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Education Budget Savings from Ending Child Marriage and Early Childbirths:

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Abstract

Ending child marriage and early childbirths would reduce total fertility rates and population growth especially in countries with a high incidence of child marriage, early childbirths, or both. Savings for public budgets could be large. This article relies on demographic projections and a UNESCO costing model for the provision of education by governments to estimate savings that could result from ending child marriage and early childbirths for public education budgets. The analysis is conducted for Niger, the country with the highest rate of child marriage in the world.

Keywords

Child Marriage, Early Childbirth, Education, Public Budget, Niger

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opinions expressed in this article are those of the author only and need not reflect the views of the World Bank, its Executive Directors, of the countries they represent.

1. Introduction

Child marriage, defined as having a first marriage or union before the age of 18, and early childbirth, defined as a girl having her first child before 18, lead women to have more children earlier and more children over their lifetime (e.g., Raj et al. 2009; Santhya et al. 2010; Santhya 2011; Godha et al. 2013; Kamal and Hassan 2015; Onagoruwa and Wodon 2016). Child marriage and early childbirths thereby contribute to higher population growth. This in turn generates challenges for governments in developing countries in providing basic services to their population.

This is the case among others for education where budget needs are large (International Commission on Financing Global Education Opportunity, 2016). In a background paper prepared for UNESCO’s Global Monitoring Report, Wils (2015) estimates that achieving basic education for all children by 2030 globally would require not only higher spending by countries using their own resources, but also an increase of official development assistance and other external sources of funding for basic education from less than US$5 billion today to US$ 22 billion annually for the period 2015-30. Ending child marriage and early childbirths would help reduce population growth, thereby generating savings for public education budgets. Using demographic projections and Wils’ (2015) costing model, this article estimates the savings that could result for public education budgets from ending child marriage and early childbirths in Niger.

2. Population Projections
The analysis proceeds in two steps. The first step consists of assessing the likely impact of ending child marriage and early childbirths on population growth for young cohorts in age of schooling. The analysis is carried using demographic projection tools (DemProj and FamPlan) by comparing a counterfactual business as usual population growth scenario with the expected population growth by age cohort that would result if child marriage and early childbirths were eliminated, and looking at the difference in the size of various age cohorts under the two scenarios.

Demproj produces demographic projections on the basis of data for a base year (population by age and sex) and assumptions about the total fertility rate, the age distribution of fertility, life expectancy at birth by sex, a model life table, and migration patterns. A key feature of DemProj is that the model is linked to other simulation tools, including FamPlan, a model to assess family planning requirements to achieve demographic and health goals. FamPlan allows the user to provide age-specific data, including on age-specific rates of unions (child marriage) and fertility, which is the approach used here. The data imputed in FamPlan is automatically used by DemProj for the population projections. This provides for a way to assess the impact of ending child marriage and early childbirths on demographic growth and especially the size of new birth cohorts.

Niger is the country in the world with the highest incidence of child marriage. According to the latest Demographic and Health Survey, three in four girls ages 18-22 marry before the age of 18, and almost one in two has a child before turning 18. In Niger, the reduction in population growth from ending child marriage and early childbirths is estimated at 0.39 percentage point at the beginning of the simulation period, and it remains high at -0.28 percent in 2030 (the target year to achieve universal secondary education under the Sustainable Development Goals) versus
the counterfactual business as usual scenario. The reductions in the size of younger age cohorts are larger, as shown in table 1. In the first four years, there is no impact on the size of the cohorts of children ages 5-9 since it takes five years for newborns to reach five years of age, at which children may join preschools and later primary school. For the next five years, there is a rapid increase in the reduction of the size of the cohorts (with cohorts defined by five years interval, it takes five years to see the full effect of the reduction in live births to show up for the interval as a whole).

For example, the size of the cohort of children ages 5-9 is reduced by 1.99 percent in 2017, and this increases to 9.31 percent in 2021. Thereafter, the increase from one year to the next is much smaller, and related in part to the fact that from previous demographic trends, the size of the cohorts of young girls likely to marry and have children increases slightly in the counterfactual scenario. Similar patterns in the reduction of the sizes of the other cohorts (ages 10-14 and 15-19) are observed, again with a gap of five years as to when the reductions start.

3. Budget Savings

The second step in the analysis consists in estimating the difference in required public funding for education that ending child marriage and early childbirths would generate between the base year for the simulations and 2030. This is not an easy task, as it requires a number of assumptions. 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.

While many different scenarios could be considered, the approach used in this article is to consider as the counterfactual projections prepared for the 2015 Education for All (EFA) Global Monitoring Report of 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.

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 of the model are available in Wils (2015).
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.

