage.

Table A4.1: Potential Strategies to Prevent Child Marriage

Strategy	Types of Programs
Empowering girls	- Life skills training - Vocational and livelihoods skills training - Information, education, comm. campaigns - Mentored learning spaces to facilitate acquisition of core academic skills - Safe spaces that allow girls to connect and socialize outside the home
Engaging parents and communities	- One-on-one meetings with parents, community and religious leaders to gain support - Group/community education on consequences of/alternatives to early marriage - Parental/adult committees/forums on life skills and SRH curricula - Information, education, comm. campaigns - Public announcements/pledges by leaders
Improving formal schooling and education opportunities for girls	- Preparing, training and supporting girls for enrolment/re-enrolment in school - Raising the quality of instruction in formal school to improve learning - Improving curriculum/training teachers on life skills, SRH, gender sensitivity - Building schools, improving facilities and hiring female teachers - Providing remedial education including through after-school programs
Providing incentives and economic support	- Incentives (cash, scholarships, fee subsidies, uniforms, supplies) to remain in school - Microfinance and related training to support income generation by adolescent girls
Enacting laws and policies	- Legal minimum age of marriage at 18 - Advocacy for new policies and enforcement of existing laws/policies. - Raising awareness about the negative consequences of early marriage

Source: Perlman et al. (2017a), adapted from Malhotra et al. (2013).

127. **In practice, it is necessary to adapt interventions to the particular context that prevails in any country.** A simple typology provided by Perlman et al. (2017a) originally for Niger outlines the type of programs that could be helpful for adolescent girls – both married and not married - in this country, but it could potentially be considered for other settings. The typology considers four target groups whose needs differ in some respects: (1) Girls ages 10-15 still in school and not married; (2) Girls ages 10-16 out of school but not yet married; (3) Girls ages 16-19 still in school and not married; and (4) Married girls out of school. A menu of potential interventions is suggested in table A4.2 is to tailor specific programs to the needs of these key groups of adolescent girls.

(1) The first two groups of girls are still in school. Most parents regard formal education as an acceptable alternative to early marriage. But the cost of schooling (out of pocket and opportunity costs) is high for households in poverty. In addition, low quality of education in rural schools does not encourage parents to invest in their daughters' education. In order to improve school quality, a focus on literacy and numeracy skills acquisition should be a priority for girls ages 10-15. In addition, cash transfers or other programs to help offset the cost of schooling are needed. Finally, girls in that group also need life skills training. Similarly, for girls in school ages 16-19, schooling must provide value. This can

be achieved by focusing more on preparing girls for the formal labor market positions such as those held by teachers and nurses. This would help not only those girls, but adolescent girls more generally by providing role models to show to communities that women can get such jobs if well educated. Several interventions for girls ages 10-15 also apply to this group.

(2) For girls out of school, the interventions listed in table A4.2 differ depending on whether they are married or not. For girls not yet married, the key is again to provide a viable alternative to marriage. Programs should focus on building financial literacy, microenterprise skills, enhancing access to savings and expanding economic opportunities. Life skills should also be emphasized through 'safe space clubs' together with financial incentives to attend. These programs should look almost like schooling to achieve some of the protective status against early marriage provided by formal education. This could be done by providing uniforms resembling those worn by schoolgirls, and ensuring that the clubs meet at least three times a week for several hours. Finally, for girls already married, programs could also offer financial literacy, microenterprise skills, and access to savings groups, as well as life skills, including a focus on knowledge about reproductive health, but in a culturally sensitive way to promote birth spacing and the use of contraception.

Table A4.2: Interventions for Adolescent Girls by Target Groups - Some Examples

Target Group	Objective	Interventions
	In School	
Ages 10-15	Remaining in school	Economic incentives to remain in school
	Learning in school	Basic literacy and numeracy curriculum
	Acquiring life skills	Life skills programs through safe spaces
Ages 16-19	Remaining in school	Economic incentives to remain in school
	Learning in school	Skills for formal employment curriculum
	Acquiring life skills	Life skills programs through safe spaces
	Out of School	
Not married	Providing incentives	Economic incentives to enroll in training
10-16	Providing training	Broad livelihood/entrepreneurship training
	Providing financing	Access to a savings group
	Ensuring literacy/numeracy	Remedial education for literacy/numeracy
	Acquiring life skills	Life skills programs through safe spaces
Married	Providing training	Training for home-based enterprises
All ages	Providing financing	Access to a savings group
	Ensuring literacy/numeracy	Remedial education for literacy/numeracy
	Acquiring life skills	Life skills programs through safe spaces
	Mentoring younger girls	Married girls serving as cascading mentors.

Source: Perlman et al. (2017a).

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