PROXIMATE DETERMINANTS OF FERTILITY AMONG POOR AND NON POOR WOMEN IN KENYA

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DECLARATION

I hereby declare that this project is my bona fide work. I earnestly declare that this project has not been presented for degree award in any other University.

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DEDICATION

This work is dedicated to my lovely family, especially my dear mother Khadija Guled, my wife Ayan Mohammed, my childrem Muhammad, Khadija, Amin, Abdulrazaq, Guled, Fathiya, Madina and my sister Fathiya Amin for all their dedicated partnership for the success of my life.

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ABSTRACT

The general objective of the study was to examine the role of the proximate determinants of fertility inhibiting effects among the poor and non poor in Kenya over the period 2003 to 2008/09. It sought to determine the fertility inhibiting effect of each of the principal proximate determinants of fertility to change in TFR. The study is based on the analysis of secondary data obtained from the Kenya Demographic and Health Surveys (KDHS) of 2003 and 2008/09. The study used Bongaarts model of proximate determinants of fertility as the main method of data analysis. The variables selected in the study included contraceptive use, postpartum infecundibility, proportion married and sterility. The findings are analyzed using three socio economic characteristic of educational level, region and residence. Due to lack of data, induced abortion was not assessed in the study. The computation procedures are first used to estimate the four indexes of contraceptive use, postpartum infecundibility, proportion married and sterility to measure the inhibiting effect. Second, TFR is estimated using the Bongaarts Fertility Model. Lastly, the indexes are decomposed to determine the contribution made by each of the proximate determinants to be observed change in fertility.

The study indicates that TFR among poor and non poor women declined by 22.2% and 1.2%, respectively. It was found that fertility declined among poor women mostly due to a 15.4% decline in marriage patterns, a 4.5% decline as a result in increase in contraceptive use and a 3.8% decline due to lengthening of the duration of postpartum infecundability. For the non poor women fertility declined due to a 4.0 %increase in marriage pattern, a 3.5% increase due to decrease in contraceptives use and a 8.5% decrease as a result of lengthening of the duration of postpartum infecundability. The increase in contraceptives use among the poor women contributed 20% while the decrease in contraceptives use among non poor contributed more than twice to the decrease in fertility. Marriage patterns contributed 69.0% of the decline in TFR among poor women and more than three times to the decrease of fertility among non poor women.

Across the regions comparison, Total Fertility Rate (TFR) among poor women declined only in Central and North Eastern Provinces. Among the non poor, fertility declined in all the Provinces except Coast Province where the increase was marginal and Eastern Province where TFR remained the same. The increase in fertility in Coast Province can be attributed to the change in marriage pattern by 21.6% and the shortening of the duration of postpartum infecundability by 2.3%. However, the increase in contraceptive use contributed to the decline in TFR by 8.8% to offset partly the increase in marriage pattern and postpartum infecundability. Among the poor and non poor women, Nyanza and North Eastern Provinces had the highest decline in TFR of 35.0% over the two periods. This could be attributed to the fact that Nyanza Province had the highest increase

in the duration of postpartum infecundability. The TFR increased by 1.1% and 2.4% among poor women with primary education and non poor women with secondary and above education, respectively.

The results of the study have shown that the important role marriage has played in fertility decline. At the sub groups, it was found that non poor women contributed to the increase in fertility while the poor women contributed to its decline. Furthermore, the study showed that at the aggregate level, urban and rural areas poor women are delaying marriage while non poor women enter into marriage earlier in 2008/09 than in 2003. The main policy implications for these findings are that we need to have education programmes for all women so that they can delay entry into marriage. These programmes should target women who had no education and regions where women tend to enter marriage earlier than in the past.

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CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

Kenya's population is growing rapidly and has more than tripled from 10.9 million people in 1969 to 38.6 million people in 2009.The population growth rate which was about 2.5 percent per annum in 1969 increased to a peak of 3.8 percent per annum in 1979, before declining and stagnating at about 2.9 percent per annum in 1999 and 2009. The current annual growth is still considered to be high, and owing to the past growth rates the population is still youthful with nearly half being aged 18 years or below. At the growth rate of 2.9 percent per annum, the population is expected to double to about 77 million in 2030 (NCPD, 2012). Fertility has been the driving factor in the growth of population in Kenya. Fertility declined dramatically during the last two decades of the 20th century, changing from a high of 8.1 children per woman in the late 1970s, through 6.7 in the late 1980s, to 4.7 during the last half of the 1990s. However, fertility seems to have started rising, albeit marginally, from 1998, reaching a fertility of 4.9 and 4.6 children per woman in 2003 and 2008/09, respectively (KDHS 2003, 2008/09).

In recent decades fertility has declined at a rapid pace in a majority of developing countries. Sub-Saharan Africa experienced significant declines despite its lagging development (Bongaarts 2008). Between 1980 and 2000 total fertility in Kenya fell by about 40 per cent, from some eight births per woman to around five (Blacker et al, 2005). However, the rate of decline begun to slow down, and by 2003 the decline in fertility had stalled.

Since 1965, Kenya has recognized the potential adverse effects of high population growth on the benefits of economic growth, to emphasize the trade-offs between high population growth and the ability to deliver quality education and health as well as reduce poverty ((NCPD, 2012). It is for this reason that the government had put many policies and programmes to manage population. In fact in 1968, Kenya was one of the first countries of Sub-Saharan Africa to develop a national population policy. This policy, however, remained largely dormant until the findings from the World Fertility Survey (WFS) in 1977 showed that Kenya had one of the highest fertility rates in the world, with a total fertility rate (TFR) of 8 children per woman (CBS, 1980). The Sessional Paper No. 4 of 1984, titled Population Policy Guidelines, and then Sessional Paper No. 1 of 2000 on National Population Policy for Sustainable Development which was developed by National Council for Population Development guided implementation

of population programmes up to 2010. The Government further reiterated its commitment to support a growing population in the Vision 2030 through investments in family planning and health (Republic of Kenya, 2007).

Kenya is characterized by high levels of poverty. It is currently estimated at slightly more than 46 percent with large regional variations (KIHBS, 2005/06). "Over years, fertility remained more than twice as high among women from the poorest 20.0 per cent of the population compared to those from the richest 20.0 per cent households" (NCPD, 2012). Given that majority of the population are poor and predominantly rural, fertility rates were higher in rural areas compared to urban areas over the same period. This shows that poor woman in Kenya experience some unique factors which are not experienced by the non poor. The continuing high fertility rate and differences in Total Fertility Rate between the poor and non poor in Kenya is, therefore, of considerable concern as the resulting high rate of population growth makes improvements in living standards difficult.

There are few studies which have measured the proximate determinants of fertility among the poor and non poor. One such study is a comparative study by Nabanita and Faujdar (2013) who examined the changes in the proximate determinants of fertility over time in six selected countries of Asia namely Bangladesh, India, Indonesia, Nepal, Philippines and Vietnam. The study found that across all the countries, contraceptive use reduced fertility among both poor and non-poor. The effect of marriage was found to reduce fertility in case of non-poor women in India, Nepal and Philippines whereas; effect of postpartum infecundity was responsible for fertility decline in case of non-poor women in Bangladesh, Indonesia and Vietnam. In case of non-poor women induced abortion played an important role in fertility reduction in India, Indonesia, Nepal and Vietnam.

1.2. Problem Statement

In Kenya, fertility dropped from 8.1 births per woman in 1978 to 4.7 in 1998. It then increased slightly to 4.9 births per woman in 2003 before it declined to 4.6 births per woman in 2008/09, the lowest ever recorded in Kenya. Despite the various population strategies and policies, total fertility rate still remains high at 4.6 percent (Oketch et al, 2011).

Several studies on proximate determinants of fertility have been undertaken in Kenya. The recent study by Njenga (2010) found out that contraceptive practice had the highest impact.

Similarly, findings by Ekisa and Hinde (2005) found that between 1989 and 1993 contraceptive use was the most important determinant of fertility. In a study by Kavali (1998) postpartum infecundability was found to be the most important fertility inhibiting variable. Similarly, Kizito et al (1991) found that postpartum infecundability was the most important fertility inhibiting variable in Kenya in 1977-1978 and 1989. Kalule-Sabiti (1984) found that there were variations in the proportion married among the population, level of contraceptive use and post-partum lactational infecundability. Despite all these numerous studies, there is no single study which touched on the proximate determinants of fertility among the poor and non poor in Kenya. Therefore, this study will add to this knowledge gap and thus enable the policy makers and planners make informed decision.

Since independence, the government had put many policies and programmes to manage population but fertility among the poor still remains higher than that of non poor. The 2008/09 KDHS shows that Total Fertility Rates (TFR) for the poor and non poor were 7.6 and 3.1 per woman compared to 7.0 and 2.9 per woman in 2003, respectively. The high fertility among poor has some implications on the government resources. This study, therefore, contributes to a better understanding in fertility change by the poor and non poor arising from the estimation of the inhibiting factors.

The study seeks to answer the question, what role does fertility inhibiting effects of the proximate determinants (marriage, contraception, postpartum infecundability and sterility) have in explaining the contribution of each of the proximate determinants by the poor and non poor over the period 2003 and 2008/09?

1.3. Objectives of the study

The general objective of the study was to examine the role of the proximate determinants of fertility inhibiting effects among the poor and non poor in Kenya over the period 2003 to 2008/09. The specific objectives of the study were:

i. To determine the trends and pattern of the proximate determinants in the fertility among the poor and non poor women and compare the changes over the period 2003 and 2008/09.

ii. To determine the fertility inhibiting effects factors which account for the regional, rural and urban fertility differential and educational levels among poor and non poor women over the period 2003-2008/09.

iii. To establish the change in Total Fertility Rate between 2003 and 2008/09

1.4. Justification of the Study

Rapid population growth continues to pose serious challenges for many poor countries, especially in Africa. This is because population affects the course of economic development (Richard el al). Therefore, the information generated by this study is crucial in assisting policy makers and planners provision of the essential services such as provision of education and health facilities and services needed by the public.

A study on proximate determinants of fertility is necessary since it will highlight the contribution of the fertility of the poor and non poor in the country. In addition, the study will help provide a basis for understanding the determinants which influence the fertility of the poor and non poor. A number of studies on fertility have been done but no study has been conducted to examine proximate determinants of fertility among the poor and non poor in Kenya. Most of the studies on fertility are centred on the relationship between poverty and fertility, rural urban fertility differential, fertility transition and determinants of fertility on the general population. The study contributes knowledge by identifying proximate determinants of fertility among poor and non poor.

1.5. Scope and Limitations of the Study

The study used DHS data collected in 2003 and 2008/09 covering the entire country. The results are presented at the national as well as regional, rural and urban areas. The variables selected included contraceptive use, postpartum infecundibility, proportion married and sterility. The findings are also analyzed by three socio economic characteristic namely educational level, region and residence. Due to lack of data, induced abortion will not be assessed in the study. This is because the data on induced abortion in the two surveys was not collected since abortion is illegal in Kenya. Despite that wealth index has some limitation it still remains the best method of measuring the economic status of the population. Rutstein et al. (2004) compared the DHS Wealth Index with more traditional indexes of consumer expenditures, concluding that the Wealth Index better represents long-term (permanent) economic status and also is much easier to implement. The 2003 and 2008/09 KDHS have used Wealth Index as a proxy for economic

status and thus it will be easy to compare. The computed Wealth Index has been standardized by taking the same asset indicators for the two surveys.

