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Male Attitude and Family Planning Practices in Angola

Bachelor thesis

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Abstract

Men's involvement in their partners' lives can be an essential driver in terms of the utilization of family planning programs. Using cross-sectional data from the Angola Demographic and Health Survey from 2015-2016, this thesis investigates the factors influencing family planning use from the men's point of view. Apart from the expected positive correlation of education, age, place of residence, and economic status with contraceptive use, it is hypothesized that men's attitude, knowledge, and fertility preferences affect contraceptive use and unmet need of their spouses. Using logistic and probit regressions, the results of this thesis point out a significant positive relationship between men's knowledge of contraception, their fertile preferences, and their partners' use of contraception. Lastly, the thesis lays down a few suggestions for future research.

Keywords

family planning in Angola, DHS data, cross-sectional data, logit, probit

Abstrakt

Zapojení mužů do života jejich partnerek může být důležitým komponentem pro využívání programů plánovaného rodičovství. Tato práce zkoumá faktory ovlivňující využití plánovaného rodičovství z pohledu mužů zapomocí průřezových dat poskytnutých organizací Demographic and Health Survey z let 2015–2016. Kromě očekávané pozitivní korelace vzdělání, věku, místa bydliště a ekonomického statusu s antikoncepčním užíváním se předpokládá, že postoj mužů, jejich znalosti a představa o rodině ovlivňují užití antikoncepce a nenaplněné potřeby jejich partnerek. S využitím logistických a probitových regresí výsledky této práce poukazují na výynamný pozitivní vztah mezi znalostmi mužů o antikoncepci, jejich představami o rodině a užitím antikoncepce jejich partnerkami. V závěru práce navrhuje další možnosti pro budoucí výzkum.

Klíčová slova

rodinné plánování v Angole, DHS data, průřezová data, logit, probit

Declaration of Authorship

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

I grant a permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, 7 May 2020

Signature

Acknowledgment

I would like to express my gratitude to my supervisor, doc. PhDr. Julie Chytilová, Ph.D., for her time, guidance and valuable comments on this thesis. Most importantly, special acknowledgments also belong to my family and friends for their constant support and encouragements during the whole studies.

Contents

List of Tables

Acronyms

AME	Average marginal effect
C	cluster
DHS	Demographic Health Survey
FP	Family Planning
IR	Individual Recode
IUD	Intrauterine contraceptive device
LAM	Lactational amenorrhea
LPM	Linear probability model
PEA	Partial effect at the average
PPS	Probability proportional to size
SEA	Standard enumeration areas

Bachelor's Thesis Proposal

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Notes: Please enter the information from the proposal to the Student Information System (SIS) and submit the proposal signed by yourself and by the supervisor to the Academic Director ("garant") of the undergraduate program.

Proposed Topic:

Sexual Intercourse Awareness and the Family Size in Angola

Preliminary scope of work:

Research question and motivation

One of the biggest problems of the last century is the rapid growth of the population. The population is still growing up mainly thanks to the developing countries. Even the most people on the Earth come from Asia, its fertility rates are nowadays significantly lower than those in Africa. That's why I have chosen to analyse the situation in Angola. Moreover, societies in developing countries do not have the greatest conditions to raise children. So it is important to determine if it is the matter of religion, environment, etc. to have big families or it results from ignorance of the possibility of becoming pregnant and lack of contraception.

Contribution

According to existing studies family size is influenced by many factors. For example the ideal number of children is higher for religious families than individuals with no religious affiliation. It also depends on specific religion e.g. Conservative Protestants and Catholics tend to have more than Mainline Protestants. [1] Also in the last decades with the growth of contraceptive use the fertility declines as well. There also appears to have been a more modest increase in the proportion of women wanting no additional children. [2]

In my thesis I would like to extend already existing study to see if there have been some changes. The existing study analyses the data from Luanda, the capital of Angola, between 2012 and 2015 and it concludes that on average the ideal number of children is lower than actual number of children born to a woman. [3] In the case of changes and confirmation that there is a dependence between information and the number of children, the results of the analysis can serve as an indicator for non-profit organizations and the government to support more family planning programmes. They could launch campaigns on sexual protection, sexually transmitted diseases, postnatal care and launch sexual protection itself. This would also improve the quality of health care and life in the analysed country. If mothers care for their children properly, the rate of neonatal mortality, which is very high in African countries, could also fall.

Methodology

Firstly, I will go through the existing literature and I will mainly focus on the existing family planning programs. After that, I will move to the empirical part and analyse the relationship between the awareness of sexual intercourse of individuals and the number of children they have. For this part I am going use questionnaires and data by Demographic and Health Surveys. Except the classical variables such as the age of the woman, education, religion, I am going to use specific questions related to the number of children, sexual intercourse and methods that a couple can use to delay or avoid a pregnancy and I will

make a model from them. At last, I will sum up my result.

Outline

1. Introduction
2. Theoretical background – the family planning programmes
3. Empirical part
   3.1. Questionnaires, data description, used methodology
   3.2. Data analysis
   3.3. Testing hypothesis
4. Result
5. Conclusion
6. Appendix

List of academic literature:

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1 Introduction

The world population increases rapidly nowadays. The predictions estimate it to reach 11.2 billion in 2100, which poses a serious concern over the economy, environment, and both regional and national development efforts. The most substantial contribution to the population growth should come in Africa, its population is expected to increase from 1.3 billion to 4.3 billion between 2020 and 2100 (DESA 2019). To be precise, projections show that this growth will occur mostly in sub-Saharan Africa, which population is predicted to more than triple (DESA 2019). The shifts in the size and distribution of the world population have significant consequences for attaining the Sustainable Development Goals, the globally agreed targets for improving social well-being and economic prosperity while protecting the natural environment.

A part of this problem is insufficient development, distribution, and accessibility of family planning programs. The family planning programs reinforce people's rights to determine the spacing of pregnancies, as well as attaining their desired number of children. Moreover, it diminishes the need for abortion, particularly unsafe abortion, and it prevents deaths of infants and mothers, which can be caused by ill-timed and closely spaced pregnancies and births. Besides, it prevents unintended pregnancies of young and older women, who face a higher risk of health problems related to pregnancy. Besides, adolescents have a higher probability of having low birth-weight or preterm babies, which can lead to neonatal mortality. In addition to that, many pregnant adolescents have to drop out of school, which brings long-term consequences not only for themselves but also for their families and the whole communities. Likewise, parents who have fewer children can invest more in each one of them and those from smaller families tend to stay longer in school comparing to children from larger ones. Last but not least, providing the availability of preferred contraception for couples is essential to ensuring the autonomy and well-being of women.

There are several obstacles in implementing family planning programs, such as weak health systems or poor infrastructure. Therefore they are not sufficiently developed, especially among poor and rural populations (Nieto-Andrade et al. 2017). As a result, in developing regions, the quarter of women who want to prevent a pregnancy still have unfulfilled needs for contraceptive methods. Frequently, poor women do not have the means to understand their fertility goals and must rely on services offered by either national programs or by non-governmental international organisations to access family planning means (UNFPA et al. 2018). It is crucial to find the best solution for implementing the family planning programs in developing countries. Most of the studies focus almost exclusively on examining the topics from the women's perspective and for

that, they only use the women's data. However, it is essential to investigate also men's influence on women's decisions.

Even though several studies investigate the influence of men's attitudes and knowledge on the use of contraception among their spouses, the case of Angola remains to some degree unexplored. Most of the studies from Angola either use women's or men's data. Studies based on women's data concentrates mostly on exploring the differences among rural and urban areas, the impact of the war, or on the high desired family size in general (Decker and Constantine 2011; Agadjanian and Prata 2002; Lee 2003). Furthermore, the studies based on men's data were mostly supported by focus group discussion, their limitation is that they are more than a decade old (Advance Africa 2003). However, to my knowledge, there has been no study using couple's data that would have explored the issue from a point of view of men's attitude towards contraception and knowledge of it at the same time. For this reason, more research is still needed.

Consequently, the goal of this thesis is to examine and discuss factors affecting the women's use of contraception, their unmet need for family planning, and the men's participation in decision making about family planning, all that based on couple's data collected in 2015-2016 by Demographic Health Survey. By applying the sampling weights, the representative sample for our thesis is obtained. In addition, by implementing logit and probit models, the determinants influencing the unmet need for family planning, contraception use, and decision making about family planning are analyzed.

