THE DETERMINANTS OF UNDERAGE MARRIAGE IN NIGERIA

Eyesan Oyomi Joy

(300091869)

Major Paper presented to the

Department of Economics of the University of Ottawa

in partial fulfillment of the requirements of the M.A. Degree

Supervisor: Professor Gamal Atallah

ECO 6999

Ottawa, Ontario

April 2020

ABSTRACT

This paper studies the structural/demographic determinants of early marriage in Nigeria. In order to achieve the Sustainable Development Goal of "eliminated child marriage by year 2030", governments will require thorough scientific data on the prevalence of child marriage in their countries and its structural determinants, to inform meaningful investment in program and policy responses. This study uses the Demographic and Health Survey (DHS) 2018 data to determine the determinants of early child marriage in Nigeria. Using the logistic estimation technique, we find that links between community-level variables and early marriage formation show that neighborhood effects are very important. The results further confirm that region and place of residence, educational attainment and number of siblings play an important role in the demand for child brides. In addition, the major ethnicities in the Northern region have a higher prevalence of child brides than other ethnicities in Nigeria.

ACKNOWLEDGEMENTS

I would like to express my appreciation to Professor Gamal Atallah and Professor Yazid Dissou for their supervision and help during the research process.

TABLE OF CONTENTS

1. Introduction 4
2. History Of Child Marriage In Nigeria 7
3. Literature Review 7
   3.1 Asia 8
   3.2 Africa 11
4. Model And Methodology 13
5. Data Description 14
   5.1. Data 14
6. Estimation Results 19
   6.1. Logistic Regression Model 19
   6.2. Multicollinearity Test 21
   6.3. Robustness Check 21
   6.4. Sensitivity Analysis 22
      6.4.1. Urban Versus Rural 22
      6.4.2. North Versus South 22
      6.4.3. Ethnic Diversity 22
7. Conclusion 23

References 25

Appendix 28

1. Introduction

The World Health Organization in their publication on "Child marriage- a threat to health" identified that data from 2000–2009 indicate that 19% of women aged 20–24 years throughout the European region were in a union or marriage before the age of 18 (WHO, 2012). Child marriage is defined as when a boy or girl gets married before the age of 18. According to UNICEF, over 44% of girls in Nigeria are married before the age of 18 and 18% are married before the age of 15 (Child Not Brides, 2017). This makes Nigeria the third country with the highest absolute number of child brides in the world at 3.5 million.

There is a wide array of literature available analyzing the determinants of child marriage across different continents. The majority of this literature focuses on Asia and Africa as continents which have a higher prevalence of child marriage. Researchers have also identified several negative economic impacts of child marriages on a country. These include high under-five mortality rates due to lack of appropriate nutrition, high population growth rate and the most common one which is low educational attainment for child brides. Wodon et al. (2016) suggest five domains that child marriage has an impact on- fertility, educational attainment, health, labour force participation and decision making.

Child marriage is an important health and children's rights concern in many low and middle-income countries (Rumble et al., 2018). Child marriage disproportionately affects girls and has an impact on their mental and physical health for the rest of their lives. Child brides are not only denied the right to choose their own partner, they are disregarded and subject to various religious, societal, political and cultural practices that fail to respect their basic human rights (WHO, 2012). Nigeria, with a population of over 190 million people is a very culturally diverse country. However, its annual gross domestic product growth rate has averaged only 2% from 2014-2018.

The slow GDP growth is due to the recession after the global decline in oil prices in 2015. With a struggling macroeconomy, children in Nigeria face a number of serious challenges. Some studies claim that over 75% of children in Nigeria live below the poverty line. Under-five mortality is improving gradually and is currently at 100 deaths per 1000 live births in 2018 compared to 263 per 1000 live births in 1969 (Hug et al., 2018). Stunting amongst children below five years remains high, at roughly 37% (Nshimyiryo, 2019). In 2017, maternal mortality averaged 917 deaths per 100,000 live births and is on the rise.

Additionally, a joint publication with Child not brides and UNICEF stated that early marriage intensifies young girls and women's exposure to unprotected sex which then limits their exposure to HIV prevention methods. 1.5% of adults between ages 15-49 are living with HIV in Nigeria (Oginni et al., 2017). An absolute number of 1.8 million, 55.56% of HIV infected people are women (Oginni et al., 2017). In order to achieve the Sustainable Development Goal of eliminating child marriage by 2030, governments will require thorough scientific data on the prevalence of child marriage in their countries and its structural determinants, to inform meaningful investment in program and policy responses (Rumble, et al., 2018).

Child marriage in Nigeria has been a persistent issue over the years as one in five girls get married before 18 while one in thirty boys gets married before 18 (Wylie, 2019). Developmental finance institutions like the United Nations and the World bank have carried out several projects to eradicate child bride marriages in African countries. The child not bride initiative founded in 2011 has partnered with over 1300 civil societies which are committed to ending child marriage. The World Bank forecasts that in 2030, child marriage will cost developing countries trillions of dollars (Fore et al., 2018). In Nigeria specifically, child brides on average earn 9% less than women

who get married later, costing Nigeria 7.6 billion dollars in earnings and productivity annually (Fore et al., 2018).

There are few reliable surveys that provide information on the possible determinants of early marriage in Nigeria. However, the Demographic and Health Survey (DHS) in partnership with the Population Council is bridging this gap in the literature. Additionally, the DHS data has nationally representative data which is important when analyzing the determinants of early marriage in any country. Nationally representative data makes it easy to understand which exact region of the country has the highest rate of child marriage and further enables policy makers to come up with policies to curb this issue. This paper will fill the gap in the literature by focusing on the structural/demographic determinants of early child marriage in Nigeria by using nationally representative data from the DHS. Previous literature on early marriage focuses on the Northern states in Nigeria but this paper will place emphasis on the country as a whole as well as narrowing down the ethnicities that select into early marriage in Nigeria.

In a nutshell, studies show how important it is to eradicate early marriage. In this study, I analyse early marriage using nationally representative data from DHS and discover that girls who live in the Northern region of Nigeria have a higher probability of getting married before 18 in comparison to girls who live in the South. Additionally, girls that come from ethnicities that dominate the North have a higher probability of getting married before 18.

The rest of the paper is organized as follows: Section 2 gives a brief history of the child marriage laws in Nigeria, Section 3 provides a literature review of evidence focusing on Asia and Africa, Section 4 describes in details the data from the DHS, Section 5 covers the model and methodology. In section 6, I explain the estimation results and finally in section 7, I explain my main findings and conclusion.

2. History of Child Marriage in Nigeria

In Nigeria, according to the *Marriage Act* of 1990, the minimum legal age for marriage is 21 for boys and girls (*Land Use Act*, 1990). However, the *Child Rights Act* of 2003 set the legal minimum age at 18 which causes a contradiction (Braimah, 2014). The *Child Rights Act* has not been passed out in 12 states in Nigeria (Child Not Brides, 2017). These states follow the Islamic law and girls can get married as low as age 12 (Braimah, 2014).

