Education is Not Uniformly Associated with the Timing of First Birth and Union: Evidence from Quantile Regression Analysis of 50 Countries

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Extended abstract as submitted to the European Population Conference, 2024 (please do not share)

Abstract[1]

The relationship between educational level and the age at which women start families has been researched extensively. However, studies mainly explored how additional schooling shifts the mean or, more broadly, only one point of the age at first birth and union distributions. This ignores distributional variation in the association between education and the timing of family formation, and the fact that schooling might shape behaviors of the most vulnerable and the more privileged women differently. Using quantile regressions, I study heterogeneity in the relationship between education and the age at first birth and the age at first union across the distribution of these events within 50 low-and middle-income countries. I examine whether additional schooling shifts relatively early childbearing and union formation (i.e., the lower parts of the distributions) similarly or differently than it shifts the other parts of the distributions. The association between an additional year at school and the age at first birth and the age at first union is weaker in the lower than the upper parts of the distributions. Education has a relatively weak effect on the reduction of early first births and unions and plays an unequalizing role in shaping family formation trajectories within countries. These findings are key to understanding the persistently high levels of early pregnancies and marriages in low-and middle-income countries, despite educational expansion.

Background

The positive association between the level of women's education and the age at which they start forming families is one of the most studied relationships in demography and sociology. However, so far, researchers have focused on examining this association at only one point of the distributions of the age at first birth and the age at first union, limiting our understanding of variation in how education is related to the timing of family formation within populations. Exiting studies ascertain how additional education (e.g., years of schooling completed or a given educational level) shifts the *mean* and the *median* of the age at first birth and the age at first union distributions, or the *proportion* of women who experience these events by a given age (e.g., first birth before the age of 20), while disregarding the rest of the distributions of these events (Bongaarts et al. 2017; Esteve and Florez-Paredes 2018; Grant 2015; Ikamari 2005; Gupta and Mahy 2003). These approaches do not allow to account for the fact that estimates of the effect of education on, for example, the mean of the age at first birth might not necessarily be indicative of the size and nature of these effects in other parts of

[1] **Acknowledgements:** This study was funded by the Marie Sklodowska-Curie Action Individual Fellowship from the European Commission, grant number 101060237-DISPARFAM.

the age at first birth distribution (e.g., in the lower or the upper parts of these distribution). Thus, what existing studies have ignored so far is the fact that the association between education and the timing of family formation might not be the same for all individuals within countries.

In places where women start families early, such as in many low- and middle-income countries, the existence of the positive association between schooling and the timing of family formation has led researchers and policymakers to emphasize the importance of expanding access to education and generating incentives for parents to send girls to school, not only for the sake of human capital improvements per se, but also because of education's capacity to delay the age at first birth and the age at first union. Early family formation has long been a concern thanks to numerous studies documenting its negative, often long-term, effects on women's and their children's health and well-being (Yount et al. 2018; Urdinola and Ospino 2015; Sunder 2019). This, in essence, means that the lower parts of the distributions of the age at first birth and the age at first union (i.e., early birth and early unions) are associated with higher risks for health and well-being. From the theory and policy perspective, it is thus relevant to ask not only how education shifts the mean, the median or, more broadly, a one point of the age at first birth or union distributions, but also whether the *association is similar, weaker,* or *stronger* in the lower than in the upper parts of the distributions of these events.

So far, however, there have been no attempts to answer such question and to measure the link between education and the age at first birth or the age at first union *across the distributions* of these two events. This article provides a novel perspective on this topic by using quantile regression analysis that allows taking into consideration the fact that schooling might have a heterogenous association with the timing of family formation within populations. Whether education shifts relatively early childbearing and unions similarly or differently than it shifts other parts of the distribution of these events is key to understanding the persistently high levels of early pregnancies and marriages, despite educational expansion, in low and middle-income countries. Moreover, it has the potential to deliver important insights regarding policy formation. In order to offer a comprehensive analysis of this topic, this study takes a cross-country and cross-regional perspective and focuses on 50 nations in Africa, the Americas, Asia and the former Soviet Republic.