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction

This chapter reviews the literature on studies, which have been undertaken on the proximate determinants of fertility. The first part provides the historical development of the Bongaarts model of proximate determinants of fertility. The second part examines the empirical application of the model in different parts of the world, including Kenya. The last part describes the analytical framework that was used in this study.

2.2. Theoretical Perspective of Proximate Determinants of Fertility

Factors influencing fertility can be classified into two groups, namely intermediate fertility variables, or proximate determinants, and socioeconomic variables. Proximate determinants of fertility is of interest because of its direct impact on fertility as it consists of a set of biological and behavioural factors through which social, economic and cultural conditions can affect fertility. In other words, in the absence of these determinants, human fertility may reach a theoretical maximum of total fecundity (TF). Thus, fertility differentials between regions and across time within the same region can always be traced to changes in one or more of the proximate determinants.

Davis and Blake (1956) outlined that the factors affecting fertility can be classified into two groups: background variables and intermediate or proximate variables. They include cultural, psychological, economic, social, health, and environmental factors. The proximate determinants are those factors that have a direct effect on fertility. The background factors operate through the proximate determinants to influence fertility; they do not influence fertility directly. They were the first to identify a set of 11 intermediate fertility variables. The classification of these intermediate fertility variables did not get wide acceptance because it was not easily incorporated in fertility analysis. Bongaarts (1978) and Bongaarts and Potter (1983) refined Davis and Blake's framework into eight factors, which were termed as the proximate determinants of fertility, to understand variation in level of fertility between populations. The eight proximate determinants are: proportion married, contraception, induced abortion, lactational infecundability, frequency of intercourse, sterility, spontaneous intrauterine mortality and duration of the fertile period.

However, after various studies, Bongaarts realized that some of these factors were more relevant than others in determining the magnitude of fertility change. In fact, only four of them (proportion married, contraceptive use and effectiveness, induced abortion and postpartum infecundability) were found to be the most important in explaining fertility variation between observed and estimated TFR, accounting for up to 96% of fertility change in some populations (Bongaarts, 1982; 1978). Bongaarts et al. (1984) added a fifth major variable, primary sterility to the proximate determinants model. John Stover suggested that as result of availability of a large amount of additional data on the proximate determinants in 1998 compared to 1978, Bongaarts model proximate determinants indexes should be refined. He suggested the following changes in the Bongaarts model modifying marriage to proportion of women sexual activity which is a more direct measure of exposure to pregnancy than marriage; the use of postpartum insusceptibility which is the combined effects of both postpartum abstinence and amenorrhea which is a more complete measure of the fertility inhibiting effects of the postpartum period; use of pathological sterility which intended to estimate the fertility-inhibiting effects of primary and secondary sterility rather than primary sterility as used in Bongaarts model (This revised sterility will measure infecundity due to any cause).

2.3. Applications of the Bongaarts Model of Proximate determinants

The Bongaarts model of proximate determinants of fertility is one of the used tools in fertility analysis (Stover, 1998). Since it was first published it has been applied in hundreds of analysis and has influenced the collection and reporting of fertility data all over the world. According to Stover, the framework has been used for a variety of purposes, including:

- Decomposing the contribution of each of the proximate determinants to the realization of the current level of the total fertility rate.

- Analyzing the contribution of changes in the proximate determinants to changes in the total fertility rate over time.

- Comparing the differences in fertility between two countries or regions on the basis of differences in the proximate determinants.

- Estimating total abortion rates as a residual after the effects of all other proximate determinants have been removed.

- Projecting future levels of contraceptive use that would be required to achieve fertility goals given expected changes in the other proximate determinants.

The proximate determinants model is mostly used to identify the main factors behind fertility changes; the changes associated in fertility through time; to compare changes in fertility among countries, or regions of a country; and to estimate changes in contraceptive use (Stover, 1998). Studies of the causes of fertility levels and their changes often seek to measure directly the impact of socioeconomic factors on fertility. Such procedures have a broad appeal to policymakers, offering as they do to pinpoint mechanisms susceptible to manipulation by official policy (Bongaarts, 1978). Studies have shown that fertility varies according to the wealth status of women. Women from the rich wealth index group have a lower fertility than women from the poor wealth index group (Teklu et al 2013).

The proximate determinants model is one of the most extensively used models in the world. A number of studies to examine the role of proximate determinants using Boogaarts framework have been carried out in various countries of the world. Literature review reveals that studies specifically on the proximate determinants among poor and non poor are scanty. The model has been used in the continent of Asia, the region of Sub Saharan Africa and Kenya as explained below:

2.3.2. Asia

In a comparative study to examine the changes in the proximate determinants of fertility over time in selected countries of Asia namely Bangladesh, India, Indonesia, Nepal, Philippines and Vietnam, Nabanita and Faujdar (2013) indicated that, across all the countries, contraceptive uses was found to reduce fertility from first period to most recent period among both poor and non-poor depending on the country. They noted that effect of marriage was found to reduce fertility in case of non-poor women in India, Nepal and Philippines whereas; effect of postpartum infecundity is responsible for fertility decline in case of non-poor women in Bangladesh, Indonesia and Vietnam. In case of non-poor women induced abortion played an important role in fertility reduction in India, Indonesia, Nepal and Vietnam. In another study done in Bangladesh, it was found that contraception was the most prominent determinant in

fertility reduction, followed by marriage, lactational infecundability and induced abortion. The analysis reveals that although the fertility reducing effect of the marriage variable is increasing, its effect is offset by the declining trend in lactational amenorrhoea period (Tanha et al, 2011).

2.3.2. Sub Saharan African Region

A comparative study by Kiersten et al (2011) undertaken for 13 sub-Saharan countries found that in most countries contraceptive use has been increasing during the entire series of surveys undertaken between 1990 to 2010. Benin and Ghana were the only countries where the fertility-reducing effect of contraception actually reversed between 2000-2004 and 2005-2009. However, fertility decline sometimes stalled, despite an increase in contraception, because of a countervailing trend in non-marriage or postpartum infecundity, predominantly the latter. For example, in all countries observed in 2000-2004 and again in 2005-2009, other than Ghana and Malawi, a reduction in breast-feeding resulted in a shorter period of post-partum amenorrhea and more exposure to the risk of child bearing, tending to neutralize the small increases in contraceptives. Another study conducted by Lubaale et al in 2007 to explain fertile decline showed that marriage had the highest reducing effect in urban areas of Uganda. They found that postpartum infecundability due to breastfeeding was found to contribute a lot to fertility decline. They indicated that background factors like region, education, religion and occupation worked through the proximate determinants in affecting fertility either reduction or increasing it. The regions where fertility reduced the index marriage had the effect followed by postpartum infecundability and contraceptives use (Lubaale et al 2007)**.**

A study in two Gondar zones of Ethiopia found that among the three major proximate determinants in reducing fertility, postpartum infecundability stood first followed by contraceptive use and non- marriage (Getu and Worku, 2009). Using the Ghana Demographic and Health Surveys data sets of 1988, 1993, and 1998, Chuks (2002) found out that the fertility-inhibiting effects of postpartum infecundability are more important than the effects of contraception and marriage patterns. The study recommended that the promotion of prolonged breast-feeding durations should continue to receive the attention of the government and other stake holders because long durations of lactation inhibit fertility.

Madhavan (2013) showed that the overwhelming contribution of contraceptive use towards fertility decline across Sub Saharan Africa, followed closely by rising proportions of non-married women. The study also found out that postpartum infecundability (usually declining)

accounted for a smaller proportion of the change in TFR in most countries. The urban-rural analysis shows that in Ethiopia, contraceptive use achieved most of the fertility decline since 2000; that non-marriage has been the key driver in Ghana; there has a been an equal mix of both in Kenya; and that Nigeria has seen so little feritlity decline that the proportions of the proximate determinants do not matter. In all countries, urban levels of contraceptive use and non marriage are higher than in rural areas.

2.3.2. Kenya

In Kenya, various studies have been conducted using Bongaarts' model with varying success. On group data from the Kenya Fertility Survey 1977/78 to examine the effect of the intermediate fertility variables on marital fertility in Kenya, Kalule-Sabiti (1984) found that variations in the proportion married among the population, level of contraceptive use and post-partum lactational infecundability can account for much but not all of the observed marital fertility differentials. Kizito et al (1991) found that postpartum infecundability was the most important suppressing fertility inhibiting variable in Kenya in 1977-1978 and 1989. The study also found that contraceptive use did not have any appreciable effect in 1977-1978, but its impact increased significantly over the study period. The effect of marriage was more important in 1977-1978 than 1989. Kavali (1998) found out that postpartum infecundability was the most important fertility inhibiting variable at the national levels and among all sub-groups except in Nairobi and Central regions as well as among women with secondary level of education. Non-marriage was the second most important variable at the national levels and among sub-groups except in the urban areas where it took the leading role in reducing fertility. Another study by Njenga (2010) indicated that contraceptive practice had the highest impact in the decrease of fertility between 2003 and 2008/09 at the aggregate and across all sub population levels except among the most educated women. At sub population level the decrease in TFR in all regions except Central province was mostly attributed to the shortening of the duration of postpartum infecundability. Western province had the highest increase in contraceptive practice. On economic status, the study revealed that an increase richest women TFR was mostly attributed to the shortening of the duration of postpartum infecundability. The study recommends that due to the important role contraception is playing in fertility reduction in the country, there is need to sustain the current trend in the increase in contraception prevalence. In particular, special attention should be paid to regions that have continued to register low contraception prevalence such as North Eastern province. In a study, Ekisa and Hinde (2005) found that between 1989

and 1993 increased contraceptive use was the most important determinant of fertility change in Kenya.

2.4. Summary of Literature Review

Literature review reveals several studies have contributed significantly to the understanding the proximate determinants in the fertility. A study was conducted to examine the changes in the proximate determinants of fertility among poor and non poor over time in six selected countries from Asia but none has been done in Kenya. This study had varying results among the poor and non poor. Other studies were undertaken on the general population in Sub Saharan Africa and Kenya. The studies found out that the fertility-inhibiting effects of postpartum infecundability and contraceptive were the most important and particular in Kenya during the period of fertility declining period. However, the effect of marriage was found to be more important in Kenya in 1977-1978, a period when Kenya's fertility rate was the highest. Also, the literature review reveals that studies focussing specifically on the proximate determinants of fertility among poor and non poor are scanty. Thus, this study will fill this gap.