The results confirm several findings of global research on men's attitude, such as that men's knowledge positively affects women's contraception use or that a condom used during last sex also yielded a positive effect on contraception use.

The thesis is organised as follows. In Background, there is a brief history of family planning and emphasizing the importance of this topic. Background is followed by Literature review, which focuses on related studies both, from all over the world and from Angola and their utilization. In Data, description and weighting of the data are introduced, as well as summary statistics are provided. The following section, Methodology, provides the theoretical background of our models. In Results, we apply methodology from the previous chapter and discuss the results. Lastly, the Conclusion, summarizes the results of this thesis.

2 Background

The global fertility revolution started in the 1800s in Europe and evolved with different speed on different continents and even in different countries (Lee 2003). According to the demographic transition theory, typically, as socioeconomic development proceeds, fertility begins falling (Easterlin 1975). With industrialization and urbanization of a country, the cost related to having a child increase, and the advantages of having large families reduce (Madsen 2015). Looking at the historic fertility transition, it first started in France and afterward in the Northern European and English-speaking countries. There were several reasons for the decline and some of them are still accurate – the maternal mortality, higher survival of newborns, low expectancy of men's life - a woman had to raise children by herself when the man died - and particularly changing work patterns and education of the women, which are still associated/correlated with lower fertility today (Casterline 2010). Not only that, higher education has an impact on the knowledge concerning sexual health, but also women become financially educated and start to see the additional cost of having a new baby. On the contrary, the decline in Asia occured almost a century later (1950s) and was encouraged by the government's investments in girls' education, for example, in Singapore or the Republic of Korea.

Family planning (FP) is a practice that allows people to determine the spacing of the pregnancies, to achieve their desired number of children, and last but not least, to select the means by which this is accomplished. FP began by itself about a century ago and its evolution depends on many factors, which are related to the most important one - the development of the country. In general, the less developed the country, the higher fertility. It is very crucial to make sure that a woman is free to choose the number of children, along with the timing and spacing of the children. All that requires having all the means available and it is connected to many human rights such as education, health, and sufficient income. Those rights not being satisfied, people are having either fewer or more children than they would like to. Former is mainly connected to economic barriers and unsuitable options to combine both the work and family life. In the latter case, they are having more, which is connected to factors such as a bad economic situation of the country, low standards of living, religion, overstretched services, shortage of contraceptive methods, and the lack of general and also sexual education. Last but not least, child marriage and the consecutive childbearing contributes to the negative socioeconomic effect as well since it disturbs the girls' education and the ensuing chance for a better job opportunity (Wodon et al. 2017).

As a responcce to pressing global concerns, such as population growth, there are three main aims of family planning programs which include reducing the number of unwanted pregnancies, increasing awareness and use of contraceptive methods, and assessing the cost-effectiveness (Nieto-Andrade et al. 2017). Even though there have been many actions taken all over the world to make the family planning affordable for everyone, there is no country that can provide that yet. There are still many women persisting who do dot have the ideal amount of children for themselves. For this to change, three conditions need to be met. Firstly, individuals need to see having fewer children as an advantage. This is changing with growing economies, which provides more job opportunities causing the people to start to see this advantage. Secondly, they need to think about fertility in such a way that they can control it and third, reliable contraception must be available and affordable and knowledge about their use must be provided. If the high fertility persists, those conditions will not be met and the fundamental barriers will remain.

In most developing countries, including Angola, family planning services are not accessible for those who need them the most. Above all, they are not sufficiently developed among the poor, rural, and hard-to-reach population (Nieto-Andrade et al. 2017). While more educated, wealthier women have the means to understand their own fertility goals, the poor ones, facing the economic obstacles, must rely on free services offered by either international non-governmental organizations or national programs in order to access contraception (UNFPA et al. 2018). Nowadays, there are about 885 million women in developing countries who would like to avoid pregnancy, and one quarter of them, about 214 million, still have an unfulfilled need for contraception (UNFPA et al. 2018). Namely in Angola, more than three million women in reproductive age had no access to the family planning services in 2017, according to the nonprofit global health organization, Population Services International, which has been operating in Angola over 18 years now (PSI 2017).

3 Literature Review

3.1 Studies from all over the world

Most of the research on family planning and fertility has been mainly devoted to the women's perspective; men have been omitted. Overall, there is only a fraction of studies focusing on contraception use which works with men's or couple's data as a base. However, in much of these studies is acknowledged the significance of men in outcomes having an impact on women. For example, research denoting the impact of men's different fertility preferences or resistance to contraception on unmet need among women. Although including the men in family planning is not a universal strategy, several pieces of research suggested exploring the contraception use and unmet need from the men's point of view (Bankole and Ezeh 1999; Becker 1999; Pearson and Becker 2014). Additionally, the men's involvement in their spouse's health outcomes is directly related to their education, knowledge, attitudes, and behavior (Sternberg and Hubley 2004).

Moreover, a study in Kenya and Zimbabwe identified the inconsistency between women's and men's reports, women are less likely to report the use of contraception rather than men. The critical part of the consistency of the couples reporting includes the discussion of family planning and if men approve it (Hollander 2000). Another study based on data from multiple countries found the discordance among couples on family planning approval and ideal family size (Becker 1996). Since having data only from one gender can be inconsistent and misleading, it is essential to investigate data from both partners.

Men's knowledge

Previous studies have proved that men's contraception knowledge is directly related to their socioeconomic factors (MacQuarrie et al. 2015; Duze and Mohammed 2006). For instance, research across 18 countries in Latin America and the Caribbean, Asia, and Africa points out that in most countries the knowledge was highly and significantly correlated with the men's level of education, the lowest knowledge had the never-married men and men without children (MacQuarrie et al. 2015).

A study Malawi Motivation Project shows that increment in men's education had an impact on contraception uptake, while at the beginning of the project, none of the participants was using family planning, following the intervention 78% in the control group reported use of the contraceptive methods. Moreover, the participants realized not only the economic benefits but also the health benefits for their counterparts (Shattuck et al. 2011). Research from Ethiopia discovered that men participating in the educational intervention about family planning were more likely to use family planning methods than the men who were not participating (Tilahun

et al. 2015). Another study also conducted in Ethiopia found that the discussion of family planning between men and their wives leads to a significant increase in modern contraception use. A randomized field trial was conducted. In the end, the use of contraception was twice as high in the intervention group than in the control group (Terefe and Larson 1993).

A study in Nigeria explored the relationship between men's support for contraception and their spouse's desire to use contraceptive, it found that men informed about female contraception were three times more likely to have wives who desired using contraception and also men supporting contraception were five times more likely to have wives who showed the desire of using contraception (E. E. Ezeanolue et al. 2015).

Men's attitudes towards contraception

Men's knowledge and education by itself may not be sufficient, it is also crucial to change men's perceptions and approach to the use of contraception in order to achieve more significant outcomes. For instance, research in Northern Nigeria demonstrated that even most men had particular knowledge about family planning method (about 2/3 of them knew at least one method), 85% of men did not let their wives use contraception, even in the case they were financially unable to take care of their children. Men willing to use family planning methods were more likely to use it for purposes of spacing children than for limiting the size of the family. As an explanation for not using contraception and negative attitudes towards it, were mainly the religious reasons given (Duze and Mohammed 2006).

According to a study examining data from 18 countries in Latin America and the Caribbean, Africa, and Asia majority of men consider that the use of contraception is related to women's promiscuity in most of the countries, even though that in all countries more than 50% of men disagreed with the statement "Contraception is a woman's business and a man should not have to worry about it." (MacQuarrie et al. 2015). Another study from Uganda also proved that men believe that women become more promiscuous with the use of contraception. Other reasons for not using family planning methods included a decrease in sexual pleasure for women and an increase in infertility risks (Kabagenyi et al. 2014).

A study investigating couples living in urban areas in Kenya pointed out the importance of communication about contraception among couples. Couples who communicated with each other about FP and the desired number of children were more like to use FP methods than the couples who lack the communication (Assaf and Davis 2018). A study in Pakistan found greater use of contraception among couples, which made the decision together than among women deciding on their own (Hameed et al. 2014). Research using data from 33 countries in Africa (including

Angola) found a significant influence of discussing the family planning with a health professional in the last couple of months on positive health outcomes (Irani, Speizer, and Fotso 2014).

