The population impact of delaying childbearing in the context of high adolescent fertility and marriage

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Abstract
We examine the population impact of delaying childbearing in the context of efforts to eliminate child marriage, invest in the human capital of girls and expand access to sexual and reproductive health information and services. In the future, these efforts would likely lead to a reduction of fertility rates in the youngest age groups. For the period up to 2040, we simulate a postponement of childbearing and use a cohort component population projection method for two types of countries where marriage at young ages is common: one where adolescent fertility (births to females aged 15-19) and period total fertility are currently high (Ethiopia and Nigeria) and one where adolescent fertility is high and total fertility is already approaching replacement level (Bangladesh and Nepal). Delayed childbearing has an impact on population growth net of the projected fertility decline, and the impact is an 8 to 10 per cent reduction in the population below age 20 by 2040 compared to the projection with no postponement of childbearing.

Introduction

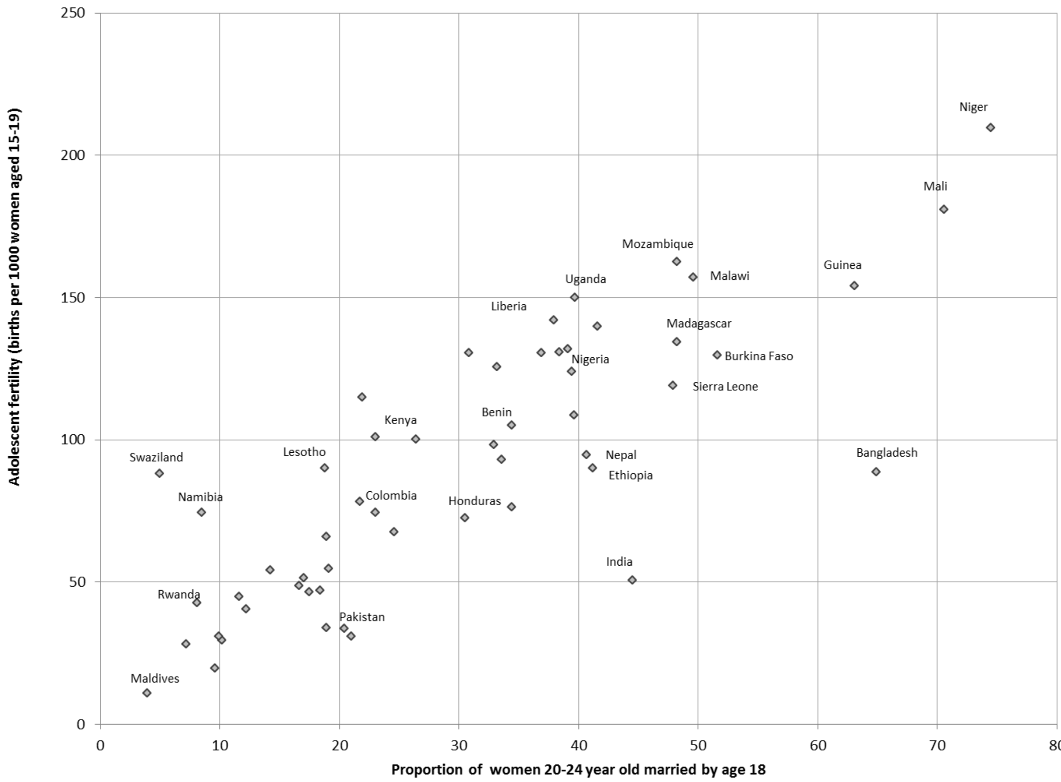
International efforts to improve the human capital of girls and young women and to ensure the protection of their rights, such as a focus of the Millennium Development Goals on achieving gender parity in schooling, reducing adolescent fertility and expanding access to reproductive health services (United Nations, 2013a), efforts to eliminate child marriage (Machel et al., 2013) and the attention to girls and women in the new global development agenda will ultimately change the lives of girls and young women. As a greater proportion of girls and young women in each succeeding cohort achieves a higher level of schooling, postpones marriage and has access to effective methods of contraception, these efforts are likely to prompt, sustain or even accelerate a delay in the start of childbearing.

In this paper we examine the potential macro-level impact of delaying childbearing on period total fertility and on population growth from 2010 to 2040, a time period in which we introduce the gradual postponement from early to later childbearing. We test the impact of delayed childbearing by simulating changes in age-specific fertility rates (ASFR) and using a cohort component population projection method for two types of countries where marriage at young ages is common: one where adolescent fertility (aged 15-19) and period total fertility are currently high (Ethiopia and Nigeria) and one where adolescent fertility is high and period total fertility is already approaching replacement level (Bangladesh and Nepal).

Current levels of child marriage and adolescent childbearing

Elimination of child marriage (commonly defined as marriage before the age of 18) has gained international attention as part of efforts to improve gender equality and women's empowerment as well as women's health (Machel et al., 2013), and has also been proposed as a target for the new global development agenda (High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, 2013). Most countries have laws that would theoretically make child marriage rare. For example, in 2010, 158 countries had a minimum legal age at marriage for women (without parental consent) of 18 years or older (United Nations, 2011). Yet child marriage still remains common, especially in Southern Asia and sub-Saharan Africa. In 39 countries at least one in three young women (aged 20-24) reported in a recent survey that they had married before the age of 18 (UNICEF, 2013). A young age at marriage is also associated with a young age at the start of childbearing and high levels of adolescent fertility (figure 1), with the exception of most countries in Latin America and the Caribbean and Southern Africa, where adolescent childbearing is often outside of marriage.