2.5. Analytical Framework

The basic analytical technique used in this study was the Bongaarts model (Bongaarts, 1978, Bongaarts and Potter, 1983). The model summarizes the relationship between the total fertility rate and the proximate determinants of fertility, and is worldwide known as the Bongaarts model of proximate determinants. The relationship is explained by biological and behavioral factors through which socioeconomic, cultural, and environmental variables affect fertility are called intermediate fertility variables. The primary characteristic of an intermediate fertility variable is its direct influence on fertility. If an intermediate fertility variable, such as the prevalence of contraception, changes, then fertility necessarily changes also (assuming the other intermediate fertility variables remain constant), while this is not necessarily the case for an indirect determinant such as income or education. Consequently, fertility differences among populations and trends in fertility over time can always be traced to variations in one or more of the intermediate fertility variables (Bongaarts, 1978).

The Bongaarts model assumes that the natural reproductive capacity, i.e. total fecundity rate (TF) of women is nearly the same for all women, but their actual reproductive performance is modified by four major proximate determinants. The fertility effects of the four most important proximate determinants, marriage, contraception, induced abortion and postpartum

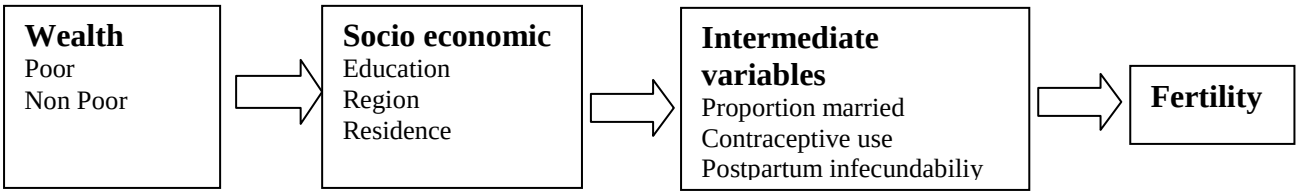
infecundability together with primary sterility are measured by five indices C_m, C_c, C_a C_i and C_p, respectively. The Bongaarts model is as follows:

$TFR = C_m \times C_c \times C_a \times C_i \times C_p \times TF$

Where TF is the total fecundity rate and Cm, Cc, Ca Ci and C_p are the indices of proportion married, contraception, induced abortion, postpartum fecundability and sterility, respectively. According to Bongaarts and Potters (1983), evidence has established that for almost all populations, observed fecundity rates vary within the range 13 to 17 children per woman, with an average of 15.3.

The model summarizes the effect of each of the fertility determinants in an index, which generally ranges between 0-1, with 0 having the greatest inhibiting effect on fertility and 1 having the least inhibiting effect (in other words, the closer the index is to zero the more influential the associated proximate determinant is in reducing fertility rate from its biological maximum and vice versa). In specific terms, the index measuring the effect of marriage patterns on fertility is denoted by Cm. This index takes the value of 1 when all women of reproductive age are in union and 0 when none are union. The index of contraception is depicted as Cc and equals 1 if no contraception is used and 0 if all fecund women use modern methods that are 100% effective. The effect of postpartum amenorrhoea and abstinence on fertility is measured by Ci, the index of postpartum infecundability in such a way that when there is no lactation or postpartum abstinence, Ci equals 1 and when infecundability is permanent, Ci equals 0. The index of abortion is denoted by Ca and equals 1 in the absence of induced abortion and 0 if all pregnancies are aborted. The index of pathological or primary sterility is represented as Cp and assumes the value of 1 in the absence of primary sterility and 0 if all women are sterile. Fertility is the primary dependent variable, while the proximate determinants will be part of the independent variables. The analysis uses indices derived from Bongaarts' model to show the relative contribution of each of the four measurable proximate determinants of fertility (contraceptive use, breastfeeding, proportion married and sterility) to total fertility rates at the time of each survey. The analysis uses the proximate determinants conceptual framework to guide our analytical approach as shown in Figure 2.1.

Figure 1.1 :Bongaarts framework for analyzing the determinants of fertility
Indirect determinants Direct determinants



Source: Adapted from John Bongaarts (1978)

2.5. Definition of Concepts

Total Fertility Rate (TFR): is the average number of children that a woman would have during ages 15-49 if she survived that age range and had children at the current age-specific fertility rates.

Total Fecundity (TF): is a hypothetical or potential value that the TFR would take if all four of the indices were exactly 1, that is, if there were no non-marriage (if all women were married from ages 15 to 49), no contraception, no postpartum infecundability (beyond a minimum of 1.5 months) and no induced abortion. It is the total fertility rate in the absence of the fertility-inhibiting effects of the proximate determinants. TF cannot be calculated directly. According to Bongaarts and Potter (1983), the TFs of most populations fall within the range of 13 to 17 births per woman, with an average of approximately 15.3. Therefore, multiplying all of the indices with 15.3 as the maximum number of births produces a predicted model TFR of the population.

Total Marital Fertility Rate (TM): Refers to the average number of births that a woman would have during ages 15-49 years if she survived that age range and bear children at the current age specific rates and to remain married during the entire reproductive period

Postpartum Amenorrhoea: Refers to the interval between child birth and the return of mensuration. The length and intensity of breastfeeding influence the duration of amenorrhoea, which offers protection from conception. The risk of conception in this period is very low.

Postpartum Abstinence: Refers to the period between child birth and the time when a woman resumes sexual activity. Delaying the resumption of sexual relations can also prolong

protection. Women who gave birth in the 3 years preceeding the survey were asked about the duration of their periods of amenorrhoea and sexual abstinence following birth.

Duration of postpartum insusceptibility: The duration of the postpartum amenorrhoea and the period of sexual abstinence following birth jointly determine the length of the insusceptibility period. Women are considered insusceptible if they are abstaining from sex following childbirth or are amenorrhoeic.

2.6. Definition of Variables and Measurements

In this study there will be two types of variables i.e. Background variables and proximate of determinants of fertility variables. The background variables are further divided into socio economic, cultural and demographic factors. The background variables operate through the proximate determinants to influence fertility; they do not influence fertility directly.

2.6.1. Background Variables

Socio Economic and Cultural Variables

Education: Refers to the number of years of formal schooling years completed. This study classified levels of education into four categories: no education, primary incomplete, primary complete and secondary and above level of education.

Marital Status: The Marital defined as either never married, married or living together, divorced/separated or widowed. Marital status for respondents aged 15 years and above will be included.

Regions: Refers to the former eight provinces of Kenya. These are Nairobi, Coast, Eastern, North Eastern, Central, Rift Valley, Nyanza and Western.

Place of Residence: This category refers to where the respondent was living at the time of the survey, classified as either urban or rural. These are coded as “1” for urban areas and “2” for rural areas.

Wealth index: The wealth index is a composite measure of a household's cumulative living standard. The wealth index is calculated using easy to collect data on a household’s ownership

of selected asset. It uses Principal Component Analysis of household assets, amenities and services. In 2003 and 2008/09 KDHS, to measure household wealth, an index was created from the following household assets data ranging from electricity, radio, TV, bicycle, motorbike and car as well as dwelling characteristics like source of water and sanitation facilities and type of material used in flooring. In this study, women are grouped according to their wealth status under the categories poor and non poor.

2.6.2. Demographic Variables

Age: Age is measured as at the last birthday of the respondent at the time of the interview.

2.6.3. Proximate determinants Variables

Proportion Married: This variable is intended to measure the proportion of women of reproductive age that engages all women between 15 and 49 years who reported to be currently married during the surveys are included in this proportion.

Contraceptive Use: Any deliberate parity-dependent practice-including abstention and sterilization-undertaken to reduce the risk of conception is considered contraception.

Breastfeeding: This is the length of time elapsed since the woman began breastfeeding after birth to the time of survey.

Sterility: Women are sterile before menarche, the beginning of the menstrual function, and after menopause, but a couple may become sterile before the woman reaches menopause for reasons other than contraceptive sterilization.

CHAPTER THREE
DATA AND METHODS

3.1. Introduction

This chapter presents sources of data and describes the methods used in data analysis in this study. It describes the estimation of the indices of the four proximate variables of marriage pattern, contraceptive use, postpartum infecundability and sterility. It finally explains the decomposition of the proximate determinants to fertility change.

3.2. Sources of data

The study is based on the analysis of secondary data obtained from the Kenya Demographic and Health Surveys (KDHS) of 2003 and 2008/09. The surveys were designed to achieve several objectives including collection of data on fertility levels, trends and differentials of the women of reproductive age. Both surveys are nationally representative of 10,000 households each and have been implemented to allow analysis for the country as a whole, the eight former provinces of Kenya and separately by rural-urban areas. The samples were selected from a national master sample frame, the fourth National Sample Survey and Evaluation programme (NASSEP IV) maintained by Kenya National Bureau of Statistics, which follows a two stage sample design. A total of 400 clusters, 129 urban and 271 rural in 2003 KDHS and 400 clusters, 133 urban and 267 rural in 2008/09 KDHS. The two surveys used three similar and methodology set of questionnaires (Household, Women and men questionnaires) thus making it comparable. A total of 8,195 and 8,444 women of reproductive age 15-49 years were interviewed in the KDHS of 2003 and 2008/09, respectively. The proportion of the married women was 54.5 % in 2003 and 54.2% in 2008/09. The Contraception Prevalence Rate (CPR) of the current married women increased from 39.0 % cent in 2003 to 46.0% in 2008/09. The CPR for both non poor and poor married women increased from 51.5% to 54% and from 17.9% to 20.1 % in 2003 and 2008/09, respectively. There has been little change in median duration for any breastfeeding among the children increasing slightly from 20 months to 21 months between the two survey periods. The median duration for any breastfeeding among the children from poor families decreased slightly from 21.6 months in 2003 to 21.4 months in 2008/09) that of the non poor families increased from 20.1 months in 2003 to 20.5 months in 2008/09). The two surveys did not collect data on direct economic measures such as income or consumption expenditure but use a composite wealth index. The wealth index is calculated using data collected on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and

types of water access and sanitation facilities. This study will use wealth index to measure the economic status.

Computed wealth index has been standardized by taking the same asset indicators for each of the two surveys. The two surveys have divided the wealth index into five equal parts into the first quintile (poorest), first quintile (poor), middle quintile (middle income), fourth quintile (rich) and fifth quintile (richest). For this study, women of reproductive age were grouped according to their wealth status, under two wealth categories i.e. poor and non poor. The lowest and second lowest quintiles has been combined and is considered as poor while the combined fourth and fifth quintiles is considered non poor. The middle quintile has been excluded in this study.

3.3. Method of Data Analysis

The study used Bongaarts model of proximate determinants of fertility as the main method of data analysis. The results are presented in tables, graphs and in narrative form. Using this model, the various indices were estimated for each region, by education and place of residence based on wealth index. The decomposition of the change in TFR between 2003 and 2008/09 is also presented.