Additionally, researchers identified major causes of child marriage to be family honor and conflict. Many Nigerian families closely guard their daughters' sexuality and virginity in order to defend the family honour. So, in order to not bring dishonor upon their family, families marry off their girls early to avoid pregnancy outside wedlock. The United Nations in September 2015 committed to eliminate all practices causing specific harm to women and girls, including child marriage through the UN Sustainable Development Goals- goal 5, target 5.3.

The Human Rights Watch report shows that girls from the poorest 20% of families are twice as likely to marry before 18 as girls whose families are among the richest 20% (Khalife, 2011). In line with the SDGs the government of Nigeria has launched several incentives to eliminate child marriage in the country like the *African Union Campaign to End Child Marriage in Africa* and the *African Charter on the Rights and Welfare of the Child*. However, implementation of these policies has been minimal or almost non-existent.

3. Literature Review

This section covers the existing literature on the determinants of early marriage. I start by considering the evidence from Asia then Africa.

3.1 Asia

Sah (2008) conducts a unique study on the determinants of early marriage in Terai of Nepal. He also mentions several gaps in the literature especially in data collection. The author identifies that demographic surveys should retrieve data at the time of marriage and during the survey in order to provide a more comprehensive analysis on the regional differences in the age of marriage for girls. Using data from the Nepal Adolescent and Yong Adult 1999 survey, Sah shows that age at first menarche, dowry, cost of marriage and cross-border migration are very important determinants in early child marriage for girls in Terai.

Roy (2008) uses a multivariate logistic regression model to identify the determinants of early child marriage in Bangladesh focusing on the Rajshashi district. The Rajshashi district is charactersied as a major urban and educational center in Bangladesh. Roy presents over 600 ever married women and discovers that 90% of marriages occur before age 18. He also shows that the mean age of marriage is as low as 15. The author recommends that issuing of birth certificates should be a legal requirement for marriages as most people in the Rajshashi district do not have a birth certificate. I believe this is a good step in curbing early child marriage legally.

With over 45% of girls getting married before age 18 in India, nearly 80% of them also face domestic violence in their homes. Lal (2013) studies child marriage in India, its factors and problems. He states that early brides often show signs of post-traumatic stress disorder, sexual and domestic abuse 2-5 years into the marriage. He focuses mainly on the mental effects of early marriage which is important because globally, people are becoming informed about the causes and long-term effect of mental illness. The main factors he points out as determinants of early marriage are: parents do not want to spend money on female education, parents want to reduce the cost of

financing marriages for their children and parents want to reduce each child's share in their ancestor properties.[1]

Bhanji and Punjani (2014) reveal the determinants of early marriage in young women in Pakistan. Integrated levels of kinship, poverty, notions of morality-honour and education status of women are the main causes of early marriage of young girls. According to them, 30% of marriages in Pakistan are child marriages. In addition, the *Child Marriage Act* of 1929 which has been implemented punishes lawbreakers with three months imprisonment and a penalty of Rs1,000 (8.50 CAD). They concluded that poor implementation and the relatively mild nature of the punishment has caused the failure of this law.

The causes of early marriage are complex, interrelated and dependent on individual circumstances and context. Nuruzzaman (2014) identify education level and monthly income as the main determinants of child marriage in Northern Bangladesh. They also found that 90% of early marriages occur before age 20 in Northern Bangladesh and most of the child brides have children before being physically fit to care for a child. The authors focused on structural variables like education, household income, educational status of parents, educational status of her husband, place of residence, monthly income and expenditure and access to mass media.

Kamal et al. (2014) study the trends and determinants of early child marriage in Bangladesh for women aged 20-49 over a period 19 years. They discovered that in 1994, the prevalence of child marriage was as high as 85%. In comparison, in 2011, this figure had dropped by 10 percentage points to 75%. Although this shows an improvement, this improvement is slow paced. No formal education or little education of husbands of child brides was the most important determinant of

[1] When a woman marries early in India, she can no longer lay claim to her father's property.

early child marriage in Bangladesh. The authors also state that enforcement of the legal minimum age at first marriage is critical in reducing the prevalance of child marriage.

Montazeri et al. (2016) conducted a qualitative study of early child marriage in Iran and discovered the determinants of child marriage to be family structure, low autonomy in decision-making, and response to social, emotional, and sexual needs. The authors also noted that early marriage is a multifactorial problem and in order to tackle the impact of early marriages, extensive research is needed to address young people's perceptions in diverse cultural contexts.

The effect of child marriage on child brides encompasses all aspects of life- social, mental, economic and health. Unwanted pregnancy, peer influence, knowledge of reproductive health and culture were the determinants that stood out in this study by Besral (2018) concerning Indonesia. He mentions that Indonesia ranks second amongst the ASEAN countries and 37th in the world in regards to early child marriage. The author uses a systematic review[2] for his study and concludes that reviewing the marriage law in Indonesia is critical in eliminating early child marriage.

Seth et al. (2018) study the social determinants of child marriage in rural India and mention that the patriarchal system prevents women from attaining an education, earning a livelihood, and becoming respected citizens. The article examines two case studies in rural India, the first one is a 14-year-old child bride who was forced to get married at age 13 due to her mother's illness. The interview with the teenager revealed that early child marriage is the norm in rural India, and girls who do not get married between ages 15-16 are prone to gender based violence or are accused of having a disability or illicit affairs. They also showed through the second case study that victims of early marriage are susceptible to maternal mortality. The second case study reveals that she got

[2] A systematic review involves using articles from different sources like Google Scholar and Scopus. The author focused on the type of study conducted, sample size, location and result.

married at age 15 and had 8 successive miscarriages so all attempts to have a child failed and her husband left her.

Rumble et al. (2018) conducted an empirical exploration of female child marriage determinants in Indonesia. Indonesia contributes significantly to the regional and global burden of child marriage. The authors also emphasize that the Indonesian government and other actors, including religious and traditional leaders, could introduce public awareness campaigns and organize community engagement to broadcast messages about children's rights, gender inequality and the harms of child marriage.

3.2 Africa

Malhotra (2010) in his study identifies the main determinants of early marriage as religion, poverty, lack of education and economic conditions in Ethiopia. He further proposes some solutions to early marriage- raising awareness to eradicate forced child marriage, providing girls with life skills such as numeracy and literacy in order to express their needs and interests to leaders. He then emphasises that ending child marriage will not only yield a double dividend but can also break the intergenerational cycle of poverty.

Adebowale et al. (2013) study early marriage in Malawi. Using a cox proportional hazard model, they discovered that early marriage can lead to high fertility in women, maternal deaths and low socioeconomic advancement. The uniqueness of this paper is the use of a cox proportional hazard model[3] which was used to identify the hazard of early marriages in different regions in Malawi. This model showed that the hazard of early marriage was low in central Malawi but high in the Northern region. However, in the South, early marriage was higher amongst males than in

[3] Cox regression (or proportional hazards regression) is a method for investigating the effect of several variables upon the time a specified event takes to happen.

the North. They also show that the prevalence of early marriage was approximately 60% in women and 14% in men. The difference in percentages is disturbing and requires urgent attention.