Several gender intervention programs for couples, which promoted understanding of family planning as well as challenge social norms and gender inequalities, have shown a positive effect in changing the inequalities between men and women (Doyle et al. 2018). They showed a lower level of men dominance in making decisions, greater men's involvement in child's and women's health, and greater use of modern contraceptives among couples who participated (Doyle et al. 2018).

Men's fertility preferences

Other aspects that need to be considered are men's desired number of children and the ideal size of the family. Analysis of data from urban areas in Kenya suggested the couples who did not want more children were more likely to use contraception over couples who desired another child (Assaf and Davis 2018). Studies conducted in Pakistan and Nigeria emphasize that women are more likely to use contraception when their spouses have the fertility preferences fulfilled (Ogunjuyigbe, Ojofeitimi, and Liasu 2009; Mahmood and Ringheim 1996). Another study from Kenya noted that women tend to use contraception twice as much if their partner genuinely did not desire another child than when they only felt so (Dodoo 1998).

Studies conducted in Asia and Kenya found more unwillingness to use family planning methods among women, when their partners wanted more children, even though the women themselves did not want to have more children in the short term. Moreover, women perceived a lack of partners' agreement on fertility as a primary obstacle to the use of contraception (Kamau et al. 1996).

3.2 Studies in Angola

Several demographic studies have detected sociodemographic characteristics or traits on individual levels that affect contraceptive use in Angola, the findings on the relative importance of the couple's records are missing nonetheless. Furthermore, due to the challenge of collecting data in developing countries during the wartime, most of the studies have been done afterwards. Much development had been lost during 40 years of war, thus initiating strategies for social and economic development, including rebuilding family planning, which awoke initiating strategies.

General approaches

A study investigating the difference of contraception use between rural and urban areas based on women's records has found out that wealth index levels were significantly correlated with

the level of education and life in urban areas. Using the analysis, the education levels, as well as wealth indexes, were both strongly related to contraceptive use. The qualitative interviews with health workers provided several explanations for not using contraception, which included young age, rural living, power imbalances, and cultural beliefs (Decker and Constantine 2011). A study investigating the connection between war and fertility in Angola found out that as the war intensified, the chance of having a child decline and subsequent rebound when the fighting diminished (Agadjanian and Prata 2002). Further research, made by the same authors, did not find any indications that the war would directly or permanently influence the fertility trends apart from "its generally inhibiting effect on any improvements in social welfare that might otherwise have encouraged some fertility decline" (Agadjanian and Prata 2001).

Men's attitude using women's data

A strategic mapping exercise, the Advance Africa program, focused on detecting the qualitative factors identifying poor utilization of family planning programs and on detecting priority areas for promotion of them using the women's data, data collected only from women using a specific questionnaire. The study found that men make the final decisions about the number and spacing of children. However, odd fact is that the major findings from focus group discussions (FGD) were in contradiction, while the interviewed men distanced themselves from being a main part of the decision making about FP, the women felt that the men did not support their decision about using FP or even worse, the men were against it. The women's claim was supported in the FGD by nurses, where the nurses stated that a husband's agreement was essential for many health providers (Advance Africa 2003). Another study which was based on the suggested evidence from previous exercise examined mainly the relationship between (1) partner's approval and (2) partner's encouragement for family planning and women's use of contraception based on women's perception. Besides controlling for the sociodemographic variables (age, marital status, education, and wealth index), it controlled for recent couple's communication about family planning. Partner's approval was connected with three times the odds of women using modern contraception. A limitation of this study was only relying on women reporting their partner‘s opinion, which might not reflect his actual opinion (Diro and Afework 2013).

High desired family size and changing preferences

Another aspect to consider is a retained desire for large families in Sub-Saharan Africa in general. While the fertility rate declines around the world, the demographic transition is progressing more slowly in Africa; couples desire a larger size of family (Lee 2003; Madsen 2015). A study looking at this problem found out that the FP program effort had a highly significant effect on women's desired family size, which means that the FP program can change women's reproductive

preferences (Bongaarts 2011). Another research examined FP programs and determined that there is a significant dependency of changing fertility preferences on strength and effort of individual FP programs. The strength and effort are measured by experts' evaluation of a set of problems such as favorable statements by leaders, legal regulations, official policies, national budgets, availability of specific methods, diverse distribution methods including community-based health workers and social marketing, training, outreach, logistics, and evaluation (Ross and Smith 2011). Most probably not only women's preferences but also men's fertility preferences can be changed.

3.3 Contribution

As we noted above, most studies in Angola are using only individual's data and thus, they are investigating the relationship between individual characteristics and contraception use. However, as it has been covered, the effects of man's attitude towards contraception, general knowledge, and fertility preferences play an important role in family planning and they have not been jointly studied in Angola. To our knowledge, there is only one study using couple's data from Angola, examining the impact of men's involvement in their partner's and children's health life in general. The objective of this thesis is to look at the issues from a different perspective. Our model will focus only on the contraception matters and will include more specific variables to determine the association of men's characteristics on contraception use among their spouses living in Angola.

4 Data Description

This thesis aims to analyze the impact of men's involvement in family planning programs and the use of contraception. Several variables were chosen for the analysis, their description along the hypothesis is provided in this section. Further, descriptive statistics and theoretical background for weighting data are presented.

4.1 Data Structure

This research analyzes the most recent couple's data from Angola collected by Demographic and Health Surveys phases VII in the years 2015 - 2016. The DHS Program collects primary data by conducting four types of Model Questionnaires – man's, woman's, household, and biomarker questionnaire. The dataset used in this study resulted as a merger of women's and men's datasets. Women's dataset contains 14,379 observables, which means 14,379 women filled in the woman's questionnaire. Similarly, 5,684 men filled in the men's questionnaire. For each man and woman to be included in our merged couple's dataset, they both had to declare to be either married to each other or living together and they had to have fully completed individual questionnaires.

The merged couple's dataset has one record for every couple consisting of 2,405 observables and 2,475 variables. However, only variables considered relevant to this thesis were utilized: background characteristics, contraceptive use and knowledge, attitudes towards contraception, men's fertility, and fertility preferences. Moreover, after weighting data, we obtained 2,349 of observables. For two of our dependent variables - *Unmet need* and *Using contraception*, the full dataset can be used. In terms of *Decision maker*, after applying weights, the dataset consists of 2,006 observables. The dataset is smaller because the question concerning the decision about FP was not asked to pregnant women.

The dataset contains inconsistencies for several observations concerning the time since the last menstrual period of the respondent. For example, (1) the respondent said that her period had returned after her last birth, but in another part of the questionnaire she said that she had never menstruated; (2) the respondent had children, but she reported never have menstruated; (3) or the respondent said that her period had returned after the last birth, but in different section of the questionnaire, she said that her last period was before her last birth. Since we do not use directly variable *time since last menstrual period*, the main analysis will be done with the full dataset, the analysis with the restricted dataset can be found in section , in particular, all tables from this section for the restricted dataset can be found in Appendix A.

4.2 Outcome variables

All of the outcome variables chosen were categorical, yet they were changed to binary for easier use. Thus, now they only take two values - zero and one.

Unmet need for family planning (from IR)

This variable includes women who have unmet need either for limiting or spacing of children. Woman is considered to have an unmet need for spacing if a current pregnancy or last birth was wanted later even in the case that the pregnancy or birth was due to contraceptive failure. And women with an unmet need for limiting the size of their family are those whose current pregnancy or last birth was unwanted even in the case that the pregnancy or birth was due to contraceptive failure. If women have unmet need either for spacing or timing the variable takes on value one, furthermore, the variables takes on value zero, if women have either no unmet need, use of contraception or they were considered infecund/menopausal.

Current contraceptive method (from IR)

Women, who or their partners are currently using any method or doing something to prevent or delay getting pregnant, were asked what contraceptive method they are using. Pregnant women were automatically excluded from asking that question. Contraceptive methods include pill, intrauterine contraceptive device (IUD), injections, diaphragm, female and male condom, female and male sterilization, periodic or prolonged abstinence, implants, withdrawal, emergency contraception, foam or jelly, lactational amenorrhea (LAM), standard days method (SDM), and other less common methods. The variables take a value of one in case that women are using any of the methods.