By using the individual woman's file for the analysis, the composite wealth index will first be computed to identify the poor and non poor. The two sets, one for the poor and the other for the non poor are then used separately to decompose the proportional change into components P_m, P_c, P_i, P_p and P_r. The following three levels would be applied to decompose the components:

i. Determine the measurements of proximate determinants separately by economic status over the period of time i.e. proportion of women married, proportion currently using contraceptives, average duration of postpartum infecundability, proportion of women aged 45-49 years who are infecund and average contraceptive use effectiveness.

ii. Calculate and estimate the effects of the four principal proximate determinants namely, the proportion married (Cm), use of contraception (Cc), and postpartum infecundability (Ci) separately by economic status over the period of time using.

iii. Calculate the P values from the indices C_m, C_c, and C_i

In order to estimate all the indexes of the intermediate fertility variables in this model, the following data is required:

i. The total number of married women in each five year age group
ii. The total number of women in each five year age group.
iii. The total births in the in the last 36 months prior to the survey by five year age groups of married mothers.
iv. Number of children ever born
v. The total number of married women using each modern contraceptive method
vi. Proportion using contraception among married women of reproductive age (15-49 years
vii. The total number of women who are currently breastfeeding.
viii. Mean duration of breastfeeding
ix. Women aged 45-49 who have had no live births
x. Economic status, education level, residence and region of married women

3.4. Computation procedures to estimate of the Indices of proximate determinants

In this study, only four proximate variables are considered namely: marriage pattern (C_m), contraceptive use (C_c), and postpartum infecundability (C_i) and Sterility (C_p). The indices for these variables can be estimated from measures of the proximate variables and these estimates are given below:

3.4.1 Estimation of Index of Marriage (C_m)

The index of marriage is intended to express the reduction in fertility caused by the fact that women are not sexually active throughout the entire reproductive period. It measures the inhibiting effect of marriage on fertility in the population. It has to be noted that the higher the level of marriage in the population the less the inhibiting effect and the reverse is true. The index is calculated as the sum of age-specific proportions married, m (a), times age-specific marital fertility rates, g(a), divided by the sum of age-specific marital fertility rates:

$Cm = \{\Sigma\ m\ (a) \times g\ (a)\} / \Sigma g(a)$

Where

- Cm = Index of marriage

- m(a)= Age specific proportions of married females, m(a) is got by dividing the number of married women of a particular age group by the number of women in the same age group.
- g(a) = Age specific marital fertility rates, g(a) is got by dividing the births of a particular age group by the number of women in the same age group

The index is often approximated by the proportion of women 15-49 that are married.

3.4.2 Estimation of the Index of Contraception (C_c)

The index of contraception in the model measures the inhibiting effect of contraception on fertility in the population. The higher the level of contraception in the population, the higher the inhibiting effect due to contraception and the lower the level of contraception the lower the inhibiting effect. The index of contraception is estimated using the formula;

C c = 1 − .1 08 * u* e

Where

u = Proportion using contraception among married women of reproductive age (15-49 years).

e = Average use effectiveness of contraception by age and method.

The coefficient 1.08 represents an adjustment for the fact that women do not use contraception if they know that they are sterile.

3.4.3 Estimation of the Index of Postpartum Infecundability (Ci)

The index of postpartum infecundability is intended to describe the effects of extended periods of postpartum amenorrhea on fertility. The index measures the inhibiting effect of breastfeeding or abstinence on fertility in the population. The index of postpartum infecundability in the model is estimated using the effect of breastfeeding (lactation amenorrhea) or postpartum abstinence. The ratio of natural fertility in the presence and absence of postpartum infecundability therefore equals the ratio of the average birth interval without and with postpartum infecundability.

Bongaarts and Potter (1983) stated that, in the presence of breastfeeding and postpartum abstinence, the average birth internal equals approximately 18.5 months (7.5 + 2 + 9) plus the duration of postpartum infecundability. The index of postpartum infecundability (Ci) is estimated as;

Ci= 20/ 18.5 + i

Where Ci = the index of postpartum infecundability, i = Average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence. In this study, the index of postpartum infecundability was estimated using the mean duration of breastfeeding and this was obtained from a question, which aimed at establishing the duration the most recent child was breastfed.

Without lactation, a typical average birth interval can be estimated to be 20 months, made up of 1.5 months of non- lactation infecundity, an average of 7.5 months waiting time to conception, 2 months added by intrauterine mortality and 9 months gestation. With lactation, it equals the average total duration of infecundable period plus 18,5 months (7.5+2+9). The ratio of the average birth intervals without and with lactation is the one called the index of lactation infecundability, Ci.

3.4.4. Estimation of Index of Primary Sterility (Cp)

Bongaarts developed an equation to estimate the index as a function of primary sterility. The equation is:

$Cp = (7.63 - 0.11 * s) / 7.3$

Where

s is the percentage of women aged 45-49 who have had no live births. This equation is equal to 1.0 when three percent of women are childless at age 45-49. Anything above this level is assumed to be the effect of pathological sterility.

3.5. Decomposition of the Proximate Determinants to Fertility Change

Any change in a population fertility level can be the result of a change in one or more of the proximate determinants. Thus, it is possible to say that the decomposition of a trend in the TFR is based on the following equation, which links the TFR to the fertility-inhibiting effects of the four principal proximate variables:

$TFR = Cm*Cc*Ca*Ci*TF$

Let 2008/09 and 2003 be the first and last years of the time period for which decomposition is done. Then, with a change in the TFR from TFR 2003 in the year 2003 to TFR 2008/09 in the year 2008/09 and with simultaneous changes in the indexes from Cm_{2003} to $Cm_{2008/09}$, from

Cc_{2003} to $Cc_{2008/09,}$ from Ca_{2003} to $Ca_{2008/09,}$ from Ci_{2003} to $Ci_{2008/09}$ and from TF_{2003} to $TF_{2008/09}$ between the years 2003 and 2008/09, the ratio $TFR_{2008/09}/TFR_{2003}$ can be expressed as,

$\mathbf{TFR_{2008/09}/TFR_{2003}} = C_{m2008/09}/C_{m2003} * C_{c2008/09}/C_{c2003} * C_{i2008/09}/C_{i2003} * C_{p2008/09}/ C_{p2003} * TF_{2008/09}/TF_{2003}$------- (i)

This can further be defined as;

$P_f = (TFR_{2008/09}/TFR_{2003}) - 1$: Proportional change in TFR between the years 2003 and 2008/09

$Pm = (Cm_{2008/09}/Cm_{2003}) - 1$: Proportional change in TFR due to a change in the index of marriage between the years 2003 and 2008/09

$P_c = (Cc_{2008/09}/Cc_{2003}) - 1$: Proportional change in TFR due to a change in the index of contraception between the years 2003 and 2008/09

$P_p = (Ci_{2008/09}/Ci_{2003)} - 1$: Proportional change in TFR due to a change in the index of postpartum infecundability between the years 2003 and 2008/09

$P_r = (TF_{2008/09}/TF_{2003)} - 1$: Proportional change in TFR due to a change in the remaining proximate variables, natural infecundability, spontaneous intrauterine mortality, and permanent sterility between the years 2003 and 2008/09

Therefore,

$P_f = P_m + P_c + P_a + P_i + P_r + I$

Where,

I is the interaction factor

CHAPTER FOUR
FERTILITY INHIBITING EFFECTS OF THE PROXIMATE DETERMINANTS

4.1. Introduction

This chapter presents results of the fertility inhibiting effects of the proximate determinants in the two KDHS periods of 2003 and 2008/09. The results are based on background variables such as educational level, region of residence, urban and rural residence.

4.2. Background Characteristics of the Survey Population

Table 4.1 shows the demographic and socio economic characteristics of poor and non poor women. Overall, about 6% and 4% of the women in 2003 and 2008/09, respectively, were in the age group 15-19 years; about 58 % in 2003 and 61% in 2008/09 in age group 20-34 years; about 28% in 2003 and 25% were in age group 35-44 years. The remaining 8.4% in 2003 and 9.5% of the women were aged 45-49 years. The proportion of the poor and non poor women in age group 20-34 years increased from about 57% and 59% in 2003 to 61% and 64% in 2008/09, respectively. The percentage of poor women in age group 45-49 years increased from 8% in 2003 to 10% in 2008/09 while that of the non poor women decreased from 8% to 7.8% over the same period. The proportion of those in the age 15-19 decreased from 6.6% in 2003 to 5.7% in 2008/09 among the poor women and from 5.6% in 2003 to 3.4% in 2008/09 among the non poor women. Similarly, for those in age group 35-44 years, the proportion decreased from about 29% and 27% in 2003 to 23% and 25% in 2008/09 among the poor and non women, respectively.

On education attainment, about 11.8% of the married women had no education, 29% incomplete primary education and primary education and 30.3% had secondary education and above. A large proportion of poor women had no education, primary incomplete and primary complete education compared to non poor women in both the two periods. On the other hand, bigger proportion of non poor women is much more likely to complete primary and secondary school than the poor women. Almost nine in ten women were either Roman Catholic or Protestant Christians while 9% are Muslim in both the two periods. Majority of the poor and non poor were Protestant Christians followed by Roman Catholic and Muslim, in that order.

Overall, Rift Valley region (27%) had the highest proportion of women while North Eastern (3%) had lowest proportion. In terms of place of residence, slightly over three quarters of the

women are from rural areas. Non poor had a higher proportion of women in urban areas than the poor women. In contrast, poor women had a larger percentage of women in rural areas than the poor women.

Table 4.1: The Demographic and Socio Economic Characteristics of Currently Married Poor and Non Poor

Characteristics	Poor				Non Poor				Total			
	2003		2008/09		2003		2008/09		2003		2008/09	
	Number	%	Numbe	%	Numbe	%	Numbe	%	Numbe	%	Numbe	%
Age Group												
15-19	113	6.6	94	5.7	107	5.6	71	3.4	258	5.8	191	4.2
20-24	306	17.9	337	20.5	386	20.1	385	18.8	836	18.7	884	19.3
25-29	381	22.2	365	22.2	396	20.6	520	25.3	952	21.3	1038	22.7
30-34	283	16.5	305	18.6	358	18.7	404	19.7	803	18.0	886	19.3
35-39	270	15.7	226	13.8	283	14.7	283	13.8	661	14.8	641	14.0
40-44	222	12.9	147	8.9	235	12.3	228	11.1	577	12.9	504	11.0
45-49	141	8.2	169	10.3	155	8.0	160	7.8	376	8.4	435	9.5
Education												
No education	493	28.7	391	23.8	118	6.1	81	4.0	718	16.1	542	11.8
Incomplete	704	41.0	690	42.0	370	19.3	331	16.1	1388	31.1	1320	28.8
Complete	361	21.1	393	23.9	571	29.8	622	30.3	1182	26.5	1331	29.1
Secondary+	157	9.2	170	10.3	860	44.8	1016	49.6	1174	26.3	1385	30.3
Religion												
Roman Catholic	386	22.5	308	18.8	436	22.8	435	21.2	1070	24.0	947	20.7
Protestant/Other Christian	1050	61.2	1035	63.0	1315	68.7	1425	69.5	2886	64.8	3098	67.7
Muslim	204	11.9	195	11.9	136	7.1	158	7.7	386	8.7	385	8.4
No religion	72	4.2	100	6.1	19	1.0	14	.7	101	2.3	122	2.7
Other	3	.2	5	.3	7	.3	18	.9	13	.3	23	.5
Region												
Nairobi	0	0.0	0	0.0	380	19.8	342	16.7	380	8.5	343	7.5
Central	86	5.0	51	3.1	372	19.4	286	14.0	619	13.9	467	10.2
Coast	165	9.6	145	8.8	169	8.8	235	11.5	384	8.6	414	9.0
Eastern	253	14.8	285	17.3	290	15.1	291	14.2	754	16.9	785	17.1
Nyanza	354	20.7	312	19.0	148	7.7	242	11.8	615	13.8	726	15.9
Rift Valley	452	26.4	505	30.8	459	23.9	509	24.8	1051	23.6	1209	26.4
Western	301	17.6	241	14.7	91	4.7	129	6.3	534	12.0	509	11.1
North Eastern	103	6.0	103	6.3	10	.5	15	.8	124	2.8	125	2.7
Residence												
Urban	34	2.0	13	.8	910	47.4	1043	50.9	972	21.8	1074	23.5
Rural	1681	98.0	1630	99.2	1010	52.6	1007	49.1	3491	78.2	3504	76.5
Total	**1715**	**100.0**	**1644**	**100.0**	**1920**	**100.0**	**2050**	**100.0**	**4462**	**100.0**	**4578**	**100.0**

4.3. Estimation of the Indices of the Poor and Non Poor Women

4.3.1. Index of Marriage (Cm)

Marriage is one of the most important determinants of fertility. Bongaarts and Potter (1983) have defined marriage as the relatively stable union to which socially sanctioned childbearing is limited in most societies.