According to the Population Council, in Ethiopia, 50% of girls get married before age 15. Workineh et al. (2015) focus on Northwest Ethiopia as a case study for the determinants of early marriage. The authors show that the odds of early marriage in Northwest Ethiopia were 95% higher in rural than urban areas. They also show that monthly income was an important determinant of early marriage in Ethiopia. Additionally, the legal marriage age was unknown to many individuals who took the survey. In conclusion, those who did not know the legal marriage age were 12 times more likely to practice early marriage than those who were aware of it.

In Nigeria, there are few studies on the prevalence of child marriage. Envuladu et al. (2016) use the Plateau state as a case study, using indicators like level of education of parents, place of residence, religion, father's employment and number of siblings. The authors conduct a primary research by distributing questionnaires to school girls. 46% of the girls identify that they were forced by their parents to get married before 18. This is the case for most girls that get married before age 18. Most girls forced into early marriage end up having to care for children when they are still growing. This can lead to a negative ripple effect on mother and child.

Age at first sexual intercourse has been revealed as one of the determinants of early marriage in the Democratic Republic of Congo (DRC). Mpilambo et al. (2017) use a multivariate analysis and discover that girls who had their first sexual intercourse before age 16 are about 73 times more likely to get married before age 18. The DRC has a high prevalence of early child marriage at 74% even though it is illegal to marry a child below age 18. The authors emphasise that adoption of formal sex education at an early age is important to curb early marriage in DRC. This paper is distinctive because most literature on child marriage does not focus on the age of first intercourse.

However, using that variable is not without problems because of correlation between age at first intercourse and age at first cohabitation.

Another gap in the literature is that most articles on the effects and determinants of early marriage focus on Asia. According to Avogo and Somefun (2019), the incidence of child marriage in West Africa is one of the highest in the world, thus researchers need to do more work on this topic. Avogo and Somefun examine the timing of marriage formation and childbearing across these West African countries- Nigeria, Burkina Faso and Niger. Niger has 60% of early marriage occurrence, followed by Nigeria with 28% and Burkina Faso with 25%. They mention that individual characteristics- women's education, place of residence, economic status and public indicators are strong determinants of early marriage and child bearing.

Most of the literature on early child marriage identifies similar determinants of early marriages. My paper will focus on the structural/demographic determinants of early marriage in Nigeria using a multivariate logistic regression modelling. In Nigeria, most studies on early child marriage focus on the Northern states and little nationally representative analysis is available.

4. Model and Methodology

For this analysis, I will be using a multivariate logistic regression model. I choose the logistic regression model because the dependent variable is dichotomous.

The outcome in a logistic regression model is either 0 or 1, 1 indicates that the outcome is present and 0 otherwise. Let us define p as the probability that the outcome is 1. The multivariate logistic model can be written as follows:

$$\hat{p} = \frac{exp\left(b_0 + b_1x_1 + b_2x_2 + \cdots . + b_px_p\right)}{1 + exp\left(b_0 + b_1x_1 + b_2x_2 + \cdots . + b_px_p\right)}$$

where:

$\hat{p}$: $expected\ probability\ that\ the\ outcome\ which\ is\ early\ marriage\ occurs\ is\ present.$

x_1: $the\ covariates/independent\ variables.$

b_0: $constant/\ intercept\ term.$

b_1: $the\ coefficient\ of\ the\ covariates/independent\ variable.$

Using a logistic model, the following equation will be estimated:

$$y_i = \beta_0 + \beta_1 E_i + \beta_2 X_i + \mathcal{E}_i$$

where y_i is underage girl (equal 1 if the woman was under 18 at marriage, and 0 otherwise), E_i is a vector which includes the following controls: educational attainment of husband/partner, female's educational attainment and number of siblings, X_i is a vector which includes the following controls: dummy variables indicating her place and region of residence, dummy variable indicating her religious affiliation and dummy variable for her husband's occupation. I also conduct a sensitivity analysis in order to deal with the potential clustering of observations at the neighborhood level.

5. Data Description

5.1. Data

In this section, I discuss the survey dataset that I will use which is the DHS individual recode in year 2018. The DHS is a nationally representative survey which is important for making individual and cross-country assessments. The surveys are not carried out yearly unlike most data collection surveys. The DHS gathers data through questionnaires, biomarker testing[4] and

[4] Biomarker testing data collection is usually gathered for height and weight indicators like sexually transmitted infections, sexually transmitted diseases, nutritional status of women and children and so on.

geographic location. For this research, I focus on the questionnaire type of data collection. According to DHS, the sample size for these surveys ranges between 5,000 to 30,000, however, for this paper the sample size was 41,821 from ages 15-49. The survey was conducted in 2018 and was done in two stages.

The first stage of the survey involved a stratified sampling technique where the data collectors select different clusters as the principal sampling unit. Thereafter, the second stage of data collection involved an orderly sampling of individuals within each cluster. According to Avogo and Somefun (2019), in order to reduce the bias that arises from older women reporting the events of early marriage later than when they actually happened, it is better to use younger women to analyse the effect of early marriage.

When analyzing the determinants of early child marriage, there is always a shortcoming in reliable data collection in regards to the sample size, the regions represented and so on. However, the DHS bridges this barrier by covering over 40,000 people from different regions in the country.

According to past literature, women's educational attainment is an important predictor of child marriage. In the DHS data description, the median number of years for education of women completed is 6.5 years compared to 10.8 years for men. In addition, only about 53.1% of women are literate, this indicates that policies to increase female education are needed. For empirical analysis, the individual recode dataset has been used in which information is given regarding individuals' demographic, social and economic situations. The recode is grouped into females and males. In the female individual recode, 112 women were married before age 12 while in the male individual recode only 1 male was married before age 12.

Dependent variable

The dependent variable used for this study is a dummy variable which is equal to 1 if a girl got married before she reached the age of 18 and 0 otherwise. According to the global definition of early marriage, any child who gets married below the age of 18 is considered a child bride, however, the *Child Rights Act* laws in different countries vary[5]. The DHS questionnaire asked the interviewees questions like "are you currently married or living together with a man as if married?", "have you ever been married or lived together with a man as if married?", etc. Further questions were asked to verify the authenticity of their marital status, for example do the participants have a valid marriage certificate or if the marriage was registered legally. The frequencies for the dependent variable are presented in Table 1 (all tables and figures are in the Appendix). We can see that approximately 44% of the respondents were married before age 18. This shows that the prevalence of child marriage in Nigeria is very high.

Covariates/ Independent variables

The covariates represent the characteristics of the participants in the survey which are part of the main focus of this study. This paper wants to discover the main demographic determinants of child marriage in Nigeria, so it uses covariates like the educational attainment of the husband/partner, place of residence (urban or rural), region of residence, religious affiliation, educational attainment, number of siblings in childhood household, occupation of the partner and ethnic diversity. It is important to note that some of these variables are fixed or time-invariant, meanwhile the dependent variable is time variant. However, we conclude based on past literature

[5] The *Child Rights Act* law in Nigeria sets age 18 as the legal age for anyone to get married. However, as mentioned earlier, this law has not been passed in 12 states in Nigeria, 11 of which are Northern.

that these covariates are not likely to be influenced by changes affecting teenagers (Winfred et al., 2019). The frequencies of these variables will be presented in Tables 2-9.

