Differential fertility by level of Education in DHS Countries

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Abstract

The relationship between female education and fertility is varied and complex but extensively discussed in the literature. This article re-assesses the relationship between female education and fertility using data from Demographic and Health Surveys. Fifty-eight countries are explored. One problem with education variable in DHS data is the inconsistencies in the definition of education categories within and across countries. We harmonized the education variable to the UNESCO's definition. The analyses conducted highlight considerable heterogeneity across total fertility rate (TFR) levels and differentials by education categories. However some empirical regularity can be isolated. For instance, we found the usual negative relationship between TFR and female education, with a monotonic pattern across education categories. Secondly, we will test whether the fertility differential is significantly different across education categories by presenting bootstrapped confidence intervals and standard errors. The final results of the analysis will be useful in predicting the fertility in the future.

Introduction

Until 1970s, common held view was that increasing education of population would contribute to fertility decline. This view is coherent with the theory of demographic transition stating that a steady decline of fertility would take place with increasing levels of socioeconomic development. Cochrane et al (1979) disproved this notion and found an inverted U shape relationship in several developing countries, challenging the common knowledge of a uniform inverse association between fertility and education. With the advent of the WFS, a largely negative association between education and fertility was confirmed. The strength of this relationship was deemed to be a function of the level of socio-economic development and cultural factors (Martin, 1995).

Extensive work on the relationship of fertility and education has been done exploring Demographic and Health Surveys (DHS). Paper by Martin (1995) examined 26 DHS surveys & highlighted that "the pattern of association between education and fertility is not static over the

course of the demographic transition" and that "considerable diversity exists in the magnitude of the gap between upper and lower educational strata and in the strength of the association across countries" (Martin 1995: page 187). Shireen Jejeebhoy (1995) analyzed the education differentials in fertility using a large set of survey data from DHS in 1995 and concluded that with higher level of education the fertility declines. Using 57 DHS datasets Bongaarts (2003) documents empirically education differentials at different phases of the fertility transition focusing on how the pattern of differentials evolves toward the end of the transition. The author identifies 2 model patterns for fertility transition by level of education.

- **Model 1: Leader–follower** (fertility across different educational groups will converge to an overall same level at the end of the fertility transition i.e. education-fertility differentials are a transient phenomenon)
- **Model 2: Permanent difference** (education- fertility differentials will not disappear over time i.e. differences exist at all stages of the transition).

Bongaarts concludes that educational differentials are marginally larger in countries in the earlier than in the later stages of the transition and that they are likely to remain when less developed countries reach the end of their transitions – hence model 2 is more likely to apply.

Aim of the Analysis

- To examine education-fertility differentials using an updated sample of all DHS countries by including two latest DHS waves for the country wherever available
- To present confidence intervals around the education specific TFRs that can be used to test the statistical significance of the differences (so far no-one reports this)
- To revisit Bongaarts' analysis with new data
- To examine whether a pattern still exists and whether this confirms to either the leader-follower or to the permanent difference one
- Hypothesize about convergence of fertility differential

Data

We are using two most recent waves of DHS data for 58 countries (altogether 94 samples). One of the main contributions of this work is the harmonization of the DHS data to ISCED 97 classification. We harmonized education categories according to ISCED 97 classification combing information about the highest attained level of education and highest grade attended. We distinguish between 6 education categories, as shown in Table 1:

Our education categories	**ISCED 1997**	**Standard DHS categories**
No education	No level or ISCED 0 Grade 1 of ISCED 1 not completed	No education
Incomplete primary	Incomplete ISCED 1	Primary
Completed primary	Completed ISCED 1 Incomplete ISCED 2	
Completed lower secondary	Completed ISCED 2 Incomplete ISCED 3	Secondary
Completed upper secondary	Completed ISCED 3 Incomplete ISCED 4	
Post-secondary	ISCED 4 & 5 & 6	Higher education

Yet another problem is that DHS normally records educational attainment according to the education system at the time of survey. This is a problem in countries with recent education reforms leading to changing length of different education levels. This can lead to attribution of wrong educational level to those cohorts who studied under different system. In our classification we take past education systems into account wherever clear evidence is found. We believe this leads to more accurate estimates of education-specific TFR.