FIGURE 1 Prevalence of child marriage and adolescent fertility, 2005-2010

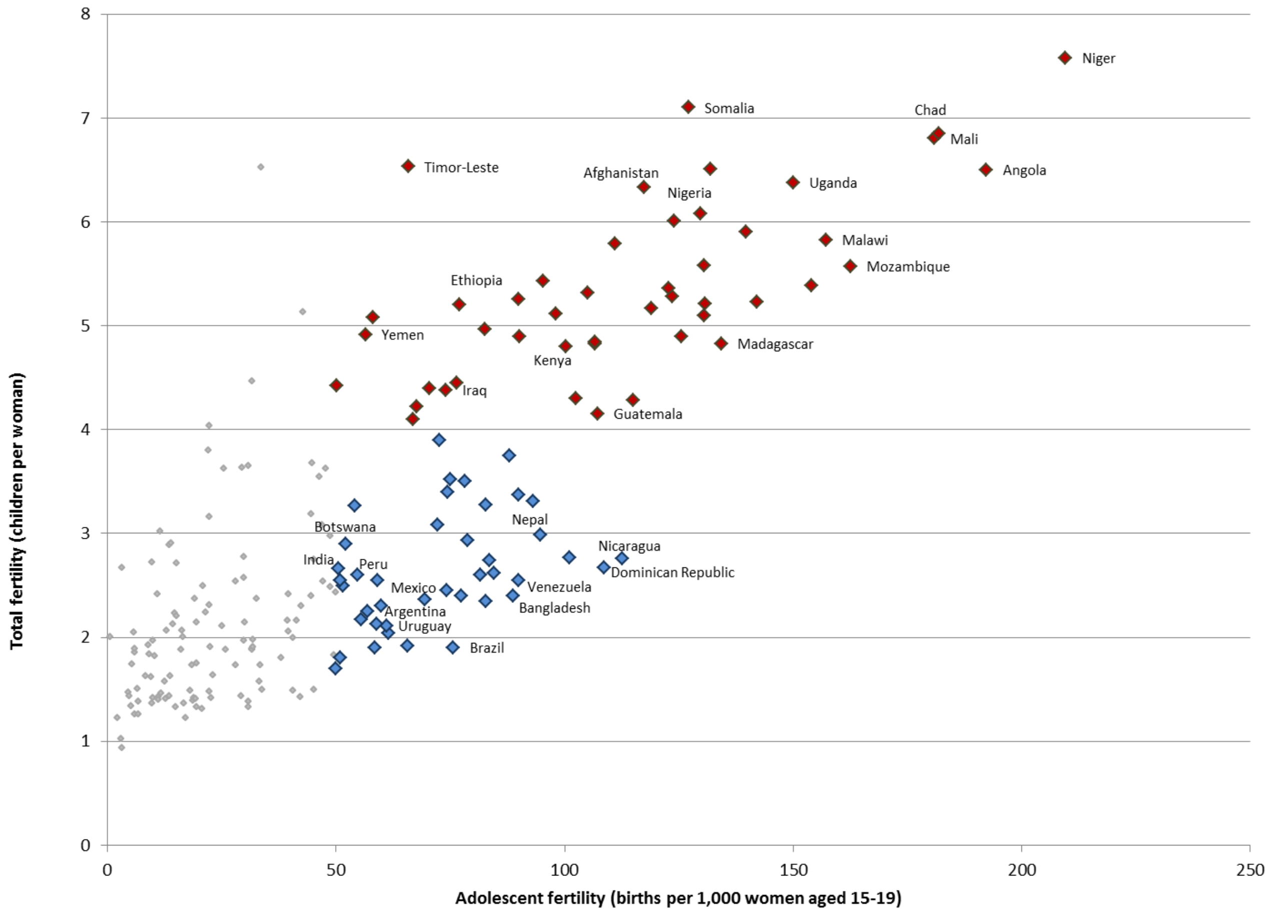


Source: UNICEF, 2013, table 9 and World Population Prospects 2012 (United Nations, 2013b)

The four countries included in this analysis have relatively high levels of both early marriage and childbearing. Nepal and Ethiopia have a prevalence of child marriage around 40 per cent and adolescent fertility is estimated around 90 births per 1,000 women aged 15-19 for the period 2005-2010 (United Nations, 2013b). Nigeria has a similar prevalence of child marriage but a much higher level of adolescent fertility (135 births per 1,000 women aged 15-19). Bangladesh has a similar level of adolescent childbearing as Ethiopia and Nepal, but a much higher prevalence of child marriage (65 per cent of women aged 20-24 reported that they had married before the age of 18).

In general, with high adolescent fertility, the overall number of children per woman is high. There is, however, a wide range of situations. Countries with adolescent fertility above 50 births per 1,000 women aged 15 to 19 but period total fertility below 4 children per woman in 2005-2010 are mainly in South Asia, Southern Africa, and Latin America and the Caribbean, including Bangladesh with period total fertility estimated for 2005-2010 at 2.4 children per woman and Nepal with 3.0 children per woman (Figure 2). During the fertility transition in these countries, fertility declined proportionally more in older age groups and childbearing is now concentrated into younger age groups. Countries with high adolescent fertility and high period total fertility are primarily in sub-Saharan Africa, including Nigeria with more than 6 children per woman and Ethiopia with 5.3 children per woman in 2005-2010.

FIGURE 2 Total fertility and adolescent fertility, 2005-2010



Source: World Population Prospects 2012 (United Nations, 2013b)
Note: Countries in the figure are divided into three groups: countries where adolescent fertility is below 50 births per 1000 women aged 15-19 (grey colour); countries where adolescent fertility is more than 50 births per 1000 women aged 15-19 and total fertility is more than 4 children per woman (red colour) or less than 4 children per woman (blue colour).

High population growth is projected to continue in all four countries. Yet, the extent and components of the population growth are quite different. Ethiopia and Nigeria are expected to grow fast and are projected to more than double by 2050 (increase 2.2 times in Ethiopia and 2.8 times in Nigeria). High fertility is responsible for the high population growth: in Nigeria, 75 per cent of the population increase between 2010 and 2050 is due to projected fertility above replacement level and in Ethiopia 47 per cent of population increase in this period is from above-replacement fertility. Additionally, a young age structure of the population is responsible for 22 per cent of the projected population increase between 2010 and 2050 in Nigeria and 45 per cent in Ethiopia (Andreev et al., 2013). Bangladesh and Nepal, despite period total fertility levels that are projected to be below 2.1 children per woman from around 2020 onwards, are expected to have total populations larger by one third by 2050. These populations continue to grow even at or below replacement-level fertility because of current young age structures, as relatively large cohorts at young ages move through their childbearing years.

Changes in the timing of childbearing and population growth

The potential impact of shifts to later ages of childbearing on population growth was addressed over 50 years ago by Coale and Tye (1961), who argued for incorporating the delay in age of marriage into the population policy discourse. They showed that even when the total number of children each woman bears does not change, postponing marriage (and, implicitly, childbearing) would slow population growth in high-fertility populations. They employed a mathematical model developed earlier (see Dublin and Lotka, 1925) and empirical evidence comparing the population growth rates of two high-fertility populations, each with different age patterns of childbearing, and concluded that high-fertility populations with later patterns of childbearing experienced slower population growth.