According to Table 2, the majority of the respondents either marry men who have no education or complete secondary education[6]. Dessy et al. (2017) conclude that in Nigeria, a casual and negative relationship exists between male's education and the probability of marrying an underage girl. Jones et al. (2014) study early child marriage and education in Ethiopia. The authors conclude that girls aspire to marry an educated man which also indicates the importance of male's education as a determinant of early child marriage.

Table 3 shows that about 10% of women in the survey have higher education compared to approximately 16% of men. Approximately 29% of men complete high school compared to 23% for women. The similarity between men and women in this dataset is that the majority of respondents either have no education or have a complete secondary education. Avogo and Somefun (2019) show that the educational attainment of a girl decreases the risk of early marriage and child bearing.

According to Tables 4 and 5 we can see that most of the respondents live in rural areas in the North. 25,540 amongst the respondents reside in the North while 16,281 reside in the South. In past studies on the determinants of early marriage, researchers grouped the region of residence into North and South. I decided to use a dummy variable for each region in order to identify which specific region has the most prevalence of early marriage in Nigeria. In a study by Alhassan (2013) in Northern Ghana, he concluded that families that reside in rural areas use early marriage as a "family survival strategy". In this paper, I control for place of residence and use urban as a baseline group.

[6] Complete secondary education is equivalent to complete high school education in Canada.

In Table 6, approximately 40% of the respondents' partners engage in farming as a source of livelihood. According to Tall et al. (2018), agriculture is the largest sector of the Nigerian economy, employing more than two-thirds of the entire population. The Northern region of Nigeria cultivates crops like cassava, rice etc.

From Table 7, 50% of the respondents are Muslims which is similar to a study by Lugo et al. (2013) which shows that 50% of the Nigerian population practice Islam while 40-45% practice Christianity. Religious bodies have been described as a "key enforcer which has the potential to bring changes to normal social norms" (Jones et al., 2014:VI)[7]. According to Jones (2014), the churches and mosques discourage marriage before 18, however, Dessy et al. (2017) show that the probability of marrying an underage bride is higher if you are a Muslim in Nigeria.

According to Table 8, 56% of the respondents have between 0-5 siblings. Peterman et al. (2015) used dummy variables if the number of siblings was above 5 (mean number of siblings) and discovered a negative but significant relationship between the number of siblings and the probability of getting married before 18. The authors further suggested that the total number of siblings should be used instead of dummy variables. So for my research, I will be using the total number of siblings.

The ethnic diversity data will be used to carry out a sensitivity analysis on how being from either a major or minor ethnic group impacts early marriage in Nigeria. Table 9 shows the different ethnic groups identified in the survey with the Hausa ethnic group having the most respondents. This is expected as most of the respondents live in the North and the dominant ethnicity in the North is Hausa.

[7] The authors stated that the church and some officials in Ethiopia teach community members about HIV at meetings, and there is a penalty for people who do not attend. In addition, the church teaches that girls should not marry under the age of 18; it used to uphold 15 as the right age for marriage. The same ideology applies to Islamic religious leaders.

6. Estimation Results

6.1. Logistic Regression Model

This study aims to investigate the main determinants of marrying an underage girl in Nigeria. In Table 11, I report the result of the odds ratio estimates of equation (1). Column (I) controls for husband's educational attainment, female's educational attainment and number of siblings. The result for husband/partners' educational attainment indicates that an additional year of schooling for a man reduces his probability of marrying an underage girl by 0.94 percentage points. The coefficient of female's educational attainment variable is negative and statistically significant. The logistic model result suggests that an additional year of schooling will reduce a girl's probability of getting married before age 18 by 0.57 percentage points. This result is similar to past research by Avogo and Somefun (2019) who identify that the educational attainment of a girl decreases the risk of early marriage and child bearing. There exists a positive and significant relationship between number of siblings and the probability of marrying an underage girl. An additional child in a family will increase the probability of her older siblings getting married before 18 by 1.09 percentage points. The explanation for this result is that in large households, especially those residing in rural areas, parents do not believe in female education so they marry off their children at a young age. This trend leads to gender-based inequality in education and is very common in Sub-Saharan Africa. Klasen (2002) identifies that the effect of gender-based inequality in education is stronger in Sub-Saharan Africa, and efforts to promote female education have a higher payoff there than in East Asia, the Middle East or South Asia.

Column (II) controls for region and place of residence. It is important to note that the region South-South is omitted from the regression because of multicollinearity. From the result, all the Northern regions have a positive and statistically significant relationship with the probability of

marrying an underage girl while the Southern regions have a negative and statistically significant relationship. The result indicates that if you reside in the North, specifically North-West, the probability of marrying an underage girl is higher compared to residing in South-South, while for men residing in South-West the probability of marrying an underage girl is lower relative to residing in South-South. The result further indicates that states in the North-West for example, (Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara) will likely have a higher prevalence of early child marriage compared to other states in Nigeria. For place of residence, I used urban area as the baseline category. The relationship between residing in rural areas and the probability of marrying an underage girl is positive and statistically significant; specifically, if you reside in a rural area of Nigeria, the probability of marrying an underage girl is higher than residing in an urban area.

In column (III) I controlled for the female's religious affiliation and husband/partners' occupation. The female's religious affiliation result suggests that being affiliated with the Muslim faith increases the probability of getting married before 18 by 1.26 percentage points compared to other religions, however, the result is statistically insignificant. The husband/partners' occupation result suggests that being a professional worker reduces the probability of marrying an underage girl compared to other occupations. The result also suggests that being a skilled worker, sales associate or an agriculturalist increases the probability of marrying an underage girl. It is important to note that all these variables are statistically significant except sales associate.

Based on these results, I conclude that the main determinants of early marriage in Nigeria are region of residence, place of residence, husband/partners' educational attainment, female's educational attainment and number of siblings. I omitted the variables that are not statistically significant. Additionally, I conducted a multicollinearity test, robustness check and a sensitivity

analysis on place and region of residence to confirm the heterogeneity effect of living in close knit communities.

6.2. Multicollinearity Test

For the multicollinearity test I only use the statistically significant variables[8] using the Variance Inflation Factor (VIF) method. The result is reported in Table 12 which shows a mean VIF of 1.94 which is good because the general rule of thumb is any VIF greater than 10 is problematic. This result indicates that there is no correlation between the independent variables used in this regression. Furthermore, the logistic regression of these variables is presented in column (II) of Table 11.

6.3. Robustness Check

For the robustness check I wanted to see the effect of different age groups at first marriage on years of schooling for girls. To show this, I grouped the 'age at first cohabitation' variable into 10 groups[9]. From the results in Table 13, we can see that girls that marry between ages 11-14 reduce their additional year of schooling by 43% compared to a girl who gets married between ages 15-17. Furthermore, a girl that gets married between ages 26-30 increases her additional year of schooling by 231% compared to a girl that gets married between ages 15-17. This further shows the importance of female education.

[8] I used only statistically significant variables because when I tested for multicollinearity using all the variables, only the statistically insignificant variables were above 10 which implies that the information is redundant.
[9] Stata omitted age group '15-17' because it provides a base to which other categories can be compared.

