



# LESSON SIX

## FERTILITY DIFFERENTIALS AND DETERMINANTS

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# Learning Objectives

## Fertility Differentials and Determinants

Indirect Determinants  
(Underlying Factors)

Direct  
Determinants

Social  
Factors

Economic  
Factors

Proximate  
Determinants

## DETERMINANTS OF FERTILITY

Why does fertility differ from one individual/society to another? The answer lies in two categories of determinants:

- A) Underlying socioeconomic factors and fecundity (distal determinates of fertility)
- B) Proximate (intermediate) determinants of fertility

Chapter 5 has addressed underlying socioeconomic determinants. This chapter with, therefore, focus on proximate (intermediate) determinants. To do so, we will rely entirely on the United Nations Fund for Population Activity (UNFPA's) teaching module [1] which can be accessed by clicking the link provided in the reference section.

The objective of this section is to introduce the concepts and frameworks of proximate determinants of fertility so that the reader can understand the mechanisms through which social, economic, cultural and environmental factors are mediated to influence individual women's journey through their reproductive life span from menarche to menopause and produce the ultimate number of live births they each end up with. "Menarche is the occurrence of a first menstrual period in the female adolescent" [2].

After going through the entirety of this chapter, the reader should be able to articulate differences between proximate and distal determinants of fertility, explain the concept of proximate determinants and Bongaarts' model, understand variations in level of each inhibiting factors of fertility in different settings, and critique the main limitations of the model.

In the mid-1950s Davis and Blake, one of the most outstanding social scientists of the twentieth century proposed eleven proximate determinants of fertility which included: contraceptive prevalence, proportion of married women; induced abortion, sterility frequency of sexual intercourse; duration of the fertile period, and spontaneous intrauterine mortality and duration of the fertile period [3]. The degree to which these factors affect fertility varies from country to country.

In the late 1970s, John Bongaarts, currently a distinguished scholar at the Population Council, identified a smaller set of proximate determinants - marriage/cohabitation; induced abortion; contraception; and postpartum in-fecundity - and developed a relatively simple model to quantify their fertility effects [4]. However, with a subsequent change in reproductive behaviors and research methods, some of original assumptions have become less accurate thereby necessitating modifications.

In 2015, Bongaarts made six adjustments to his original (1978) model and to a version proposed by Stover in 1998 [5] to produce a better fit than did earlier models. Bongaarts latest revision is based on the premise that "the proximate determinants model, as originally

conceived, remains conceptually, sound [but that] theoretical and empirical evidence accumulated over the past three decades suggests a number of ways to fine-tune the model to make it more robust and accurate in contemporary populations”. All of the below discussions are based on this publication.

The proximate determinants (PD) refer to biological and behavioral factors mediating the impacts of what are known as background determinants (social, economic, and environmental variables) to affect fertility levels and trends for national and subnational populations. The most distinct feature of a proximate determinant is its direct relationship with fertility which means that “...if a proximate determinant, such as contraceptive use, changes, then fertility necessarily changes also (assuming the other proximate determinants remain constant)”. “If accurately measured and modeled, the proximate determinants should explain 100% of variation in fertility”. This statement is not necessarily true for a background determinant of such as income or educational levels.

At the core of the original PD model is the following multiplicative equation for a population at a given point in time:

$$TFR = CmCcCiCa TF$$

Where:

TFR = Observed total fertility rate

$Cm$  = Marriage index

$Cc$  = Contraception index

$Ci$  = Postpartum infecundability index

$Ca$  = Abortion index

TF = Total fecundity rate.

Each PD is treated as a factor that inhibits fertility and has values that range from 1 to 0 depending on the degree of inhibition.

**The index of marriage  $Cm$ :** gauges the impact marriage whether formal or consensual union). The index would have a value of one when all women are married or cohabitating, and zero when no the proportion of women are in a union is zero. It is worth noting here that only women in a union are assumed to be at risk of childbearing – an assumption which was revised as part of the 2015 update.

**The index  $Cc$ :** would have a value of one when no contraception is practiced, and zero when all fecund women use contraception that is 100% effective.

**The index  $Ci$ :** would have a value of one in the absence of lactational amenorrhea (temporary infertility associated with breast feeding) or postpartum abstinence. Its effect and decreases in magnitude as the period of postpartum infecundability rises.

**The index of abortion Ca:** would have a value of one in the total absence of abortion and decreases in its contribution as the incidence of abortion rises.

“The total fecundity rate is the hypothetical total fertility rate that would be observed in a population in which all inhibiting effects of the proximate variables are absent, i.e., when  $Cm = Cc = Ci = Ca = 1$ . TF values typically are around 15 births per woman.”

The original equations are summarized in Table 1. Most of the required variables can be readily obtained from DHS surveys, the main exception being induced abortion for which data are often of poor quality or lacking all together.

**Table 1. Original aggregate proximate determinants model and equations for indexes (age 15 – 49)**

	<b>Equations</b>	<b>Variables</b>
<b>Original aggregate model</b>	$TFR = CmCcCiCaTF$	TFR=total fertility rate TF= total fecundity rate
<b>Marriage index</b>	$Cm = \frac{\sum m(a)fm(a)}{\sum fm(a)}$	m(a)= proportion married by age fm(a)= age-specific marital fertility rate a=age
<b>Contraceptive index</b>	$Cc = 1 - 1.08 u e$	u=contraceptive prevalence (married women) e=average effectiveness
<b>Postpartum infecundability index</b>	$Ci = \frac{20}{18.5 + i}$	i=average duration of postpartum infecundability
<b>Abortion index</b>	$Cm = \frac{TFR}{TFR + b TAR}$ $b = 0.4(1 + u)$	TAR= total abortion rate b=births averted per abortion

**Table 2. Rating of Intermediate Fertility Variables**

<b>Intermediate Fertility Variables</b>	<b>Sensitivity of intermediate variable</b>	<b>Variability among populations</b>	<b>Overall rating</b>
<b>Proportions married</b>	+++	+++	+++
<b>Contraceptive use</b>	+++	+++	+++
<b>Prevalence of induced abortion</b>	++	+++	+++
<b>Postpartum infecundabiity</b>	++	+++	+++
<b>Fecundability</b>	++	++	++
<b>Spontaneous intrauterine mortality</b>	+	+	+
<b>Permanent sterility</b>	++	+	+
			<b>+ = Low or</b>
<b>KEY</b>	<b>+++ = High</b>	<b>++ = Medium</b>	<b>Absent</b>

Source: Based on [4]

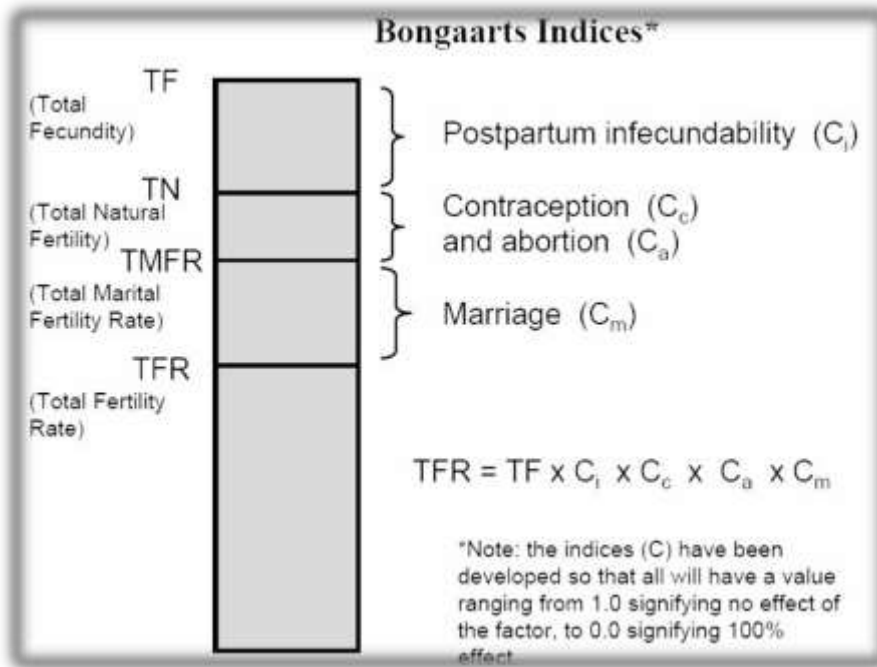
The table above is derived from the seminal work by John Bongarts [4] on direct determinants of

