HAS UGANDA EXPERIENCED ANY STALLED FERTILITY TRANSITION? : REFLECTING ON THE LAST FOUR DECADES (1973-2011)

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Background

Persistent high fertility remains a public health concern as it frustrates efforts to curb maternal and child mortality [1-3]. Fertility decline particularly in Sub-Saharan has been debated among scholars pointing to divergent views pertaining to fertility transition [4, 5]. Most regions of the world have had gradual fertility declines over the years, the latest starting around 1940s. For instance compared to other regions like Asia and Latin America, Sub-Saharan Africa lags behind with high fertility levels (TFR-5.1). These rates are far above the other regions that have already reached replacement fertility[6, 7]. The United Nations estimates present these regions to have had drastic reduction since their onset of fertility transition in the early 1960s [8]. To some researchers like Shapiro [9], Sub-Saharan African is the last region to begin fertility transition in the world. The variations and pace in fertility decline among the regions and countries were further confirmed by Casterline [10] and Schoumaker et. al [11].

Furthermore, Bongaarts [12] made an explicit illustration of the transition where he found about seven countries (Bangaledesh, Turkey, Dominican Republic, Colombia, Peru, Kenya and Ghana) had stalled fertility two of which were from Sub-Saharan Africa. In his definition all the countries with no eminent reduction between recent or consecutive surveys were considered to have stalled fertility. The fertility stall in the mid-1990s ranged from 4.7 births per woman in Kenya to 2.7 births per woman in Turkey. The other countries (Uganda, Mali, Burkina Faso, Mozambique, and Niger) were not considered since they were far above the pre-transitional stage. Implying that the latter countries had not yet began their visible fertility transition. Additionally the high fertility rates in those countries have also been attributed to low use of contraception [15, 16] and sociocultural inhibitions [17, 18].

Divergent views have been raised explaining stalling fertility as having a new type of transition [19] due to changes in the older women's fertility and the longer postpartum

period [20]. Bongaarts [16] argued that more than half of all Sub Saharan countries had stalled fertility. Additionally, Garenne [4] and Ezeh et al [5] pointed to a stall in fertility in Eastern African countries associated with increased adolescent fertility and larger family size preference. Schoumaker [21] however noted that the fertility stall in Sub Saharan Africa was spurious as opposed to some countries with eminent consistent declines. Some scholars however suggested that the stall are superficial and that there could be possibilities of reversal in the reductions as observed with Kenya's fertility transition [25]. There is no information that shows the country specific analysis over the years that could explicitly show the fertility stall or reduction in Uganda over period of years. This study therefore sought to a) Examine whether there is a fertility stall in Uganda using all existing DHS data b) provide estimates for the current fertility levels and trends in Uganda and c) To examine the demographic and socioeconomic factors responsible for fertility levels in Uganda.

Methods

This is a secondary analysis of data from the five consecutive Uganda Demographic Health Surveys (UDHS); 1988/1989, 1995, 2000/2001, 2006 and 2011. The method using pooled data as proposed by Schoumaker was applied to estimate fertility levels, patterns and trends. The method can further be used for estimation of differentials in fertility using rate ratios. This classification was grounded on information on enumerated children and mothers by single year ages at the time of the survey. The enumerated children were then linked to their mothers using the reverse-projection to the time of their births by age of the mother.

Data

We used demographic and health survey data sets because they collect information on birth histories of the mother where dates of all children born to a mother are reported starting with the first birth up to the last child. We used the demographic and health survey data set as they provide information on birth histories of all the enumerated mothers The DHS module captures information on all the children a woman has had in her life which is pertinent for this analysis. However this method can be limited by adoption and age misreporting though in circumstances with accurate age reporting it was considered the best.

Type of in-put information

Information on enumerated children under the age of 10 or 15 years preceding the survey classified by single year ages. Specifically:

1. Date of birth for each respective child
2. Birth dates of each woman irrespective of whether the woman had ever given birth or not and The date of the survey.

Estimated parameters */out-put are the* respective age specific fertility rates for each of three years preceding the enumeration**.** Total fertility for each of the 10 or 15 years preceding enumeration. A Poisson regression model was also used to analyses fertility differentials over the study period.