The index of marriage measures the inhibiting effect of marriage on fertility in the population. The higher the level of marriage in the population, the less the inhibiting effect on fertility and vice versa. The index Cm gives the proportion by which TFR is smaller than TM as the result of non marriage. The index is calculated as the ratio of the Total Fertility Rate (TFR) to the Total Marital Fertility Rate (TM) i.e. Cm = TFR/TMFR. TM is the average number of children that a woman would have during ages 15-49 if she survived that age range and had children at the current age-specific rates for ever-married women. These rates include all births but are limited to ever-married women, and are therefore larger than the usual age-specific fertility rates.

Table 4.2 presents the estimates of the index of marriage by background characteristics and economic status, 2003-2008/09. The estimates of the index of marriage among the poor women reduced from 0.604 in 2003 to 0.511 in 2008/09 while that of the non poor women increased from 0.498 to 0.518 over the same period. This indicates that the marriage pattern of the poor women reduced actual fertility below marital fertility by 39.6% in 2003 and 48.9% in 2008/09. Similarly, despite the increase in the marriage index, the marriage pattern of the non poor women reduced the actual fertility below marital fertility by 50.2% in 2003 and 48.2% in 2008/09. This shows that poor women delayed entry into marriage more in 2008 than in 2003 thus rising their median age at first marriage. On the other hand, non poor women entered marriage earlier in 2008/09 compared to 2003 thus reducing their median age at first marriage. The fertility inhibiting effect of the non poor women were higher than that of the poor women in both rural and urban areas over the two periods, except for the non poor women in 2008/09. The fertility suppressing factor of the non poor women was 52.8% and 49.9% in urban areas in 2003 and 2008/09, respectively compared to the fertility inhibiting effect of 49.3% and 50.0% for the urban poor women over the same period. The fertility inhibiting effect of the non poor women was 47.5% and 46.2% in rural areas in 2003 and 2008/09, respectively while the fertility inhibiting effect of rural poor women was 39.4% and 42.8% over the same period. This result show that poor women in both urban and rural areas delayed entry into marriage while non poor women in urban and rural areas entered marriage earlier in 2008/09 compared to 2003.

Table 4.2: Estimates of the index of marriage by background characteristics and Economic Status, 2003-2008/09

Characteristics	C_m Poor			C_m Non Poor		
	2003	2008/09	% change	2003	2008/09	% change
Residence						
Urban	0.507	0.500	-1.4	0.472	0.501	6.1
Rural	0.606	0.572	-5.6	0.525	0.538	2.5
Region						
Nairobi	_	_	_	0.456	0.470	3.1
Central	0.486	0.490	0.8	0.520	0.512	-1.5
Coast	0.705	0.639	-9.4	0.501	0.609	21.6
Eastern	0.576	0.589	2.3	0.530	0.563	6.2
Nyanza	0.532	0.542	1.9	0.465	0.494	6.2
Rift Valley	0.630	0.547	-13.2	0.521	0.516	-1.0
Western	0.643	0.571	-11.2	0.453	0.498	9.9
North Eastern	0.752	0.730	-2.9	0.667	0.455	-31.8
Education						
No education	0.737	0.739	0.3	0.551	0.600	8.9
Primary incomplete	0.556	0.541	-2.7	0.458	0.486	6.1
Primary complete	0.620	0.572	-7.7	0.529	0.583	10.2
Secondary & Above	0.488	0.440	-9.8	0.491	0.490	-0.2
Total	**0.604**	**0.511**	**-15.4**	**0.498**	**0.518**	**4.0**

In terms of regions, fertility decline among poor women were noted in all provinces except among poor women with no education and in Eastern and Nyanza Provinces. Fertility decline among non poor women were observed in Central, Rift Valley and North Eastern Provinces as well as among non poor women with secondary and above education. This means that poor women with no education and those in Eastern and Nyanza Provinces tend to marry earlier than before while for non poor women, those with secondary and above education and from Central, Rift Valley and North Eastern Provinces tend to marry later. North Eastern Province and poor women with no education had the lowest fertility inhibiting effect among poor women at 24.8% in 2003 and 26.1% in 2008/9, respectively. For the non poor women, North Eastern and Coast Provinces had the lowest inhibiting effect at 33.3% in 2003 and 39.1% in 2008/09, respectively. On the other, Central Province and poor women with secondary and above education had the highest fertility in inhibiting effect of marriage for the poor women at 51.4% in 2003 while and 56.0%% in 2008/9, respectively. For the non poor women, Western and North Eastern Provinces had the highest inhibiting effect of marriage at 54.7% in 2003 and 54.5% in 2008/9.

Coast Province had the highest positive change at 21.6% in the effect of marriage while North Eastern Province at 31.8% had the highest negative change among the non poor women. On the other hand, among non poor women, rural areas had the lowest positive change at 2.5% while non poor women with secondary and above education had the lowest negative change at 1.0% in the effect of marriage. Among the poor women, Eastern Province had the highest positive change at 2.3% in the effect of marriage while Rift Valley Province at 13.2% had the highest negative change. Poor women with no education had the lowest marginal positive change while urban poor women had the lowest negative change at 1.4% in the effect of marriage. Education has had varying effect on index of marriage for both the poor and non-poor. Apart from poor women with no education fertility inhibiting effect of poor women with other levels of education increased from 2003 to 2008/09. The fertility inhibiting effects of non poor women with secondary and above education increased while fertility inhibiting effects of non poor women with no education, primary incomplete and primary education reduced. Similarly, the fertility inhibiting effect increased with the level of education, except for the primary incomplete and primary complete for both the poor and non poor in both the two periods. The increase in inhibiting effect could be attributed to the delay in entry of women into marriage due to acquisition of higher levels of education.

4.3.2. Index of Contraception (Cc)

Among populations, contraceptive practice is the intermediate fertility variable primarily responsible for the wide range in the levels of fertility within marriage (Bongaarts, 1978). Contraception has a direct negative impact on fertility. The index of contraception in the model measures the inhibiting effect of contraception on fertility in the population. The higher the level of contraception in the population, the higher the inhibiting effect due to contraception and the lower the level of contraception the lower the inhibiting effect. The reciprocal of the index of contraception provides the magnitude by which total marital rate (TN) is reduced relative to total marital fertility rate (TM) by contraceptive practice.

Table 4.3 shows that the that the fertility inhibiting effect of contraception for the poor women increased from 15.0 % in 2003 to 18.8 % in 2008/09 while that of the non poor women reduced from 37.1.% to 34.9.% over the two survey periods. This shows that poor women contributed more towards fertility decline than the non poor women over the two periods. Between 2003 and 2008/09, the fertility inhibiting effect of contraception among poor women increased in all the sub population except in Eastern Province, among poor women who did not complete

primary education and those with secondary and above education. This increase varied across the sub populations with urban areas having the highest reduction in the index of contraception of 18% followed by poor women with incomplete primary education (12.6%) and Western Province (11.8%), respectively. Similarly, among the non poor women, fertility inhibiting effect of contraception increased in all the sub population except in Central Province and among non poor women with no education and those with secondary and above education. Nyanza Province had the highest reduction in the index of contraception at 15.3% followed by North Eastern Province (13.7%) and Rift Valley Province (13.4%).

In 2003, contraception had a higher fertility inhibiting effect among the poor women in rural areas than urban areas while the fertility inhibiting effect was higher in urban areas than in rural areas in 2008/09. The fertility inhibiting effect for the non poor women was found to be higher in urban areas than rural areas in both the two periods.

Table 4.3: Estimates of the index of contraception by background characteristic and Economic Status, 2003-2008/09

Characteristics	C_c Poor			C_c Non Poor		
	2003	2008/09	% change	2003	2008/09	% change
Residence						
Urban	0.933	0.765	-18.0	0.620	0.600	-3.2
Rural	0.856	0.801	-6.4	0.586	0.533	-9.0
Region						
Nairobi	_	_	_	0.602	0.573	-4.8
Central	0.565	0.522	-7.6	0.424	0.426	0.5
Coast	0.952	0.894	-6.1	0.753	0.687	-8.8
Eastern	0.763	0.764	0.1	0.457	0.456	-0.2
Nyanza	0.881	0.793	-10.0	0.784	0.664	-15.3
Rift Valley	0.883	0.816	-7.6	0.655	0.567	-13.4
Western	0.805	0.710	-11.8	0.617	0.585	-5.2
North Eastern	1.000	0.996	-0.4	0.988	0.853	-13.7
Education						
No education	0.954	0.938	-1.7	0.879	0.924	5.1
Primary incomplete	0.872	0.762	-12.6	0.721	0.638	-11.5
Primary complete	0.697	0.752	7.9	0.655	0.596	-9.0
Secondary & Above	0.636	0.711	11.8	0.460	0.484	5.2
Total	**0.850**	**0.812**	**-4.5**	**0.629**	**0.651**	**3.5**

The index of contraception declined in all sub populations among the poor women except in Eastern Province, among poor women with primary education and those with secondary and above education, whereas among non poor women, the index of contraception declined in all sub populations except in Central Province, among non poor women with no education and those with secondary and above education. Across the sub populations, Central Province had the highest fertility inhibiting effect for both the poor and non poor women between 2003 and 2008/9. The fertility inhibiting effect in this province increased from 43.5% in 2003 to 47.8% in 2008/9 for the poor women and reduced from 57.6% to 57.4% for the non poor women over the same period. North Eastern province had the lowest fertility inhibiting effect for the poor women. Among the non poor women, North Eastern in 2003 and non poor women who had no education in 2008/09 had the lowest fertility inhibiting effect.

