Comparison of timing of the 2nd birth between high fertility country (Uganda) and Lower fertility country (South Africa)

By Yovani A Moses Lubaale (PhD) and Lutendo Malisha (PhD)

Although many scholars have studied the timing of the first child after marriage in both high and low fertility countries that is developed and developing, little has been studied on the timing of the second birth within the developing countries with high fertility rates of above TRF 5. The studies on the timing of the second birth are mainly from the developed counties looking mainly at the effect of timing of the second birth to the labour market dynamics and high level education attainment which is also related to labour. The timing of the first birth usually brings with it joy, happiness and challenges; what does the timing of the second birth come with?

Objective of the paper: The main objective of this study is to look at the timing of the 2nd birth in Uganda and South Africa. Uganda representing a country of high fertility rate (TFR 5.4) while South Africa representing a country of lower fertility rate (TFR 2.6).

Source of data: The sources of data for the study will be the most recent Demographic and Health surveys carried out in Uganda and South Africa in 2016. The inclusion criteria is that the mother is married and has more than one birth. In the analysis frequency distribution are presented fisrt and some cross tabulation on timing of 2nd birth and the pre-disposing factors. Time to second birth after the first birth among married couples will be assessed using a Cox Proportional Hazard model. The model will be used because it does not assume a functional form for the baseline hazard rate. Associations will be established in the analysis at 1% and 5% levels, unless otherwise stated.

Results: Preliminary findings show that time to second birth after first birth is lower in Uganda compared to that of South Africa. Irrespective of the country, it is high among formally employed women compared to those in other occupation.

Introduction

Scholars all over the globe continue to look into fertility and its determinants. Fertility is an event that occurs over time and is affected by numerous factors (Gerland, et al., 2017; Nzimande & Mugwendere, 2018; Moutrie & Timæus, 2001). Other than studying fertility rates, trends, fertility transition and stalling, family formation has been another approach at which studies used to explain fertility determinants (Ntozi, et al., 1997). Fertility decline in South Africa has been recorded for decades and studies have also linked it to political history where Africans were encouraged to utilise contraception for the benefit of the non-democratic government then (Palamuleni, et al., 2007; Udjo, 2005; Moultrie & Timæus, 2002; Camlin, et al., 2004). Udjo (2005) argue that the fertility decline over time in South Africa is due to age patterns and timing of birth. In addition, there are variations in fertility based on several factors such as population group, province of residence. Black Africans are reported to have higher fertility rates compared to other population groups while more rural provinces such as Limpopo, Mpumalanga, Eastern Cape and North West have high fertility rates compared to more urbanised provinces such as Gauteng and Western Cape with consistent lower fertility rates (STATSSA, 2015). However, some studies have reported that certain rural areas in Mpumalanga province have experienced fertility decline stalling since the early 80s and in the early 2000s (Garenne, et al., 2007). This was attributed to large influx of migrants from Mozambique during that period (Ibisomi, et al., 2014).

In Uganga however, fertility has been constantly high compared to other east African countries such as Kenya and Rwanda that showed rapid decline in fertility for decades (Ntozi, et al., 1997; Gerland, et al., 2017). According to the last five censuses conducted between 1948 and 2002, Uganda is population growth has been high and doubling in less than 25 years (Lubaale 2002, Mukulu 2019, Ssekamate 2019). A study by Kabangenyi and colleagues (2015) forecasted that Uganda is currently at a pre-transitional stage of fertility showing foreseeable fertility rate reduction in the years to come. While fertility stalling is still very much a question in Uganda (Kabagenyi, et al., 2015). In the case of Uganda marital status has consistently shown to be a strong predictor of giving birth and unmet contraceptive needs still high (Blacker, et al., 2005). Those married in Uganda gave birth to more than one child compared to those not in marital unions. In addition, contraceptive use in Uganda has consistently been reported to be low compared to other African countries (Namasivayam, et al., 2019; Hoke, et al., 2012; Stanback, et al., 2007). This is coupled with the desire of women in Uganda to have large families (Blacker, et al., 2005). Those in rural areas had even higher fertility rates and continued desire for more children (Kabagenyi, et al., 2015; Blacker, et al., 2005).

The above stated factors are those reported to be predicting fertility in the two countries, however, it is still unclear which factors predict the birth of a second child in the two countries. Therefore, this paper will attempt to details some of the factors that determine the second born in each country followed by considerations of some of the factors that may explain the difference in the two countries.

Objective of the paper

The major objective of this paper to compare the timing of second child between a low fertility developing Country South Africa and high fertility developing country- Uganda.

Specifically, the study presents how the different socioeconomic factors after the timing of the 2nd child in the two countries.

