The effect of Region of residence on fertility in Nigeria

By

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Declaration

I, the undersigned, _____ *(full names, please print)*, hereby declare that this research is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the Honours degree in Demography & Population Studies at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

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Abstract

Nigeria has the fifth highest Total Fertility Rate in Sub-Saharan Africa at 5.5 children born to a woman. Some demographic research has found that there is an association between region of residence and fertility in Nigeria, with the Northern regions pertaining to high fertility and the Southern regions pertaining to low fertility levels. Even so, little attention has been given to understanding the effect of region of residence on fertility. Instead, a significant amount of research has been conducted on exploring the proximate determinants of fertility in Nigeria. The objective of this study was test whether there is an association between region of residence and fertility in Nigeria. Using a sample size of 38 948 women aged 15-49 derived from the 2013 NDHS and the Poisson regression model for analysis, the study has found that region of residence has a significant effect on fertility. Moreover, the ANOVA test has shown that there is a socioeconomic disparity by region of residence in Nigeria. The Northern regions of Nigeria have shown to have higher levels of fertility as compared to the Southern regions. Therefore, while proximate determinants of fertility and socio-demographic characteristics of women are important, region of residence remains one of the fundamental determinants of fertility. Given these findings, it is recommended that government should not exhaust its resources or focus its fertility reduction policies and programmes at entire populations but target specific regions where fertility is most prevalent.

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Abbreviations

CEB: Children ever born
ANOVA: Analysis of Variance

CHAPTER 1:

1.1 Introduction

According to the United Nations (UN), fertility is defined as the average number of children ever born to a woman of reproductive age (15-49) on condition that she survives her childbearing age. Based on the UN's measurement of fertility, total fertility levels of above 5 children per woman constitute high fertility while total fertility levels of below 2.1 children per woman constitute low fertility (UN, 2013). In the sub-Saharan region, Nigeria is ranked 5th in high Fertility with a TFR of 5.5 following Guniea, Liberia, Burkina Faso and Mali (Okonofua & Binagwaho, 2014).

Even so, over the years Nigeria has achieved a marked reduction in fertility rates from a TFR of 6.6 in 1965, 6.0 in 1990, 5.7 in 2003 to a TFR of 5.5 in 2013 (Okonofua & Binagwaho, 2014). While this reduction is commendable, when using the UN's fertility measurement, Nigeria still poses as a high fertility country.

A number of studies have identified regional differentials in fertility levels across Nigeria with some regions pertaining to high fertility while others seemingly had low fertility levels. Reed and Mberu found that the North East and North West have a relatively higher TFR as compared to the southern regions because of the Muslim domination in these regions which promotes and allows for large family sizes (Reed & Mberu, 2014). A study on fertility in Nigeria found that the three southern regions, on average, had considerably lower fertility levels (4.5 children ever born) than the northern regions with an average fertility level of 6.7 (Joseph, 2006). A report by the World Economic Forum further stated that fertility was higher in the Northern regions (between 5.4 and 7.2) than in the Southern regions (between 4.2 and4.4) (World Economic Forum, 2014)

There are various factors that researchers have held responsible for the fertility levels across the different regions in Nigeria. Odimegwu pointed out that in Nigeria marriage in most communities is with the view of producing offspring. As a result, women marry early to give themselves enough time for childbearing (Odimegwu, 1998). A study on early marriage and girls' education in Nigeria indicated that particularly in the North East

and North West regions, a large number of girl children were not enrolled in school, with a large percentage of these being those who dropped out to get married (Kwarai, 2011).

While it would be expected for educated women to have lower fertility as compared to the uneducated, early research done in Eastern Nigeria observed that educated woman reproduced at a faster rate within a residual child bearing period to make up for the time they had spent on education (Ozumba, 2012). Therefore, in spite of increasing age at first marriage and encouraging education among young girls, fertility remains consistently high in Nigeria. However, not all regions are subject to high fertility. As Mberu and Reed have stated, the Northern regions experience high fertility levels compared to the Southern regions (Mberu & Reed, 2014). The aim of this study is to, therefore, establish whether region of residence has an effect on fertility in Nigeria.

1.2 PROBLEM STATEMENT

Fertility is, among others, a vital measurement of population growth and projections. Bongaarts's model of the proximate determinants of fertility has allowed governments and policy-makers to create policies aimed at reducing high fertility (Bongaarts, 1978).

Nigeria currently has the highest population (178,516,904) in Africa, persistently high fertility levels lead to rapid population growth (World Bank, 2010). Bongaarts states that rapid population growth poses serious challenges for many poor countries, especially in Africa (Bongaarts, 1978). These challenges include environmental degradation, economic stagnation and political unrests. For example, the uneven distribution of oil wealth among Nigeria's vast population has triggered ethnic conflict, undermined equitable economic growth and weakened state institutions (Ko, 2014).

Even with the challenges presented by increased fertility levels, fertility in Nigeria remains considerably high despite efforts to reduce it (Okonofua & Binagwaho, 2014). More concerning is that specific regions within the country have reflected to have a higher fertility level which, generally, inflates the country's total fertility rate. Many studies have been conducted on the proximate determinants of fertility. However, little attention is paid to the implication of region of residence on fertility.