The fertility inhibiting effect increased among the poor women with no education and primary incomplete education, whereas the inhibiting factor reduced among poor women with primary and secondary and above education. Among the non poor women, fertility inhibiting effect increased among non poor women with primary incomplete and primary complete education while it reduced among those with no education and secondary and above education. Generally, non poor women had higher fertility inhibiting effect in all sub populations compared to the poor women.

4.3.3. Estimation of the Index of Postpartum (Ci)

Breastfeeding and postpartum amenorrhoea and abstinence are associated with fertility. Women are considered infecundable if they are not exposed to the risk of conception either because they are amenorrhoeic or are abstaining from sexual intercourse after childbirth. Postpartum infecundability is one of the four proximate factors through which economic, social and other factors operate to influence fertility. The index of postpartum infecundability measures the inhibiting effects of postpartum amenorrhea and breastfeeding on fertility in the population. The longer the duration, the higher is its effect inhibiting fertility. The index of postpartum infecundability measures to the extent postpartum infecundability reduces Total Fecundity Rate.

Table 4.4 presents the estimates of the index of postpartum infecundability by background characteristics and economic status for the periods 2003 and 2008/09. Overall, the postpartum infecundability reduced the total fecundity rate of the poor women by 36.1% in 2003 and 38.5% in 2008/09. The fertility inhibiting effect of the non poor women reduced the total fecundity rate

by 35.7% and 41.0% over the two periods, respectively. This means that both poor and non poor women had a longer period of postpartum infecundibility. The index of postpartum infecundability for the poor and non poor reduced in both the urban and rural areas in both 2003 and 2008/09. Furthermore, fertility inhibiting effect of this factor increased in all sub populations among poor women except for poor women with primary education and in Central, Coast and North Eastern Provinces. Similarly, the fertility inhibiting effect among non poor women also increased in all sub populations except among non poor women with no education, in Coast and North Eastern Provinces.

Generally, the fertility suppressing factor increased in both rural and urban areas both in 2003 and 2008/09 for the two sub groups. With the exception of urban areas in 2008/09, urban areas had a higher fertility inhibiting effect than the rural areas among the poor and non poor women.

Table 4.4: Estimates of the index of postpartum Infecundability by background characteristics and Economic Status, 2003-2008/09

Characteristics	C_i			C_i		
	Poor			Non Poor		
	2003	2008/09	% change	2003	2008/09	% change
Residence						
Urban	0.631	0.556	-11.9	0.613	0.581	-5.2
Rural	0.643	0.625	-2.8	0.639	0.601	-5.9
Region						
Nairobi	_	_	_	0.612	0.610	-0.3
Central	0.610	0.690	13.1	0.631	0.557	-11.7
Coast	0.647	0.656	1.4	0.641	0.656	2.3
Eastern	0.602	0.599	-0.5	0.631	0.593	-6.0
Nyanza	0.881	0.629	-28.6	0.641	0.602	-6.1
Rift Valley	0.643	0.604	-6.1	0.635	0.570	-10.2
Western	0.654	0.592	-9.5	0.651	0.602	-7.5
North Eastern	0.639	0.671	5.0	0.625	0.690	10.4
Education						
No education	0.791	0.635	-19.7	0.601	0.606	0.8
Primary incomplete	0.654	0.597	-8.7	0.647	0.562	-13.1
Primary complete	0.637	0.647	1.6	0.637	0.593	-6.9
Secondary & Above	0.583	0.568	-2.6	0.610	0.595	-2.5
Total	**0.639**	**0.615**	**-3.8**	**0.643**	**0.590**	**-8.2**

Across the regions, postpartum infecundability had the highest fertility inhibiting effect of 39.8% and 40.8% among poor women in Eastern Province in 2003 and Western Province in

2008/09, respectively. For the non poor women, Nairobi and Central Provinces had the highest fertility inhibiting effect of 38.8% in 2003 and 44.3% in 2008/09, respectively. On the other hand, Nyanza and Central Provinces had the lowest fertility inhibiting effect of 11.9% in 2003 and 31.0% in 2008/09 among poor women, respectively. For the non poor, Western Province with 34.9% in 2003 and North Eastern Province with 31.0 % in 2008/09 had the lowest inhibiting effect.

On education, poor women with secondary and above education had the highest fertility inhibiting effect in both 2003 and 2008/09 while poor women with no education had the lowest fertility inhibiting effect in the two periods. Non poor women with no education in 2003 and those who did not complete primary education in 2008/09 had the highest fertility inhibiting effect. The non poor women with incomplete primary education in 2003 and those with secondary and above education in 2008/09 had the lowest fertility inhibiting effect. With exception of women who did not complete primary education in 2003 and those with secondary and above education in the two periods, there was a higher fertility inhibiting effect among non poor women in all level of education than the poor women. This means that non poor women had a longer period of postpartum infecundibility than poor women within the same level of education.

4.3.4. Estimation of Index of Primary Sterility (Cp)

The index of sterility was calculated using all ever married women (both formerly married and currently married). The findings indicated that primary sterility had no any fertility effect for all ever-married women aged 45-49 years in 2003 and 2008/09.

4.4. Role of the major Proximate Determinants by Economic Status

Tables 4.5 and 4.6 show the estimated indices of the proximate determinants of fertility by economic status for the years 2003 and 2008/09. The findings indicate marriage pattern has played an important for both poor and non poor women in the two surveys periods. Postpartum infecundability followed for the poor women in 2003 while contraceptive use was second among poor and non poor women in 2008/09. For the non poor women in 2003, contraceptive use was second followed by postpartum infecundability. These results were consistent with the other studies conducted earlier (Nabanita and Faujdar, 2013; Lubaale et al, 2007) where the effect of marriage was found to reduce fertility. The findings were also inconsistent with the other studies (Nabanita and Faujdar, 2013; Kiersten et al 2011; Getu and Worku, 2009; Chuks,

2002; Madhavan 2013; Kalule-Sabiti, 1984; Kizito et al 1991; Kavali, 1998; Njenga, 2010; Ekisa and Hinde 2005) where either contraceptive use or postpartum infecundability was found to be the most suppressing fertility factor.

Table 4.5: Estimates of the Indices of proximate determinants of fertility of the by Economic Status, 2003 KDHS

	Poor			Non Poor		
	Cm	Cc	Ci	Cm	Cc	Ci
Residence	2003			2003		
Urban	0.507	0.933	0.631	0.472	0.620	0.613
Rural	0.606	0.856	0.643	0.525	0.586	0.639
Region						
Nairobi	_	_	_	0.456	0.602	0.612
Central	0.486	0.565	0.610	0.520	0.424	0.631
Coast	0.705	0.952	0.647	0.501	0.753	0.641
Eastern	0.576	0.763	0.602	0.530	0.457	0.631
Nyanza	0.532	0.881	0.881	0.465	0.784	0.641
Rift Valley	0.630	0.883	0.643	0.521	0.655	0.635
Western	0.643	0.805	0.654	0.453	0.617	0.651
North Eastern	0.752	1.000	0.639	0.667	0.988	0.625
Education						
No education	0.737	0.954	0.791	0.551	0.879	0.601
Primary incomplete	0.556	0.872	0.654	0.458	0.721	0.647
Primary complete	0.620	0.697	0.637	0.529	0.655	0.637
Secondary & Above	0.488	0.636	0.583	0.491	0.460	0.610
Total	**0.604**	**0.850**	**0.639**	**0.498**	**0.629**	**0.643**

As shown in Tables 4.5 and 4.6, marriage pattern had played an important role in reducing fertility except in a few sub groups in 2003 and 2008/09. These include Coast and North Eastern Provinces where postpartum infecundability was found to have the highest fertility inhibiting effect among the poor women in 2003. Similarly, postpartum infecundability was found to reduce fertility among the non poor women in North Eastern Province in the same year.

In addition, among the non poor women, contraceptive use had the highest fertility inhibiting effect for non poor women in rural areas in 2008/09. Similarly contraceptive use had the highest impact on fertility decline among non poor in Central and Eastern Provinces as well as women with secondary and above education in 2003 and 2008/09.

Table 4.6: Estimates of the Indices of proximate determinants of fertility of the by Economic Status, 2008/09 KDHS

	Poor			Non Poor		
	Cm	Cc	Ci	Cm	Cc	Ci
Residence	**2008/09**			**2008/09**		
Urban	0.500	0.765	0.556	0.501	0.600	0.581
Rural	0.572	0.801	0.625	0.538	0.533	0.601
Region						
Nairobi	_	_	_	0.470	0.573	0.610
Central	0.490	0.522	0.690	0.512	0.426	0.557
Coast	0.639	0.894	0.656	0.609	0.687	0.656
Eastern	0.589	0.764	0.599	0.563	0.456	0.593
Nyanza	0.542	0.793	0.629	0.494	0.664	0.602
Rift Valley	0.547	0.816	0.604	0.516	0.567	0.570
Western	0.571	0.710	0.592	0.498	0.585	0.602
North Eastern	0.730	0.996	0.671	0.455	0.853	0.690
Education						
No education	0.739	0.938	0.635	0.600	0.924	0.606
Primary incomplete	0.541	0.762	0.597	0.486	0.638	0.562
Primary complete	0.572	0.752	0.647	0.583	0.596	0.593
Secondary & Above	0.440	0.711	0.568	0.490	0.484	0.595
Total	**0.511**	**0.812**	**0.615**	**0.518**	**0.651**	**0.590**

4.5. Estimation of TFR using Bongaarts Fertility Model

Tables 4.7 and 4.8 show estimated TFR of the poor and poor women for the periods 2003 and 2008/09 using Boongaarts fertility model. Using the model with the observed total fecundity of 16.5, the estimated TFR of the poor women was 5.41 births per woman in 2003 and it reduced to 4.21 births per woman in 2008/09 as presented in Table 4.7. Table 4.8 indicates that estimated TFR of the non poor women was 3.32 in 2003 and declined to 3.28 births per woman in 2008/09.