6.4. Sensitivity Analysis

6.4.1. Urban versus Rural

There are several determinants of underage marriage but place and region of residence is one of the main factors that lead to early marriage. The patriarchy and social norms in close communities can lead to older men demanding younger girls as brides. Figures 1 and 2 confirm that the likelihood of marrying an underage girl is larger in the North than in the South and in rural areas than in urban areas.

In order to confirm this heterogeneous effect, I estimate for each region using OLS. The results are presented in Tables 14 and 15. In Table 14, I show how residing in rural or urban areas affects the probability of demanding an underage girl. The result indicates that residing in an urban area reduces a girl's probability of getting married before 18 by 25%, while residing in a rural area increases a girl's probability of getting married before 18 by 25%.

6.4.2. North versus South

For this analysis, I group the region of residence categories into North and South variables for simplicity. In Table 15, the result suggests that the probability of marrying an underage girl increases by 15% if the person resides in the North and decreases by 15% if the person resides in the South. This result is statistically significant.

6.4.3. Ethnic Diversity

Nigeria has over 250 ethnic groups. The major ethnic groups are Igbo, Yoruba and Hausa while the minor ethnic groups are Ibibio, Itsekiri, Igala, Idoma, etc. (Italoye, 2019). For this study, the minor ethnic groups are Ekoi, Fulani, Ibibio, Tiv, Kanuri/ BeriBeri, Ijaw/Izon and Igala. From Table

16, the result indicates that ethnic groups located in the Northern region of Nigeria have a stronger explanatory power and give statistically significant results. Based on the results, if a girl is from the Fulani, Hausa or Kanuri ethnic group this increases her probability of getting married before age18. This implies that girls in the Northern region of Nigeria are at most risk in relation to early marriage.

7. Conclusion

The main aim of this paper is to discover the determinants of underaged marriage using the 2018 DHS Survey. I use a logistic regression to find these determinants.

The impact of neighborhood factors on the wellbeing and practices of adolescents endures over one's life, from youth to adulthood, and are critical for the wellbeing and economic development of the neighborhood. The link between community-level variables and early marriage formation shows that neighborhood effects are very important. These results confirm that a large proportion of females are still entering into child marriage and cohabitation situations in Nigeria, placing young mothers and their children at significant risk. Community characteristics are significant determinants of early marriage in Nigeria. On an individual-level, a girl's education attainment decreases the risk of early marriage formation. Being part of the Christian faith lowers the risk of early child marriage, however, the result was statistically insignificant. Residing in Northern parts of the country- specifically the North-Western part- increases the risk of early marriage. Furthermore, rural residence is associated with an increase in early marriage formation.

The finding is consistent with previous literature that suggests that education is a strong protective factor against child marriage. All things being equal, policies that promote girls' completion of secondary schooling could lead to meaningful decreases in child marriage. Poor households may see child marriage as economically beneficial in the short-term, but it does not

improve the economic status of the household in the long-run. Furthermore, parents who marry off their children at such a young age in a bid to provide financial security for the future usually incur a loss potentially due to married girls and women not working. This is also consistent with my result as the number of siblings is another factor that leads to an increase in the probability of early marriage.

There are several limitations of this study primarily resulting from the observational nature of the analysis. As the data is cross-sectional, I was not able to track respondents over time to explore whether factors evident at earlier ages are causally linked to later marriage outcomes or, similarly, if early marriage is causally linked to adverse later-life health or well-being outcomes. Another limitation for this study is that education can be a reason why girls decide to leave school because of pressure from peers or her husband, which causes an endogeneity problem. Despite these limitations, the data are nationally representative and therefore have potential to inform policy and programming recommendations.

References

Alhassan, E. 2013. "Early Marriage of Young Females: A panacea to Poverty in the Northern Region of Ghana.?", *Research on Humanities and Social Sciences,* 3 (12): 18-30.

Avogo, W., & Somefun, O. 2019. "Early Marriage, Cohabitation, and Childbearing in West Africa.", *Journal of Environmental and Public Health*, 2019 (1): 1-10.

Bhanji, S., & Punjani, N. 2014. "Determinants of Child (Early) Marriages among Young Girls- A Public Health Issue.", *Journal of Women's Health Care*, 3 (3): 1-3.

Braimah, T. 2013. "Child marriage in Northern Nigeria: Section 61 of Part I of the 1999 Constitution and the protection of children against child marriage.", *African Human Rights Law Journal*, 2014(14): 475-488.

Child Not Brides. 2017. "Economic Empowerment and Child Marriage: Lessons from Nigeria.", Available on website:https://www.girlsnotbrides.org/economic-empowerment-child-marriage-lessons-nigeria/.

Dessy, S., Diarra, S., & Pongou, R. 2017. "Underage Brides and Grooms' Education.", *Working Paper Available at SSRN 2956941,* (2017): 1-46.

Envuladu, E., Umaru, R., Lorapuu, N., Osagie, I., Okoh, E., & Zoakah, A. 2016. "Determinants and Effect of Girl Child Marriage: A Cross Sectional Study of School Girls in Plateau State, Nigeria.", *International Journal of Medicine and Biomedical Research*, 5(3): 122-129.

Fore, H., Kanem, N., & Oranje, M. 2018. "This is the economic cost of child marriage.", W*orld Economic forum and Project Syndicate,* Available on website: https://www.weforum.org/agenda/2018/06/the-cost-of-child-marriage.

Hug, L., Sharrow, D., Zhong, K., & You, D. 2018. "Level and Trends in Child Mortality: Report 2018.", *Estimates Developed by the United Nations Children's Fund,* 1(1): 1-44.

Italoye, I. 2019. "List of Minority Ethnic Groups in Nigeria.", Avaiable on website: https://nigerianinfopedia.com.ng/list-of-minority-ethnic-groups-in-nigeria/.

Jones, N., Tefera, B., Stephenson, J., Gupt, T., Pereznieto, P., Emire, G., Gebre, B., & Gezhegne, K. 2014. "Early marriage and education: the complex role of social norms in shaping Ethiopian adolescent girls' lives.", *Country Report: Shaping policy for development*, 1(3): 1-103.

Kamal, S., Hassan, C., Alam, G., & Ying, Y. 2014. "Child marriage in Bangladesh: Trends and Determinants.", *Journal of Biosocial Science*, 47(1): 120-139.

Khalife, N. 2011. "How Come You Allow Little Girls to Get Married?", *Child Marriage in Yemen-Human Rights Watch,* 1(1): 1-2.

Klasen, S. 2002. "Low Schooling for Girls, Slower Growth for All? Cross-Country Evidence on the Effect of Gender Inequality in Education on Economic Development.", *The World Bank Economic Review*, 17(2): 345-373.

Lal, B. 2015. "Child Marriage in India: Factors and Problems.", *International Journal of Science and Research*, 4(4): 2993-2998.

Land Use Act. 1990. "Land Use Act, Chapter 202, Laws of the Federation of Nigeria.", Available on website: http://www.nigeria-law.org/Land%20Use%20Act.htm.

Lugo, L., Cooperman, A., Bell, J., O'Connell, E., & Stencel, S. 2012. "The World's Muslims: Religion, politics and society.", *World*, 1(3): 1-164.