1.3 RESEARCH QUESTION:

1. Is there a relationship between region of residence and fertility in Nigeria?

SUB QUESTION:

2. Does fertility vary by region?

1.4 OBJECTIVE

1. The principle objective is to test the association between region of residence and fertility in Nigeria.

SPECIFIC OBJECTIVE

2. To identify the regional differences in fertility across the six regions in Nigeria.

1.5 JUSTIFICATION

In Nigeria, fertility remains consistently high despite efforts to reduce it. Nigeria's first population policy aimed at reducing, among others, high fertility was devised in 1988 and revised again, in 2004 (National Population Commission, 2015). Both population policies have had limited success in reducing fertility levels in Nigeria. Fertility in the country has since 1988 to 2013 remained well above 5 children per woman (Okonofua & Binagwaho, 2014). Much demographic research has already been conducted on the proximate determinants of fertility. It is important to study the effect of region of residence on fertility in Nigeria because considerable amount of research has indicated that fertility in Nigeria varies by region (Okonofua & Binagwaho, 2014). A focus on the effect of region of residence on fertility will allow fertility reduction policies and programmes to target specific regions which have higher prevalence of fertility.

CHAPTER 2:
LITERATURE REVIEW

Global fertility rates currently stand at 2.4 children per woman whereas in the late 1960s, global fertility rates were on average 6.0 children per woman (Ramos, 2014). There has, identifiably, been a considerable shift in global fertility levels from high fertility to low fertility. Even so, over the past decades Africa has had the highest fertility rates in the World with a TFR of between 6.0 and 6.5 births per women (Ushe, et al., 2011). In 2013 West Africa was reported to having a TFR of 5.5 births per woman while Nigeria had the 5th highest TFR at 5.7 (Okonofua & Binagwaho, 2014).

Fertility studies such as the one by Okonofua & Binagwaho have pointed out that fertility varies widely by region and socio-demographic characteristics (Odimegwu, 1998) (Okonofua & Binagwaho, 2014). Region of residence in this study refers to the six geopolitical zones in Nigeria which are the North Central, North East, North West, South East, South West and South South regions. Persistently high fertility levels have led to many investigations on the proximate determinants of fertility in Africa. However, little attention has been given to the implacations of region of residence on fertility, especially in high fertility countries such as Nigeria.

Considerable amount of research has found that while region of residence is not a proximate determinant of fertility, it has an effect on the number of children given birth by a woman. For example, a study conducted in Pakistan found that fertility varied among the different geographical areas in Pakistan. Fertility was highest in the Balochistan region with a TFR of 4.72 and lowest in the North West Frontier Province (NWFP) with a TFR of 4.17 (Hakim, 1994). Although there is only a slight difference between the total fertility rates among the different regions in Pakistan, it is evident that the women in the different regions of Pakistan on average do not have the same number of children. Another study conducted in Ethiopia using the 2005 Demographic and Health Survey found that fertility varied greatly among the different regions in Ethiopia. The regions with high proportions of Muslims (Afar, Somali and Harar) had higher fertility levels as compared to the regions with high a dominance of Christians (Addis

Ababa, Amhara, Gambela etc.) (Teller and Gebresselassie 2009). Identifiably, religion has an effect on the number of children born to a woman. However, the study on Ethiopia is evidence to that women affiliated to specific religions i.e. Islam and Christianity are found in certain regions of the country. In regions where the dominant religion is Islam, fertility was found to be high because Muslims favour large family sizes as compared to regions where the dominant religion is Christianity. Research done on South Africa also found fertility to vary among the different provinces. Statistics South Africa reported that in 2007 fertility was highest in two provinces; Eastern Cape (4.1) and Limpopo (3.7) and lowest in Gauteng (2.3) (Stats SA, 2010).

The explanation given by a number of studies for the regional variations in fertility has been that women have different socio-economic and demographic characteristics and it is common for women of the same characteristics to be found in the same region. For example, in our country of interest Nigeria, Kwarai found that the majority of uneducated women where found in the Northern region (Kwarai, 2011). While Odimegwu and Zerai have indicated that early age at first marriage is a key determinat of fertility (Odimegwu & Zerai, 1996). Ozumba went on to find that it is women of specific regions, predominantly, the Northern region which are more prone to early marriage as compared to other regions (Ozumba, 2012).

After examining Bongaarts fertility framework which has identified, among others, age at first sex, contraception use and abortion as proximate determinants of fertility (Bongaarts, 1978), research has found that these characteristics of women also vary by region. In nigeria sex usually occurs in the context of marriage. However, young girls in Nigeria enter into marriage, on average, between the ages of 15-24. As a result, these adolescents become exposed to sex at an early age (Eruklar & Bello, 2007). Even so, not all regions have its teenage girls exposed to sex at an early age because not all regions have women who marry early. For example a study using the 2003 NDHS found that the median age at first sex for the North West region was 15.8 while it was 20.4 for the South East region (Eruklar & Bello, 2007).