Methods

The study was based on a demographic technique of reverse survival using own children information. This technique provides estimation of annual age specific fertility rates for a period of 10 to 15 years before any survey or census. The analysis was based on information obtained from enumerated children classified by age of the mother at the time of the survey. We used Schoumaker [26] method of retrospective fertility estimation which was deemed appropriate to provide patterns, trends and levels of births in any given area or country. This approach has been used elsewhere successfully [27, 28] to estimate for the same.

Analysis and Reconstruction of fertility Trend

Using five DHS data sets for Uganda for the period 1988/89 to 2011. We begin by evaluating the quality of data assessing age and dates of birth for the children and their respective mothers. This is important to control for age heaping and misreporting which is evidenced in demographic and health surveys data [21].

After evaluating the data, we begin by providing the country specific demographic we do a fertility reconstruction for over 38 years utilizing a method proposed by Schoumaker [26] based on pooled of Uganda DHS data. In this approach the person-period approach to analyze all the birth histories of the women is employed. The Poisson regression model is estimated using person-period data takes on the form

$\text{Log}(\mu_i) = \log(t_i) + \alpha + f(\text{age}) + g(\text{time})$

Where

μ_i is the expected number of children born to the mother in each respective time segment,

t_i this is the length of the time or exposure,

f(age) is a function of age estimated , and
g(time) this is a function of calendar time.

As parameters being estimated, age is a dummy that represents the five-year age groups of the mother and the function of the calendar time represents annual fertility variations for the respective Uganda DHS. The yearly total fertility estimates are presented accordingly in the tables with corresponding confidence intervals. Lastly, modeling of fertility rates by selected socioeconomic factors for the two Uganda DHSs (1988/89 and 2011) is carried out to examine the factors responsible for fertility decline over the years. This is done by computing for the rate ratios of the socio demographic indicators examining their influence on fertility trends over the years. These computations are done with an assumption of proportionality of rates that is the age pattern of fertility is fairly similar or constant across the different categories. In order to get the required rate ratios, the different categorical variables are used as covariates in the model. In the output for differentials, age-specific fertility rates are computed for the respective reference category and rate ratios of the other categories and variables.

Results

Estimates of the selected socio economic and demographic indicators in Uganda are presented in Table 1.The country's fertility rates have remained persistently high that is above 6 children born per woman and particularly among rural women. These women have on average over 7 children born. Evidently the urban women's fertility levels have gradually been reducing over the years, from 5.7 in 1988/89 to 3.8 children born per woman. Use of contraception for all methods has increased six times from as low as 4.9%in 1988/89 surveys to 30% in 2011. The increase has been most evident among users of modern contraception. Age at first marriage has remained extremely low at 17 years, which exposes women to many years of child

bearing in the country. Age at first sexual intercourse has increased slightly from 15.6 years in 1988 to a current estimate of 16.8 years for women.

Total fertility rate and Age specific fertility rates for three years preceding Demographic and Health Survey

The age specific fertility levels for the respective three-year period are presented in Figure1. Over the years the rates reduced in the respective age groups of the mothers with the highest rates were recorded in the 1988/89 survey compared to 2011. The fertility levels over the years have been consistent with the corresponding demographic and health surveys as indicated in Figure 2.

Retrospective Fertility levels over for 38 years in Uganda

Retrospective annual total fertility estimates of a 15-year period for each respective survey are presented in Figure 2 providing visible assessment of the annual fertility rates for a period of 38 years. The regression analysis shows oscillations in the fertility levels ranging from 8.8 children born per woman in 1976 to a minimum of 6.2 children born in 2014 in Figure 1. In the retrospective 15 years before the first demographic and health survey of 1988/89, fertility rate was 7.7 children born in 1973 then short up to 8.3 in 1974, reduced to 7.6 children born in 1975. There was a sharp reduction to 6.8 children born in 1981 from a rate of 8.4 in 1980. The pattern remained the same until the period 1983 to 1987 where the rates consistently remained at around 7 children born per woman. The retrospective years before 2000/01 survey had unsteady rates ranging from 8 to 6 children born per woman. For the most recent survey 2011, only two years 1996 and 2000 were rates at 8 children born per woman. Notably, for 5 years (2006 -2010) the rates remained around ranging from 6.7 to 6.1 children born per woman. It is only during this period that a consistent rate of 6 children born per woman is observed without fluctuating to a rate of 7 or 8 children born.