Malhotra, A. 2010. "The Causes, Consequences and Solutions to Forced Child Marriage in the Developing World.", Submitted to the *US House of Representatives Human Rights Commision*, *International Center for Research on Women*, 1(1): 1-5.

Montazeri, S., Gharacheh, M., Mohammadi, N., Alaghband, R., & Eftekhar, A. 2016. "Determinants of Early Marriage from Married Girls' Perspectives in Iranian Setting: A Qualitative Study.", *Journal of Environmental and Public Health,* 2016: 1-8.

Mpilambo, J., Appunni, S., Kanayo, O., & Stiegler, N. 2017. "Determinants of Early Marriage among Young Women in Democratic Republic of Congo.", *Journal of Social Sciences,* 52(1-3): 82-91.

Nourou, M., Suffyan, K., & Dominique, B. 2018. "Northeastern Nigeria Situation Report-Adamawa, Borno and Yobe.", *Situation Report: Food and Agriculture Organisation of the United Nations*, 1(1): 1-2.

Nshimyiryo, A., Hedt-Gauthier, B., Mutaganzwa, C., Kirk, C., Beck, K., Ndayisaba, A., Mubiligi, J., Kateera, F., & El-Khatib, Z. 2019. "Risk factors for stunting among children under five years: a cross-sectional population-based study in Rwanda using the 2015 Demographic and Health Survey.", *BMC Public Health,* 19(1): 1-175.

Nuruzzaman, S. 2014. "Differentials and Determinants of Early Marriage and Child Bearing: A study of the Northern Region of Bangladesh.", *International Journal of Scientific Footprints*, 2(1): 52-65.

Oginni, A., Adebajo, S., & Ahonsi, B. 2017. "Trends and determinants of comprehensive knowledge of HIV among adolescents and young adults in Nigeria.", *African Journal of Reproductive Health,* 21(2): 26-34.

Peterman, A., Schwab, B., Roy, S., Hidrobo, M., & Gilligan, D. 2015. "Measuring womens decision making: indicator choice and survey design experiments from cash and food transfer evalutions in Ecuador, Uganda and Yemen.", *International Food Policy Research Institute,* 1(1): 1-52.

Roy, T. 2008. "Determinants of Early Marriage in Rajshashi, Bangladesh.", *Pakistan Journal of Social Sciences*, 5(6): 606-611.

Rumble, L., Peterman, A., Irdiana, N., Triyana, M., & Minnick, E. 2018. An empirical exploration of female child marriage determinants in Indonesia. *BMC public health*, 18(1): 1-13.

Sah, N. 2008. "How useful are the demographic surveys in explaining the determinants of early marriage of girls in the Terai of Nepal?", *Journal of Population Research*, 25: 207-222.

Seth, R., Bose, V., Qaiyum, Y., Chandrashekhar, R., Kansal, S., Taneja, I., & Seth, T. 2018. "Social Determinants of Child Marriage in Rural India.", *The Ochsner Journal*, 18(4): 390–394.

WHO. 2012. "Child Marriage – A Threat to Health.", *World Health Organisation*, Available on website:http://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/news/news/2012/12/child-marriage-a-threat-to-health.

Wodon, Q., & Malé, C. 2016. "Basic Profile of Child Marriage in Nigeria.", *World Bank*, Available on website: https://openknowledge.worldbank.org/handle/10986/24547.

Workineh, S., Kibretb, G., & Degu, G. 2015. "Determinants of Early Marriage among Female Children in Sinan District, Northwest Ethiopia.", *Health Science Journal*, 9(6): 1-7.

Wylie, H. 2019. "115 million boys and men around the world married as children", *UNICEF*, Available on website: https://www.unicef.org/press-releases/115-million-boys-and-men-around-world-married-children-unicef.