Furthermore, while it has been found that Nigeria has one of the lowest prevalence of contraceptive use (11-13% in 2010) in the Sub-Saharan region (Monjok, et al., 2010), the prevalence is even lower in the Northern regions as compared to the Southern regions. In 2001 Akinyoade conducted a study in Nigeria which showed that on average 6.9% of women in North West Nigeria were on contraception while in the South West region the proportion of women on contraception was 16.3% (Akinyoade, 2001). From these studies, women from the Northern regions of Nigeria have shown to have different socio-economic characteristics from women in the Southern regions.

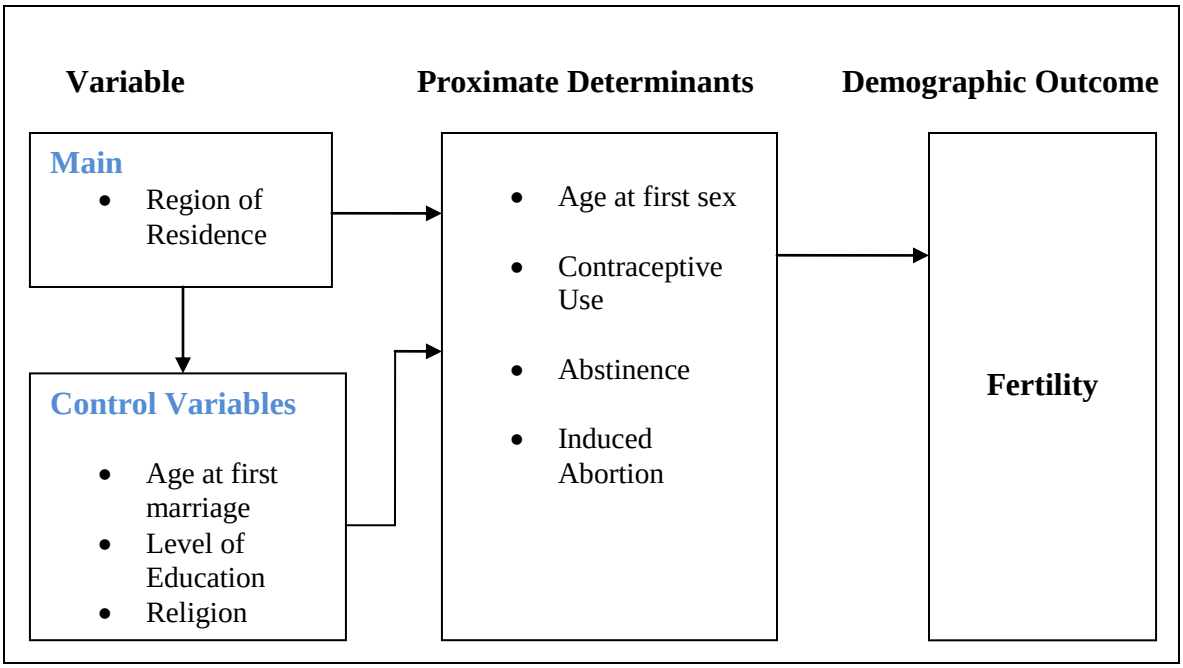
While much of the studies included in this research have shown that region is among the fundamental factors that significantly contribute to the undertsanding of variations in fertility, great emphasis has rather been put on the socio-economic and demographic characteristics of the women in the different regions of Nigeria and the effect of these characteristics on fertility. Nonetheless, the literature provided has shown that while it is the socio-economic and demographic characteristics (age at first sex, age at first marriage, education, etc,) that influence high or low fertility in Nigeria, women with similar characteristics are commonly found in the same regions. Therefore, region of residence plays a significant role in understanding fertility in Nigeria (Reed & Mberu, 2014).

2.3 CONCEPTUAL FRAMEWORK

2.3.1 Bongaarts Fertility Model

This study is based on the adaptation of Bongaarts' aggregate model of the determinants of fertility. The usefulness of this model lies in that it aims to give an understanding of variations in fertility levels between populations. The model itself is also an adaptation of Davis and Blake's (1956) fertility framework which identified three groups of intermediate variables through which any social factors influencing the fertility level must operate. These groups were namely: factors affecting exposure to intercourse, factors affecting exposure to conception and factors affecting gestation and succesful delivery. From this framework, Bongaarts merely developed a simple theoretical model of understanding variations in the level of fertility by replacing the term 'intermediate variables' with 'proximate determinants'. Bongaarts found that any variation in the fertility level across populations could be broken down into variations in the proximate determinats of, among others, age at first sex, abstinence, use of contraception and induced abortion (Bongaarts, 1978). Region of residence and other controlling variables are introduced in this framework to ultimately show how region of residence works through Bongaarts' proximate determinants to influence fertility.

Figure 1: Conceptual Framework for factors affecting fertility



Source: Adopted from Bongaarts fertility framework, Bongaarts 1978

Although Bongaarts described seven proximate determinants of fertility in his fertility framework, this study has included the four which are seen more important in the study of region and fertility in Nigeria. Literature has indicated that women who are exposed to early age at first sex are commonly found in the Northern regions, again in these regions, family planning and contraceptive use is low. Therefore, it can be said that region of residence can influence womens' age at first sex and their use use of family planning methods. (Contraceptive use, abstinence and induced abortion can be seen as familiy planning methods).