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fertility which he also named intermediate variables. These include:

- Proportions married
- Level of contraceptive use Induced abortion
- Postpartum / Lactational/ amenorrhea Fecundability
- Spontaneous intrauterine mortality Sterility

**Fig. 1. Bongaart's Model of Intermediate Fertility Determinants**



Source: Copied from [4]

**Table 2. Age specific rates for the old model were calculated using the below:**

	<b>Equations</b>	<b>Variables</b>
<b>Age specific</b>	$f(a) = Cm(a)Cc(a)Ci(a)Ca(a)$ $ff(a)$	$f(a)$ =age-specific fertility rate $ff(a)$ =age-specific fecundity rate $a$ =age
<b>Marriage index</b>	$Cm(a) = m(a)$	$m(a)$ = proportion married
<b>Contraception index</b>	$Cc(a) = 1 - r(a)u(a)e(a)$	$u(a)$ =contraceptive prevalence (married women) $e(a)$ =average effectiveness $r(a)$ =fecundity adjustment
<b>Postpartum infecundability index</b>	$Ci(a) = \frac{20}{18.5 + ia}$	$i(a)$ =average duration of postpartum infecundability
<b>Abortion index</b>	$Ca(a) = \frac{fa}{fa(a) + b ab(a)}$ $b = 0.4(1 + u)$	$ab(a)$ = abortion rate $b$ =births averted per abortion

**Proposed revisions:** Revisions had to be done for each of the proximate determinants as specific issues had been identified as necessitating a modification. The revisions are as follows:

**Marriage/union/sexual exposure:** Since extramarital sex and pregnancy have become more prevalent in even in developing countries, an estimate of the number of women who are exposed to the risk of childbearing is now captured by the sum of married women (or in consensual unions as defined in DHS surveys) and unmarried women who are “who are pregnant, report sex in the last month, use contraception, or are postpartum Infecundable”. Additionally, the name Marriage index was changed to the Index of Sexual Exposure as proposed by Stover in 1998 because it is more accurate.

**Contraception:** The proposed change here was to exclude the overlap between contraceptive use and postpartum infecundabilty in the calculation of  $C_c$  and to use to use the age-specific PD model instead of the aggregate model while revising it to all for variations in effectiveness by age.

**Postpartum infecundability:** No revisions needed.

**Abortion:** A new equation will be used to calculate the abortion index in the revised model proposed here.

### Implementation of revisions

The calculation of these indexes requires the following age-specific variables:

- $m(a)$ = proportion married/in union
- $ex(a)$ = extramarital sexual exposure
- $u(a)$ = contraceptive prevalence (among sexually active women)
- $o(a)$ = contraceptive prevalence that overlaps with postpartum infecundability
- $e(a)$ = average contraceptive effectiveness
- $r(a)$ = fecundity adjustment  $\cos(a + b) = \cos a \cos b - \sin a \sin b$
- $i(a)$ = average duration of postpartum infecundability
- $f(a)$ = fertility rate
- $f_m(a)=f(a)/(m(a)+ex(a))$ = fertility rate among sexually exposed women
- $ab(a)$ = abortion rate  $e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$ ,  $-\infty < x < \infty$

**Table 3. Revised age-specific proximate determinants model and equations for indexes**

	Equations	Variables
<b>Sexual exposure index</b>	$f(a) = {}^*C_m(a) {}^*C_c(a) {}^*C_i(a) {}^*C_a(a) {}^*C_f(a)$ ${}^*C_m(a) = m(a)+ex(a)$	*represents revised measures $m(a)$ = proportion married/union $ex(a)$ =extramarital exposure
<b>Contraception index</b>	${}^*C_c(a) = 1 - r^*(a)(u^*(a) - o(a))e^*(a)$	$u^*(a)$ =contraceptive prevalence (exposed women) $o(a)$ =overlap with postpartum infecundability $e^*(a)$ =average effectiveness $r^*(a)$ =fecundity adjustment
<b>Postpartum infecundability index</b>	${}^*C_i(a) = \frac{20}{18.5 + ia}$	$i(a)$ =average duration of postpartum infecundability
<b>Abortion index</b>	${}^*C_a(a) = \frac{f(a)}{f(a) + b \cdot ab(a)}$	$ab(a)$ = abortion rate

\*represents revised measures

**Table 4. Revised aggregate model (weighted version of the age-specific indexes, with the weights varying by index)**

Index	Equations	Variables
Revised aggregate model	$TFR = \sum C_m^*(a) C_c^*(a) C_i^*(a) C_a^*(a) f_f^*(a)$ $= C_m^* C_c^* C_i^* C_a^* TFR^*$	$TFR^*$ = revised total fecundity rate $f_f^*(a)$ =revised fecundity rate
Sexual exposure index	$C_m^* = \sum C_m^*(a) w_m(a)$ $w_m(a) = \frac{f_m^*(a)}{\sum f_m^*(a)}$ $f_m^*(a) = C_c^*(a) C_i^*(a) C_a^*(a) f_f^*(a)$	$f_m^*(a)$ = fertility rate, exposed women a=age
Contraception index	$C_c^* = \sum C_c^*(a) w_c(a)$ $w_c(a) = \frac{f_n^*(a)}{\sum f_n^*(a)} \approx \frac{f_f^*(a)}{\sum f_f^*(a)}$ $f_n(a) = C_i^*(a) C_a^*(a) f_f^*(a)$	$f_n^*(a)$ = natural exposed fertility a=age
Postpartum infecundability index	$C_i^* = \sum C_i^*(a) w_i(a) \approx C_i$	
Abortion index	$C_a^* = \sum C_a^*(a) w_a(a) \approx \frac{TFR}{TFR + b^* TAR}$	

**Table 5. Classification of contraceptive methods and effectiveness**

Modern	Effectiveness	Traditional method	Effectiveness
Pill	0.92	Periodic abstinence	0.5
IUD	0.96	Withdrawal	0.5
Injections	1	Abstinence	1
Diaphragm	0.81	Other	0.1
Condom	0.81		
Female sterilization	1		
Male sterilization	1		
Implants/Norplant	1		
Lactational amenorrhea	1		
Female condom	0.81		
Foam or Jelly	0.91		
Other modern method	0.91		

Source: [6]

A year after Bongaarts published his revised model, came a study titled “Delayed marriage, contraceptive use, and Breastfeeding: Fertility patterns over time and wealth quintiles in sub-Saharan

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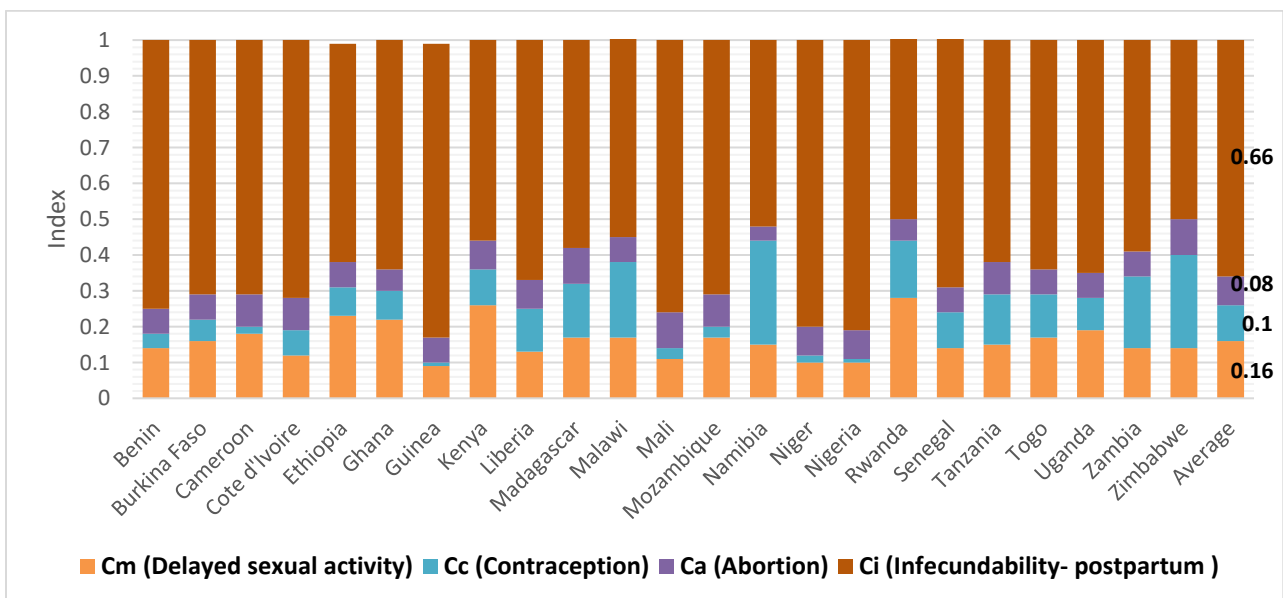
Africa”. The study applied Bongaarts updated methodology [6]. All of the below discussions are based on this publication.