Two main reasons why a younger childbearing pattern in populations with high fertility and mortality produces faster growth are: 1) younger childbearing permits some births to occur that otherwise would be prevented by the mortality of women of reproductive age, and 2) the population growth per generation that results from a given average number of offspring is compressed into a shorter time period to produce a higher annual rate of growth. Also, the pyramid shape of the age distribution in high-fertility countries, with large population sizes at young ages and a rapid reduction in the number of women in older age groups, results in a larger number of births when the same fertility rates are applied to younger age groups.

The shifts in the timing (tempo) of childbearing may cause considerable fluctuations in period fertility rates and thus have an additional impact on population size. The increased period fertility of the baby boom era between the mid-1950s and the mid-1960s in many countries in Western and Northern Europe, as well as the pronatalist policy measures in a number of countries in Central and Eastern Europe during the communist regime, were partly driven by shift of childbearing to younger ages of women. In the opposite direction, the ongoing trend in the postponement of childbearing in Europe has been unprecedented in its pace, duration and ultimately its impact on period fertility measures, explaining a large part of the declines and rises in period total fertility in Europe (Sobotka, 2004; Bongaarts and Sobotka, 2012) and consequently influencing population growth. It has been suggested that ending the increase in the mean age at childbearing in Europe would have a substantial effect on population dynamics by slowing population decline and aging (Lutz et. al, 2003; Lutz and Skirbekk, 2005).

In the context of high-fertility countries, Bongaarts (1994) addressed the delay in childbearing with respect to policy-relevant ways to slow population growth attributable to population momentum. He examined the potential population impact of delayed childbearing by simulating the effect for a population with replacement-level fertility of a 2.5 year and 5 year increase in the mean age at childbearing. Substantial reductions in population size resulted by 2100: for all developing countries, a 2.5 and 5 year delay in childbearing resulted in a reduction of 0.6 billion and 1.2 billion, respectively. A more recent study of the demographic impact of delayed childbearing used cohort component population projections in India and found that a policy encouraging later marriage and longer birth spacing would result in a future total population in 2050 of about 52 million fewer people–a reduction by 3.3 per cent—than if the current early fertility trajectory in India continued (Matthews et al., 2009).

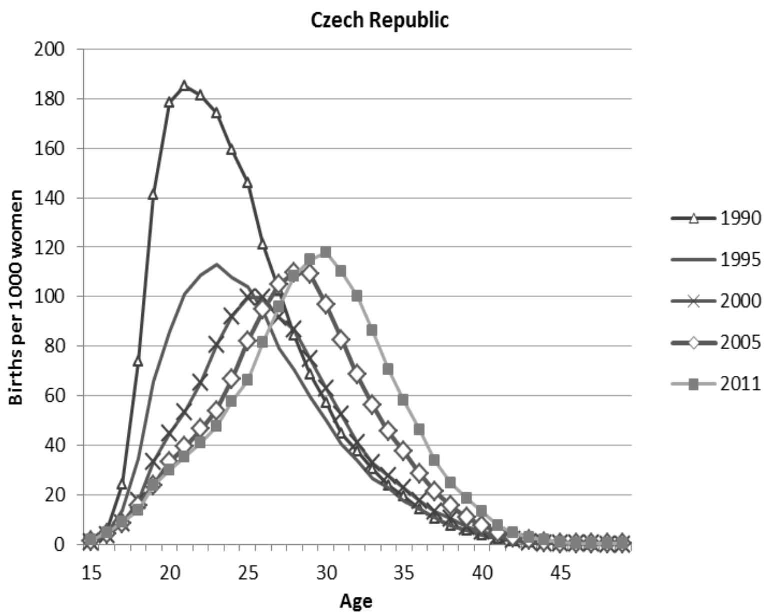
In estimating the impact of changes in the timing of childbearing and population growth, these previous studies employed either mathematical models derived from stable population theory and its extensions with simulation exercises of changes in the mean age of childbearing in specific populations (Bongaarts, 1994; Lutz et al., 2003; Goldstein et al., 2003), or full details of current and projected age-specific fertility rates, starting age structure and mortality and migration projections in a full cohort-component model (Lutz and Skirbekk, 2005; Matthews et al., 2009). While the first approach is valuable for studying long-term impacts, the second approach enables a more detailed assessment of the impact of the postponement of childbearing in the short term of just a few decades.

Recent examples of the postponement of childbearing

While early childbearing has never been as common in Europe as in parts of Africa and Asia, there are recent examples of fast reductions of high fertility rates among women aged 15 to 24 years through the process of the postponement of childbearing. For example, in the Czech Republic as of 1990, the peak fertility rates were among 21-year-olds (185 births per 1,000 women aged 21), and a quarter of period total fertility was contributed by women aged 19 or less (Human Fertility Database, 2014). In the wake of political, economic and social transformations since 1990, the postponement of childbearing played a pivotal role in the fall of period total fertility rates over the 1990s. The experience of the Czech Republic illustrates that the reduction in early childbearing can occur in a short time period: in just 15 years, the fertility rates among women aged 18-22 declined by more than three quarters of the levels in 1990 (figure 3). Similar changes in timing of childbearing characterize many Central and Eastern European countries (Sobotka, 2004). In more general terms, the postponement of the mean age at childbearing has characterized a wide range of countries with diverse cultural and social conditions in Europe, East Asia, Northern America and Australia and New Zealand.