In Nigeria region of residence also affects womens' age at first marriage, level of education and religion. The literature provided in this study has indicated that the Northern regions are, predominatly, populated by Muslims. Women from these regions have early age at first marriage, low education attainment and have low contraception prevalence (Osuafor & Mturi, 2013).

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On the other hand, age at first marriage can influence age at first sex because early marriage creates early exposure to sex. A woman's level of education could limit her exposure to intercourse by increasing the age at first marriage and indirectly time of exposure to sex. Also, a woman's religious affiliation can decrease her age at first sex and use of family planning methods because not all religions support early age at first sex or the use of family planning methods.

CHAPTER 3:
METHODOLOGY

In this section the proposed methodology for the investigation of region's effect on fertility is discussed with particular focus on the research design, data source and study population. The analysis plan of examining the relationship between region of residence and fertility in Nigeria is also briefly discussed. Variable description is provided as well as the proposed management of the data.

3.1.1 Data Source

The study uses secondary survey data from the 2013 Nigeria Demographic and Health Survey (NDHS). The data was taken from the DHS website. The survey was cross-sectional because both the independent and dependent variables were collected at the same time (NDHS 2013).

3.1.2 Research Design

The sampling frame used in the NDHS was a stratified three-stage cluster sampling which consisted of 904 clusters. A breakdown shows that 372 clusters were in the urban areas and 532 in the rural areas, with a fixed sample take of 45 households per cluster. A sample of 40 680 households were included in the survey (NDHS 2013).

3.1.2 Study Population

The study population in this study is women of reproductive age (15-49). In total A national representative sample of 38 948 women aged 15-49 were observed. Of this population atleast 4 399 women had one child born.

3.2 VARIABLE DESCRIPTION

Three types of variables are used in this study, the main independent, other independent variables and the outcome variable.

3.2.1 Outcome Variable

The outcome variable is fertility. However, the number of children ever born (CEB) is used to assess fertility. This focus of this study is the number of children ever born to women aged between (15-49) given that these ages represent the reproductive age of a woman.

3.2.2 Main Independent Variable

The main independent variable is region of residence which refers to the six regions or geo-political zones in Nigeria. Namely these are: North Central, North East, North West, South East, South West and the South South regions.

3.2.3 Other Independent Variables

Other independent variables included in this study are age at first marriage, contraceptive use, level of education and religion. The inclusion of these variables is so at to identify the effect of region of residence on fertility in the presence of other variables and also see the effect of these variables on fertility.

3.3 ANALYSIS PLAN

The analysis of the relationship between region of residence and fertility among women of reproductive age (15-49) in Nigeria will be done using STATA 12. The data has been weighted to ensure that our findings are representative of the population of interest. The procedure of analysis is outlined.

3.3.1 Data Management

To ensure convenience in the analysis of the data, some variables have been recoded. The variable religion is recoded so that those that have other religions or do not know which religion they subscribe to are grouped into one category called unknown. The STATA

command used is [i.e. 1=1 “Catholic”...96/99=5 “Unknown”**]**. Age at first marriage is recoded such that the following age groups are formed 10-14, 15-19, 20-24, 25-29, 30-34, 35-39 and 40-46. The STATA command used is **[**recode v511(10/14=1 "10-14") (15/19=2 "15-19") (20/24=3 "20-24") (25/29=4 "25-29") (30/34=5 "30-34") (35/39=6 "35-39") (40/46=7 "40-46"), gen (age_at_first_marriage)**].** Other variables are kept as shown in the data but given new names.

3.2.2 Analysis Procedure

The Total Fertility Rate (TFR) is calculated as $\sum$**ASDR**, where ASDR is the number of children the average woman would bear in her lifetime if she experienced the currently observed age-specific fertility rates throughout her reproductive years.

A univariate Analysis is provided to show the percentage distribution of the variables used. A bivariate (One way ANOVA) is applied to examine the regional variations of fertility in Nigeria. The equation for this is **F=MSF/MSE** where, MSF is the mean square of factor in question (CEB) and MSE is the mean sum of errors. Model assumptions are tested using the poisgof and Estatgof tests *(see appendix table 1b and 1c).*

The statistical analysis used in this study is the Poisson regression. The equation for this is $\mathbf{Log_e(Y)=\beta_0+\beta_1X_1+\beta_2X_2}$. The Poisson regression is suitable for this study because for it to be used the outcome variable needs to be a count. The number of children ever born, in this case, is a count variable given that it is a whole number that cannot be a fraction, or a negative integer.

3.2.3 Hypothesis testing

The hypotheses that will be tested in this study are as follow:

$\mathbf{H_0}$: There is no relationship between region of residence and the number of children ever born to women of reproductive age (15-49) in Nigeria.

Ha: There is a relationship between region of residence and the number of children ever born to females of reproductive age (15-49) in Nigeria.

CHAPTER 4

4.1 DATA ANALYSIS

In this section the analysis is performed through providing outputs of the Univariate, Bivariate and Multivariate analyses performed in STATA.