APPENDIX

Figure 1: Probability of Marrying an Underage girl and Place of Residence

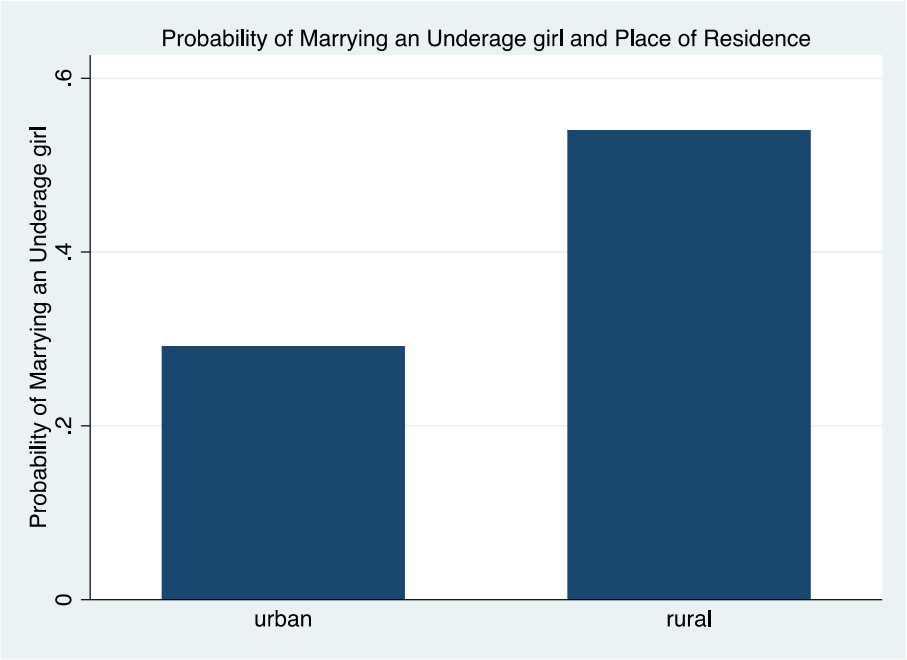

Figure 2: Probability of Marrying an Underage girl and Region of Residence

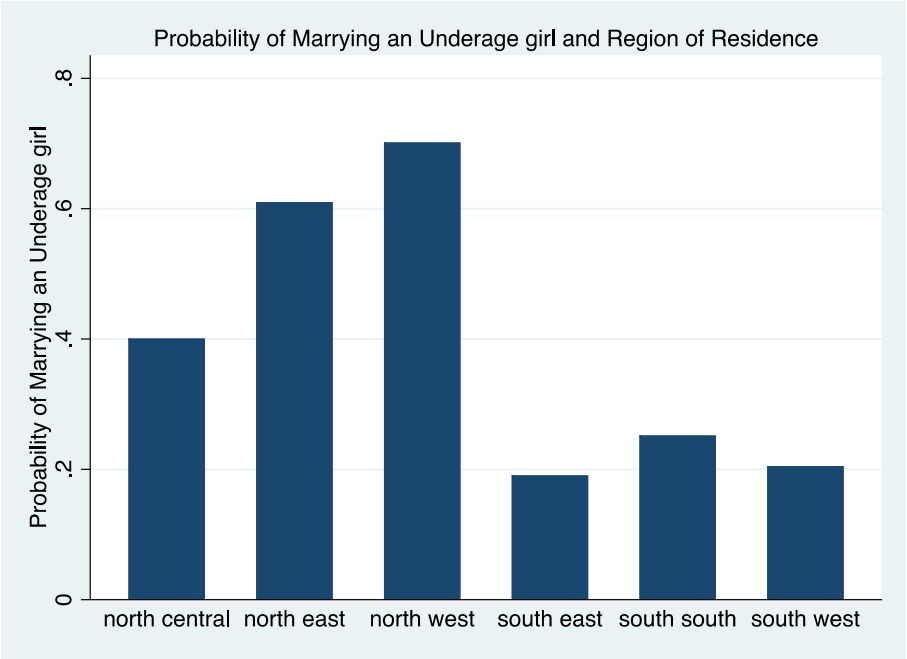

Figure 3: Probability of Marrying an Underage girl and Number of Siblings

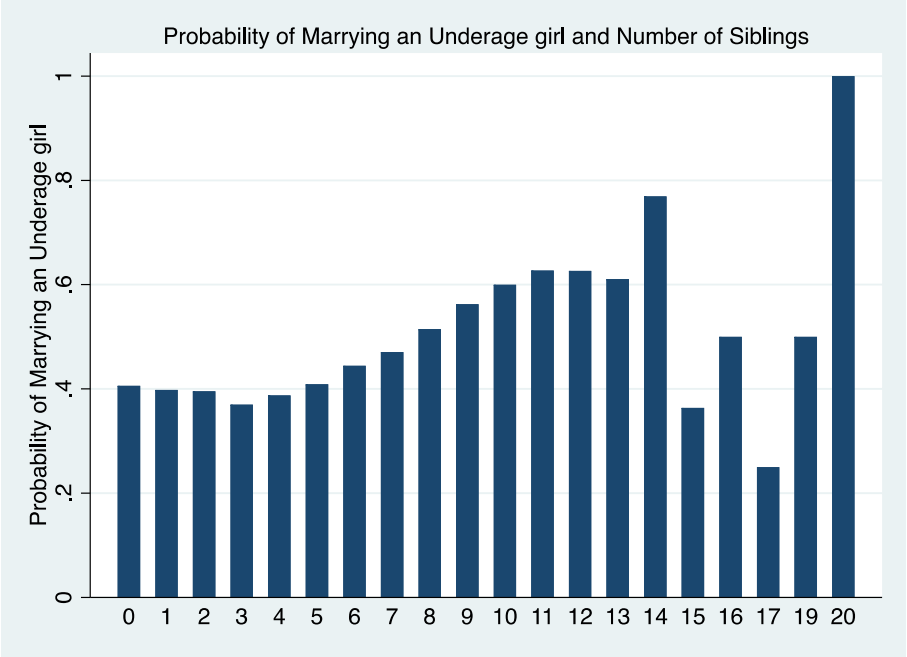

Figure 4: Probability of Marrying an Underage girl and Husband/Partners' education

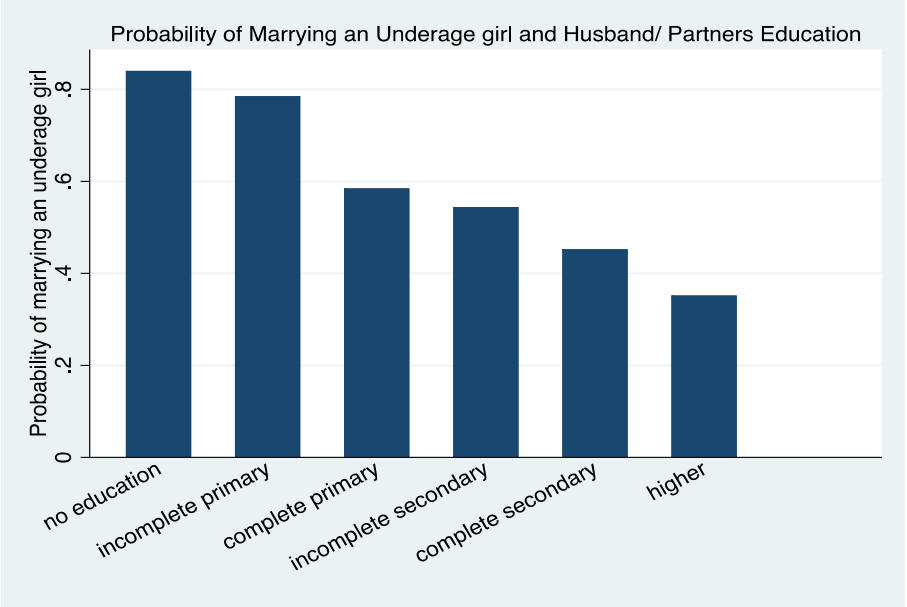

Table 1: Underage bride

Underage Girl	Freq	Percent	Cum.
Married after 18	23,443	56.06	56.06
Married before 18	18,378	43.94	100.00

Table 2: Husband/Partners' educational attainment

Underage Girl	Freq	Percent	Cum.
No education	9,803	33.93	33.93
Incomplete primary	575	1.99	35.92
Complete primary	3,861	13.37	49.29
Incomplete secondary	1,531	5.30	54.59
Complete secondary	8,238	28.52	83.11
Higher	4,487	15.53	98.64
Don't know	393	1.36	100.00

Table 3: Educational attainment

Underage Girl	Freq	Percent	Cum.
No education	14,398	34.43	34.43
Incomplete primary	1,908	4.56	38.99
Complete primary	4,475	10.70	49.69
Incomplete secondary	7,246	17.33	67.02
Complete secondary	9,452	22.60	89.62
Higher	4,342	10.38	100.00

Table 4: Place of residence

Underage Girl	Freq	Percent	Cum.
Urban	16,984	40.61	40.61
Rural	24,837	59.39	100.00

Table 5: Region of residence

Underage Girl	Freq	Percent	Cum.
North-Central	7,772	18.58	18.58
North-East	7,639	18.27	36.85
North-West	10,129	24.22	61.07
South-East	5,571	13.32	74.39
South-South	5,080	12.15	86.54
South-West	5,630	13.46	100.00

Table 6: Husband/Partners' Occupation

Underage Girl	Freq	Percent	Cum.
Professional, technical and related work	2,423	8.50	8.50
Clerical	463	1.62	10.13
Sales	14,072	49.39	59.51
Service	2,708	9.50	69.02
Skilled manual	1,393	4.89	73.91
Unskilled manual	34	0.12	74.03
Agricultural	7,325	25.71	99.73
Other	76	0.27	100.00

Table 7: Religious Affiliation

Underage Girl	Freq	Percent	Cum.
Catholic	4,436	10.61	10.61
Other Christian	16,070	38.43	49.03
Islam	20,959	50.12	99.15
Traditionalist	156	0.37	99.52
Other	200	0.58	100.00

Table 8: Number of siblings

Underage Girl	Freq	Percent	Cum.
0-5	23,376	55.90	55.90
6-11	18,038	43.13	99.03
12-20	407	0.97	100.00

Table 9: Ethnic Diversity

Underage Girl	Freq	Percent	Cum.
Ekoi	275	0.66	0.66
Fulani	2,953	7.06	7.72
Hausa	10,765	25.74	33.46
Ibibio	801	1.92	35.37
Igala	457	1.09	36.47
Igbo	6,714	16.05	52.52
Ijaw/Izon	1,201	2.87	55.39
Kanuri/Beriberi	873	2.09	57.48
Tiv	976	2.33	59.81
Yoruba	5,372	12.85	72.66
Other	11,404	27.27	99.93
Don't Know	30	0.07	100.00