Decision maker for using or not using contraception (from IR)

Women in unions who use contraception are asked whether the use of contraception is mainly their decision, her husband's/partner's decision, or if it is a joint decision. Correspondingly, women in union and not using contraception are asked whether the non-use of contraception is mainly her decision, her husband's/partner's decision, or if it is a joint decision. On condition that men are involved in the decision, the variable will have a value of one; otherwise, it is zero.

4.3 Independent variables

The chosen independent variables can be divided into four main groups: background characteristics of men (including age, education, wealth religion), their knowledge of contraception, attitudes towards contraception, and their fertility preferences. The background characteristics variables have proven to have significant effects in other studies, thus it is essential to include them in our

model. However, the aim of this thesis is to demonstrate the importance of including men in FP programs. Therefore, our hypotheses are based on variables concerning men's knowledge, attitudes, and fertility preferences.

4.3.1 Background characteristics. variables

Control variables include men's in 5-year groups (only aged 15-54 were interviewed), place of residence (rural vs. urban), wealth index distinguishing between rural and urban areas (lowest, second, middle, fourth, highest), religion (Catholic, Methodist, Assemblies of God, Universal Church of the Kingdom of God, Jehovah's Witnesses, Protestant, Islamic, Animism, without religious) and education (no education, primary, secondary, higher). In the analysis, only Catholic and Protestant have separated group since they represent the majority, other religions are group in one catgory - other religion.

4.3.2 Knowledge

The category knowledge contains three variables concerning the men's knowledge of contraception as well as the knowledge of the fertile period and the possibility of getting pregnant after giving birth. The detailed description of variables is provided as well as the hypotheses concerning the variables.

Hypothesis 1: *Men's incorrect knowledge of the fertile period (ovulatory cycle) has a positive effect on men deciding on using contraception.*

Hypothesis 2: *Men's correct knowledge of getting pregnant after birth before the period return has a positive impact on men deciding on using contraception*

Hypothesis 3: *Men's knowledge of contraception has a significant positive effect on contraception use.*

Hypothesis 4: *Men's knowledge of contraception has a significant positive effect on the decision to use contraception by men.*

Knowledge of ovulatory cycle

This variable detects if men have correct knowledge of women's fertile period. It is based on this question from the men's questionnaire, "From one menstrual period to the next, are there certain days when a woman is more likely to become pregnant when she has sexual relations?". To have adequate knowledge, the respondent should answer that it is in the middle of the woman's cycle. Other options were before the period begins, during the period, after the period has ended and at any time.

Can women get pregnant after birth before period return

This variable detects if men have correct knowledge of women's chance to get pregnant after birth before period return. To have adequate knowledge, the respondent should answer that it is possible since women are ovulating before their period returns.

Knowledge of any contraceptive method

Men's knowledge of contraception is taken based on this question, "Now I would like to talk to you about family planning – the various ways or methods that a couple can use to delay or avoid a pregnancy. Have you heard of (some of the method)?". The number of known contraceptive methods represents how many times the answer was "yes".

4.3.3 Attitudes towards contraception

The next variables indicate whether the men have positive or negative attitudes towards contraception. The first two variables are derived from the men's survey, where men were asked if they agree or disagree with the statements. Furthermore, hypotheses regarding these variables are presented first.

Hypothesis 5: *Agreement with the statement that women who use contraception become promiscuous has a significant positive effect on women having an unmet need.*

Hypothesis 6: *Disagreement with the statement that contraception is a women's business positively affects the men's involvement in a decision about using contraception.*

Hypothesis 7: *Disagreement with the statement that contraception is a women's business positively affects contraception use.*

Hypothesis 8: *Discussing FP with a health worker has a negative effect on having an unmet need.*

Hypothesis 9: *Use of a condom during last sex has a positive effect on men deciding about using contraception.*

Hypothesis 10: *Use of a condom during last sex has a positive effect on contraception use.*

Hypothesis 11: *Not using a condom during the last sex positively affects women having unmet needs.*

Women who use contraception become promiscuous

In case of disagreement with the statement, the attitude is considered as positive.

Contraception is women's business, men should not worry

In case of disagreement with the statement, the attitude is considered as positive.

Discussed FP with a health worker in the last few months

The attitude is considered positive if the man discussed family planning with a health worker in the last few months.

Condom used during last sex with most recent partner

The attitude is considered positive when the respondent used a condom the last time he had sexual intercourse. It includes only men who had at least one sexual partner during the previous 12 months.

4.3.4 Fertility preferences

There are two variables in this category presented, along with two hypotheses stated relevant to them.

Hypothesis 12: *Wanting no more children has a positive effect on not using contraception.*

Hypothesis 13: *Preferred waiting time higher than a year is positively correlated with contraception use.*

Hypothesis 14: *Preferred waiting time being less than a year has a negative effect on having an unmet need.*

Fertility preferences

Fertility preferences capture men's desire for another child. Men who declared infecund, never had sex, and are sterilized (respondent or partner) have their categories and are not included in the category – no more children.

Preferred waiting time for birth of a/another child

The base for this variable are all men wanting another child, the waiting time for birth of a child is split into two categories (1) waiting time is less than a year and (2) waiting time is over a year.

4.4 Sampling weights and sample probabilities

Due to the disproportionate allocation of samples to the different provinces and the possible differences in response rates, sampling weight needs to be used in the analysis of the data. By using them, we ensure that the survey results are representative at national, domain levels, urban and rural levels, as well as at the level of sociodemographic variables such as gender, age groups, education level, and socioeconomic quintiles of the population. The theoretical background of sampling weights is based on Angola, Final Report (2017).

Formally, Angola is divided into 18 provinces, each province was divided into rural and urban areas that yielded 36 sampling strata. Samples were chosen independently in each sampling

stratum by a three-stage selection process. To collect data, Angola was divided into clusters (C) with well-defined borders. In the first stage, standard enumeration areas (SEAs) were chosen with a probability proportional to size (PPS) within each stratum, a SEA corresponds to 3-5 clusters. In the second stage, a cluster was systematically selected in each SEA with PPS. Finally, fewer than 30 households were selected in every cluster in the third stage.

It follows that the sampling weight depends on the sampling probabilities, which are calculated individually for each stage of the sampling and each cluster.

(1) The probability of selecting the SEA in stratum h for our sample is calculated as follows:

$$p_{1hi} = \frac{n_h \times M_{hi}}{M_h}$$

Where:

n_h is the number of SEAs selected in stratum h;

M_{hi} is the total number of households by sampling frame in the i^{th} SEA of stratum h;

$M_h = \sum M_{hi}$ is the total number of households in stratum.

(2) The probability of selecting cluster C_j from the SEA_i in stratum h, is calculated as follows:

$$P_{2hij} = \frac{M_{hij}}{M_{hi}}$$

Where:

M_{hij} is the total number of households for C_j from the SEA_i in stratum h;

(3) The third stage's selection probability for each household in the C is calculated as follows:

$$P_{3hij} = \frac{m_{hij}}{M'_{hij}}$$

Where:

m_{hij} is the total number of households selected in c_j in the SEA_i in stratum h

M'_{hij} is the total number of households in c_j in the SEA_i in stratum h.

The selection probability of each household in c_j in the SEA_i in stratum h is therefore, a product of all three probabilities above:

$$P_{hij} = P_{1hi} \times P_{2hij} \times P_{3hij} = \frac{n_h \times M_{hi}}{M_h} \times \frac{M_{hij}}{M_{hi}} \times \frac{m_{hij}}{M'_{hij}} = \frac{n_h \times M_{hij}}{M_h} \times \frac{m_{hij}}{M'_{hij}}$$

The sampling weight (W_{hij}) for each household in c_j in the SEA_i in stratum h, is calculated as the inverse of the overall selection probability:

$$W_{hij} = 1/P_{hij} = \frac{M_h \times M'_{hij}}{n_h \times M_{hij} \times m_{hij}}$$

The design weights were adjusted for individual non-response to obtain the sampling weights for women and men, accordingly. Non-response is adjusted at the sampling stratum level. Finally, the men's sampling weight is calculated as follows:

$$W'_{hij} = W_{hij} \times \frac{m'_{hij}}{m''_{hij}}$$

Where:

m'_{hij} is the number of men interviewed in C_j from the SEA_i in stratum h;

m''_{hij} is the number of men with complete interviews in C_j from the SEA_i in stratum h

As follows, the final sampling weights were normalized in order to obtain the final standard weights that are part of the data set and were used in this thesis. The normalisation process takes place in order to get a total number of unweighted cases, which is equal to the total number of weighted cases at the domain and national level for the total number of men.