4.1.1 Univariate Analysis

Table 1: Percentage distribution of children ever born

Children ever born	Frequency (N)	Percent (%)
0	11,497	29.52
1	4,399	11.29
2	4,012	10.3
3	3,838	9.85
4	3,651	9.37
5	3,169	8.14
6	2,581	6.63
7	1,988	5.1
8	1,413	3.63
9	988	2.54
10	677	1.74
11	368	0.94
12	260	0.67
13	63	0.16
14	27	0.07
15	10	0.03
16	3	0.01
17	3	0.01
18	1	0
Total	38,948	100

In 2013 Nigeria had a TFR of 5.5. On average 3,169 (8.14%) women aged 15-49 had 5 children and 2,581 (6.63%) had 6 children.

Table 2: Percentage distribution of region of residence

Region of residence	Frequency (N)	Percent (%)
North Central	6,251	16.05
North East	6,630	17.02
North West	9,673	24.84
South East	4,462	11.46
South South	6,058	15.55
South West	5,874	15.08
Total	38,948	100

The North West region has the highest population of women aged 15-49 (24.84%) and the South East region has the lowest population (11.46%).

4.1.2 Bivariate Analysis

Table 3: Analysis of Variance (ANOVA) for means of CEB

	Sum of Squares	df	Mean Square	F	Sig
Between groups	18330.53	5	3666.105	421.19	0.0000
Within Groups	338953.6	38942	8.704		
Total	357284.1	38947	9.1735		

The result of the ANOVA shows that the mean number of children ever born (CEB) differs among the different regions in Nigeria given that the level of significance is 0.000.

Table 4: Comparison of CEB by region

	North Central	North East	North West	South East	South South
North East	1.06459				
	0.000				
North West	1.42425	0.360			
	0.000	0.000			
South East	-.068123	-1.133	-1.492		
	1.000	0.000	0.000		
South South	-.130007	-1.195	-1.554	-0.062	
	0.218	0.000	0.000	1.000	
South West	-.159927	-1.225	-1.584	-0.092	-0.030
	0.043	0.000	0.000	1.000	1.000

While the ANOVA showed that the mean number of CEB differs by region, the output above shows which of the regions have different mean numbers of CEB. The regions with a level of significance of 0.000 are the regions whose mean number of CEB differs. It is evident that there are differences in fertility across the six regions in Nigeria.

Before introducing covariates, test for over dispersion was performed (*see appendix table 1a*). After overdispersion is found negative binomial regression is performed (*see appendix table 2a*)

4.1.3 Multivariate Analysis

Table 5: Unadjusted Poisson Regression

CEB	Coef.	Standard Error	z	P>z	[95% Conf.	Interval]
Region of residence						
South East (Reference)						
North Central	.10439	0.0125341	8.33	0.000	.0798236	0.128956
North East	.3611597	0.0118513	30.47	0.000	.3379316	0.384388
North West	.4606419	0.0106215	43.37	0.000	.4398241	0.48146
South South	-.0569635	0.0133616	-4.26	0.000	-.0831518	-0.03078
South West	-.0125845	0.012513	-1.01	0.315	-.0371095	0.011941

The reference category used for region of residence is the South East region.

In the unadjusted model the expected number of children ever born is 0.46 times higher among women in the North West region as compared to women in the South East region, holding other variables in the model constant. Region of residence is significant. The level of significance shows a CI [0.4398241; 0.48146] and p-value <0.05. The expected number of children ever born is 0.01 times lower among women in the South West region as compared to women in the South East region, holding other variables in the model constant. There is no significant relationship between this region and CEB. CI [-0.0371; 0.011941] and p-value> 0.05.

Table 6: Adjusted Poisson Regression

CEB	Coef.	Standard Error	z	P>z	[95% Conf.	Interval]
Region of residence						
South East (ref. category)						
North Central	-0.22667	0.0136489	-16.61	0.000	-0.253425	-0.1999222
North East	-0.19736	0.0148644	-13.28	0.000	-0.2264975	-0.1682299
North West	-0.16159	0.0142522	-11.34	0.000	-0.1895213	-0.1336536
South South	-0.12959	0.0141486	-9.16	0.000	-0.157318	-0.1018565
South West	-0.17313	0.013706	-12.63	0.000	-0.1999925	-0.146266
Age at first marriage						
10-14 (ref. category)						
20-24	-0.20821	0.006922	-30.08	0.000	-0.22178	-0.1946464
25-29	-0.31088	0.0099298	-31.31	0.000	-0.3303406	-0.2914166
30-34	-0.50857	0.0155504	-32.7	0.000	-0.5390491	-0.4780925
35-39	-0.55904	0.0280867	-19.9	0.000	-0.6140907	-0.5039927
40-44	-0.60813	0.0623812	-9.75	0.000	-0.7303922	-0.4858623
45-49	-0.63116	0.1322344	-4.77	0.000	-0.8903343	-0.3719849
Level of education						
No education (ref.category)						
Primary	-0.05542	0.008663	-6.4	0.000	-0.0723965	-0.0384381
Secondary	-0.4048	0.009832	-41.17	0.000	-0.4240685	-0.3855278
Tertiary	-0.45716	0.0159337	-28.69	0.000	-0.4883901	-0.4259311
Contraception Use						
No method (ref. category)						
Folkloric method	0.17232	0.0331496	5.2	0.000	0.1073504	0.2372944
Traditional method	0.19849	0.0150156	13.22	0.000	0.1690616	0.2279217
Modern method	0.2383	0.0104431	22.82	0.000	0.2178362	0.2587723
Religion						
Catholics (ref.category)						
Other Christians	0.01558	0.0120705	1.29	0.197	-0.0080772	0.0392385
Muslims	-0.05793	0.0134244	-4.32	0.000	-0.0842381	-0.0316156
Traditionalists	0.1353	0.0276439	4.89	0.000	0.0811222	0.1894842
Unknown	-0.05839	0.0421727	-1.38	0.166	-0.1410504	0.0242635