With the exception of non poor women TFR in 2008/09, rural areas had higher TFR than the urban areas for both the two sub groups. Across the regions, North Eastern Province had the highest TFR for both poor and non poor women in the two periods followed by Coast and Nyanza Provinces while Central Province had the lowest TFR both in 2003 and 2008/09. Among the poor women, all the regions recorded decline in TFR between 2003 and 2008/09 except Central Province which registered an increase from 2.76 to 2.91 births per woman, Eastern Province from 4.37 to 4.45 births per woman and North Eastern Province from 7.93 to 8.05 over the two periods. Nyanza Province recorded the highest decline in TFR of 2.4 births per woman while Rift Valley Province had the lowest decline of 1.45 births per woman. In comparison, Central Province had the highest increase of 0.15 births per woman while Eastern

Province lowest increase of 0.08 births per woman over the same period. For the non poor women, all the regions recorded decline in TFR between 2003 and 2008/09 except Coast Province, which had an increase in TFR of 0.54 births per woman. North Eastern Province had the highest reduction in TFR of 2.38 births per woman while Eastern Province had the lowest decline of 0.01 births per woman. Coast Province

Table 4.7: Estimation of TFR of the poor women using Boongaarts Fertility Model, 2003-2008/09

	C_m		C_c		C_i		Cp			Fitted TFR	
	Poor		Poor		Poor		Poor				
Characteristics	2003	2008/09	2003	2008/09	2003	2008/09	2003	2008/09	TF	2003	2008/09
Residence											
Urban	0.51	0.50	0.93	0.77	0.63	0.56	1.00	1.00	16.5	4.92	3.51
Rural	0.61	0.50	0.86	0.80	0.64	0.63	1.00	1.00	16.5	5.50	4.14
Region											
Nairobi	_	_	_	_	_	_	1.00	1.00	16.5	_	_
Central	0.49	0.49	0.57	0.52	0.61	0.69	1.00	1.00	16.5	2.76	2.91
Coast	0.71	0.64	0.95	0.89	0.65	0.66	1.00	1.00	16.5	7.16	6.18
Eastern	0.58	0.59	0.76	0.76	0.60	0.60	1.00	1.00	16.5	4.37	4.45
Nyanza	0.54	0.54	0.88	0.79	0.88	0.63	1.00	1.00	16.5	6.86	4.46
Rift Valley	0.63	0.55	0.88	0.82	0.64	0.60	1.00	1.00	16.5	5.90	4.45
Western	0.64	0.57	0.81	0.71	0.65	0.59	1.00	1.00	16.5	5.56	3.96
North Eastern	0.75	0.73	1.00	1.00	0.64	0.67	1.00	1.00	16.5	7.93	8.05
Education											
No education	0.74	0.74	0.95	0.94	0.79	0.64	1.00	1.00	16.5	9.18	7.26
Primary incomplete	0.56	0.54	0.87	0.76	0.65	0.60	1.00	1.00	16.5	5.23	4.06
Primary complete	0.62	0.57	0.70	0.75	0.64	0.65	1.00	1.00	16.5	4.54	4.59
Secondary & Above	0.49	0.44	0.64	0.71	0.58	0.57	1.00	1.00	16.5	2.99	2.93
Total	**0.60**	**0.51**	**0.85**	**0.81**	**0.64**	**0.62**	**1.00**	**1.00**	**16.5**	**5.41**	**4.21**

TFR was the highest among poor and non poor women with no education compared to other educational levels. With exception of poor and non poor women with primary education, TFR reduced with the increase in the level of education. TFR for the poor women with primary education increased from 4.54 to 4.59 births per woman. TFR for poor women with no education had the highest decline of 1.92 births per woman while those who completed primary education had the lowest decline of 0.05 births per woman. Among the non poor women, TFR for those with no education and secondary and above increased. Non poor women who did not complete their primary education had the highest decline in TFR.

Table 4.8: Estimation of TFR of the non poor women using Boongaarts Fertility Model, 2003-2008/09

Characteristics	C_m		C_c		C_i		C_p			Fitted TFR	
	Non poor		Non poor		Non poor		Non poor			Non poor	
	2003	2008/09	2003	2008/09	2003	2008/09	2003	2008/09	TF	2003	2008/09
Residence											
Urban	0.472	0.501	0.620	0.600	0.613	0.581	1.00	1.00	16.5	2.96	2.88
Rural	0.525	0.538	0.586	0.533	0.639	0.601	1.00	1.00	16.5	3.24	3.06
Region							1.00	1.00	16.5		
Nairobi	0.456	0.470	0.602	0.573	0.612	0.610	1.00	1.00	16.5	2.77	2.71
Central	0.520	0.512	0.424	0.426	0.631	0.557	1.00	1.00	16.5	2.30	2.00
Coast	0.501	0.609	0.753	0.687	0.641	0.656	1.00	1.00	16.5	3.99	4.53
Eastern	0.530	0.563	0.457	0.456	0.631	0.593	1.00	1.00	16.5	2.52	2.51
Nyanza	0.465	0.494	0.784	0.664	0.641	0.602	1.00	1.00	16.5	3.86	3.26
Rift Valley	0.521	0.516	0.655	0.567	0.635	0.570	1.00	1.00	16.5	3.58	2.75
Western	0.453	0.498	0.617	0.585	0.651	0.602	1.00	1.00	16.5	3.00	2.89
North Eastern	0.667	0.455	0.988	0.853	0.625	0.690	1.00	1.00	16.5	6.80	4.42
Education							1.00	1.00	16.5		
No education	0.551	0.600	0.879	0.924	0.601	0.606	1.00	1.00	16.5	4.79	5.54
Primary incomplete	0.458	0.486	0.721	0.638	0.647	0.562	1.00	1.00	16.5	3.53	2.88
Primary complete	0.529	0.583	0.655	0.596	0.637	0.593	1.00	1.00	16.5	3.64	3.40
Secondary & Above	0.491	0.490	0.460	0.484	0.610	0.595	1.00	1.00	16.5	2.27	2.33
Total	**0.498**	**0.518**	**0.629**	**0.651**	**0.643**	**0.590**	**1.00**	**1.00**	**16.5**	**3.32**	**3.28**

4.5 Decomposition of the Change in TFR for the Period 2003-2008/09

To attribute the contribution made by each of the proximate determinants to be observed change in fertility two periods, Boongarts and Potter (1983) derived the decomposition of the change in TFR by the following formula:

$P_f = P_m + P_c + P_a + P_i + P_r + I$

Table 4.9 presents the measures of the contribution performed by each of the proximate factors to the observed TFR between 2003 and 2008/09. The results indicate that TFR among poor and non poor women declined by 22.2% and 1.2%, respectively. It was found that fertility has declined among poor women were mostly due to a 15.4% decline in marriage patterns, a 4.5% decline as a result in increase in contraceptives use and a 3.8% decline due to lengthening of the duration of postpartum infecundability. For the non poor women fertility declined due to a 4.0 % increase in marriage pattern, a 3.5% increase due to decrease in contraceptives use and a 8.5% decrease as a result of lengthening of the duration of postpartum infecundability. The increase in contraceptives use among the poor women contributed 20.3% while the decrease in contraceptives use among non poor contributed more than twice to the decrease in fertility. Marriage patterns contributed 69.4% of the decline in TFR among poor women and more than three times to the decrease of fertility among non poor women.

Across the regions comparison, Total Fertility Rate (TFR) among poor women declined only in Central, Eastern and North Eastern Provinces. Among the non poor, fertility declined in all the Provinces except Coast Province where the increase was marginal and Eastern Province where TFR remained the same. The increase in fertility in Coast Province can be attributed to the change in marriage pattern by 21.6% and the shortening of the duration of postpartum infecundability by 2.3%. However, the increase in contraceptive use has contributed to the decline in TFR by 8.8% to offset partly the increase in marriage pattern and postpartum infecundability. Among the poor and non poor women, Nyanza and North Eastern Provinces had the highest decline in TFR of 35.0% each over the two periods. This could be attributed to the fact that Nyanza Province had the highest increase in the duration of postpartum infecundability. TFR among poor women with primary education and non poor women with secondary and above education increased by 1.1% and 2.4%, respectively.

Table 4.9: Decomposition of the change in Total fertility rate (TFR) for Poor and Non Poor Women from 2003 to 2008/09

	Poor							Non Poor						
Characteristics	**P_f**	**P_m**	**Pc**	**P_i**	**P_p**	**I**	**Absolute change in TFR**	**P_f**	**P_m**	**P_c**	**P_i**	**P_p**	**I**	**Absolute change in TFR**
Residence														
Urban	-28.7	-1.4	-18.0	-11.9	0.0	2.5	**-1.4**	-2.6	6.1	-3.2	-5.2	0.0	-0.3	**-0.1**
Rural	-24.8	-5.6	-6.4	-2.8	0.0	-10.0	**-1.4**	-5.8	2.5	-9.0	-5.9	0.0	6.7	**-0.2**
Region														
Nairobi	_	_	_	_	_	_	_	-2.2	3.1	-4.8	-0.3	0.0	-0.1	**-0.1**
Central	5.4	0.8	-7.6	13.1	0.0	-1.0	**0.1**	-12.7	-1.5	0.5	-11.7	0.0	0.1	**-0.3**
Coast	-13.7	-9.4	-6.1	1.4	0.0	0.4	**-1.0**	13.5	21.6	-8.8	2.3	0.0	-1.6	**0.5**
Eastern	1.9	2.3	0.1	-0.5	0.0	0.0	**0.1**	-0.4	6.2	-0.2	-6.0	0.0	-0.4	**0.0**
Nyanza	-35.0	1.1	-10.0	-28.6	0.0	2.5	**-2.4**	-15.5	6.2	-15.3	-6.1	0.0	-0.3	**-0.6**
Rift Valley	-24.6	-13.2	-7.6	-6.1	0.0	2.2	**-1.5**	-23.0	-1.0	-13.4	-10.2	0.0	1.6	**-0.8**
Western	-28.8	-10.8	-11.8	-9.5	0.0	3.3	**-1.6**	-3.6	9.9	-5.2	-7.5	0.0	-0.8	**-0.1**
North Eastern	1.5	-2.9	-0.4	5.0	0.0	-0.2	**0.1**	-35.0	-31.8	-13.7	10.4	0.0	0.1	**-2.4**
Education														
No education	-20.9	0.3	-1.7	-19.7	0.0	0.3	**-1.9**	15.6	8.9	5.1	0.8	0.0	0.8	**0.7**
Primary incomplete	-22.4	-2.7	-12.6	-8.7	0.0	1.6	**-1.2**	-18.4	6.1	-11.5	-13.1	0.0	0.1	**-0.6**
Primary complete	1.1	-7.7	7.9	1.6	0.0	-0.6	**0.0**	-6.6	10.2	-9.0	-6.9	0.0	-0.9	**-0.2**
Secondary & Above	-1.8	-9.8	11.8	-2.6	0.0	-1.2	-0.1	2.4	-0.2	5.2	-2.5	0.0	-0.1	**0.1**
Total	**-22.2**	**-15.4**	**-4.5**	**-3.8**	**0.0**	**1.4**	**-1.2**	**-1.2**	**4.0**	**3.5**	**-8.2**	**0.0**	**-0.5**	**0.0**

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the summary of the study, conclusions of the results and recommendations for policy and further research.

5.2. Summary

The general objective of the study was to examine the role of the proximate determinants of fertility inhibiting effects among the poor and non poor in Kenya over the period 2003 to 2008/09. It sought to determine the fertility inhibiting effect of each of the principal proximate determinants of fertility to change in TFR. The basic analytical technique used in this study was the Bongaarts model (Bongaarts, 1978, Bongaarts and Potter, 1983). The variables selected in the study included contraceptive use, postpartum infecundibility, proportion married and sterility. The findings are analyzed using three socio economic characteristic of educational level, region and residence. Due to lack of data, induced abortion was not assessed in the study. The computation procedures are first used to estimate the four indexes of contraceptive use, postpartum infecundibility, proportion married and sterility to measure the inhibiting effect. Second, TFR is estimated using the Bongaarts Fertility Model. Lastly, the indexes are decomposed to determine the contribution made by each of the proximate determinants to be observed change in fertility.