The study used data collected as part of the Demographic and Health Surveys for 21 SSA countries between 1990 and 2014. The authors examined the within-country fertility patterns by wealth by applying the Bongaarts (2015) proximate determinants model [5]. Among their overall findings was that fertility has declined in SSA for the richest fifth of wealth quintiles, but not for the poorest. This has resulted in slow declines in the national-level total fertility rate in most of the countries studied. The study found contraceptive use to be on the rise, particularly for the richest quintile, but noted a decrease in the duration of breastfeeding across countries thereby putting upward pressures on the fertility rate. As a result, the total fertility rate is declining for the richest wealth quintile, but has remained stagnant for the poorest quintile in most of the countries studied.

The authors analyzed the specific role of each proximate determinant to examine its contributions within countries, by wealth quintile, and over time in order to reveal trends of their impacts by as well as show the fertility gaps between richest and poorest quintiles. Although all 21 countries experienced a decline in fertility for the richest quintiles, only 14 of the 21 countries experienced a decline in fertility for the poorest wealth quintiles. In all 21 countries, contraceptive use plays an increasingly positive role for fertility decline. Postpartum infecundability also plays a dominant role, particularly for the poorest quintiles, although its relative contribution to bringing fertility down from the biological maximum (assumed by Bongaarts to be 15.3 births) has declined somewhat over time, very likely due to decreases in the duration of breast feeding.

Figure 2 shows the proportionate contributions of four proximate determinants among the poorest respondents (lowest wealth quintile) in 21 Sub Saharan African countries on the Demographic and Health Survey (DHS) wealth index distributions during the latest survey (as of the publication of the results in 2016). Figure 3 shows the equivalent distribution for the richest respondent (highest quintile). The last bar shows the average for all 21 countries.

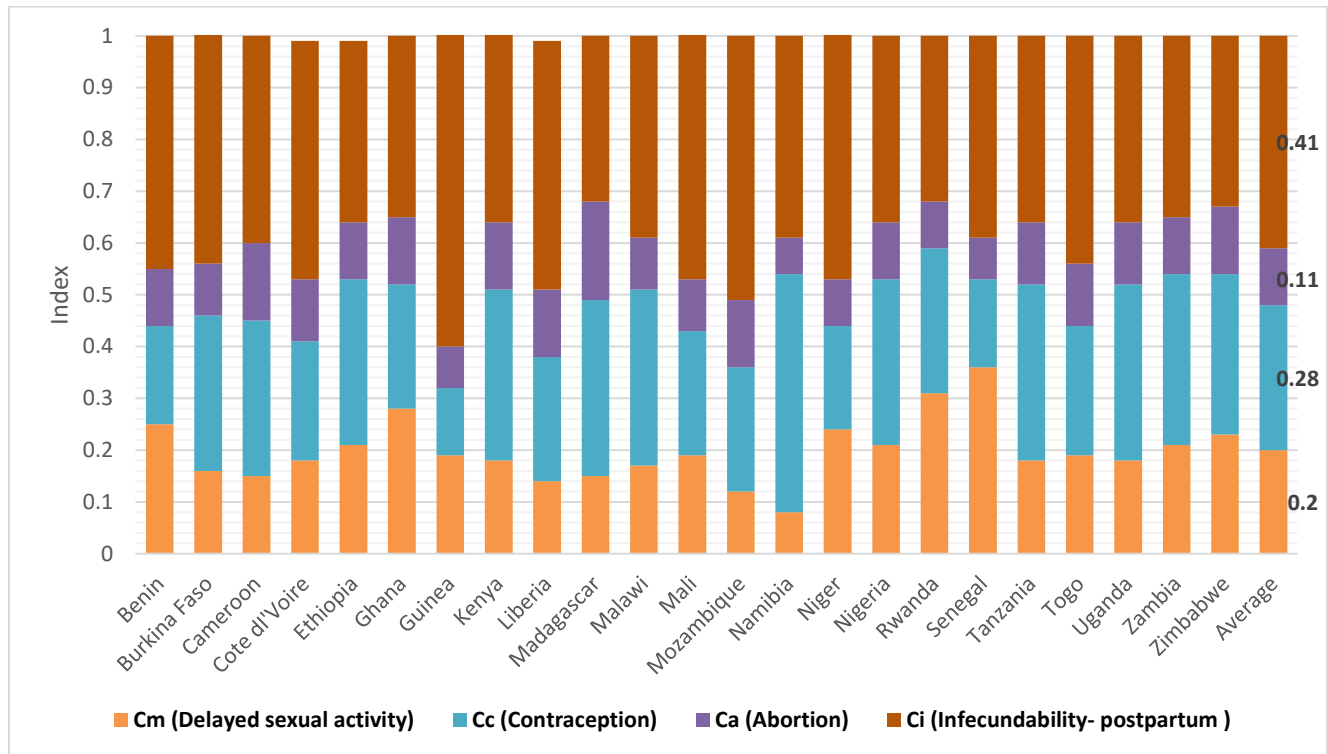
**Figure 2.** Proportionate Contributions of Four Proximate Determinates for Poorest Respondents (lowest quintile) in 21 Sub Saharan African Countries



Source: Based on [6]

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**Figure 3.** Proportionate Contributions of Four Proximate Determinates for Richest Respondents (highest quintile) in 21 Sub Saharan African Countries

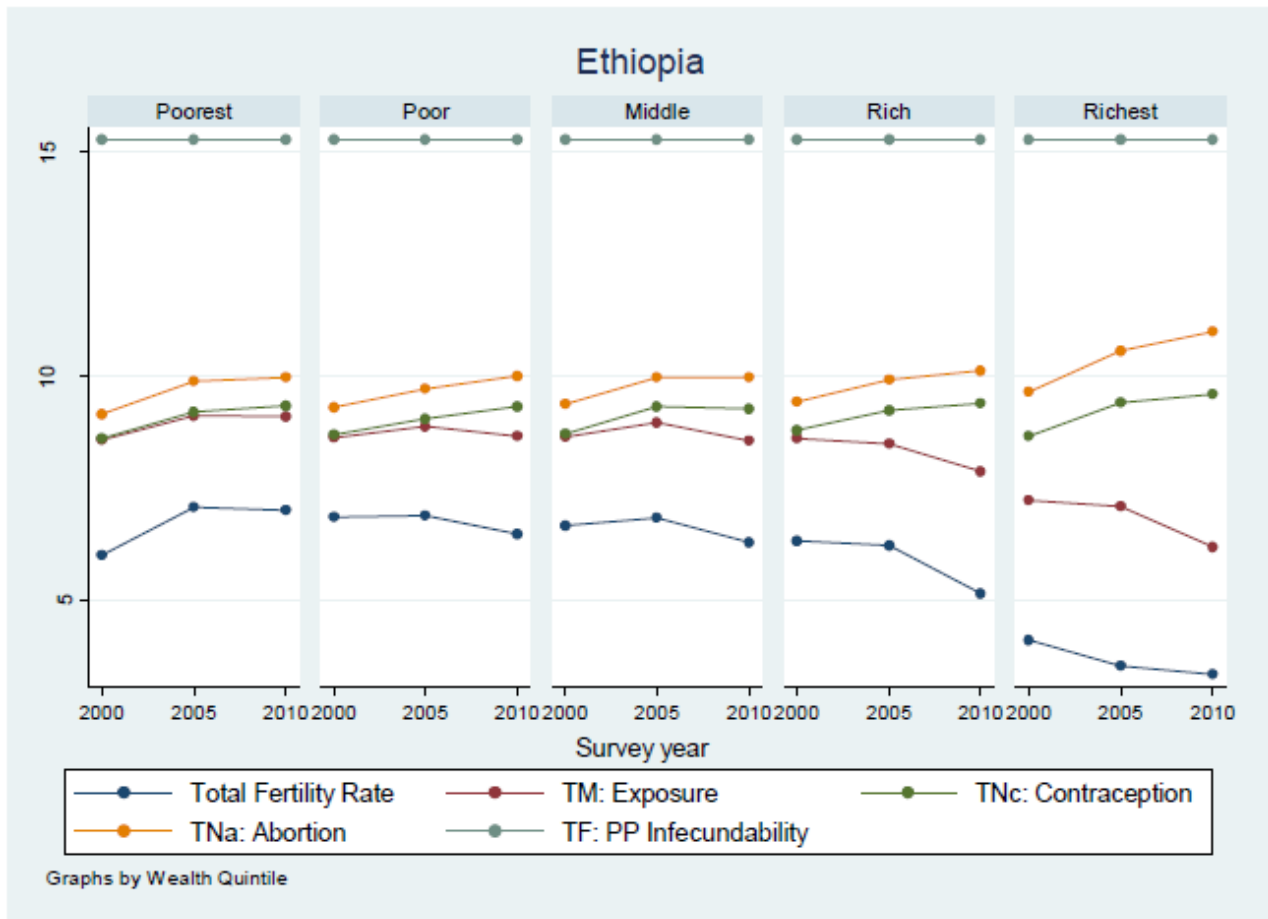


Source: Based on [6]