Data & Methods

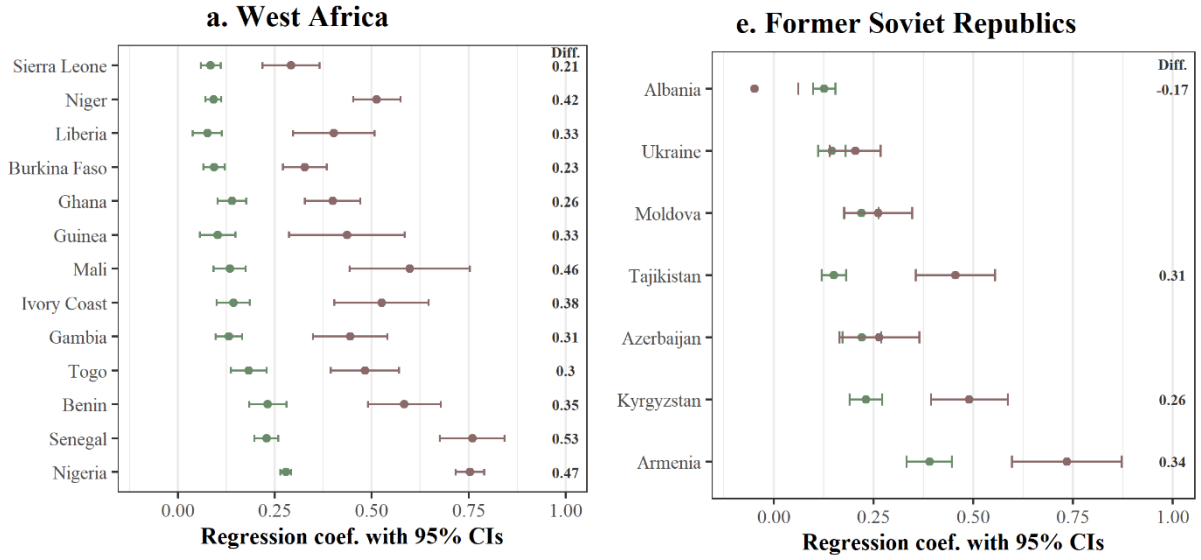
This study uses data from the Demographic and Health Surveys. The analyses are based on two retrospective questions about the age at first birth and the age at first union, and information about the number of years of schooling completed. I use unconditional quantile regression (Firpo et al. 2009) to explore the relationship between the number of years of schooling completed and the age at first birth and the age at first union, across the distributions of these two outcomes. Quantile regression

offers a more comprehensive view of the association between schooling and the timing of family formation because it allows for the exploration of how education shifts different quantiles of the age at first birth and the age at first union distributions. Thus, it examines whether and how the association of interest differs between individuals and permits capturing the fact that the association might be stronger or weaker in the upper than in the lower quantiles, for example. I am concerned with exploring if an additional year at school is associated with postponement of family formation uniformly in the lower quantiles (i.e., where the age at family formation is lower, thus early) and the upper quantiles (i.e., where the age at family formation is higher, thus late). For that purpose, I focus not only on the 50th percentile (median), but also on the 25th and 75th percentiles.

Preliminary Results & Conclusions

Figure 1 presents selected preliminary results of the quantile regression models for the 25th and 75th percentiles (in green and pink, respectively) for the age at first birth in West Africa and former Soviet Republics. In countries where the confidence intervals for the two estimates do not overlap, the figures also depict a difference between these two-point estimates (Diff.).

Figure 1 Coefficients describing the association between schooling and the age at first birth from the QR (25th and 75th percentiles). Difference in the coefficients from the 75th and 25th percentile QR (Diff.), if statistically significant.



Notes: The 95% CI for the 75th pct. in Albania, missing from the output due to larger bottom range, is (-0.16; 0.06). Models control for women's birth cohort and place of residence.

The relationship between an additional year of schooling completed and the age at first birth is positive across the lower and the upper parts of the distributions of these outcomes (see coefficients at the 25th and 75th percentiles, respectively). Completing more years of education is significantly associated with an increase in the age at first birth. However, in many countries, West African in

particular, the magnitude of the relationship varies across the distributions of this outcome. The association is stronger in the upper quartile (i.e., the upper part of the age at birth distributions) than in the lower quartile. Thus, education has a heterogenous association across the distribution of the age at first birth. Substantively, these results mean that the family formation postponement effect associated with more years at school is less pronounced among women who form families relatively early, than among women who form families relatively late. In other words, schooling has a relatively weaker effect on the reduction of early first birth. The existence of a weaker association among women at the lower ends of the age at first birth distribution also mean that there is a tendency for the dispersion (heterogeneity) of this distribution to grow with increasing years of schooling. Education contributes to first birth postponement among all women, but it also increases inequality in the timing of childbearing due to its widening effect on the distribution of the age at this transition.

The results draw attention to the importance of employing distributional approaches when studying links between schooling and family formation. They convey that, in many low- and middle-income countries, where many women form families early in life and thus might be at risk of adverse outcomes related to health and well-being, schooling's capacity to contribute to shifting this family building behavior might be limited. The results are important from the policy perspective, as they underline that, despite the positive association between additional schooling and the age at family formation, expanding access to education might provide relatively little impetus for the reduction of early childbearing. In the next step, analyses will be conducted for all countries and for the age at first union to explore whether results pertaining to transition to motherhood expend to union formation as well.

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