Because the data for couple recode are merged from women's and men's datasets, they contain sampling weights for both spouses. Following the process of computing the weight, it is clear that the numbers differ. One of the approaches to deal with this inconsistency would be to composite a couple's weight, which is proposed because the couple non-response rate varies and it is greater than the one from either the men or women. Since this would be more complicated to implement and since the effect would be trivial according to DHS Data Specialists, only women's and men's sample weight are considered. Despite this, it would make very little empirical difference using either one of the weights, the sampling weight for men is preferred considering the fact that it is adjusted for men non-response, which is more serious than non-response for women. To apply the weights for our data function called *svydesign* from a *survey* package in R is used, it is designed to adjust the data according to weights. Implementing the function to our dataset and how our variables were changed can be seen in Table 3.1. The table illustrates the percentile distribution of women and men of age from a range of 15-59 by selected background characteristics. Since only women aged 15-49 took part in the survey, the age category 50-59 is not applicable for

women. Concerning residence, wealth quintile, and region, all data are the same for women and men as a result of working with the couple recode.

Table 4.1: Background characteristics of respondents

	Women			Men		
Background characteristics	Weighted percent	Weighted number	Unweighted number	Weighted percent	Weighted number	Unweighted number
Age						
15-19	8.7	204	224	0.9	21	26
20-24	21.7	509	540	11.0	259	272
25-29	21.5	504	515	20.7	486	482
30-34	16.7	393	411	18.2	428	426
35-39	14.9	351	351	15.7	369	362
40-44	10.7	252	237	14.5	342	376
45-49	5.8	136	127	12.5	294	284
50-59	na	na	na	6.4	151	177
Religion						
Catholic	41.5	975	981	41.0	963	980
Protestant	34.1	800	893	30.7	720	803
Other religion	18.4	432	385	11.9	278	273
Without religion	6.0	142	146	16.5	387	349
Residence						
Urban	64.8	1,521	1,366	64.8	1,521	1,366
Rural	35.2	828	1,039	35.2	828	1,039
Education						
No education	27.5	646	786	8.6	203	259
Incomplete primary	31.6	742	750	26.0	610	634
Complete primary	6.0	140	148	7.9	186	198
Incomplete secondary	24.8	582	512	35.8	841	805
Complete secondary	6.5	154	146	13.7	323	343
Higher	3.6	86	63	8.0	188	166
Wealth quintile						
Lowest	17.5	412	535	17.5	412	535
Second	19.7	462	514	19.7	462	514
Middle	21.7	510	494	21.7	510	494
Fourth	20.9	492	431	20.9	492	431
Highest	20.2	473	431	20.2	473	431
Region						
Cabinda	2.3	54	133	2.3	54	133
Zaire	2.4	57	152	2.4	57	152
Uíge	5.4	127	145	5.4	127	145
Luanda	34.3	806	256	34.3	806	256
Cuanza Norte	1.4	32	113	1.4	32	113
Cuanza Sul	8.7	205	140	8.7	205	140
Malanje	3.3	76	112	3.3	76	112
Lunda Norte	3.2	76	148	3.2	76	148
Benguela	8.2	192	142	8.2	192	142
Huambo	7.7	182	141	7.7	182	141
Bié	5.1	120	141	5.1	120	141
Moxico	2.0	47	97	2.0	47	97
Cuando Cubango	1.2	29	77	1.2	29	77
Namibe	1.1	25	123	1.1	25	123
Huíla	8.8	207	161	8.8	207	161
Cunene	2.1	50	83	2.1	50	83
Lunda Sul	1.7	40	127	1.7	40	127
Bengo	1.1	25	114	1.1	25	114
TOTAL	100	2,349	2,405	100	2,349	2,405

4.5 Descriptive statistics

Table 3.2 presents the descriptive statistics for the three considered dependent variables. All of the variables are binary variables, so they take only two values - zero and one. Even though we had 2,405 observations, after weighting data, our total sample reduced to 2,349 observations. As it was presented, the total number of observations should remain the same after the weighting process. However, since we only work with the subset of the original dataset for which the weights we computed, we obtain a lower total number of respondents.

Moreover, the number is even lower for *Decision maker* because the questions about decision making were asked only to nonpregnant women. Besides, it is assumed that women who are menopausal, sterilized, or declared themselves infecund, do not use family plannings. Table 3.2 illustrates that while 73.8% of men participate in decision for (not) using contraception, the women's use of contraception stands only at 12.6%, and 37.3% have an unmet need for family planning.

Table 4.2: Descriptive statistics for dependent variables

Variable	Mean	St. Dev	Min	Max
Unmet need	0.373	0.484	0	1
Using contraception	0.126	0.332	0	1
*Decision maker**	0.738	0.440	0	1

N=2,349; for *Unmet need* and *Using contraception*
*N=2,006 for *Decision maker*

Table 3.3 shows the descriptive statistics for independent variables. There are only three continuous variables, which includes *Age*, *Education*, and *Number of known contraceptive method*. The rest of the variables are either dummy variables or categorical variables that were remade into the dummy variables as well. For the dummy variables, the means measure the percentage proportion of the data. Thus, the table indicates that respondents are almost equally distributed among the wealth quintiles, more of the respondents, 64.8% to be precise, live in urban areas, most of the respondents are religious - the largest proportions take Catholics and Protestants. In general, we can see that the men's knowledge of contraception and attitude towards contraception is not significant at all, only 6.4% of men knew the ovulatory cycle and fertile days, 14.8% used a condom during last sex, less than a quarter discussed the family planning with a health worker. On average, they knew 6.7 of contraception methods from a total of 20 methods.

Again, the number of observations is equal to 2,349, but it was less for the variable *Condom use*, which represents if the condom was used at last sex. This question was not asked to the respondents who did not have sex over the past twelve months. For this reason, the new category was made for respondents who did not have sex during last year. In addition, we can see that

the numbers for those three variables *Undecide*, *No more*, *Sterilized or Declared infecund* are identical since the question about preferred waiting time was based on the fertility preferences. Those variables will be used only once in our model since it would make no sense to use them twice.

Table 4.3: Descriptive statistics for independent variables

Variable	Mean	St. Dev	Min	Max
Age	35.054	8.916	16	54
Education	7.388	4.225	0	24
Number of known method	6.772	4.226	0	15
Dummy variables				
Residence urban	0.648	0.478	0	1
Know ovulatory cycle	0.064	0.245	0	1
Pregnant after giving birth	0.581	0.493	0	1
Discussed FP with Heathworker	0.236	0.425	0	1
Categorical variables				
Wealth				
Lowest	0.175	0.380	0	1
Second	0.197	0.398	0	1
Middle	0.217	0.412	0	1
Fourth	0.209	0.407	0	1
Highest	0.202	0.401	0	1
Religion				
Catholic	0.410	0.492	0	1
Protestant	0.307	0.461	0	1
Other religion	0.119	0.323	0	1
Without religion	0.165	0.371	0	1
Promiscuous				
Agree	0.317	0.465	0	1
Disagree	0.501	0.500	0	1
Don't know	0.182	0.386	0	1
Women's business				
Agree	0.411	0.492	0	1
Disagree	0.459	0.459	0	1
Don't know	0.131	0.337	0	1
Condom				
Used	0.146	0.353	0	1
Not used	0.854	0.353	0	1
No sex during last year	0.019	0.136	0	1
Fertility preferences				
Wants another	0.596	0.491	0	1
Undecided	0.086	0.281	0	1
No more	0.296	0.456	0	1
Sterilized or Declared infecund	0.022	0.148	0	1
Preferred waiting time				
Wants within a year	0.111	0.314	0	1
Wants after 1+ year	0.351	0.478	0	1
Unsure timing	0.133	0.340	0	1
Undecided	0.086	0.281	0	1
No more	0.296	0.456	0	1
Sterilized or Declared infecund	0.022	0.148	0	1

N=2,349

The detailed frequency distribution of dependent variables among independent variables can be seen in tables 3.4 - 3.6. Table 3.4 represents the proportional distribution of women with unmet and met needs for family planning. Also, the distribution of total demand for family planning is shown. As depicted, the unmet need for family planning exceeds the met need for family planning. We can see that the demand for planning increases with education level and also there is a higher demand for the spacing of the children than for limiting children. This finding is in line with research by MacQuarrie et al. (2015). While the unmet need is almost the same for rural and urban areas, about 37%, there is a significant difference in met need in these areas, it is 18.6% in urban areas and 1.7% in rural areas. Besides, the met need increases with wealth quintile, which confirms the findings of a study by Decker and Constantine (2011). The data also indicate that in case of unmet need discussing family planning with health workers does not really matter. It can also be seen that for unmet needs, there is a larger proportion of men who agree with the statement *Contraception is women's business*, while for met need, the ration of men who disagree with the statement is larger.