Comparison of Figure 2 and Figure 3 provides useful insights into existing dynamics of proximate determinants responsible for fertility outcomes among the poorest and richest segments of women interviewees participating as measured in terms of DHS wealth indices calculated following national surveys. The terms rich and poor are relative as substantial portions of the richest in sub-Saharan Africa are not reach at all by world standards. The most notable difference is the dominant role of postpartum infecundability among women in the lowest wealth quintile (60%) (Figure 1) which drops by a full third (41%) for women in the highest wealth quintile (Figure 2). The second most important observation is the weak role of contraception among women in the lowest wealth quintile (10%) which neatly triples (28%) for women in the highest wealth quintile. The contributions of abortion and delayed sexual activity do not appear to depend as heavily as the other two, on women's economic position at the extremes of wealth quintiles.

Figure 4 is a direct copy as the authors of the Sub Saharan African paper did not release publish the actual numbers. It shows the changing contributions of three proximate determinants – sexual exposure, postpartum infecundability, and abortion, in Ethiopia with the latter two showing a rising trend from DHS 2000 to 2005, and to 2011 (wrongly labeled as 2010).

**Figure 5. Ethiopia: Total Fertility Rate (TFR) and the changing contributions of three proximate determinants – sexual exposure, postpartum infecundability, and abortion, DHS 2000, 2005, and 2011 (wrongly labeled as 2010)**



Source: direct copy from [6]

## Breaking Down the Components

### I. PROPORTIONS MARRIED

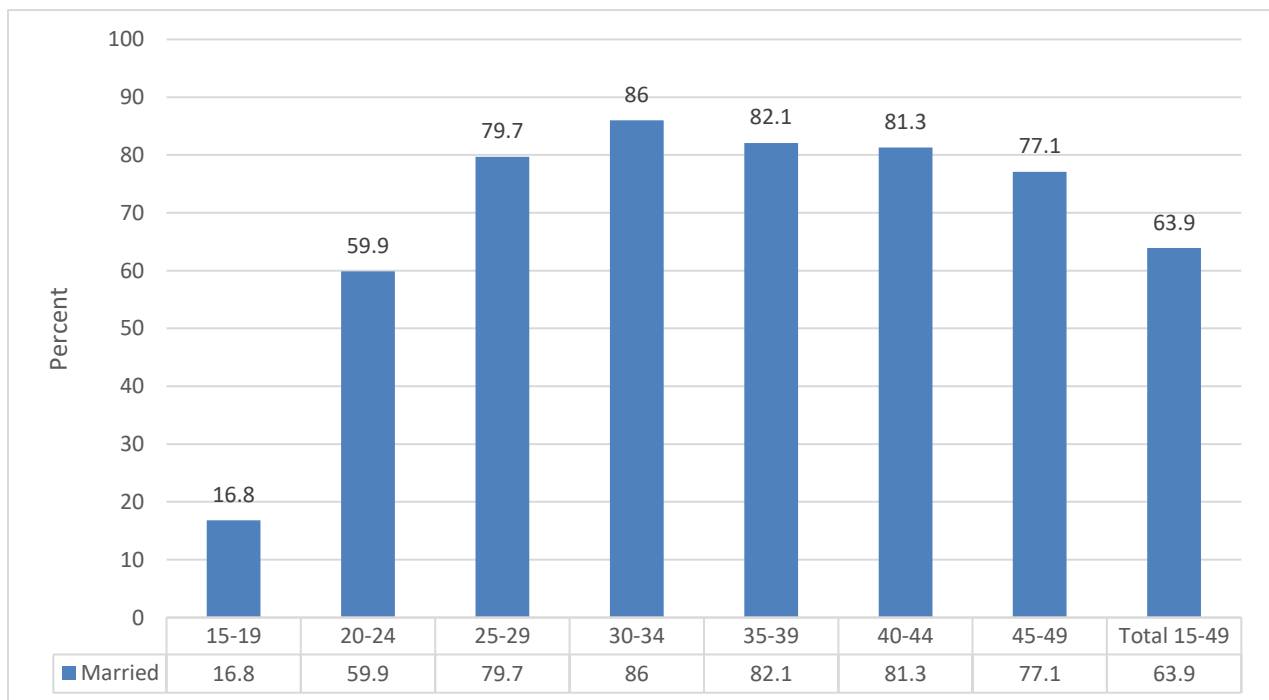
There are marked differences in Ethiopia in marital status by sex and age. Overall, the percentage of women in a union is higher than that among men until age 34. As an example, 17% of women age 15-19 were in the currently married or living together with a partner group at the 2016 Demographic and Health Survey (DHS), as compared with only 1% of men in the same age category. All of the below discussions are based on results of this survey [7].

The percentage of Ethiopian women currently in a union increases up to age 30-34, at which point it starts to decline whereas among men, the percentage rises with age. Expectedly, the proportion of women who are divorced or separated also increases with age. However, there are no age differentials in the proportions of men who are widowed, divorced, or separated. Some women report being in a polygynous marriage. This is when their husband or partner has other wives. Polygyny has

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implications for TFR due to its potential to reduce exposure to sexual activity, of wives who have to share a husband. In DHS 2016 11% percent of women age 15-49 reported that their husband or partner has other wives while 5% of men reported having more than one wife. The proportion of women who report being in a polygynous marriage has declined slightly - from 14% in 2000 and 12% in 2005 to 11% in both 2011 and 2016. Younger women are less likely than older women to have co-wives: 4% among those age 15-19 and 18% among those age 45-49. Additionally, rural are more likely to report having co-wives (12%) than urban women (5%). All four of Ethiopia's DHS have shown Somali *Kilil* as a region with the highest percentage of women reporting themselves as being in a polygynous union (29% in 2016), followed by Benishangul-Gumuz (21%), Gambella (21%), Afar (19%), SNNPR (16%), and Oromiya (14%), while the Amhara region has the lowest percentage (1%) which is lower than Addis Ababa's (2%). It is interesting that 2% of married women in the nation's capital share a husband with another wife. Finally, women who have attended school less likely to have co-wives (7%) than those with no education (14% in 2016).

**Fig. 6. Percentage Proportion of Married Women by Age Group (DHS 2016)**



Source: based on [7]

In Figure 6 close to two-thirds of Ethiopian women who would ever marry have already married by age 25 and nearly 80% marry before age 30. The proportion married peaks around age 32 after which it declines due, to widowhood, divorce, and separation.