Table 10: Summary Statistics

Variables	Mean	SD
Probability of Marrying an Underage girl	0.439	0.496
Husband/Partners' Education	2.472	2.058
Number of siblings	5.250	2.557
Female's educational attainment	2.202	1.842
Region of Residence		
North-Central	0.185	0.385
North-East	0.182	0.386
North-West	0.242	0.428
South-East	0.133	0.339
South-South	0.121	0.326
South-West	0.134	0.341
Place of Residence		
Rural	0.593	0.491
Urban	0.406	0.491
Religious Affiliation		
Catholic	0.106	0.307
Other Christian	0.384	0.486
Islam	0.501	0.500
Traditionalist	0.003	0.061
Other	0.004	0.068
Husband/Partners' Occupation		
Agriculture	0.257	0.437
Unskilled worker	0.001	0.034
Skilled worker	0.048	0.215
Professional worker	0.085	0.278
Clerical	0.016	0.126
Sales	0.493	0.499
Service	0.095	0.293
Ethnic Diversity		
Major ethnic groups	0.551	0.500
Minor ethnic groups	0.446	0.500
Number of observations	41,821	41,821

Table 11: Logistic Regression Modelling of the determinants of Underage Marriage

Variables	Column (I)	Column (II)	Column (III)
Husband/Partners' Education	0.94***	0.959***	0.971**
	[0.93-0.96]	[0.94-0.98]	[0.95-0.99]
Female's educational attainment	0.572***	0.667***	0.706***
	[0.56-0.58]	[0.65-0.68]	[0.68-0.72]
Number of Siblings	1.098***	1.048***	1.036***
	[1.09-1.11]	[1.03-1.06]	[1.02-1.05]
North-Central		1.325***	1.174**
		[1.20-1.46]	[1.04-1.32]
North-East		2.538***	2.007***
		[2.80-2.82]	[1.75-2.29]
North-West		3.742***	2.871***
		[3.36-4.15]	[2.49-3.30]
South-East		0.694***	0.738***
		[0.62-0.77]	[0.65-0.83]
South-West		0.754***	0.664***
		[0.67-0.84]	[0.58-0.75]
Rural		1.274***	1.268***
		[1.20-1.35]	[1.17-1.36]
Catholic			0.767
			[0.49-1.19]
Other Christian			0.786
			[0.50-1.21]
Islam			1.261
			[0.80-1.96]
Traditionalist			0.647
			[0.34-1.21]
Agriculture			1.332
			[1.17-1.51]
Sales			1.22***
			[1.09-1.36]
Skilled worker			1.127
			[0.93-1.35]
Professional worker			0.743***
			[0.63-0.87]
Constant	3.173***	1.492***	1.410
	[2.95-3.41]	[1.31-1.69]	[0.89-2.22]
Observations	28,888	28,888	28,888
Pseudo R-squared	0.196	0.239	0.239

Notes: Dependent variable is underage girl 0/1. Confidence interval in parenthesis * indicates level of significance at 10%; ** indicates level of significance at 5%; *** indicates the level of significance at 1%. If the odds ratio is >1, this implies a positive relationship and <1 implies otherwise.

Table 12: Multicollinearity Test

Variables	VIF	1/VIF
Husband/Partners' Education	1.73	0.578
Female's educational attainment	2.21	0.453
Number of Siblings	1.06	0.944
North-Central	1.27	0.787
North-East	2.19	0.456
North-West	2.60	0.385
South-East	3.07	0.326
South-West	1.68	0.594
Rural	1.70	0.590
Mean VIF	1.943	

Table 13: Robustness Check

Variables	Column (I)
7-10	-0.113
	(0.855)
11-14	-0.428***
	(0.259)
18-20	1.074***
	(0.258)
21-25	1.841***
	(0.266)
26-30	2.319***
	(0.363)
31-35	2.252***
	(0.645)
36-40	2.002***
	(0.125)
41-45	1.402***
	(0.245)
46-48	0.545***
	(0.599)
Observations	31,125
R-squared	0.273

Notes: Dependent variable is female's educational attainment. Standard errors in parenthesis clustered at the primary-sampling unit * indicates level of significance at 10%; ** indicates level of significance at 5%; *** indicates the level of significance at 1%.

Table 14: Urban versus Rural

Variables	(I) Urban	(II) Urban	(III) Rural	(IV) Rural
Underage girl	-0.243***	-0.235***	0.243***	0.235***
	(0.005)	(0.005)	(0.005)	(0.005)
Islam		-0.0229***		0.0229***
		(0.00502)		(0.005)
Constant	0.513***	0.521***	0.487***	0.479***
	(0.003)	(0.004)	(0.003)	(0.004)
Observations	41,821	41,821	41,821	41,821
R-squared	0.060	0.061	0.060	0.061

Notes: Dependent variable is underage girl 0/1. Standard errors in parenthesis clustered at the primary-sampling unit * indicates level of significance at 10%; ** indicates level of significance at 5%; *** indicates the level of significance at 1%.

Table 15: North versus South

Variables	(I) North	(II) North	(III) South	(IV) South
Underage girl	0.355***	0.154***	-0.355***	-0.154***
	(0.004)	(0.004)	(0.004)	(0.004)
Islam		0.531***		-0.531***
		(0.004)		(0.004)
Constant	0.455***	0.277***	0.545***	0.723***
	(0.003)	(0.003)	(0.003)	(0.003)
Observations	41,821	41,821	41,821	41,821
R-squared	0.131	0.385	0.131	0.385

Notes: Dependent variable is underage girl 0/1. Standard errors in parenthesis clustered at the primary-sampling unit * indicates level of significance at 10%; ** indicates level of significance at 5%; *** indicates the level of significance at 1%.

Table 16: Logistic Regression Modelling of Ethnic Diversity

Variables	Column (I)	Column (II)
North	4.317***	1.777***
	[4.12-4.52]	[1.64-1.91]
Rural	2.084***	2.126***
	[1.99-2.17]	[2.02-2.30]
Ekoi		0.665**
		[0.50-0.88]
Fulani		4.183***
		[3.80-4.59]
Hausa		3.406***
		[3.21-3.61]
Ibibio		0.846*
		[0.71-1.00]
Igala		0.936
		[0.77-1.13]
Igbo		0.655***
		[0.59-0.71]
Ijaw/Izon		1.140*
		[0.98-1.31]
Kanuri		2.50***
		[2.16-1.89]
Tiv		1.063
		[0.92-1.21]
Yoruba		0.727***
		[0.66-0.79]
Constant	0.193***	0.239***
	[0.18-0.20]	[0.22-0.25]
Observations	41,821	41,821
R-squared	0.118	0.164

Notes: Dependent variable is underage girl 0/1. Confidence interval in parenthesis * indicates level of significance at 10%; ** indicates level of significance at 5%; *** indicates the level of significance at 1%. If the odds ratio is >1, this implies a positive relationship and <1 implies otherwise.