Table 2 provides the estimates of the cost of reaching universal secondary education by 2030 in Niger under the baseline UNESCO scenario. It also provides the cost estimated without child marriage and early childbirths based on the reduction in the size of specific age cohorts documented in table 1. In the baseline scenario, public spending for education increases 13-fold in real terms due to both population growth and the progressively higher enrollment assumed to be able to reach universal enrollment and completion by 2030. In the first four years for the simulations, there is no budget savings from ending child marriage and early childbirths because newborn children are still too young to enroll in school. After that initial period, the savings as a share of the budget to reach universal education increase over the years.

Two main factors play a role in this increase. First, with every additional year the reduction in the number of students to be enrolled due to ending child marriage and early childbirths becomes larger. Second, as children progress through the grades and cycles, the savings per child/student become larger since unit costs tend to be higher at higher levels of schooling. By 2030, the savings account for nearly a tenth of the budget needed to achieve universal education. For the period as a whole from the start of the simulations to 2030, the
savings amount to 6.2 percent of the required budget to achieve universal education or US$ 1.9 billion, a large sum for a country like Niger.

4. Conclusion

Ending child marriage and early childbirths could result in substantial budget savings in the provision of public education due to the smaller size of the cohorts of children going to school. Estimating those savings is not straightforward as multiple assumptions are required. The approach used in this brief has been to assess savings from ending child marriage and early childbirths as a share of the estimated budget needs to achieve universal preschool, primary, and secondary education by 2030 in Niger. The savings arising from ending child marriage and early childbirths are estimated at 6.2 percent of the total cost of achieving universal education by 2030. This corresponds to savings of US$ 1.9 billion from 2013 to 2030. Using the approach suggested in this article, this type of analysis could be replicated for other countries and used to make a stronger case for investments to end child marriage and early childbirths.

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Table 1: Reduction in the Size of Age Cohorts from Ending Child Marriage and Early Childbirths in Comparison to a Counterfactual Business as Usual Scenario (%)

| Year | Ages 5 to 9 | Ages 10 to 14 | Ages 15 to 19 |
|------|-------------|---------------|--------------|
| 2013 | -           | -             | -            |
| 2014 | -           | -             | -            |
| 2015 | -           | -             | -            |
| 2016 | 1.99%       | -             | -            |
| 2017 | 3.90%       | -             | -            |
| 2018 | 5.75%       | -             | -            |
| 2019 | 7.55%       | -             | -            |
| 2020 | 9.31%       | -             | -            |
| 2021 | 9.41%       | 1.99%         | -            |
| 2022 | 9.50%       | 3.90%         | -            |
| 2023 | 9.59%       | 5.75%         | -            |
| 2024 | 9.66%       | 7.56%         | -            |
| 2025 | 9.73%       | 9.31%         | -            |
| 2026 | 9.81%       | 9.42%         | 2.02%        |
| 2027 | 9.89%       | 9.51%         | 3.97%        |
| 2028 | 9.97%       | 9.59%         | 5.84%        |
| 2029 | 10.07%      | 9.67%         | 7.67%        |

Source: Estimation by the author.

Table 2: Budget Savings from ending Child Marriage and Early Childbirths, US$ million

| Year | Baseline Cost | Cost w/o Child marriage and early childbirths | Difference in Cost | Difference in Cost (%) |
|------|---------------|----------------------------------------------|-------------------|------------------------|
| 2012 | 267           | 267                                          | -                 | -                      |
| 2013 | 281           | 281                                          | -                 | -                      |
| 2014 | 376           | 376                                          | -                 | -                      |
| 2015 | 485           | 485                                          | -                 | -                      |
| 2016 | 605           | 603                                          | 2                 | 0.3%                   |
| 2017 | 736           | 729                                          | 7                 | 1.0%                   |
| 2018 | 885           | 871                                          | 14                | 1.6%                   |
| 2019 | 1,054         | 1,031                                        | 23                | 2.2%                   |
| 2020 | 1,238         | 1,204                                        | 34                | 2.7%                   |
| 2021 | 1,431         | 1,381                                        | 50                | 3.5%                   |
| 2022 | 1,627         | 1,557                                        | 70                | 4.3%                   |
| 2023 | 1,834         | 1,738                                        | 96                | 5.2%                   |
| 2024 | 2,051         | 1,925                                        | 126               | 6.1%                   |
| 2025 | 2,278         | 2,119                                        | 159               | 7.0%                   |
| 2026 | 2,516         | 2,326                                        | 190               | 7.6%                   |
| 2027 | 2,770         | 2,547                                        | 223               | 8.1%                   |
| 2028 | 3,030         | 2,774                                        | 256               | 8.4%                   |
| 2029 | 3,291         | 2,998                                        | 293               | 8.9%                   |
| 2030 | 3,548         | 3,221                                        | 327               | 9.2%                   |
| Total| 30,303         | 28,433                                       | 1,870             | 6.2%                   |

Source: Estimation by the author.