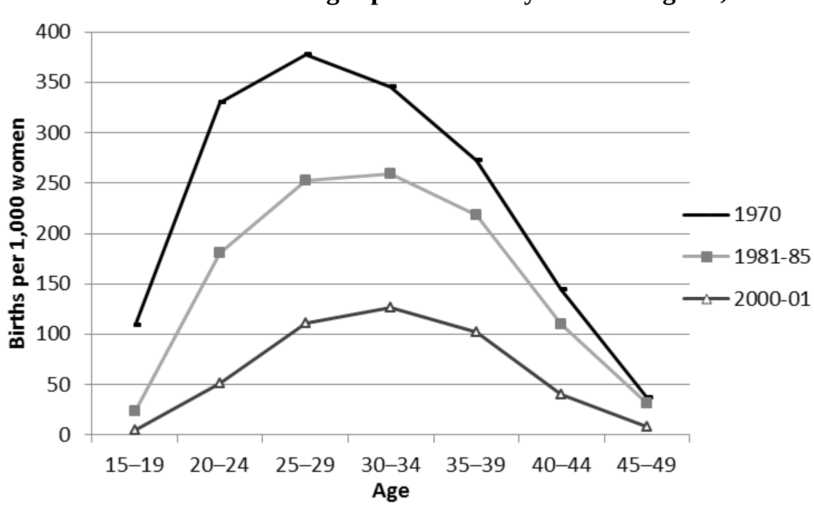
Outside of these regions, few other countries have experienced a significant postponement in the mean age at childbearing. In countries of Northern Africa, rapid fertility declines in the 1970s and 1980s have been led by delays in marriage. In Algeria, the proportion of women married at young age groups declined between the 1966 and the 1987 censuses: from 44 per cent to 9 per cent at ages 15–19 and from 83 per cent to 46 per cent at ages 20–24 (United Nations, 2013). Period total fertility in the country declined from 8.1 children per woman in 1970 to 5.3 in 1981–1985. In societies where women face heavy social restrictions against sexual relationships outside of marriage, a rise in the marriage age is strongly correlated with lower fertility (Ouadah-Bedidi and Vallin, 2013). Such declines in fertility rates are then concentrated at young ages (figure 4); fertility rates among women aged 15-19 declined from 109 births per 1,000 women in 1970 to 24 in 1981-1985 and among women aged 20 to 24 from 330 births per 1,000 women in 1970 to 181 in 1981-1985.

FIGURE 3 Age-specific fertility rates in the Czech Republic, selected observations



Source: Human Fertility Database. http://www.humanfertility.org

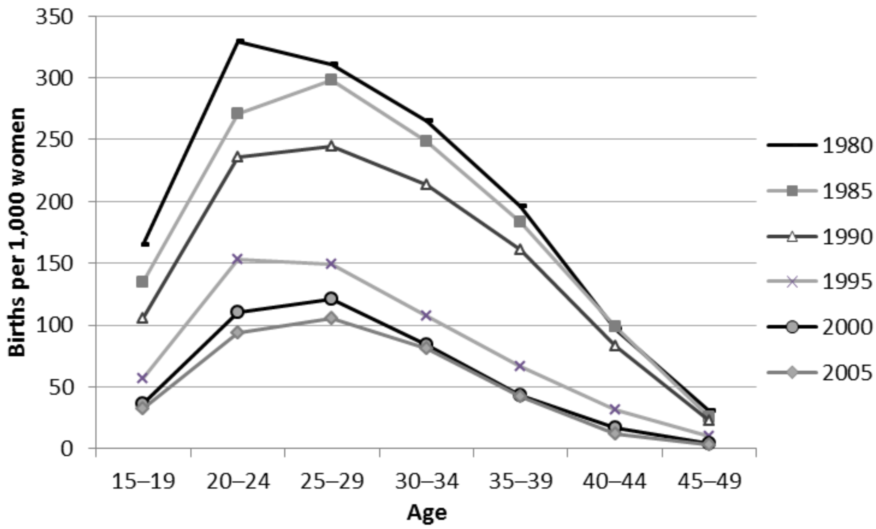
FIGURE 4 Age-specific fertility rates in Algeria, selected observations



Source: Collection of data by Ouadah-Bedidi and Vallin, 2013.

The fast fertility transition in Iran is another example. In 1980, the adolescent fertility rate was above 150 births per 1,000 women aged 15-19. During the 1980s fertility shifted to a relatively later childbearing pattern with the peak of childbearing in the age group 25–29 years. Since the late 1990s, adolescent fertility rates declined further to below 50 births per 1,000 women by 2000 (Abbasi-Shavazi et al., 2009). At the same time, the proportion of women married in young age groups declined between the 1976 and the 2006 censuses: from 34 per cent to 17 per cent at ages 15–19 and from 79 per cent to 50 per cent at ages 20–24 (Abbasi-Shavazi et al., 2009).

FIGURE 5 Age-specific fertility rates in Iran, selected observations



Source: Own-children estimates of the age specific fertility rates for Iran, 1986, 1996, 2006 Censuses (Table 3.3, page 52, Abbasi et al., 2009).

Algeria and Iran are examples of countries with an initial situation of early marriage and high fertility rates and where postponement of marriage and childbearing contributed to faster fertility transitions. Such types of fertility transitions are examples of the potential impact of eliminating child marriage and delaying childbearing in high-fertility countries in Africa and Asia. The mechanism of the postponement of childbearing in Central and Eastern European countries, with initial situations of early marriage and total fertility close to replacement level, are examples of the potential impact of delaying childbearing in countries in Asia with high adolescent fertility and period total fertility already close to replacement level.

Scenarios of the postponement of childbearing

The population projections used in this analysis are based on estimates and projections (medium variant) from the 2012 Revision of *World Population Prospects* (United Nations, 2013b). We create three age-specific fertility scenarios in which all other components—mortality, migration, current population age structure and total fertility—are as specified in the 2012 Revision. For projections we use the same cohort-component methodology and programs as in the 2012 Revision.