5.3. Conclusions

Kenya has experienced a decline in fertility rate between 2003 and 2008/09. But this change in fertility is not shared equally among the poor and non poor women. The study revealed that effects of the proximate determinants of fertility among the poor and non poor vary based on rural-urban residence, region of residence and educational levels. It showed marriage pattern was the most important fertility inhibiting factor at the aggregate level for both poor and non poor women in the two surveys periods.

Among the sub groups, the study found that marriage pattern of the poor women contributed to the decline in fertility while that of non poor women was responsible for the increase in fertility. This shows that the poor women were delaying marriage while non poor women enter into marriage earlier than they did in the past. The results also show that poor women in both urban and rural areas delayed entry into marriage while non poor women in urban and rural areas entered marriage earlier in 2008/09 compared to 2003. Furthermore, poor women with no education and those in Eastern and Nyanza

provinces tend to marry earlier than before while for non poor women, those with secondary and above education and from Coast, Rift Valley and North Eastern Provinces tend to marry later.

Over time, contraception has played a major role in the decline of fertility in Kenya. Earlier studies by Njenga (2010) and Ekisa and Hinde (2005) found that contraceptive use was the most important determinant of fertility. Examination of the changes in the use of contraception in this study reveals that poor women contributed more towards fertility decline than the non poor women over the two periods. Generally, contraceptive use among poor and non poor women increased in all the sub population except for the poor women in Eastern Province, among poor women who did not complete primary education and those with secondary and above education as well for the non poor women in Central Province, among non poor women with no education and those with secondary and above education. This result shows that contraception practice plays an important role in the reduction of fertility among the two sub groups. It, therefore, provides Kenya with an opportunity to increase its contraceptive use among these two sub groups since the CPR of the current married women of 46.0% is still very low and in particular the CPR of 20.1 % among the poor. Against exceptions, reasons as to why contraceptive use among all women with secondary and above education reduced needs to be examined so as to reduce this existing gap

Kavali (1998) and Kizito et al (1991) found that postpartum infecundability was the most important fertility inhibiting in Kenya. This study revealed that at the aggregate level, urban and rural both poor and non poor women had a longer period of postpartum infecundibility. Poor women with primary education and those in Central, Coast and North Eastern Provinces and the non poor women who completed primary education and among non poor women with no education and non poor women in Coast and North Eastern Provinces had a shorter period of postpartum infecundibility. For all level of education, non poor women had a higher effect of reducing fertility than the poor women. This means that non poor women had a longer period of postpartum infecundibility than poor women within the same level of education. There is, therefore, need to investigate as to why this is so, given that it is expected that poor women are expected to have time to breastfeed their children more than the non poor women who in most cases are career women.

5.3. Recommendations

5.3.1. Recommendations for Policy

This study showed that both the poor and non poor women made different contribution towards fertility decline. The TFR as estimated by the Bongaarts Model for the poor women reduced from 5.41

births per woman in 2003 to 4.21 births per woman in 2008/09. Similarly, TFR for the non poor women reduced from 3.32 births per woman to 3.28 births per woman over the same period. The reproductive needs of both the two sub groups, therefore, cannot be ignored if the country has to achieve the replacement level of 2.1 births per woman.

Various policy implications can be drawn from the results of this study. The results of the study have shown the important role marriage has played in fertility decline. However, at the sub group level, it was found that non poor women had contributed to the increase in fertility while the poor women had contributed to the decline in fertility. It showed that at the aggregate level, urban and rural areas poor women are delaying marriage while non poor women enter into marriage earlier in 2008/09 than in 2003. It was also found that poor women with no education and those in Eastern and Nyanza provinces tend to enter marriage earlier than before while for non poor women, those with secondary and above education and from Coast, Rift Valley and North Eastern Provinces tend to marry later. The government should put programmes that will reach the poor and non poor women especially in regions where women tend to enter marriage earlier than in the past. These include putting in place education programmes to improve on the literacy level among the poor and non poor women.

.The findings showed that poor women used contraceptive more than non poor women. This could be attributed to the past government policies to manage population targeting the poor women only. The government, therefore, should put in place population policy that will incorporate the non poor women. This policy should address the contraception needs of the non poor women including providing education to all women. It should also be noted that despite the increase in use of contraceptive over the period for the poor women, the inhibiting fertility effect for the poor women was much lower than that for the non poor women. The government should, therefore, increase efforts to promote the use of contraceptive and provide effective contraceptive methods, especially in areas where contraceptive use rates are low among the two sub groups. There should be more focus in areas where such as North Eastern Province where the use of contraception is very low.

The analysis revealed that both poor and non poor women had a longer period of postpartum infecundibility. Poor women in Central, Coast and North Eastern Provinces and non poor women who completed primary education and those with no educationas well as non poor women in Coast and North Eastern Provinces had a shorter period of postpartum infecundibility. Against expectation, non poor women had a longer period of postpartum infecundibility than poor women within the same level

of education. The government should target the poor women in their breastfeeding practices through the breastfeeding policy and programmes.

5.3.1. Recommendations for further Research

The findings from this study show that there is need for further research in four areas. First, further research should focus on similar study to this one on the proximate determinants of fertility among poor and non poor women focussing on the county level. Second, further research is needed on the factors responsible for the increase in fertility among the non poor women. Third, future research is also needed on the effect of marriage among in North Eastern and Cosat Province among the poor women. Fourth, future research should be done on the effect of marriage among in North Eastern among the non poor women.

REFERENCES

Blacker J., Opiyo C., Momodou J., Sloggett A. and Ssekamatte-Ssebuliba J. 2005. "Fertility in Kenya and Uganda." *A comparative study of trends and determinants Population Studies, Vol. 59, No. 3, 2005: 355-373*

Bongaarts J. 1978. "A framework for analysing the proximate determinants of fertility," Population and Development Review 4(1): 105-132.

Bongaarts, J. 1982. "The fertility-inhibiting effects of the intermediate fertility variables," Studies in Family Planning 13(6/7): 178-189.

Bongaarts J. 2008. "Fertility transitions in developing countries: progress or stagnation?" Working paper No. 7, Stud. Family Plann 39: 105–110.

Bongaarts, J. 1984. "A simple method for estimating the contraceptive prevalence required to reach a fertility target". Studies in Family Planning 15(4):184–190.

Bongaarts, J. and Potter R. 1983.Fertility, Biology, and Behavior: An Analysis of the Proximate Determinants. New York: Academic Press, Inc.

Central Bureau of Statistics. 1980. "Kenya Fertility Survey, 1977-1978." *World Fertility Survey Programme, Nairobi, Kenya.*

Central Bureau of Statistics (CBS), Kenya, Ministry of Health (MOH), Kenya, and ORC Macro. 2004. Kenya Demographic Health Survey of 2003, Calverton, Maryland.

Central Bureau of Statistics, Ministry of Planning and National Development. 2007. "Kenya Integrated Household Budget Surveys- 2005-2006," Nairobi. Kenya.

Chuks J. 2002. "Ghana's Reproductive Revolution: Analysis of the Determinants of Fertility Transition, African, Ph.D." *Regional Institute for Population Studies, Legon, Ghana. Population Studies/Etude de la Population Africaine: Vol. 17, pp. 47-67.*

Davis K, Blake J. 1956. "Social structure and fertility, an analytic framework: Economic Development and Cultural Change.": 4:211-23.

Ekisa L.A and Hinde A.. 2005. "Fertility Transition in Kenya": A Regional Analysis of Proximate Determinants." *Applications and Policy Working Paper A06/03*. Southampton, UK: Southampton Statistical Sciences Research Institute.

Getu D. A., Alemayehu W., 2009. "Estimation of the total fertility rates and proximate determinants of fertility in North and South Gondar zones, Northwest Ethiopia: An application of the Bongaarts' model", Ethiopia J. Health Dev. 23 (1)

Kenya National Bureau of Statistics (KNBS, and ICF Macro. 2010. Kenya Demographic Health Survey 2008-09, Calverton, Maryland.

Kiersten J., Abderrahim N. and Rutstein S. O. 2011. "Changes in the Direct and Indirect Determinants of Fertility in Sub Saharan Africa." *DHS Analytical Studies No. 23.* Calverton,Maryland, USA: ICF Macro.

Madhavan Supriya 2013. "An Analysis of the Proximate Determinants of Fertility in Sub-Saharan Africa," *Johns Hopkins Bloomberg School of Public Health*, PFRH Jean-Pierre François GUENGANT, IRD Institut de Recherche pour le Development

Teklu HailemariamTeklu, Alula Sebhatu and Tesfayi Gebreselassie. 2013. "Components of Fertility Change in Ethiopia. Further analysis of the 2000, 2005 and 2011 Demographic and Health Surveys." *DHS Further Analysis Reports No.80*. Calverton, Maryland, USA: ICF International.

Kalule-Sabiti. 1984. "Bongaarts' pr oximate determinants of fertility applied to group data from the Kenya Fertility Survey 1977/78." *Journal of Biosocial Science, 16*: 205-218.

Kizito P.M.L., Obungo W., Kibet M., Njogu W. 1991. "Fertility Transition in Kenya: DHS Further Analysis Studies 11", Macro International Inc., Calverton, USA.

Lubaale Y. A., Kayizzi J. B. 2007. "Using the Bongaarts model in explaining fertility decline in urban areas of Uganda," *A paper presented during the Fifth African Population Conference, Session "Emerging issues in the Demography of East Africa".*

Mutetei Kavali. 1998. "The proximate determinants of fertility: Evidence from the 1993 Kenya Demographic and Health Survey," Unpublished MSc thesis in Population studies, University of Nairobi

Nabanita M. and Faujdar R. 2013. "Fertility among Poor: explaining the Role of Proximate Determinants of Fertility," International Institute for Population Sciences, Fertility, IIPS

Njenga J. N. 2010. "Impact of Proximate Determinants of Fertility on Change in Total Fertility Rate in Kenya between 2003 and 2008/09," Unpublished MSc Research project in Population studies, University of Nairobi

Richard P., Cincotta and Robert Engelman. 1997. Economics and Rapid Change: The influence of population growth," Population Action international.

Republic of Kenya. 2012. "Sessional Paper No. 3 of 2012 on Population Policy for National Development, Kenya Situational Analysis," National Council for Population and Development.

Republic of Kenya. 2007. "Kenya Vision 2030, the Popular Version," Nairobi: Government Printer

Rutstein S. O. and Kiersten J. 2004. "The DHS wealth index" *DHS Comparative Reports No. 6*. Calverton, Maryland, USA, ORC Macro.

Stover J. 1998. "Revising the Proximate Determinants of Fertility Framework: What Have We Learned in the Past 20 Years?" *Studies in Family Planning* 29(3): 255-267

Tanha M. and Imran A. 2011. "Analyzing Bongaarts model and its applications in the context of Bangladesh," Curtin University, Australia University of Dhaka, Bangladesh ,19th International Congress on Modelling and Simulation, Perth,

Oketch T. C., Wawire N. W. and Mburu T. K. 2011. "Contraceptive Use among Women of Reproductive Age in Kenya's City Slums," *International Journal of Business and Social Science* Vol. 2 No.1, January 2011.