Fertility trends over the 38 year period in Uganda

Average fertility estimates of each respective year are presented in Figure 2. These results are presented with the fitted regression line to show the trends over the years. Overall the fertility levels in Uganda have been high from 8 children born 1970s to 6

children born per woman in 2010. The regression line shows a gradual reduction over the years with a possibility of continued trend in the forth-coming years. The results further show no fertility stall in the four decades that have been estimated over time.

Fertility differentials patterns for the survey period of 1988/89 to 2011

The results for the fertility differentials in Uganda for three years preceding the survey are presented in Table 2. These computations were done using the adopted tfr2 approach for all the respective surveys using categorical variables [26]. The table shows the net effect of education controlling for residence and marital status. The estimated age specific fertility rates for the reference category in this case women with no education and the displayed rate ratios are of the other categories and variables. The results show for the survey period of 1988/89 and 2011 one variable marital status seemed to have direct impact of the number of children born controlling for education and residence. The TFR among the married women was 3.8 in 1988/89 and 6.8 in 2011 while for those who were formerly married was 2.8 in 1988/89 and 4.7 in 2011. In the other survey years, education, place of residence and marital status does have an influence on total fertility rates. For instance in 1995 survey, women with primary education had fertility equal to 1.09 compare to those with education while women in rural areas had 1.2 children born compared to those in urban areas.

Conclusions

The findings suggest no fertility stall for Uganda but demonstrate an onset of fertility transition where the levels are likely to continue declining consistently to lower levels. These findings are pertinent for policy makers especially at this point in time when the country is focusing on harnessing the demographic dividend. As the reduction in fertility commences the country ought to facilitate this process with increased investment in education and family planning. This study is the first to indicate and have reconstructed fertility levels and trends over the years for the country to establish whether the country has a fertility stall or not.

The study suggests no evidence of fertility stall in Uganda but demonstrate an onset of fertility transition in the country. If this trend continues, Uganda will also

experience a low fertility regime in the near future, a finding pertinent for policy makers especially as the continent and the country focus on harnessing the demographic dividend. .

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LIST OF FIGURES AND TABLES

Figure 1: Retrospective fertility rates using own children method for single Calendar years using consecutive UDHS (1988/89-2011)