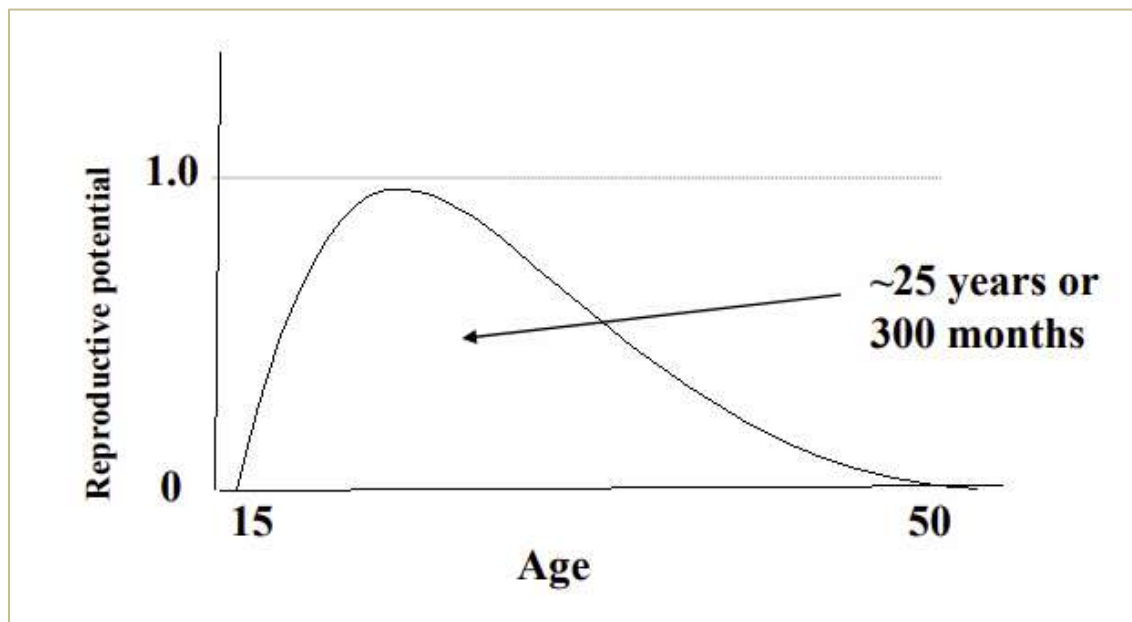
## 2. Age at First Marriage

Although things are starting to happen, it is still predominantly the case in rural Ethiopia that sexual activity and, hence, exposure to pregnancy happens coincidentally with marriage. This is increasingly less true for urban areas where roughly a fifth of the population lives. Women

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who marry early - at age 20 for example - have roughly twice as many years of reproductivity as those marrying late - at 35, for example. In addition, their reproductive potential (Figure 7) is twice that of women marrying age 35. In other words, even as women marrying at age 35 expose themselves to pregnancy half as many years as those marrying at 20, the remaining years are not as productive biologically as the 15 reproductive years between age 20 and 35 (Fig. 7) due to a reduced fecundibility (biological potential to reproduce). This difference in biological potential to conceive (fecundity difference) leaves women marrying for the same length of time but late, with a smaller number of births than those marrying early. The median age at first marriage among women age 25-49 has increased from 16.5 years in 2011 to 17.1 years in 2016 [7] and that of women marrying before age 18 declined from 63% to 58%. The percentage of women who married before their 15th birthday decreased from 8% in 2011 to 6% in 2016.

**Figure 7. Potential Reproductive Life-Spans**

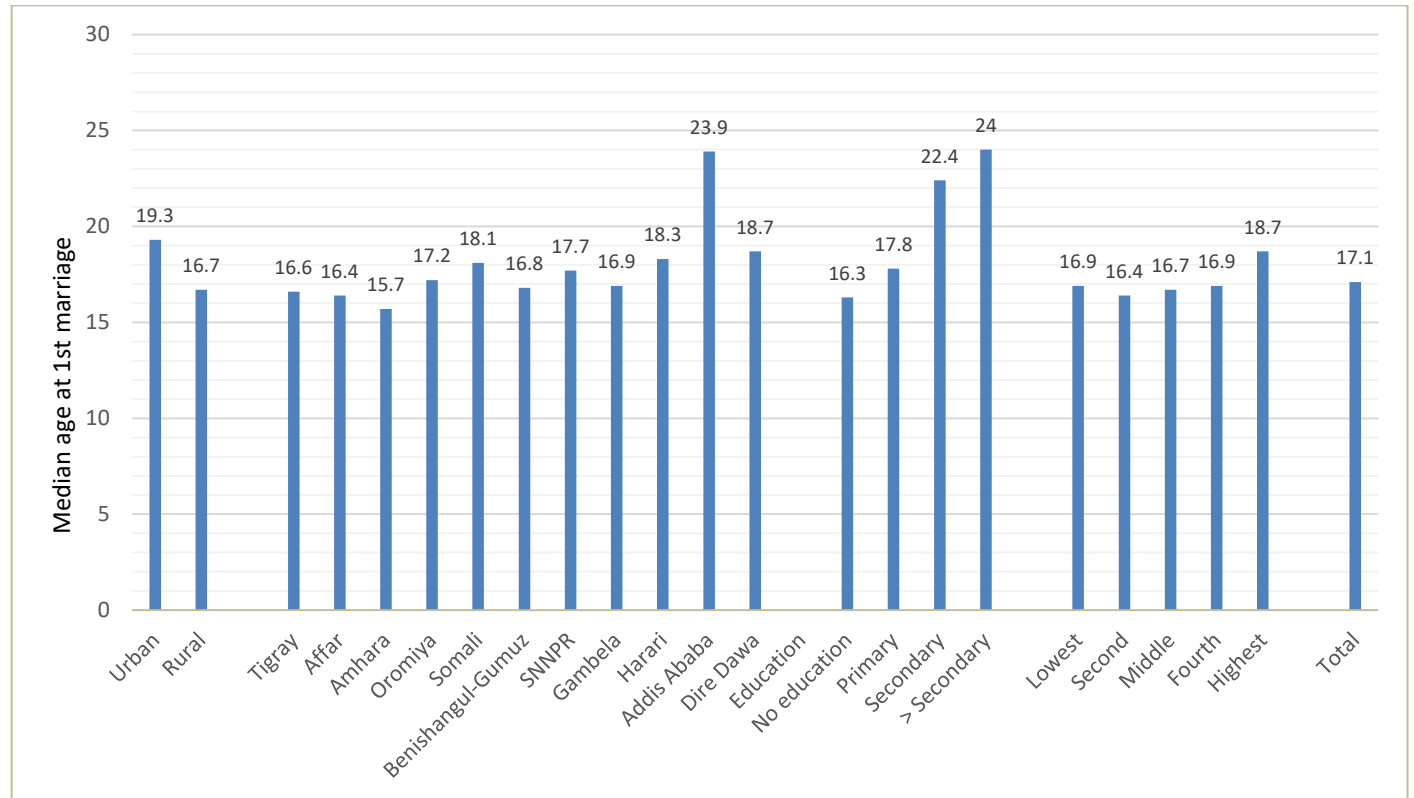


Source: Copied from [8]

Source: [1]

Figure 8 shows age at first marriage among women aged 25 - 49 at DHS 2016 by region, education and wealth index quintiles. There is little variability except by education and urban-rural residence. Being a resident of Addis Ababa and with above secondary education is consistent with having the highest age (24) at first marriage (Figure 8). Being from Amhara region and having no education are consistent with having the lowest age at first marriage.

**Figure 8. Median Age at First Marriage Among Women Aged 25 – 49 by Background Characteristics**



Source: Based on [7]

## II. CONTRACEPTIVE USE

### Knowledge:

During DHS 2005, only 15% percent of married women used contraception [10] with the most widely used method being injectables (10%) followed by the pill (3%). A lot has changed since then as knowledge of contraceptive methods has steadily increased, having risen from 85 percent in 2000 [9] and 87 percent in 2005 [10] to 99% in 2016 [7]”. However, actual use rates remain relatively low. Among households where only one spouse knows of a method, husbands are more likely to know it than wives.