Data source

For this comparative study, data utilised is from Uganda Demographic and Health Survey (UDHS) 2016 and South African Demographic and Health Survey 2016 (SADHS). These are cross-sectional surveys that are part of the worldwide DHS project that collects data on different demographic, population and health indicators in developing countries. For the UDHS the sample size was….. of the women in reproductive age groups 15-49 years while the SADS sampled 8514 of women in the same age groups. The SADHS 2016 used a stratified two-stage sample design with a probability proportional to size and systematic sampling methods. The first stage was at a primary sampling unit (PSU) level where the proportional to size sampling was used and second stage was at a dwelling unit (DU) where systematic sampling was applied to select participants.

Methodology

Multiple linear regression for the medium month was carried out for the study how the different factors affect the timing of the second birth. This model was adopted from Baum (2013).

Analogous to the conditional mean function of linear regression, we may consider the relationship between the regressors and outcome using the conditional median function Qq(yjx), where the median is the 50th percentile, or quantile q, of the empirical distribution.

The quantile q 2 (0; 1) is that y which splits the data into proportions q below and 1 □ q above: F(yq) = q and yq = F□1(q): for the median, q = 0:5.
If _i is the model prediction error, OLS minimizes P i e2 i . Median regression, also known as least-absolute-deviations (LAD) regression, minimizes P i jei j. Quantile regression minimizes a sum that gives asymmetric penalties (1 □ q)jei j for overprediction and qjei j for underprediction. Although its computation requires linear programming methods, the quantile regression estimator is asymptotically normally distributed.

Median regression is more robust to outliers than least squares regression, and is semiparametric as it avoids assumptions about the parametric distribution of the error process.

Both the squared-error and absolute-error loss functions are symmetric; the sign of the prediction error is not relevant. If the quantile q differs from 0.5, there is an asymmetric penalty, with
increasing asymmetry as q approaches 0 or 1. Advantages of quantile regression (QR): while OLS can be inefficient if the errors are highly non-normal, QR is more robust to non-normal errors and outliers. QR also provides a richer characterization of the data, allowing us to consider the impact of a covariate on the entire distribution of y, not merely its conditional mean.
Furthermore, QR is invariant to monotonic transformations, such as log(_), so the quantiles of h(y), a monotone transform of y, are h(Qq(y)), and the inverse transformation may be used to translate the results back to y. This is not possible for the mean as E[h(y)] 6= h[E(y)].

The quantile regression estimator for quantile q minimizes the objective function Q(_q) = XN
i:yi_x0 i _ qjyi □ x0 i _qj + XN
i:yi<x0
i _
(1 □ q)jyi □ x0 i _qj
This nondifferentiable function is minimized via the simplex method, which is guaranteed to yield a solution in a finite number of iterations.
Although the estimator is proven to be asymptotically normal with an analytical VCE, the expression for the VCE is awkward to estimate. Bootstrap standard errors are often used in place of analytic standard errors.

The Stata command qreg estimates a multivariate quantile regression with analytic standard errors. By default the quantile is 0.5, the median. A different quantile may be specified with the quantile() option. The bsqreg command estimates the model with bootstrap standard errors, retaining the assumption of independent errors but relaxing the assumption of identically distributed errors; thus they are analogous to robust standard errors in linear regression.

Specifically, the study is using Uganda which until recently had fertility rates of above 6.5 percent

	South Africa			Uganda		
Percentile	Months before 2nd birth	[95% Conf. Interval]		Months before 2nd birth	[95% Conf. Interval]	
5	19	18	20	13	13	13
10	24	23	24	16	16	17
25	36	34	37	22	21	22
50	57	56	58	28	28	28
75	85	83	87	38	37	38
90	125	122	128	52	51	53
95	150	144	155	67	65	69

	RSA		Uganda	
	No of Mothers	Months before 2nd birth	Months before 2nd birth	
Current age of mother				
15-19	15	24	138	24.5
20-24	226	34	1727	28
25-29	665	47	2423	29
30-34	853	58	2414	28
35-39	788	64	1943	27
40-44	783	63	1542	28
45-49	752	64	1130	27
Residence				
Urban	2205	59	2259	31
Rural	1877	55	9058	27.5
Level of education				
No education	141	51	1822	27
Primary	591	53	7045	28
Secondary	2972	58	1882	30
Higher	378	57.5	568	35

Knowledge of fertile period				
During her periods	223	58	86	27
After period have ended	855	54	5736	28
Middle of the cycle	1144	59	2643	29
Before her periods begins	608	55.5	1084	28
At any time	555	54	896	27
Other	4	85	73	28
Do not know	693	59	799	27