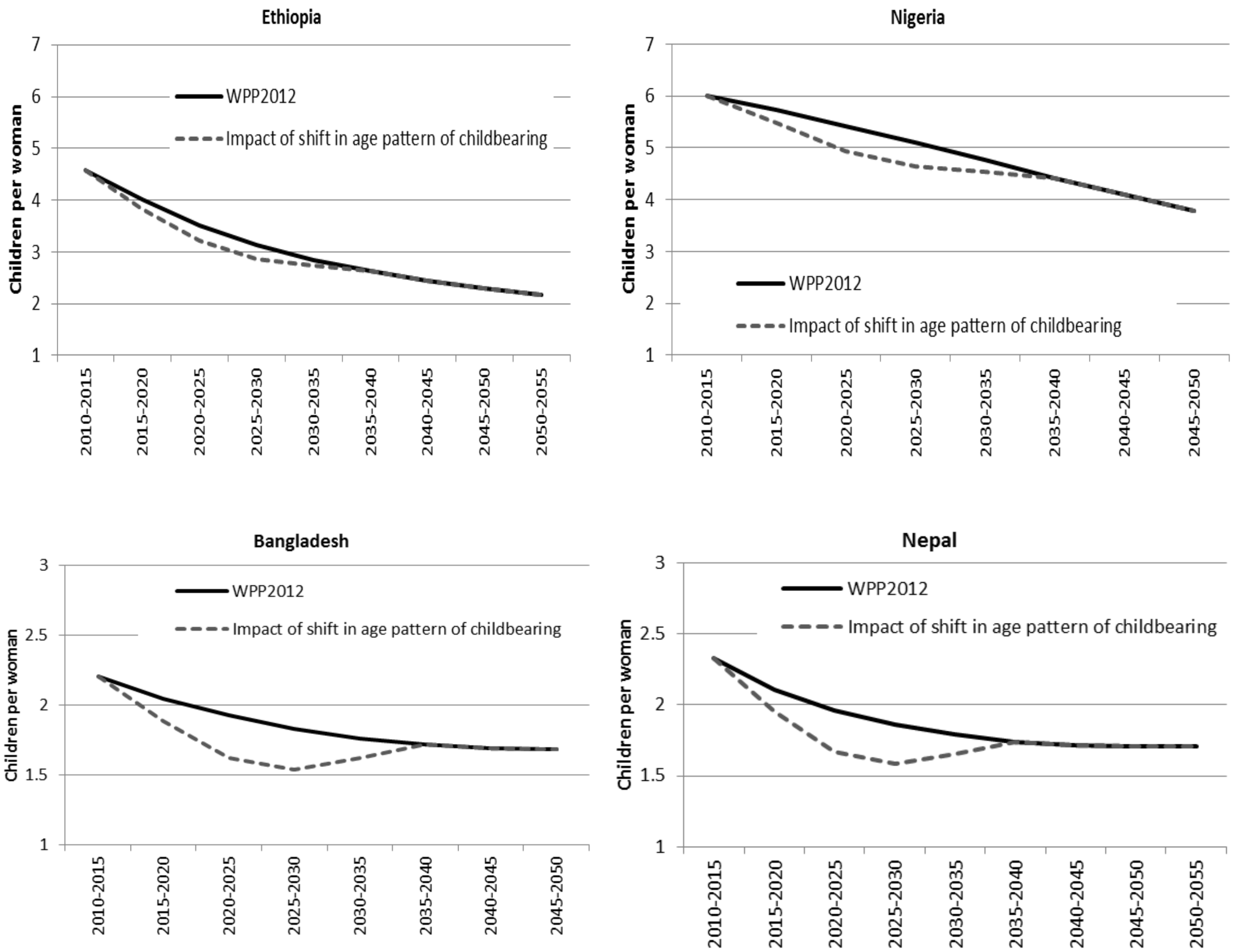
Three scenarios for each of the countries with an early start of childbearing are centred on the age-specific fertility patterns. In the first scenario, we assume that the proportional age-specific fertility rates (PASFR) stay constant at the values for 2010-2015 over the whole projection period until 2040 (the "constant PASFR" scenario). Age-specific fertility rates change proportionally in relation to the projected period total fertility from the 2012 Revision of *World Population Prospects*.

In the next step, we assume a change in the age pattern of childbearing that reduces the age-specific fertility rate in the age group 15-19 by 25 per cent in the period 2015-2020 compared to the situation in 2010-2015, and by another 25 per cent for 2020-2025 and 2025-2030. Thus, by 2025-2030, the ultimate impact is an assumed reduction by 75 per cent of the age-specific fertility rate for adolescents (15-19) in a 15-year time period. Several countries experienced this magnitude of change in the adolescent fertility rate over a similar time period, as described earlier. A smaller reduction is assumed for the fertility rate in the age group 20-24, with a reduction by 10 per cent in 2015-2020 and again in 2020-2025 and 2025-2030, resulting in a total impact of a 30 per cent reduction by 2025-2030 compared to 2010-2015. We assume that postponed births from the age groups 15-19 and 20-24 are realized 10 years later in the age groups 25-29 and 30-34, respectively. By 2040, the transformation is completed from the initial age pattern of fertility to an older age pattern of fertility.

In the second scenario, the projections of the total fertility from the 2012 Revision of *World Population Prospects*, which we assume are due to a quantum effect, are applied to the proportions of age-specific fertility rates (PASFR) from the postponement scenario (the "postponement only" scenario). In countries with a fast decline in period total fertility, the age-specific fertility rates for age groups 15-19 and 20-24 in 2025-2030 will be reduced by more than 75 per cent and 30 per cent, respectively, from the rates in 2010-2015, due to the impact of overall fertility decline.