Method

- Estimation of education specific ASFR using the DHS data.
- Estimation of confidence intervals around the education specific TFRs using the method of boot-strapping. This will be presented in the later version of the paper.

- Fitting a regression model for relative education differentials on level of TFR (using different models, linear, cubic etc.) and finding the model that best fits the data.

First results

At this stage, we present descriptive results of our analysis. Figure 1 plots estimated education-specific TFRs from our calculation. Our result shows that it is important to distinguish between incomplete and completed primary education as well as between lower and upper secondary whenever possible as fertility in these groups differ substantially. Women with incomplete primary education tend to behave more alike those with no education and often they comprise a group with highest fertility. Women with completed secondary education are more similar to those with post-secondary education and putting them into one category with those with lower secondary conceals important differences.

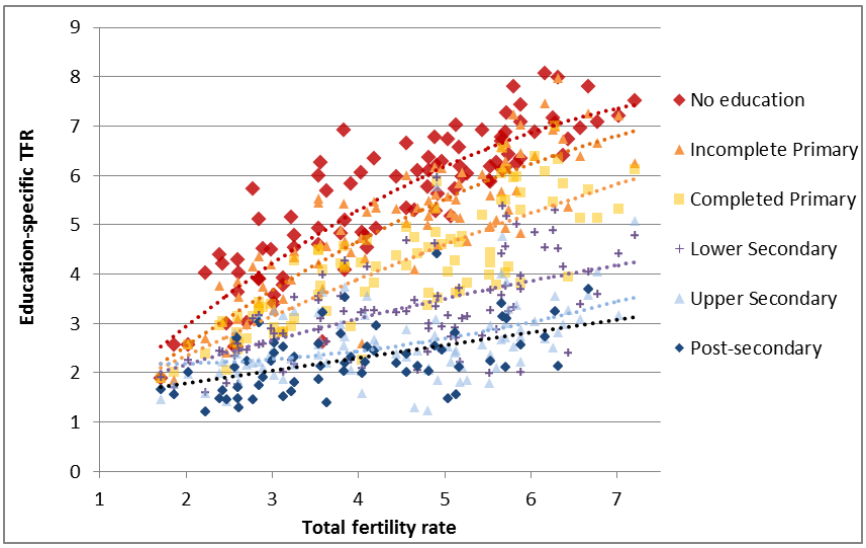

Figure 1 Education specific period TFR in 58 DHS countries

Looking at relative education differentials (Figure 2) we find that these tend to be more pronounced in countries at the onset of demographic transition. During the transition the differential widens and narrows down only once TFR drops below 4 children per woman. This is caused by increased education of women and the known compressing effect of higher education on family size. In countries where most women have very little education and only very few achieve post-secondary level, the differential is pronounced, but narrower than in countries

where more women have at least completed upper secondary education. This proves that highly educated women are the trendsetters in preference for smaller families.