In the adjusted model the expected number of children ever born is 0.16 times lower among women from the North West region as compared to women from the South East region, holding other variables in the model constant. Region of residence is significant. CI [-0.1895213; -0.1336536] and the p-value < 0.05. The expected number of CEB is 0.17 times lower among women in the South West region as compared to women in South East region, holding other variables in the model constant. Region of residence is significant. Level of significance CI [-0.1999925; -0.146266] and p-value <0.05.

The expected number of CEB is 0.50 times lower for women whose age at first marriage is between 30-34 as compared to women whose age at first marriage is between 10-14, holding other variables in the model constant. There is a significant relationship between

age at first marriage and CEB. CI[-0.5390491;-0.4780925] and relationship between age at first marriage and ceb is statistically significant because the p-value <0.05.

The expected number of CEB is 0.45 times lower for women with tertiary education as compared to women with no education, holding other variables in the model constant. The relationship between level of education and CEB is statistically significant. CI [-0.4883901;-0.4259311] and p-value <0.05.

The expected number of CEB is 0.23 times higher among women who use the modern contraceptive methods as compared to women who use no method of contraception, holding other variables in the model constant. There is an association between contraception use and CEB. The level of significance CI [0.2178362; 0.2587723] and the p-value <0.05.

The expected number of CEB is 0.05 times lower among Muslim women as compared to Catholic women, holding other variables in the model constant. The relationship between religion and CEB is statistically significant. CI [-0.0842381; -0.0316156] and the p-value <0.05.

CHAPTER FIVE

This section gives an overview of the research question, objectives and hypothesis. The results will be discussed in line with the objectives of the study and the hypothesis stated will either be rejected or accepted. Recommendations for policy and programme interventions for fertility in Nigeria will be provided.

5.1 Discussion

This study has examined whether there is an association between region of residence and fertility in Nigeria. Specifically, it examined the number of children ever born to women 15-49 among the six regions in Nigeria. It aimed to achieve the objective of testing whether region of residence had an effect on number of CEB and identifying whether fertility varied by region. In order to achieve these objectives data from the 2013 NDHS was analysed. While the main independent variable was region of residence, other controlling variables; age at first marriage, level of education, contraceptive use and religion were used to predict fertility outcomes among women in Nigeria.

The results from the unadjusted Poisson model have shown that region of residence has a strong association with the number of children born to women 15-49 in Nigeria. The level of significance was <0.05. In the adjusted model, the level of significance for region of residence and CEB was, again, <0.05. This shows that region of residence is statistically significant and, thus, associated with the number of children born to women (15-49) in Nigeria. The principle objective of testing the association between region of residence and fertility has been achieved.

The Univariate analysis showed that North West region has the highest population of women aged 15-49 (24.84%) and the South East region has the lowest population (11.46%). In the unadjusted model the expected number of CEB was 0.46 times higher for women in the North West region compared to women in the South East region. The large number of women in the North West region could be responsible for inflating

fertility in the region. The South East region could be showing to have lower fertility levels because of their relatively small population.

The study also wanted to explore variations in fertility among the different regions in Nigeria. Results from the ANOVA test have shown that the mean number of children ever born to women (15-49) varies widely by region. Larger variations were found among the Northern and Southern regions. The objective of identifying the regional variations in fertility across the six regions in Nigeria was also achieved.

The literature in this study has indicated that while region of residence may have an effect on fertility, it is primarily the socio-economic and demographic characteristics of women in the described regions that either propelled high or low fertility. Odimegwu and Zerai have indicated that early age at first marriage had an effect on fertility (Odimegwu & Zerai, 1996). This study has also found that early age at first marriage has a significant association with fertility. It found that the expected number of CEB was 0.5 times lower for women whose age at first marriage was between 30-34 as compared to women whose age at first marriage is between 10-14. As Eruklar and Bello earlier noted, because young girls in Nigeria enter into marriage at an early age, they become exposed to sex at an early age (Eruklar & Bello, 2007). This holds as reason to why age at first sex is a proximate determinant of fertility in Bongaarts fertility framework. Moreover, Ozumba found that women in the Northern region which were more prone to early marriage as compared to other regions (Ozumba, 2012). The high fertility observed in the Northern regions could be a consequence of early age at first marriage/sex.