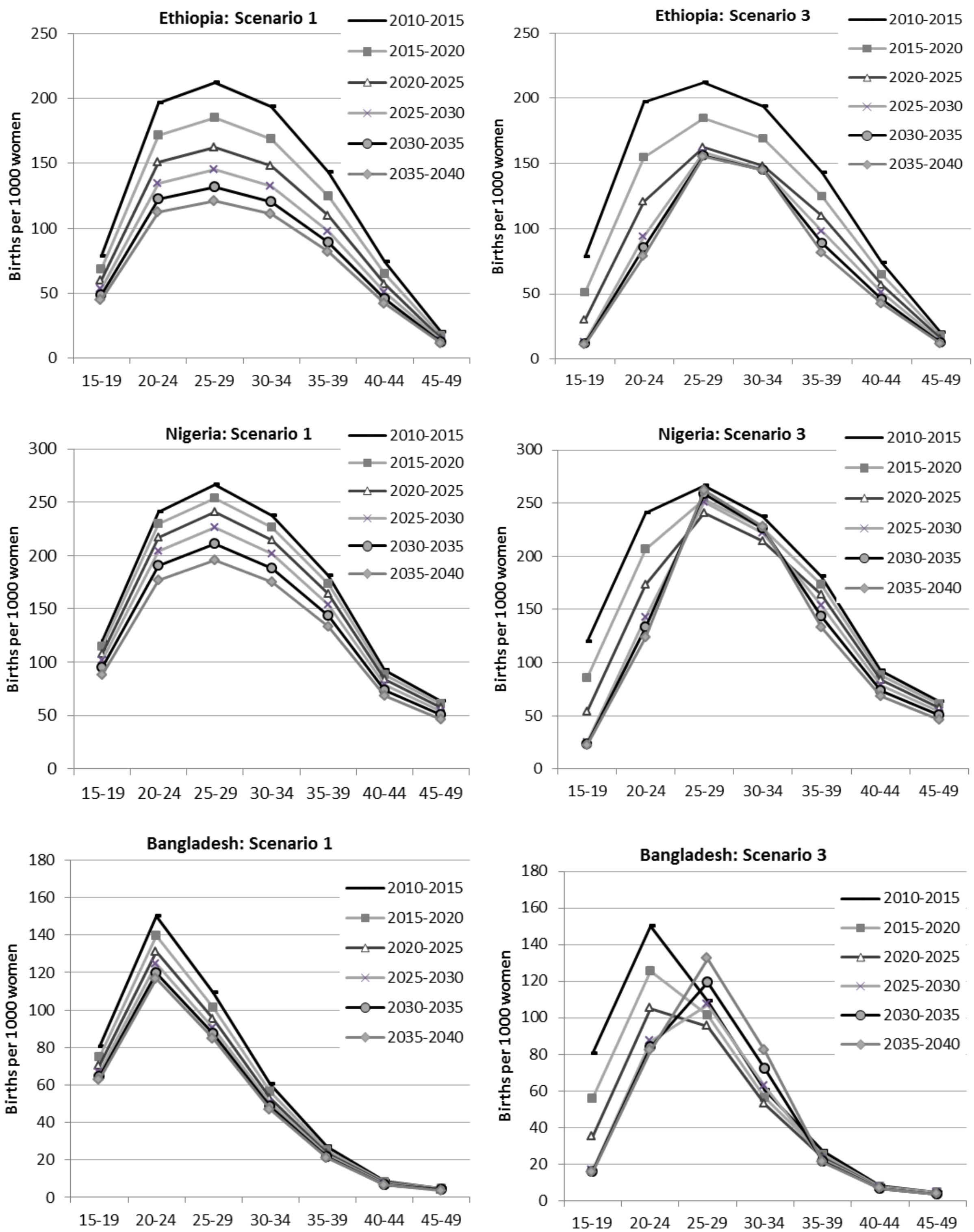
A third scenario adopts the proportions of age-specific fertility rates (PASFR) changes described above and also includes the additional transitory impact on period total fertility from the change from one age-specific fertility schedule to another. We calculate the proportional impact of the postponement of childbearing on the period total fertility for the periods 2015-2020 to 2030-2035 and apply the ratio to the projected total fertility from the 2012 Revision of *World Population Prospects*. The resulting age-specific fertility rates and period total fertility are used in the third scenario (the "postponement with the impact on period total fertility" scenario). The shifts in the timing of childbearing reduce period total fertility by 9 per cent in Ethiopia and Nigeria (difference in absolute terms of 0.3 and 0.5 children per woman, respectively) and by 15 per cent in Bangladesh and Nepal (difference of 0.3 children per woman) (Figure 6 and Table 1).

FIGURE 6 Period total fertility as projected in medium variant of the 2012 Revision of *World Population Prospects* (scenarios 1 and 2) and the postponement scenario with the impact on period total fertility (scenario 3)



The age-specific fertility rates from the constant PASFR scenario (scenario 1) and the postponement scenario with the impact on period total fertility (scenario 3) are illustrated in Figure 7 for the periods 2010-2015 to 2035-2040. The resulting mean age at childbearing would increase between 2010-2015 and 2035-2040 from 25.8 years to 28.2 years in Bangladesh and from 29.8 years to 31.1 years in Ethiopia. The impact of postponement on period total fertility is highest in 2020-2025, with total fertility of 1.6 children per woman compared to 1.9 children per woman from the constant PASFR scenario in Bangladesh. In 2020-2025, the postponement scenario produces a period total fertility of 3.2 children per woman compared to 3.5 children per woman from the constant PASFR scenario in Ethiopia and 4.6 children per woman compared to 5.1 children per woman from the constant PASFR scenario in Nigeria.

FIGURE 7 Projected changes in age-specific fertility rates, constant PASFR (scenario 1) and postponement scenario with the additional impact on period total fertility (scenario 3), 2010-2015 to 2035-2040



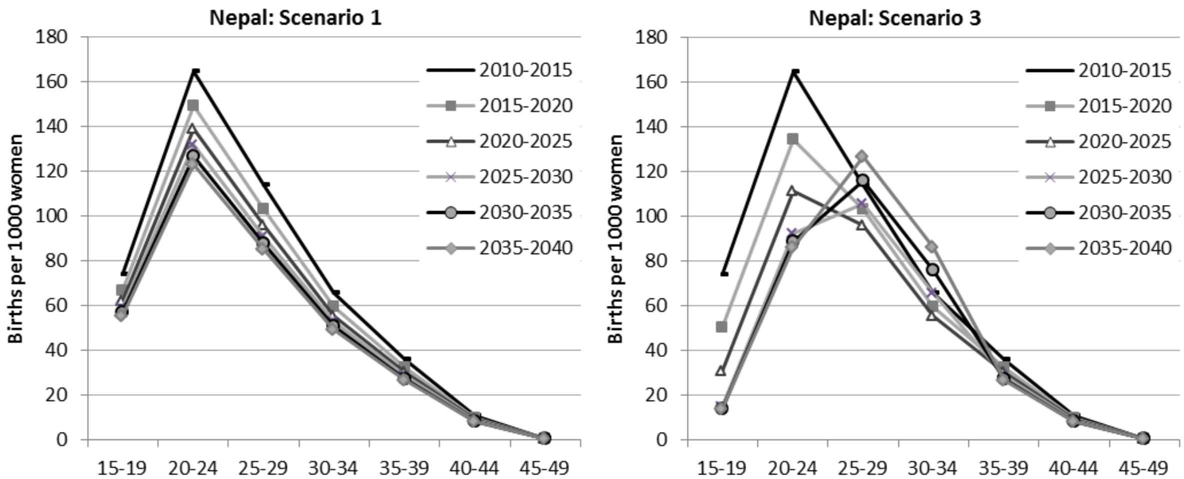


Table 1: Age-specific fertility rates for age groups 15-19 and 20-24, mean age at childbearing and period total fertility for the postponement scenario with the additional impact on period total fertility (scenario 3) and comparison with period total fertility from WPP 2012 (medium variant)