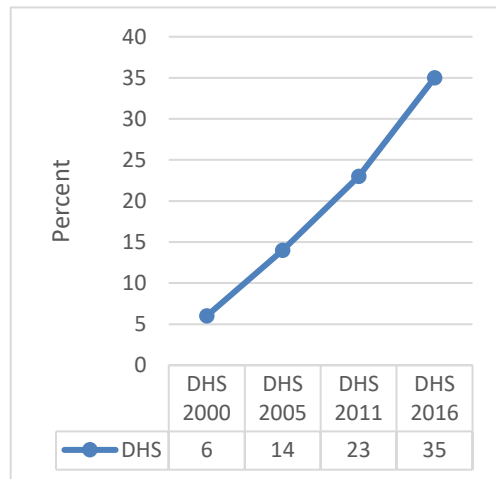
### Ever use and current use

Knowledge of contraceptive methods does not vary by most background characteristics except region. All currently married women and men in Addis Ababa know at least one method of contraception, while in Somali only 79% of currently married women and 83% of currently married men know at least one method of contraception... The contraceptive prevalence rate (CPR) for currently married women age 15-49 in Ethiopia is 36%, with 35% using modern methods and 1% using traditional methods. Fifty-eight percent of sexually active unmarried women use

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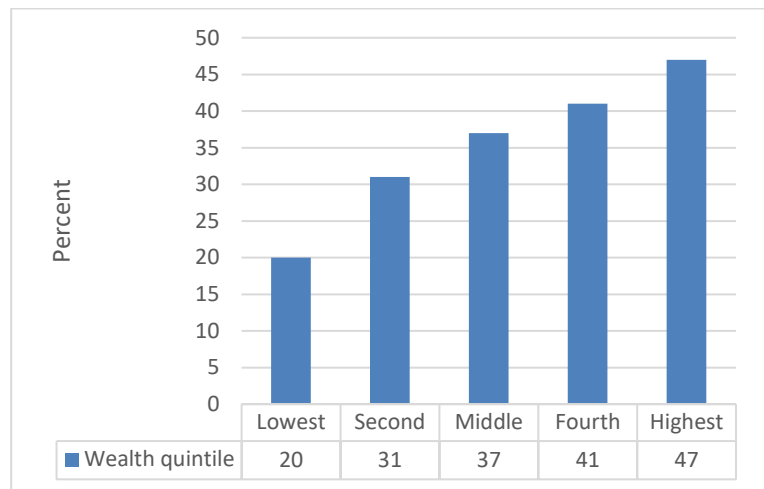
contraceptive methods, with 55% using modern methods and 3% using traditional methods... The most commonly used contraceptive method for currently married women in Ethiopia is injectables (23%), followed by implants (8%). For sexually active unmarried women, the most popular methods are injectables (35%), followed by implants (11%), and male condom and emergency contraception (4% each)

**Figure 9A. Trends in Contraceptive Use  
Percentage of Married Using a Modern  
Contraceptive Method**



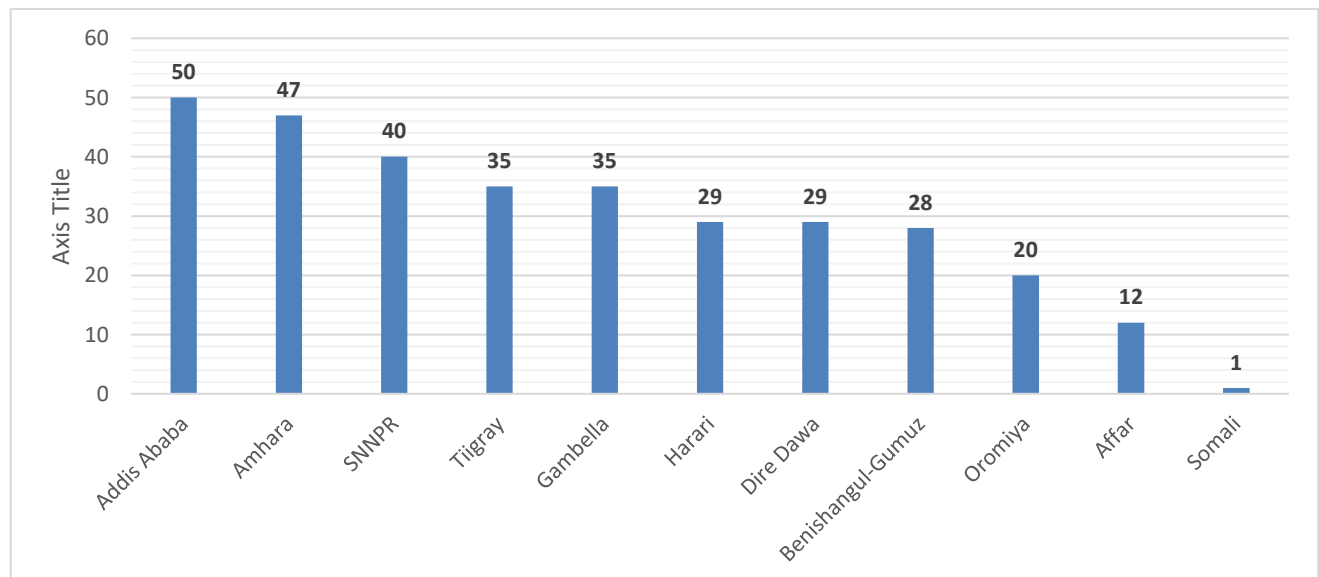
Source: Based on [7]

**Figure 9B. Percentage of Married Using a  
Modern Contraceptive Method by  
Wealth Quintile (DHS 2016)**



Source: Based on [7]

**Figure 9C. Percentage of Married Using a Modern Contraceptive Method by Region (DHS 2016)**



Source: Based on [7]

A clear pattern of higher prevalence in urban areas than in the predominantly rural regions, among women in the highest wealth quintile, and a rising trend of prevalence from year 2000 to 2006 are evident (Figure 9A, B, C). Amhara Region has made impressive gains over the years which have helped to counter balance its standing as a region with the lowest median age at first marriage (see Figure 8). As is clearly apparent in Figure 9C very low current use rates prevail among Somali women with a mere 1% practicing any modern method in 2016. On the plus side, Afar has crept up into double digit percentages from low coverage low single-digit percentages recorded at previous DHS surveys.

### III. INDUCED ABORTION

“After decades battling high maternal death rates - at least a third of which were due to botched abortions - Ethiopia took a stand: it prioritized newborn and maternal health, and in 2005 it relaxed its abortion law in an effort to save women’s lives.” [11]

Stopping short of legalizing abortion, the new law decriminalized the act. It also allows women to terminate pregnancies that result from rape or incest, if the foetus has a severe defect, or if a girl is under the age of 18 and cannot care for the baby herself. Before 2005, a woman could only have an abortion if it was a matter of life or death. The fertility impacts of abortions in Ethiopia have not been studied and remain largely unknown. This prevents, direct estimations of Ca for application of Bongaart’s Proximate determinants formula. A year 2008 estimate puts the number of abortions in Ethiopia at 382,500 for an annual rate of 23 abortions per 1,000 women aged 15–44 which is relatively low compared with WHO estimates for Africa and Eastern Africa—29 and 39 per 1,000, respectively [12]. The abortion rate in urban Ethiopia is considerably higher than the national average (49 per 1,000 in Addis Ababa, the country’s capital city and most economically developed city). “Some 35% of women obtaining induced abortions and 27% of those obtaining postabortion care report having had a previous abortion” [12]. It is estimated that about 50% half of health care facilities in Ethiopia provide induced abortion services with greater percentages for public hospitals (76%) and private or nongovernmental organizations (NGOs) facilities (63%) than for public health centers (41%). “These proportions are likely changing rapidly, as efforts are being made to expand abortion services in public facilities.” [12]. Technical guidelines in the 2005 law were revised in 2014 following a review of the WHO’s guidelines [13]. For instance, use of medical abortion was expanded beyond 9 weeks, following studies demonstrating the safety of the procedure at later gestational ages and “second-trimester abortions were divided into two categories by gestational age and were assigned to either primary hospitals or general/referral hospitals” [13].

Data are not available at a national level to calculate the national fertility impacts of induced



abortion (denoted by the symbol “Ca” in Bongaart’s formula) in Ethiopia. Such a calculation is done by isolating the contribution of “Ca”.

#### **IV. POSTPARTUM / Lactational/ AMENORRHEA**

A little over 9 percent of Ethiopian women know that the period of intense breastfeeding after giving birth is also a period of temporary infecundity. However, only a small percentage are actively using this as a birth control technique. The percentages are less than 0.1 for the 15 to 24 age group and as low as 0.6 for the 25- 44 age group, and 0.1 for the 45 to 49 age group [10].

## **SOCIOECONOMIC DETERMINANTS OF FERTILITY**

### **Social Determinants**

Perhaps the most important social determinant of a woman’s fertility behavior is the amount of control she is able to exercise over her own body, on whether or not to have a child, how many children to have, and when to have them. More importantly, her ability to make decisions on whether or not to engage in sex, the kind of sex (protected vs. unprotected), and the timing of sex vis-à-vis the natural monthly fertility cycle are crucial factors. Here we are talking about women’s rights and level of empowerment as it has significant implications for their health including reproductive health, and for prevention of sexually transmitted diseases. The 2005 DHS survey provided a glimpse into the status of women and their position in marriage. Indirect measures such as control over earnings, participation in decision making, attitudes towards refusing sex with husband, attitude towards wife beating, and female genital mutilation (FGM) were gauged using data [7]. The picture is not pretty.