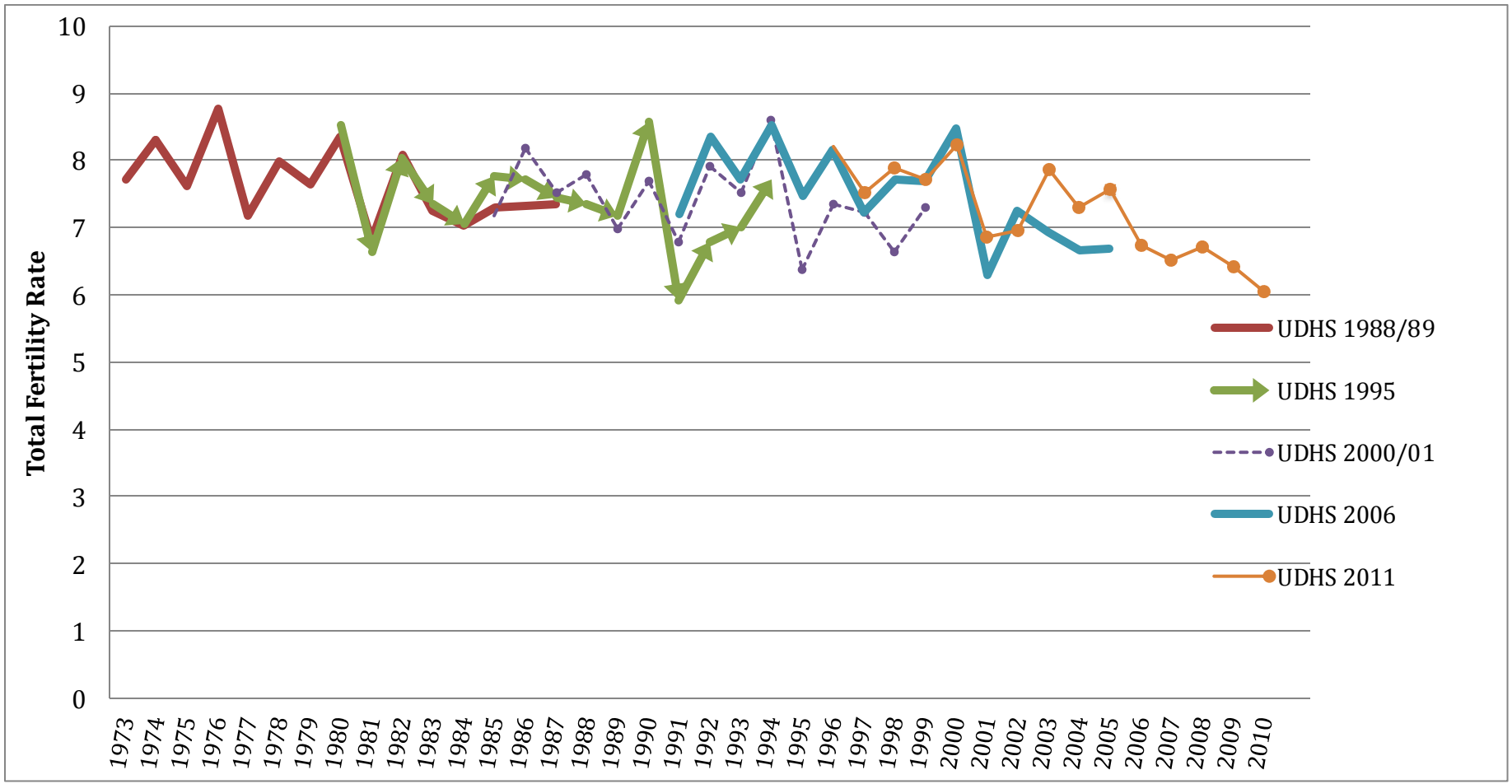

Figure 2: Reconstructed Fertility trends (15-49) of Uganda for 38 years using DHS surveys