		Scenario 3					
Country	*Period*	*ASFR 15-19 (births per 1000 women)*	*ASFR 20-24 (births per 1000 women)*	*Mean age at childbearing (years)*	*Total fertility (children per woman)*	*Total fertility WPP2012*	*Ratio of scenario 3 to WPP2012*
Bangladesh							
	2010-2015	81	150	25.8	2.20	2.20	100
	2015-2020	56	125	26.3	1.88	2.05	92
	2020-2025	35	105	26.9	1.62	1.93	84
	2025-2030	17	87	27.9	1.54	1.83	84
	2030-2035	16	84	28.0	1.62	1.76	92
	2035-2040	16	82	28.2	1.72	1.72	100
Nepal							
	2010-2015	74	164	26.0	2.32	2.32	100
	2015-2020	50	134	26.5	1.95	2.11	93
	2020-2025	31	111	27.1	1.67	1.96	85
	2025-2030	15	92	28.0	1.58	1.86	85
	2030-2035	14	89	28.1	1.66	1.79	93
	2035-2040	14	86	28.3	1.74	1.74	100
Ethiopia							
	2010-2015	78	197	29.8	4.59	4.59	100
	2015-2020	51	155	30.3	3.83	4.00	96
	2020-2025	30	121	30.8	3.22	3.52	91
	2025-2030	13	94	31.2	2.87	3.14	91
	2030-2035	12	86	31.2	2.73	2.85	96
	2035-2040	11	79	31.1	2.63	2.63	100
Nigeria							
	2010-2015	120	240	30.2	6.00	6.00	100
	2015-2020	86	207	30.7	5.47	5.73	96
	2020-2025	54	174	31.2	4.94	5.43	91
	2025-2030	25	143	31.7	4.64	5.10	91
	2030-2035	24	133	31.6	4.55	4.76	96
	2035-2040	22	124	31.6	4.42	4.42	100

The population impact of the postponement of childbearing

Table 2 shows the population impact of different scenarios for Bangladesh and Nepal (high adolescent fertility rate and total fertility close to replacement level) and Ethiopia and Nigeria (high adolescent fertility rate and high total fertility). The postponement scenario with the impact on period total fertility (scenario 3) is projected for year 2040 to have a total population size lower by 3.4 per cent in Bangladesh, 3.5 per cent in Nepal, 3.6 per cent in Ethiopia and 5.8 per cent in Nigeria compared to a constant PASFR (scenario 1). These reductions are in the context of increasing total population sizes from 2015 to 2040 in all four countries in the medium variant of *World Population Prospects* and in all projection scenarios.

The impact on population size is larger for the youngest age groups; that is, the cohorts that will be the result of births in the period 2015 to 2040. In 2035, when the impact of the postponement scenario is the largest, the population below age 20 would be reduced by more than 11 per cent in Bangladesh, Nepal and Nigeria compared to the constant PASFR scenario. For Bangladesh and Nepal, it results in accelerating the decline in the population size of 0 to 19 year olds. While for Ethiopia and Nigeria, the postponement scenario results in slowing the growth of the population below age 20.

How do different scenarios differ with respect to population projections? For Bangladesh, there are negligible differences in the projections of the population below age 20 among WPP 2012 (medium variant), constant PASFR (scenario 1) and the postponement scenario without a change in period total (scenario 2) (figure 8). Substantial differences are attributable to the additional impact of postponement on period total fertility (scenario 3). Thus, in situations of overall low fertility and mortality and a balanced age structure at reproductive ages, the postponement of childbearing at the same level of period total fertility has by itself a negligible impact.

A similar situation applies in Nepal, where there is little difference between the constant PASFR and the postponement only scenarios. WPP2012 (medium variant) projects a very fast increase of the mean age at childbearing and thus WPP2012 projections are below the two scenarios. The postponement of childbearing with impact of the postponement of childbearing on period total fertility (scenario 3) reduces the population aged 0 to 19 by 1 million in 2040 compared to the constant PASFR (or a 10 per cent reduction).

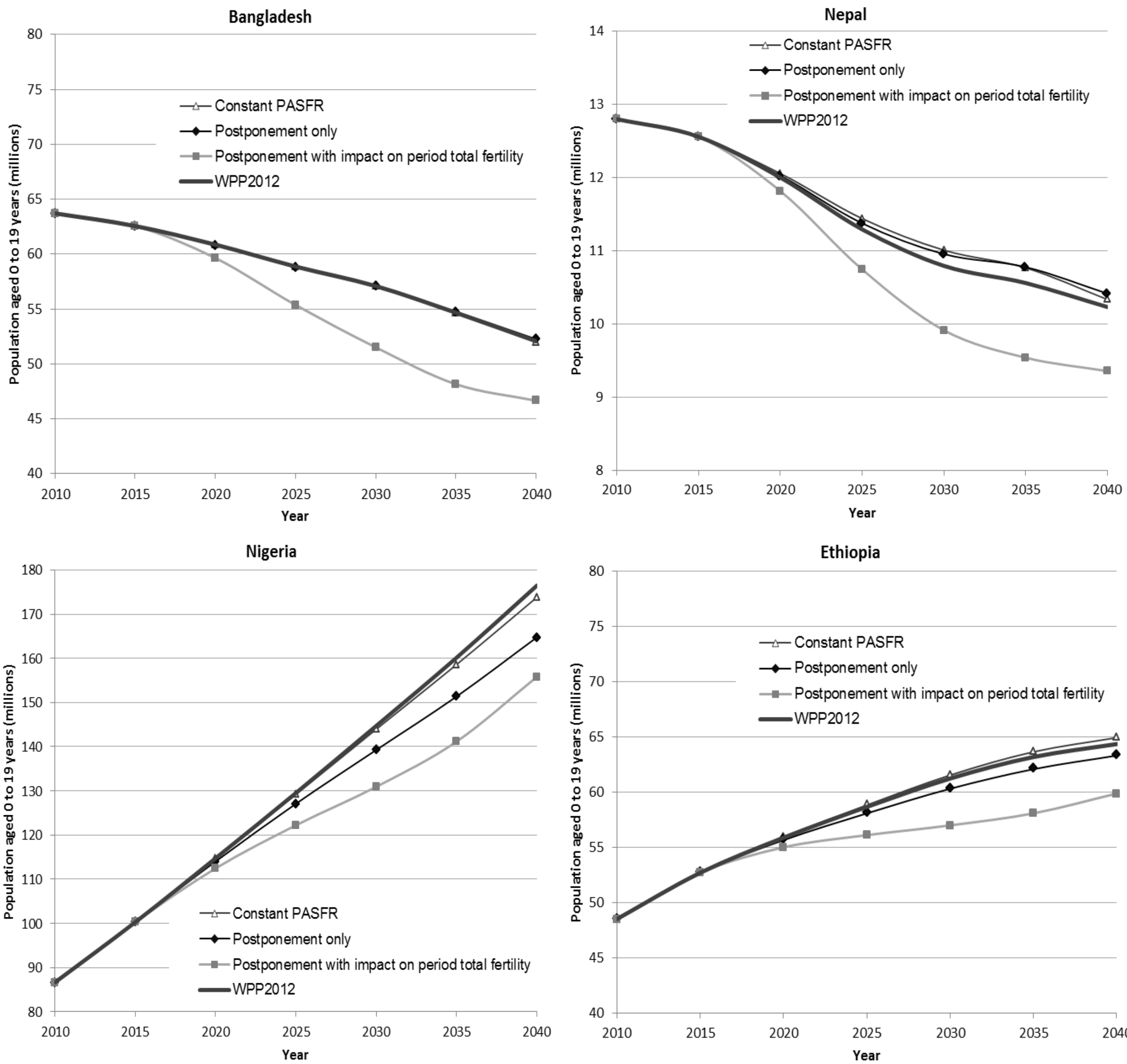
In Nigeria, a country with high total fertility, the comparisons between the scenarios are more varied. WPP2012 (medium variant) projects a slight shift of age patterns of childbearing to early ages (at high levels of fertility, age-specific fertility rates are assumed to decline faster in older ages than in younger ages) and thus the population projection for the age group 0 to 19 is higher than in the constant PASFR scenario. The postponement of childbearing to older ages without an impact on period total fertility (scenario 2) reduces the size of the population below age 20 by 9 million in 2040 compared to WPP2012 (medium variant), and the additional transitory impact of the postponement of childbearing on period total fertility (scenario 3) adds another 9 million reduction in population compared to the constant PASFR (or a 10 per cent reduction in population aged 0 to 20 through postponement of childbearing).