Education has been found to have an effect on fertility (Kwarai, 2011). This study has also found that the relationship between level of education and CEB to be statistically significant because the p-value <0.05. The expected number of CEB is 0.45 times lower for women with tertiary education as compared to women with no education. Women with tertiary education, identifiably, spend more time pursuing their education and thus delay their age at first marriage. Moreover, women with tertiary education are better able to make responsible reproductive choices than women with no education.

Kwarai has indicated that in Nigeria the majority of uneducated women are found in the Northern regions (Kwarai, 2011). The high fertility observed in the Northern regions could be because most women remain uneducated.

As research has shown, use of contraception has a strong association with CEB. However, while one of the reviewed studies has shown that the North West region has a lower prevalence of contraceptive use (6.9%) as compared to the South West region (16.3%) (Akinyoade, 2001), This study has found that the expected number of CEB was 0.23 times higher among women who use modern contraceptive methods as compared to women who use no method of contraception. The use of modern contraceptive can at times be expensive. Often it is women who are educated and employed who can afford them. However, research has found that educated women at times have children at a faster rate to make up for the time they had spent on their education or careers. Therefore, even amongst educated women who can afford and use contraception, fertility will remain high.

A significant relationship has been found between religion and number of CEB. However, this study unlike the reviewed studies has found that in Nigeria the expected number of CEB was 0.05 lower among Muslim women as compared to Catholic women. Even so, fertility among Muslim women is less than fertility among Catholic women by only a small percentage 05%. It has been said that the regions with high proportions of Muslims often have higher fertility levels as compared to the regions with high a dominance of Christians, (Teller and Gebresselassie 2009). However, the lower fertility levels observed among Muslims in Nigeria could be because of the coming of the Boko Harem terrorist groups which could have disrupted the normal fertility patterns in North Nigeria where Muslims are predominantly found. Most of the findings in my research are similar to the reviewed literature in this study. This research has found that region of residence has an effect on fertility in Nigeria.

5.2 Limitations

A major limitation of the study emanates from the method of data collection employed. Our analysis was based on secondary quantitative data from the Demographic Health Survey (DHS). Quantitative data alone is limiting because perceptions on the effect of region of residence on fertility cannot be gathered. Moreover, the analysis was based on data from the 2013 NDHS. The relevance of our findings could have changed over time.

5.3 Conclusion

This study has found that there exists a relationship between region of residence and fertility in Nigeria. The null hypothesis stating that there is no relationship between region of residence and fertility is, thus, rejected. Moreover, the study found that of the six regions in Nigeria fertility is highest in the North West region and lowest in the South East region. However, region of residence alone cannot be used to explain the prevalence of high fertility in the North West region and the low fertility in the South East region. Socio-demographic characteristics such as age at first marriage, level of education contraceptive use and religion have proved to influence fertility patterns in these regions. While these characteristics are important, the importance of region of residence should not be overlooked because sufficient research has shown that these socio-demographic characteristics vary by a woman's region of residence.

5.4 Recommendations

On the basis of these findings, family planning campaigns and programmes should be targeted at the Northern regions of Nigeria as these regions reflected high fertility levels than the Southern regions. The strategic approach family planning policies and campaigns should take is to encourage late marriages as the study has shown that the expected number of CEB was 0.5 times lower for women whose age at first marriage is between 30-34 as compared to women whose age at first marriage is between 10-14.

Government should look into creating incentives for young women to stay in school i.e. subsidy on tertiary education fees, creating employment opportunities etc., specifically for women in the Northern regions, because the study has found that the expected number of CEB was 0.45 times lower for women with tertiary education as compared to women with no education. Finally, policy makers should promote and emphasis the benefits of using contraception among prominent religious groups such as the Catholics and Muslims. Moreover, these family planning programmes should also target specific regions where there is high prevalence of fertility rather than wasting money on nationwide campaigns that are of little benefit to regions with already low fertility levels.

5.5 Dissemination of findings

This study has shown that region of residence has an effect on fertility in Nigeria. The findings of this study can form part of other studies on fertility in Nigeria that can be used to aid government policies on the reduction of fertility in Nigeria. To ensure this is achieved, I aim to disseminate these findings at population conferences and conduct a similar study for my Masters thesis which I also hope to publish.

APPENDIX

Model Diagnostics

The Poisson model is not fit on data that is over dispersed (highly skewed data). A test for over dispersion is carried out to check the whether the model is fit for the data.

Table 1a: Test for Overdispersion

Observations	Mean	Standard Dev.	Variance	Skewness
38948	3.065267	3.028795	9.173597	0.8695354

Outputs from the test for over dispersion showed that the mean number of CEB is 3.065267 and the Variance is 9.173597. Given that the mean and variance are not equal. The data was found to be over dispersed.

Covariates were introduced to the model to test for Goodness Fit using poisgof and estatgof commands.