### **Control over Household Earnings**

A third of currently married women reported themselves as “employed” in the 7 days preceding the 2016 DHS and half of married women (but only 8% of men) had not been employed in the past 12 months [7]. Nearly half (49%) of employed women did not receive any payments for their labor in the 2016 survey. This represents a decline from the year 2005 level of 60% [10] but a significant rise from the 30% mark in 2011 [7]. The percentage of the currently employed rises with age, from 40% in the 15-19 age group to a peak of 53% in the 30- 34 age group among married women and the percentage of those who are not paid for their employment is highest in the 15-19 and 45-49 age groups (66% and 56%, respectively) [7].

Women gain direct access to what surrounding economic activities offer when they are gainfully employed for cash. Access that is meaningless unless they also control how their earnings are used. In DHS 2016 married women respondents were considered to have control over their own earnings if they a) participated in decisions alone or b) jointly participated with their husband and made

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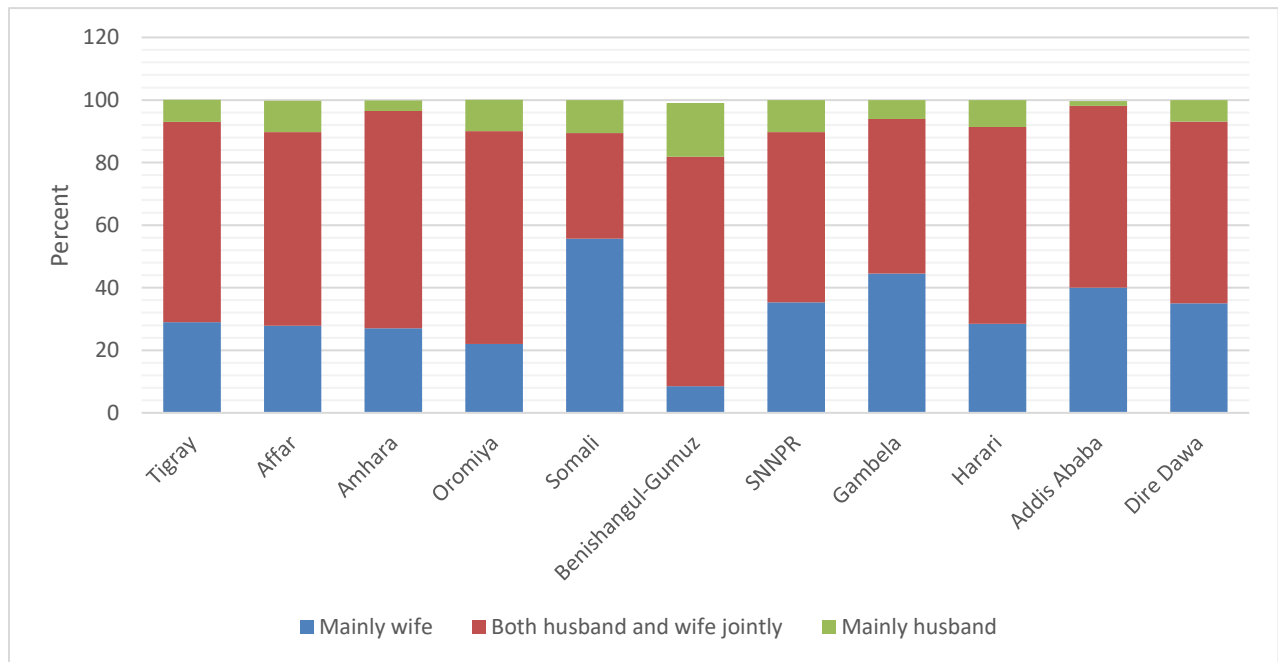
decisions on how their own earnings will be used [7]. The result is interesting but some are startling.

While most women earn less than their husbands (58%), 21% are paid about the same as their husbands, while 16% earn more than their husbands. The magnitude of women’s earnings relative to that of their husbands makes a difference in the control of decisions about how their earnings are used. Forty five percent of women who earn more than their husbands say they make the decisions about how their earnings are used, compared to 11% of women who earn the same as their husbands. The likelihood that married women with cash earnings decide for themselves about how those earnings are used increases with age, peaking at 40% among women age 45-49. The large majority of women in both urban and rural either decide for themselves (29% and 30%, respectively) or jointly with their husbands (67% and 59%) about how the woman’s earnings will be used. Only 11% of rural women and 4% of urban women say their husbands mainly make these decisions [7]

### Married Women’s’ Participation in Decision Making Over their Cash Earnings

There is some variation in female decision-making powers by region. Women respondents were asked “who made the household decision regarding expenditure of earned income?”. The regional picture is as follows:

**Figure 10. Decision Making by Cash-earning Currently Married Employed Women**



In Figure 10, Somali women represented the highest percentage of women who were reportedly able to exercise full financial control over their earnings. If this alone was a measure of empowerment as well as ability to exercise all decisions freely, including fertility decisions, they would have the lowest fertility. In reality, however, with a TFR of 7.02 in 2016, they have by far the highest fertility rate of any region in the country. Benishangul-Gumuz has the lowest reported percentage of women that are able to control their finances independently of their husbands.

## Attitude Towards Wife Beating

The most fundamental human right of an individual is a right to personal safety. In Ethiopia, cultural dictates and the usurping of religious edicts in favor of men have resulted in traditions whereby women are socialized to be/feel inferior to men to the point of accepting beatings as one of the powers husbands should exercise over them. The 2005 DHS survey sought to uncover women's (and men's) attitude towards wife beating by asking whether or not a husband is justified in beating his wife if she [10]. The survey design stipulated that "women who believe that a husband is justified in hitting or beating his wife for any of the five specified reasons may believe themselves to be low in status both absolutely and relative to men. Such a perception could act as a barrier to accessing health care for themselves and their children, affect their attitude towards contraceptive use, and impact their general wellbeing." and fertility [10]

The 2016 DHS survey attempted to gauge Ethiopian women's attitude and belief regarding consent in sexual matters, and whether or not a woman should be able to say "no" to sex, and the circumstances under which she should do so. The questions which related to whether or not it was ok to say no to sex under the following conditions produced highly revealing and often astounding results about Ethiopian wives current social standing vis-à-vis husbands as constructed by centuries of traditional/cultural values and mores [7]:

1. she burns the food,
2. she argues with him,
3. she goes out without telling him,
4. she neglects the children, and
5. she refuses to have sex with him.

"Overall, 63% of Ethiopian women age 15-49 believe that a husband is justified in beating his wife in at least one of the five specified circumstances..." "The percentage of women who agree that wife beating is justified in at least one of the five specified circumstances has also declined but at a much slower rate than among men, dropping from 85% in 2000 EDHS to 63% in 2016". Tolerance of wife beating is less common among women employed for cash than among other women; 55% of women who are employed for cash agree that wife beating is justified in at least one of the five specified circumstances, compared with 71% of women employed but not earning cash and 63% of women who are not employed" .... "Wife beating is more acceptable in rural areas than urban areas; 70% of women and 31% of men in rural areas agree that wife beating is justified in at least one of the five specified circumstances, compared with 39% of women and 15% of men in urban areas" ... Acceptance of wife beating decreases with increasing education level and wealth quintile. For example, 72% of women with no education agree that wife beating is justified in at least one of the five specified circumstances, compared with 26% of women with more than secondary education. Similarly, 71% of women in the lowest wealth quintile agree that wife beating is justified in at least one of the five specified circumstances, as compared with 43% of women in the highest wealth quintile" [7].