In Ethiopia, WPP2012 (medium variant) projects a slight increase in the mean age at childbearing compared to the constant PASFR scenario. The postponement of childbearing to older ages without an impact on period total fertility (scenario 2) reduces the size of the population below age 20 by 1.6 million in 2040 compared to constant PASFR scenario, and the additional transitory impact of the postponement of childbearing on period total fertility adds another 3.4 million reduction in population compared to the constant PASFR (or an 8 per cent reduction in population aged 0 to 19 through postponement of childbearing).

Table 2: Projections of total population and the population aged 0 to 19 years for the postponement scenario with the impact on period total fertility (scenario 3) and constant PASFR (scenario 1), 2015-2040

	Total population (millions)			*Age group 0-19 (millions)*		
	Postponement (Scenario 3)	*Constant (Scenario 1)*	*Reduction (per cent)*	*Postponement (Scenario 3)*	*Constant (Scenario 1)*	*Reduction (per cent)*
Bangladesh						
2015	160.4	160.4	0.0	62.6	62.6	0.0
2020	168.4	169.6	0.7	59.7	60.9	2.0
2025	174.4	177.9	2.0	55.4	58.9	6.0
2030	179.5	185.1	3.0	51.5	57.1	9.8
2035	184.5	191.0	3.4	48.2	54.6	11.9
2040	189.2	195.8	3.4	46.6	52.0	10.3
Nepal						
2015	28.4	28.4	0.0	12.6	12.6	0.0
2020	29.8	30.1	0.8	11.8	12.1	2.0
2025	30.9	31.6	2.2	10.7	11.4	6.1
2030	32.0	33.1	3.3	9.9	11.0	9.9
2035	33.0	34.2	3.6	9.5	10.8	11.4
2040	34.0	35.2	3.5	9.4	10.3	9.5
Ethiopia						
2015	98.9	98.9	0.0	52.7	52.7	0.0
2020	110.6	111.6	0.8	55.0	55.9	1.7
2025	122.0	124.7	2.2	56.1	58.8	4.6
2030	133.4	138.0	3.3	57.0	61.6	7.4
2035	145.6	151.2	3.7	58.1	63.7	8.7
2040	158.2	164.2	3.6	59.9	65.0	7.8
Nigeria						
2015	183.5	183.5	0.0	100.3	100.3	0.0
2020	207.9	210.0	1.0	112.5	114.7	1.9
2025	232.6	239.5	2.9	122.2	129.2	5.4
2030	259.3	272.3	4.8	130.9	144.0	9.0
2035	291.1	308.6	5.7	141.2	158.6	11.0
2040	327.9	348.0	5.8	155.8	173.8	10.4

FIGURE 8 Projected population aged 0 to 19 years (millions) in Bangladesh, Ethiopia, Nepal and Nigeria, 2010 to 2040, constant PASFR (scenario 1), postponement only (scenario 2), postponement with impact on period total fertility (scenario 3) and WPP2012 (medium variant)



Conclusion

International efforts to eliminate child marriage and invest in the human capital and reproductive health of girls and young women are likely to have macro-level population effects that go beyond policies and programmes targeting individual well-being and rights. Countries where these investments are particularly relevant are in Asia and Africa, where early marriage and early childbearing are closely correlated.

While childbearing patterns may start young, overall fertility levels are relatively diverse across countries in these regions, and thus the implications of postponing childbearing may be different. In Bangladesh and Nepal, fertility is approaching replacement level and shifts in the age structure towards people of working-age have opened up an immediate opportunity to reap a “demographic dividend”. In Ethiopia and Nigeria, total fertility levels remain relatively high and the population pyramid retains a wide, populous base. The population policy focus in the region is generally oriented towards supporting investments in youth and women and, more recently, fertility decline in the context of shifting the age structure and increasing economic growth (United Nations, 2013c).

The results from this analysis suggest that delayed childbearing has an impact on population growth net of the projected fertility decline, and the impact can be as large as an 8 to 10 per cent reduction in the population below age 20 by 2040 compared to the projection with no postponement of childbearing. The impact may even be larger as we have not considered the behavioural and biological effects of changes in the timing of childbearing on the total number of children born over women's lifetimes. In countries with high total fertility (such as Ethiopia and Nigeria), a later start of childbearing could accelerate declines in overall fertility levels both in period and cohort perspective.

In sum, rights-based approaches of eliminating child marriage, investing in girls and young women and ensuring reproductive rights have the potential to slow population growth and support age structure shifts that reduce dependency ratios above and beyond projected declines in the number of children women have over their reproductive years.

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