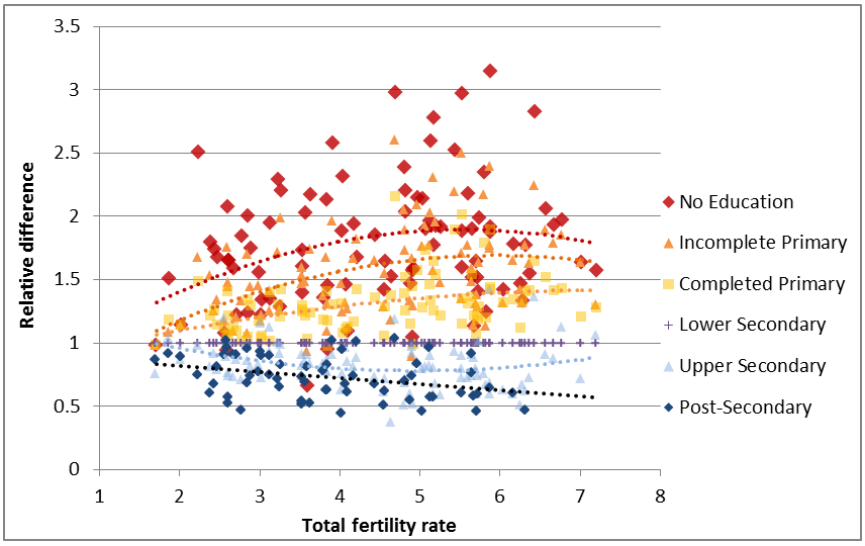

Figure 2. Relative Differentials in period TFR by level of education in 58 DHS countries

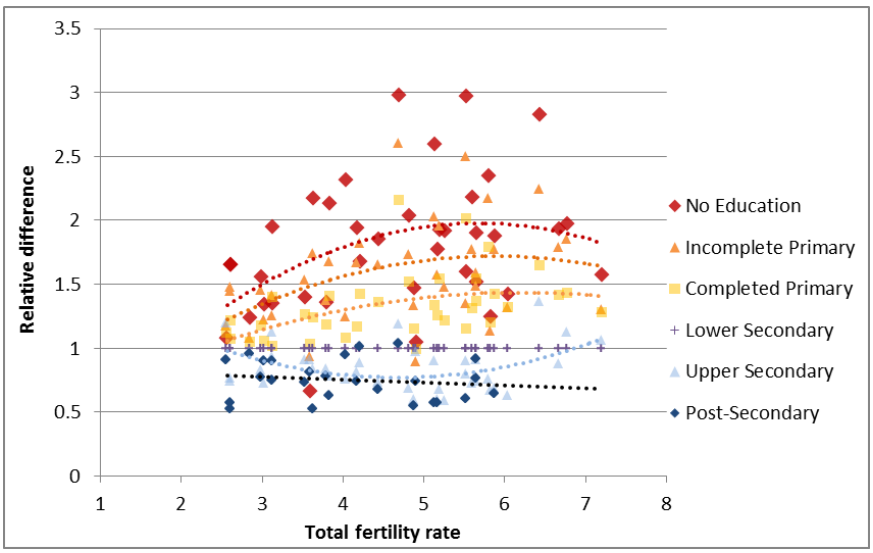

Figure 3. Relative Differentials in period TFR by level of education in (Most Recent DHS)

Conclusion

The Aim of this study was to re-assess the fertility differential by level of educational attainment using data from demographic and health surveys and to propose a future pathways for

educational differentials. Based on the analysis, it is safe to assume that in the (near) future relative fertility differential increases at the beginning of the fertility transition and then decreases at the end but do not converge, therefore, reconfirm Bongaart's findings.

In addition, the widening of the fertility differentials during the transition was observed consistently in the DHS countries. This was not observed in Bongaart's analysis (could be because only three education categories were used).

The reason behind the widening of differential fertility at the beginning of the fertility transition is due to the early onset of fertility transition among the more educated followed by the less educated women (leader-follower hypothesis, Bongaarts, 2003).

And the reason for no (not yet?) convergence (permanent difference hypothesis of Bongaarts) by the end of the fertility transition could be due to several factors that are still significantly associated with level of education such as demand for and use of contraception, desired family size, age at marriage, women's autonomy, and higher opportunity costs of unintended childbearing (Bongaarts, 2010).

We found that it matters if we study fertility differentials using period or cohort data. Looking at cohort fertility rates we observe less pronounced differentials and results tend to be more stable. This means that tempo of fertility is influencing education-specific differentials in high fertility countries as well as in low fertility ones. Therefore we plan to look more into this and analyze cohort data in more detail.

References:

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