There is significant regional variation, however, with Somali and Afar women (where nomadic herding is predominant and women perform all household chores including the building, dismantling, and rebuilding of moveable huts), had the highest level of disagreement with all of the conditions listed above. They believed that a woman should continue to have sex with her husband regardless. A quarter of women in SNNP, forty percent of Somali and Afar women, two thirds of women in Benishangul Gumuz, and almost half of women in Gambella say women should not refuse to engage in sex with their husbands when confronted with all or one of the three reasons. There is a clear urban-rural divide, with less than 10 percent and 21 per cent respectively, of urban and rural women agreeing that a husband should have his way,

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and that a woman should engage in sex under all three conditions. Expectedly, the highest percentage of women who said no (94.3%) lived in Addis Ababa, the capital. [5]

**Figure 11. Percentage of Married Women who Agreed that Wife Beating was Acceptable Under at Least One of the Five DHS Conditions**

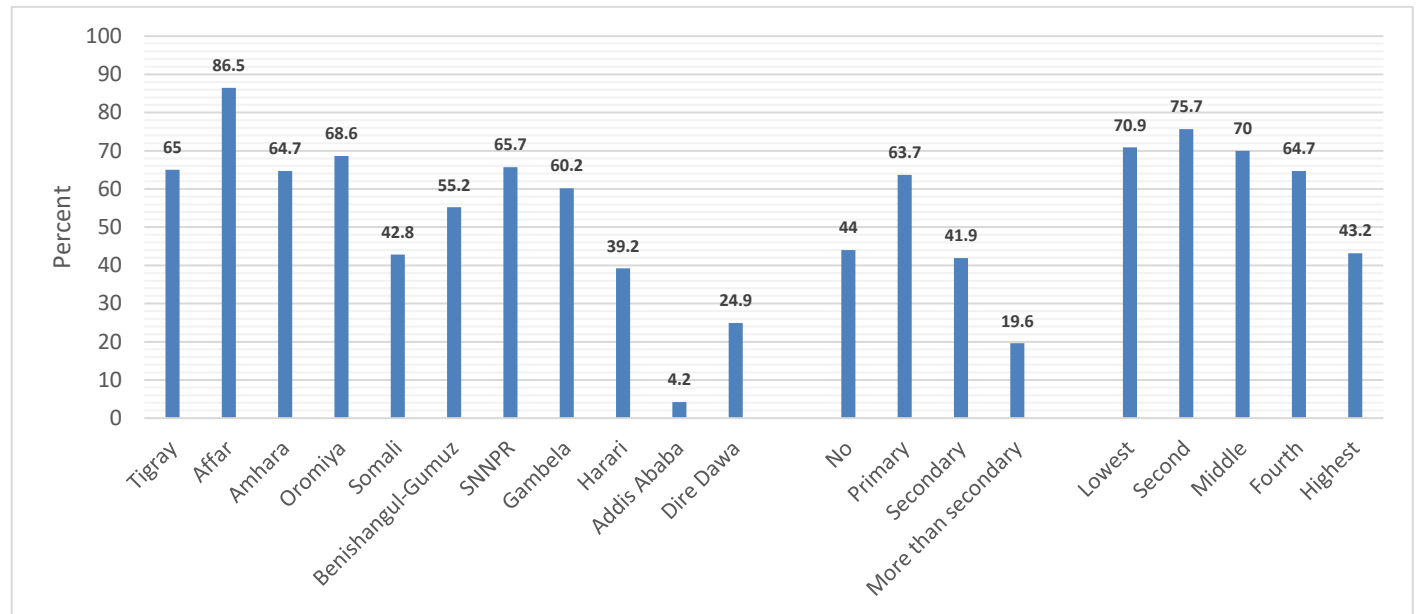


Figure 11 presents as percentages women's responses to questions on when it would be okay for a husband to beat his wife. Breakdowns are shown by region, education, and wealth quintile. Afar Region is a clear standout with 86.5% agreeing that it is okay for a man to beat his wife if at least one of the five conditions set by DHS is violated. Addis Ababa is a standout in the opposite direction with 95+ percent of married women disagreeing with that assertion. The perception dynamics among women with no education and primary education is rather perplexing and not expected.

## Women's Attitude Toward Refusing Sex with their Husbands

Of the five scenarios outlined by DHS, as a possible trigger for a husband to beat his wife – burns food, argues with him, goes out without telling him, neglects the children, and refuses to have sex with him, the last item deserves a special focus due to its fertility implications and its potential for pregnancy-related health consequences arising from it. Additionally, a wife's ability to negotiate safe sex is a crucial aspect of her empowerment as a woman. The rural-urban divide is especially important.

Eighty two percent of urban women but only 55% of their rural counterparts believed that a woman is justified in asking her husband to use a condom if he has an STI. Additionally, rural women are less likely to be able to say no to sex than urban women (42% and 64%, respectively) and only 24% of rural women responded that they can ask their husbands to use a condom, compared to 61% of their urban counterparts [7].

“Women in the Somali Region are least likely to say that they can negotiate sexual relations with their husbands. For example, only 28% of women in the Somali Region say that they can say no to their husbands if they do not want to have sexual intercourse, compared with 70% of women in Tigray and 68% in Addis Ababa.” ...” Seventy-seven percent of women with more than secondary education, but only 40% of women with no education, can say no to their husbands if they do not want to have sexual intercourse. Similarly, 83% of women with more than secondary education can ask their husbands to use a condom, compared with 20% of women with no education. Wealth is similarly associated with a greater

## Education

Overall, 49% of females and a much lower proportion (35%) of males aged 6 and over have never attended school [7]. As in everything else, there is a clear urban-rural difference. Just a quarter (24%) of urban females age 6 and older have no education, as compared with 54% of urban females. Somali Region has the highest proportions (66% and 51%, respectively) and Addis Ababa has the lowest (16% and 8%, respectively) [7]. The educational trend over the past twenty years is encouraging as the percentage of women with no education has gone down from 66% in 2005 and 51% in 2011 to 48% in 2016. Similarly, the percentage of men with no education has shrunk - down from 43% in 2005 to 30% in 2011 and 28% in 2016 [7]. Rankings on DHS's wealth quintiles has a strong association with education as 74% of women in the lowest quintile lack any education compared with 19% of women in the highest wealth quintile. Likewise, less than 1% of women in the lowest wealth quintile have more than a secondary education while with 18% of those in the highest quintile [7].

The number of children women have declines with increasing education. In a dramatic example, women with no education have 3.8 more children than those with more than secondary education (5.7 children versus 1.9 children) [7]. This is partly due to differences in median birth intervals which increase with increasing education. For instance, birth intervals among women with more than a secondary education are 13.7 months longer than intervals among those with no education (47.7 months versus 34.0 months) [7]. It is also because women with a secondary education start childbearing six years later than women those with no education (24.5 years versus 18.6 years) [7]. Since maternal education is also strongly correlated with child survival, many of the additional births among uneducated women would go under what is referred to in demography as replacement fertility.

The DHS data shed some light on the status of women in Ethiopia. While the majority of Ethiopians have little or no education, women are generally less educated than men. However, the male-female gap in education is more obvious at higher than at lower levels of education, indicating the government's recognition and successful intervention to address gender disparity in more recent years.[10]

A non-negligible proportion of Ethiopian teenagers are mothers. Given that the impact of education is most profound and most consequential in the teen years where even an elementary education can reduce teenage births three-fold and secondary education by a factor of ten, pregnant or child bearing teens miss out on the protective powers of education throughout their reproductive years. It has also been shown that attaining a secondary education delays the start of childbearing by at least four years and increases the interval between births significantly [10]. Moreover, educated Ethiopian women conclude their reproductive activity early [10].

Childbearing starts early in Ethiopia, and the typical woman "... will have had more than half of her lifetime births by age 30, and nearly three-fourths by age 35" [10]. Urban-rural fertility difference is most pronounced in the early years of reproductivity. Teenagers in rural Ethiopia are three times more likely to have begun childbearing than their urban peers as 15 percent of rural teens have had a live birth or are pregnant, compared to 5% for urban teens [7]. Urban women in the 20–24 age group gave birth to less than half as many children as a similar-sized group of rural women [10]. Such differences result from differences in level of education.

"Education in urban areas is better than in rural areas; 57% of rural women have no formal education, as compared with 16% of urban women. The urban-rural difference is more pronounced at the secondary or higher levels of education. For example, only 1% of women in rural areas have more than a secondary education, compared with 21% of urban women". [7]

Fertility levels are decreasing in both urban and rural Ethiopia and, with the exception of the "very old", for all age groups of women, but at different rates. The total fertility rate of women in rural areas declined from 6.0 children in 2000 to 5.2 in 2016, and in urban areas, it declined from 3.0 children in 2000 to 2.3 [7]. Differences in the duration of postpartum amenorrhoea are partly to blame as there is virtually no difference in the length of time urban and rural women abstain from sex after giving birth.

"Women living in rural areas have a longer duration of postpartum insusceptibility than urban women (16.2 months and 7.3 months, respectively) because the period of postpartum amenorrhoea is longer among rural than urban women (15.3 months and 5.7 months, respectively). Postpartum abstinence is almost identical among rural and urban women (2.3 months and 2.4 months, respectively)" [7]

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