Table 3.5 indicates the frequency distribution of women's contraception based on their husband's/partner's characteristics. Contraception is divided into three categories: folkloric, traditional, and modern. The folkloric method includes spiritual methods and locally described methods of unproven effectiveness, such as amulets, herbs, gris-gris, etc. The traditional method consists of periodic abstinence, withdrawal, and country-specific methods of proven effectiveness. Finally, modern methods involve male sterilization, female sterilization, male condom, female condom, the contraceptive pill, intrauterine contraceptive device (IUD), implants, injectables, diaphragm, contraceptive jelly and contraceptive foam, standard days method (SDM), lactational amenorrhea method (LAM), country-specific modern methods and other modern contraceptive methods mentioned by respondents (contraceptive sponge, cervical cap) (Angola, Final Report 2017). Overall, it can be seen that most of the women do not use any method. What is striking that traditional methods are used significantly less often than modern methods. The use of modern methods oscillated at 10% among all age categories except for the age of 30-34, where 17.1% of women used the modern method. In terms of education and wealth, our data confirm that with higher education and larger wealth respectively the use of modern method increases, which was found in a study by Shattuck et al. (2011). As it was shown in previous research by Decker and Constantine (2011), the use of contraception is remarkably different among rural and urban areas. The peculiar thing is that contraception use is the same among women whose husbands agree with the statement that contraception is women's business and among ones whose husbands disagree with the statement. Moreover, the table indicated another odd fact, that there is the same percentage of women using contraception no matter if their husband wants a child or not.

The asterix in table 3.6 indicates that the sample was based on less than 25 unweighted cases, which means that this subgroup is too small and the data are not reliable. It is essential to highlight the fact that in general, men decide more for not using contraception over using it. In general, couples make the decision, whether to use contraception, together. Moreover, it is noticeable that in the matter of age, the decision maker is changed every five years between men and women. Also, comparing the percentage for using contraception while looking at the religion percentage distribution, we can see that there are larger proportions of decisions by wife and husband jointly than among couples who do not use family planning.

Table 4.4: Need and demand for family planning among women

	Unmet need for FP			Met need for FP (currently using)			Total demand for planning[i]			Number	Percentage
Characteristics	For spacing	For limiting	**Total**	For spacing	For limiting	**Total**	For spacing	For limiting	**Total**	of women	of demand satisfied[ii]
Age											
15-19	28.6	4.8	33.3	9.5	0.0	9.5	38.1	4.8	42.9	21	9.5
20-24	35.1	3.9	39.0	7.3	3.5	10.8	42.5	7.3	49.8	259	10.8
25-29	29.4	5.1	34.6	10.9	1.4	12.3	40.3	6.6	46.9	486	12.4
30-34	29.9	8.9	38.8	12.4	5.8	18.2	42.3	14.7	57.0	428	18.2
35-39	26.3	15.7	42.0	9.5	5.7	15.2	35.8	21.4	57.2	369	15.2
40-44	16.7	19.9	36.5	2.9	8.2	11.1	19.6	28.1	47.7	342	11.1
45-49	16.7	25.5	42.2	3.7	6.1	9.9	20.4	31.6	52.0	294	9.9
50-59	5.3	14.6	19.9	0.0	3.3	3.3	5.3	17.9	23.2	151	3.3
Residence											
Urban	24.6	12.4	37.0	11.4	7.2	18.6	36.0	19.6	55.6	1,521	18.6
Rural	24.9	12.9	37.8	1.2	0.5	1.7	26.1	13.4	39.5	828	1.7
Religion											
Catholic	22.3	12.7	35.0	6.0	4.9	10.9	28.3	17.5	45.9	963	10.9
Protestant	23.2	12.4	35.6	8.2	6.1	14.3	31.4	18.5	49.9	720	14.3
Other religion	25.9	15.8	41.7	12.6	2.9	15.5	38.5	18.7	57.2	278	15.5
Without religion	32.8	10.3	43.2	8.0	3.6	11.6	40.8	14.0	54.8	387	11.6
Education											
No education	25.6	16.7	42.4	1.5	0.5	2.0	27.1	17.2	44.3	203	2.0
Incomplete primary	22.3	13.9	36.2	1.5	2.1	3.6	23.8	16.1	39.8	610	3.6
Complete primary	25.3	15.6	40.9	2.2	9.1	11.3	27.4	24.7	52.2	186	11.3
Incomplete secondary	26.9	13.9	40.8	8.4	4.2	12.6	35.3	18.1	53.4	841	12.6
Complete secondary	23.8	6.8	30.7	15.2	8.4	23.5	39.0	15.2	54.2	323	23.5
Higher	22.3	5.3	27.7	25.5	11.2	36.7	47.9	16.5	64.4	188	36.7
Wealth quintile											
Lowest	23.1	14.6	37.6	2.9	3.2	6.1	26.0	17.7	43.7	412	6.1
Second	27.9	10.6	38.5	5.4	5.6	11.0	33.3	16.2	49.6	462	11.0
Middle	25.5	14.3	39.8	7.1	3.3	10.4	32.5	17.6	50.2	510	10.4
Fourth	22.8	14.6	37.4	7.1	4.3	11.4	29.9	18.9	48.8	492	11.4
Highest	23.9	8.7	32.6	15.9	7.4	23.3	39.7	16.1	55.8	473	23.3
Knowledge of ovulatory cycle											
Uncorrect knowlege	24.1	12.4	36.5	8.0	4.7	12.6	32.1	17.1	49.2	2,199	12.6
Correct knowledge	32.7	16.0	48.7	5.3	6.0	11.3	38.0	22.0	60.0	150	11.3
Can women get pregnant after birth and before period											
Uncorrect knowlege	21.8	12.8	34.7	5.8	3.2	8.9	27.6	16.0	43.6	984	8.9
Correct knowledge	26.7	12.5	39.2	9.2	5.9	15.2	36.0	18.4	54.4	1,365	15.2
Number of known contrapetion method											
0-2	22.9	15.2	38.1	0.6	1.8	2.4	23.5	17.0	40.5	541	2.4
2-5	27.3	9.8	37.1	4.9	3.5	8.4	32.2	13.3	45.5	490	8.4
More than 5	24.4	12.5	37.0	11.9	6.5	18.5	36.4	19.1	55.4	1,317	18.5
Women who use contraception become promiscuous											
Disagree	23.2	13.3	36.5	9.1	4.8	13.9	32.3	18.0	50.3	1,176	13.9
Agree	28.0	12.1	40.1	7.4	5.9	13.3	35.3	18.0	53.4	744	13.3
Don't know	23.1	11.7	34.7	5.1	3.0	8.2	28.2	14.7	42.9	429	8.2
Contraception is women's business											
Disagree	22.5	13.5	36.0	10.2	6.7	16.9	32.7	20.1	52.9	1,078	16.9
Agree	28.2	12.0	40.2	7.0	3.9	10.9	35.2	16.0	51.1	964	10.9
Don't know	20.8	11.7	32.6	2.3	0.7	2.9	23.1	12.4	35.5	307	2.9
Discuss FP with healthworker											
No	24.7	12.8	37.5	7.3	3.8	11.1	32.0	16.7	48.7	1,795	11.1
Yes	24.5	11.9	36.5	9.4	7.9	17.3	33.9	19.9	53.8	554	17.3
Condom used during last sex											
No	24.7	13.2	37.9	6.1	4.0	10.1	30.8	17.2	47.9	1,963	10.1
Yes	24.9	9.1	33.9	18.1	9.4	27.5	43.0	18.4	61.4	342	27.5
No sex during last year	22.7	13.6	36.3	2.3	4.6	6.9	45.0	18.2	43.2	44	6.8
Fertility preferences											
Wants another	28.4	8.6	37.0	10.3	2.9	13.2	38.7	11.5	50.2	1,399	26.2
Undecided	24.6	12.8	37.4	4.9	4.9	9.9	29.6	17.7	47.3	203	20.8
No more	17.9	19.6	37.5	4.3	8.9	13.3	22.2	28.5	50.7	694	26.1
Sterilized or Declared infecund	17.0	24.5	41.5	0.0	0.0	0.0	17.0	24.5	41.5	53	0.0
Prefered waiting time											
Wants within a year	18.5	8.1	26.5	5.0	1.5	6.5	23.5	9.6	33.1	260	26.8
Wants after 1+ year	30.9	9.1	40.0	12.1	3.4	15.5	43.0	12.5	55.4	826	27.9
Unsure timing	30.0	8.3	38.3	9.9	2.6	12.5	39.9	10.9	50.8	313	24.5
Undecided	24.6	12.8	37.4	4.9	4.9	9.9	29.6	17.7	47.3	203	20.8
No more	17.9	19.6	37.5	4.3	8.9	13.3	22.2	28.5	50.7	694	26.1
Sterilized or Declared infecund	17.0	24.5	41.5	0.0	0.0	0.0	17.0	24.5	41.5	53	0.0
TOTAL	24.6	12.6	37.3	7.8	4.8	12.6	32.4	17.4	49.9	2,305	25.3