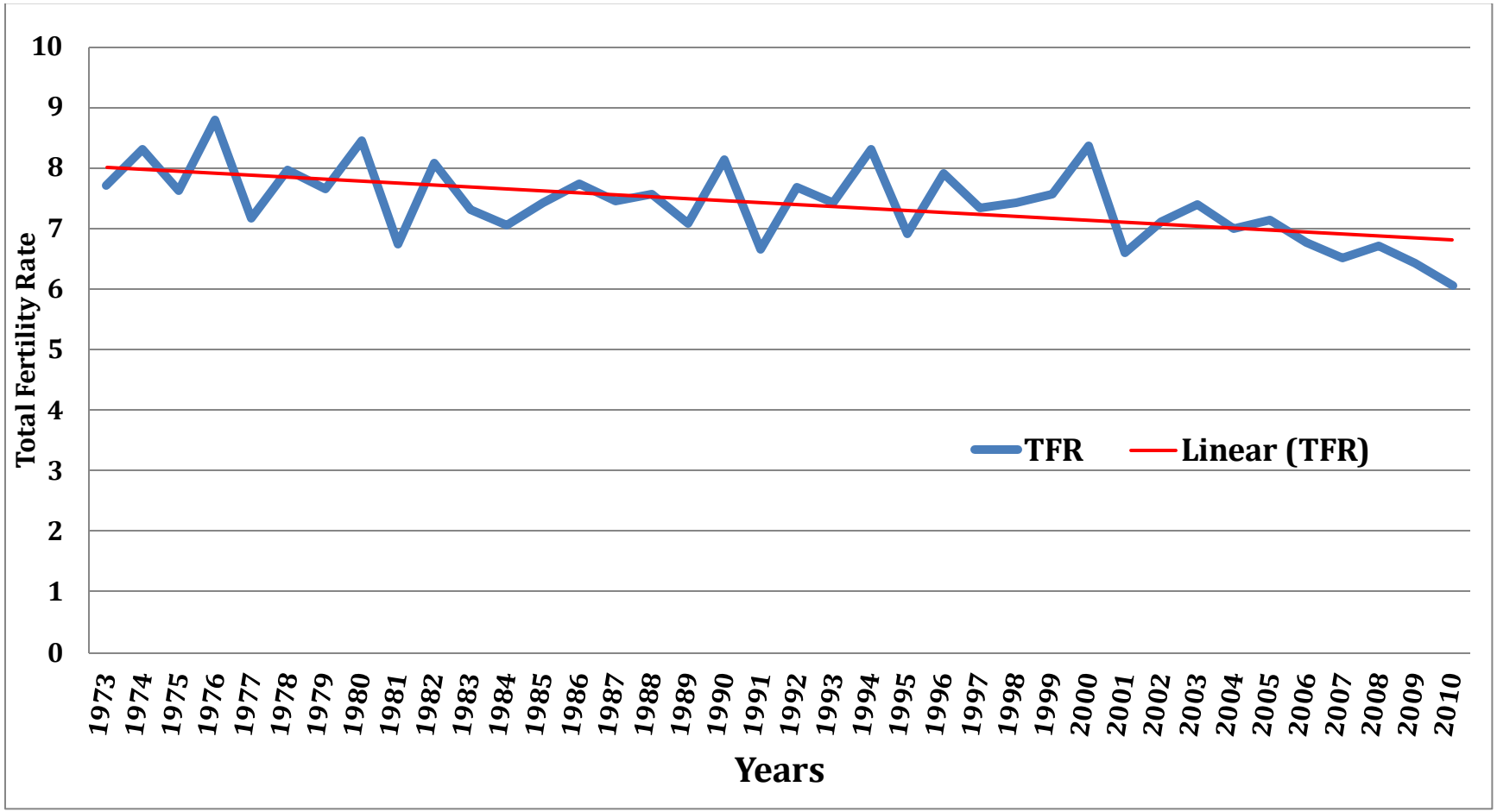

Table 1 Selected Socioeconomic Indicators for Uganda for the period 1988-2011

Characteristics	Demographic and Health Survey				
	1988-89	1995	2000-01	2006	2011
Sample survey					
TFR	7.4	6.9	6.9	6.7	6.2
Residence					
Rural	7.6	7.2	7.4	7.1	6.8
Urban	5.7	5.0	4.0	4.4	3.8
Contraceptive use					
Any Method	4.9	14.8	22.8	23.7	30
Modern method	2.5	7.8	18.2	17.9	26
Median Age at First sexual Intercourse	15.6	16.0	16.6	16.4	16.8
Median age at first marriage	17.0	17.4	17.8	17.6	17.9

Table 2: Socioeconomic and demographic fertility differentials for the retrospective period for 1988/89 to 2011 DHS

	Rate ratios				
	DHS YEAR				
Variable	1988/89	1995	2000/01	2006	2011
Education					
None[Rc]	1.0	1.0	1.0	1.0	1.0
Primary	0.97	1.07*	1.01	1.05	1.06
Secondary	0.93	.95	.78**	0.96	1.04
Residence					
Urban[Rc]	1.0	1.0	1.0	1.0	1.0
Rural	1.11*	1.23*	1.3**	1.12*	1.17*
Marital					
Single[Rc]	1.0	1.0	1.0	1.0	1.0
Married	3.8***	4.6***	5.9**	6.4**	6.71*
Formerly	2.8***	3.1***	3.6**	4.2**	4.55*
Wealth	.	.			
Poorest[Rc]	.	.	1.0	1.0	1.0
Poorer	.	.	0.98	0.96	0.91*
Middle	.	.	1.10*	0.94	0.92*
Richer	.	.	1.08*	0.93	0.88*
Richest	.	.	1.05	0.75*	0.71*
Contracep					
Not Using[Rc]	1.0	1.0	1.0	1.0	1.0
Using	1.12	1.11*	1.06*	0.93*	1.00

Legend: * p<.1; ** p<.05; *** p<.01 , **Rc** Reference Category