1.1. Test for Goodness of Fit for Poisson regression model.

Table 1b: Poisgof test

Deviance goodness-of-fit	=	59320.62
Prob > chi2(29106)	=	0.0000
Pearson goodness-of-fit	=	53482.18
Prob > chi2(29106)	=	0.0000

Table 1c: Estat test

Deviance goodness-of-fit	=	59320.62
Prob > chi2(29106)	=	0.0000
Pearson goodness-of-fit	=	53482.18
Prob > chi2(29106)	=	0.0000

The gof of both tests are <0.05. They are significant, showing that the model is inappropriate. However, a negative binomial regression is performed as it is more suitable for dispersed data.

Table 2a: Results from Negative Binomial Regression

Likelihood ratio	Test	of	alpha=0:	chibar2(01)	=	6913.2	Prob>=chibar2	=	0.0000

The likelihood test ratio in the binomial regression produced an Alpha of 0. When Alpha is 0 the binomial distribution is the same as the Poisson distribution. The p-value is also <0.05.

Works Cited

Akinyoade, A. A., 2001. Comparative Analysis of Contraceptive Use in North and South West Nigeria. *IFE PsychologIA,* 9(1), pp. 148-172.

Bongaarts, J., 1978. A Framework for Analyzing the Proximate Determinants of Fertility. *Population and Developmenty Review,* 4(1), pp. 105-132.

Bongaarts, J., 2002. *The End of the Fertility Transition in the developing world.* New York: Population Council.

Eruklar, A. S. & Bello, M., 2007. *The Experience of Married Adolescent Girls in Northern Nigeria,* Abuja: Population Council.

Hakim, A., 1994. Factors Affecting Fertility in Pakistan. *The Pakistan Development Review,* 33(4), pp. 685-709.

Joseph, S., 2006. *Encyclopedia of Women & Islamic Cultures.* Leiden: Koninkljke Brill NV.

Ko, V., 2014. *Nigeria's Resource Curse: Oil as an Impediment to True Federalism,* s.l.: E-International Relations Students.

Kwarai, M., 2011. *Insights into Early Marriage and Girls' Education in Northern Nigeria,* Lagos: Action Health Incorporated.

Mberu, B. U. & Reed, H. E., 2014. Understanding Sub-group Fertility in Nigeria. *Population Review,* 53(2), pp. 23-46.

McDonald, P., 2008. Very Low fertility consequences, causes and policy approaches. *The Japanese Journal of Population,* 6(1), pp. 19-23.

Monjok, E., Smesny, A., Ekabua, J. E. & Essien, J. E., 2010. Contraceptive Prevalence in Nigeria: Literature Review and recommendation for future policy decisions. *Open Access Journal of Contraception,* Volume 1, pp. 9-22.

NDHS, 2013. *Nigeria Demographic and Health Survey: Preliminary Report,* Abuja: National Population Commission.

Odimegwu, C., 1998. Application of Demographic estimation models to a Nigerian Ethnic group: implications for population growth and family planning programmes. *Development and Society,* 27(2).

Odimegwu, C. & Zerai , A., 1996. Understanding the Proximate Determinants of Fertility of a Nigerian ethnic group. *Genus,* 52(3), pp. 67-86.

Okonofua, F. & Binagwaho, A., 2014. Current and Predicted Fertility using Poisson Regression Model: Evidence from 2008 Nigerian Demographic and Helath Survey. *African Journal of Reproductive Health,* 8(1), pp. 72-100.

Osuafor, G. N. & Mturi, A. J., 2013. Do Regious beliefs influence Use of Contraception among currently married women in nigeria. *Journal of Social Development in Africa,* 28(1).

Ozumba, C. O., 2012. *Early marriage and Fertility Outcomes in South East Nigeria,* Johannesburg: University of the Witwatersrand.

Ramos, J., 2014. Nativity: Emodiment of Future and Faith. In: *The Other Journal: Body.* Eugene: Wipf and Stock Publishers, pp. 112-144.

Reed, H. B. & Mberu, B. U., 2014. Capitalizing on Nigeria's demographic dividend: reaping the benefits and diminishing the burdens. *African Population Studies,* 27(2), pp. 319-330.

Stats SA., 2010. Estimation of Fertility from the 2007 Community Survey of South Africa, Pretoria: Statistics South Africa.

UN, 2013. *United Nations Department of Economic and Social Affairs.* [Online]
Available at: http://esa.un.org/wpp/documentation/glossary.htm
[Accessed 7 May 2015].
UN, 2013. *World Fertility Report 2013: Fertility at the Extreames,* New York: United Nations.
UNFPA, 2004. *UNFPA Population Council.* [Online]
Available at: http://nigeria.unfpa.org/nigeirachild.html
[Accessed 06 June 2015].
Ushe, M. A., Ogaboh, A. A. M., Olumodeji, E. O. & Attah, F., 2011. Socio-cultural and economic determinants of fertility, differentials in rural and urban Cross River State, Nigeria. *Journal of Geography and Regional Planning,* 4(7), pp. 383-391.
World Bank, 2010. Determinants and consequences of high fertility: A synopsis of the evidence, Washington: World Bank.
World Economic Forum, 2014. Prospects of Reaping the Economic Dividend in Nigeria, Geneva: World Economic Forum.