Note: Total demand is computed as the sum of unmet need and met need.[1]
Percentage of demand satisfied is computed as met need for FP divided by total demand for FP.[2]

Table 4.5: Use of contraceptive methods

Variable	No method	Folkloric method	Traditional method	Modern method	**Total**	Number of women
Age						
15-19	90.5	0.0	0.0	9.5	100.0	21
20-24	89.5	0.0	0.0	10.5	100.0	258
25-29	87.8	0.2	0.6	11.3	100.0	485
30-34	81.8	0.0	1.2	17.1	100.0	428
35-39	84.8	0.0	2.2	13.0	100.0	369
40-44	88.6	0.0	0.6	10.8	100.0	342
45-49	90.1	0.0	0.7	9.2	100.0	294
50-59	96.7	0.0	0.0	3.3	100.0	151
Residence						
Urban	81.4	0.1	1.2	17.3	100.0	1,522
Rural	98.3	0.1	0.2	1.3	100.0	828
Education						
No education	98.5	0.0	0.0	1.5	100.0	202
Incomplete primary	96.6	0.2	0.3	3.0	100.0	610
Complete primary	88.7	0.0	2.7	8.6	100.0	186
Incomplete secondary	87.3	0.1	0.4	12.2	100.0	841
Complete secondary	76.2	0.0	0.9	22.9	100.0	323
Higher	63.8	0.0	4.3	31.9	100.0	188
Wealth quintile						
Lowest	93.9	0.0	0.5	5.6	100.0	411
Second	89.0	0.2	0.6	10.2	100.0	462
Middle	89.4	0.2	1.4	9.0	100.0	510
Fourth	88.6	0.0	0.0	11.4	100.0	491
Highest	77.0	0.0	1.7	21.4	100.0	473
Religion						
Catholic	89.1	0.0	0.5	10.4	100.0	963
Protestant	85.8	0.1	1.5	12.5	100.0	720
Other religion	84.5	0.0	0.7	14.7	100.0	278
Without religion	88.4	0.0	0.5	11.1	100.0	387
Knowledge of ovulatory cycle						
Uncorrect knowlege	87.3	0.0	0.9	11.7	100.0	2,199
Correct knowledge	88.1	0.0	1.3	10.6	100.0	151
Can women get pregnant after birth and before period						
Uncorrect knowlege	91.0	0.1	0.8	8.0	100.0	983
Correct knowledge	84.8	0.1	0.9	14.3	100.0	1,366
Number of known contrapetion method						
0-2	97.8	0.0	0.7	1.5	100.0	541
2-5	91.8	0.2	1.4	6.5	100.0	490
More than 5	81.5	0.0	0.7	17.8	100.0	1,317
Women who use contraception become promiscuous						
Disagree	86.2	0.1	0.7	13.1	100.0	1,177
Agree	86.7	0.1	0.9	12.2	100.0	744
Don't know	91.8	0.0	1.4	6.8	100.0	429
Contraception is women's business						
Disagree	83.1	0.1	1.1	15.7	100.0	1,070
Agree	89.0	0.1	0.7	10.2	100.0	964
Don't know	97.1	0.0	0.7	2.3	100.0	307
Discuss FP with healthworker						
No	88.9	0.1	1.1	9.9	100.0	1,795
Yes	82.6	0.0	0.0	17.4	100.0	553
Condom used during last sex						
No	89.9	0.1	1.0	9.1	100.0	1,963
Yes	72.5	0.0	0.0	27.5	100.0	342
No sex during last year	93.2	2.3	0.0	4.5	100.0	44
Fertility preferences						
Wants another	86.9	0.1	1.0	12.0	100.0	1,398
Undecided	90.1	0.0	2.0	7.9	100.0	203
No more	86.6	0.0	0.4	12.9	100.0	695
Sterilized or Declared infecund	100.0	0.0	0.0	0.0	100.0	53
Preferred waiting time						
Wants within a year	93.1	0.0	0.8	6.1	100.0	261
Wants after 1+ year	84.6	0.1	1.1	14.2	100.0	825
Unsure timing	87.5	0.0	1.3	11.2	100.0	313
Undecided	90.1	0.0	2.0	7.9	100.0	203
No more	86.6	0.0	0.4	12.9	100.0	695
Sterilized or Declared infecund	100.0	0.0	0.0	0.0	100.0	52
TOTAL	87.4	0.1	0.9	11.7	100.0	2,349

Table 4.6: Decision making

	Among women who currently use family planning						Among women who currently do not use family planning					
Variable	Mainly wife	Mainly husband	Wife and husband jointly	Other	Total	Number of women	Mainly wife	Mainly husband	Wife and husband jointly	Other	Total	Number of women
Age												
15-19	*	*	*	*	*	2	*	*	*	*	*	11
20-24	*	*	*	*	*	28	12.8	26.7	52.3	8.1	100.0	172
25-29	15.0	5.0	78.3	1.7	100.0	60	23.3	23.0	50.9	2.8	100.0	326
30-34	15.2	25.3	59.5	0.0	100.0	79	22.7	34.6	37.4	5.2	100.0	286
35-39	16.4	10.9	72.7	0.0	100.0	55	33.5	21.4	41.7	3.4	100.0	266
40-44	15.8	18.4	65.8	0.0	100.0	38	23.3	24.4	50.4	1.9	100.0	262
45-49	*	*	*	*	*	29	21.9	24.3	43.7	10.1	100.0	247
50-59	*	*	*	*	*	5	14.9	27.0	51.1	7.1	100.0	141
Residence												
Urban	16.0	14.2	70.2	0.0	100.4	282	27.6	21.9	46.8	3.7	100.0	1,028
Rural	*	*	*	*	*	12	15.7	31.9	45.1	7.3	100.0	683
Education												
No education	*	*	*	*	*	3	18.0	26.7	47.7	7.6	100.0	172
Incomplete primary	*	*	*	*	*	20	20.7	30.7	41.7	7.0	100.0	489
Complete primary	*	*	*	*	*	21	21.3	34.6	39.0	5.1	100.0	136
Incomplete secondary	16.0	15.1	68.9	0.0	100.0	106	23.3	22.9	49.6	4.2	100.0	617
Complete secondary	7.8	11.7	80.5	0.0	100.0	77	30.8	23.2	45.5	0.5	100.0	198
Higher	24.6	5.8	69.6	0.0	100.0	69	25.3	13.1	54.5	7.1	100.0	99
Wealth quintile												
Lowest	23.1	19.2	57.7	0.0	100.0	26	21.5	30.5	43.4	4.6	100.0	325
Second	5.9	39.2	54.9	0.0	100.0	51	17.3	30.9	47.0	4.8	100.0	330
Middle	18.5	9.3	70.4	1.9	100.0	54	24.9	27.2	40.7	7.1	100.0	393
Fourth	8.9	5.4	85.7	0.0	100.0	56	26.0	19.6	51.1	3.3	100.0	362
Highest	19.4	9.3	71.3	0.0	100.0	108	23.7	21.3	49.7	5.3	100.0	300
Religion												
Catholic	16.2	10.5	72.4	1.0	100.0	105	21.5	24.4	48.0	6.2	100.0	698
Protestant	16.7	9.8	73.5	0.0	100.0	102	20.9	29.3	46.7	3.1	100.0	522
Other religion	7.0	30.2	62.8	0.0	100.0	43	29.0	18.4	46.4	6.3	100.0	207
Without religion	22.2	17.8	60.0	0.0	100.0	45	25.2	29.1	40.4	5.3	100.0	282
Knowledge of ovulatory cycle												
Uncorrect knowledge	13.8	13.4	72.8	0.0	100.0	276	22.8	25.6	46.2	5.3	100.0	1,599
Correct knowledge	*	*	*	*	*	17	23.2	29.5	45.5	1.8	100.0	112
Can women get pregnant after birth and before period												
Uncorrect knowledge	14.6	20.2	64.0	1.1	100.0	89	16.3	28.7	49.5	5.5	100.0	742
Correct knowledge	16.0	11.7	72.3	0.0	100.0	206	27.8	23.8	43.7	4.7	100.0	969
Number of known contraception method												
0-2	*	*	*	*	*	12	18.3	27.8	47.3	6.6	100.0	442
2-5	17.9	23.1	56.4	2.6	100.0	39	19.5	31.8	43.2	5.5	100.0	384
More than 5	14.5	12.8	72.7	0.0	100.0	242	26.4	22.4	46.9	4.3	100.0	885
Women who use contraception become promiscuous												
Disagree	14.7	13.5	71.8	0.0	100.0	163	21.9	24.3	48.2	5.6	100.0	873
Agree	19.6	13.4	67.0	0.0	100.0	97	26.2	25.8	42.7	5.2	100.0	515
Don't know	5.9	20.6	70.6	2.9	100.0	34	20.1	30.3	46.1	3.4	100.0	323
Contraception is women's business												
Disagree	18.9	8.9	71.7	0.6	100.0	180	22.5	22.0	48.9	6.5	100.0	754
Agree	8.7	22.1	69.2	0.0	100.0	104	25.5	26.6	43.8	4.2	100.0	722
Don't know	*	*	*	*	*	9	15.7	36.4	44.5	3.4	100.0	236
Discuss FP with healthworker												
No	11.1	16.2	72.2	0.5	100.0	198	20.7	26.7	47.5	5.1	100.0	1,327
Yes	24.2	10.5	65.3	0.0	100.0	95	30.1	23.4	41.3	5.2	100.0	385
Condom used during last sex												
No	13.2	12.7	73.6	0.5	100.0	197	22.9	26.6	45.6	4.8	100.0	1,471
Yes	20.0	17.9	62.1	0.0	100.0	95	21.3	22.3	50.0	6.4	100.0	202
No sex during last year	*	*	*	*	100.0	3	28.9	15.8	44.7	10.5	100.0	38
Fertility preferences												
Wants another	16.5	13.7	69.2	0.5	100.0	182	21.9	26.5	46.7	4.9	100.0	993
Undecided	*	*	*	*	*	19	17.3	21.3	53.3	8.0	100.0	150
No more	15.2	15.2	69.6	0.0	100.0	92	25.1	26.5	44.1	4.3	100.0	517
Sterilized or Declared infecund	na	na	na	na	na	na	33.3	21.6	35.3	9.8	100.0	51
Preferred waiting time												
Wants within a year	*	*	*	*	*	18	12.5	21.3	60.2	6.0	100.0	216
Wants after 1+ year	14.4	13.6	71.2	0.8	100.0	125	27.0	27.4	42.3	3.3	100.0	551
Unsure timing	12.8	17.9	69.2	0.0	100.0	39	18.5	29.1	44.5	7.9	100.0	227
Undecided	*	*	*	*	*	19	17.3	21.3	53.3	8.0	100.0	150
No more	15.2	15.2	69.6	0.0	100.0	92	25.1	26.5	44.1	4.3	100.0	517
Sterilized or Declared infecund	na	na	na	na	na	na	33.3	21.6	35.3	9.8	100.0	51
TOTAL	15.6	14.2	69.8	0.3	100.0	295	22.9	26.0	46.1	5.1	100.0	1,711

Note: Table excludes women who are currently pregnant. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

5 Methodology

This section provides a theoretical description of the models used in the next chapter. Since the dependent variables in our model are categorical, thus their ranges of values are limited, the variables will not be treated as continuous but the Logit and Probit models will be used instead. The theoretical background of those two models is primarily based on Wooldridge (2015).

5.1 Logit and Probit models

All of our dependent variables are binary and they take only two values - zero when the use of *contraception/unmet need/decision of the husband* is not present, and one if it is present, each of the explained variables is estimated by itself in different models. For estimating our models, the linear probability model (LPM) could be used as it is easy to interpret; however, it has several drawbacks. Firstly, the fitted probabilities can be outside the interval (0,1), another disadvantage is a constant partial effect of the explanatory variable. Due to these limitations, logit and profit models were used for the purposes of this thesis. Both logit and probit models are binary response models, where we mainly observed the response probability

$$\mathrm{P}(y = 1|\mathbf{x}) = P\left(y = 1|x_1, x_2, \ldots, x_k\right),$$

where $\mathbf{x}$ denotes the full set of explanatory variables. In our case, when y represents women's unmet need for contraception, $\mathbf{x}$ contains an individual's characteristics as well as men's fertility preferences, their knowledge about contraception as well as their attitude towards it. To avoid LPM limitations mentioned earlier, we consider nonlinear function G:

$$\mathrm{P}(y = 1|\mathbf{x}) = G\left(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k\right) = G\left(\beta_0 + \mathbf{x}\boldsymbol{\beta}\right) \tag{5.1}$$

which is taking on only values strictly greater than zero and lower than one, that is $0 < G(z) < 1; \forall z \in \mathbb{R}$. In the **logit** model, G represents logistic function with a cumulative distribution function to a standard logistic random variable.

$$G(z) = \frac{\exp(z)}{1 + \exp(z)} = \Lambda(z) \tag{5.2}$$

In the **probit** model, G represents the standard normal cumulative distribution function and it is defined as follows:

$$G(z) = \Phi(z) \equiv \int_{-\infty}^{z} \phi(v)\mathrm{d}v \tag{5.3}$$

where $\phi(z)$ is the standard normal density

$$\phi(z) = (2\pi)^{-1/2} \exp(\frac{-z^2}{2})$$

In both equations above (2) and (3), G represents an increasing function, which increases most quickly at $z = 0$, and as $z \to -\infty, G(z) \to 0$, and as $z \to \infty, G(z) \to 1$. To derive logit and probit model, the **latent variable model** will be used:

$$y^* = \beta_0 + \mathbf{x}\boldsymbol{\beta} + e, \quad y = 1\left[y^* > 0\right] \tag{5.4}$$

where y^* is a latent, or unobserved variable and $1[\cdot]$ defines a binary outcome. It holds that $1[\cdot]$ is equal one if the value in brackets is true, otherwise is zero, stated differently y is one if $y^* > 0$, and y is zero if $y^* < 0$. We must take into consideration that e has either the standard normal distribution or the standard logistic distribution and that e is independent of $\mathbf{x}$. From these assumptions and from equation (4), the response probability for y can be derived:

$$\begin{aligned} \mathrm{P}(y = 1|\mathbf{x}) &= \mathrm{P}\left(y^* > 0|\mathbf{x}\right) = \mathrm{P}\left[e > -\left(\beta_0 + \mathbf{x}\boldsymbol{\beta}\right)|\mathbf{x}\right] \\ &= 1 - G\left[-\left(\beta_0 + \mathbf{x}\boldsymbol{\beta}\right)\right] = G\left(\beta_0 + \mathbf{x}\boldsymbol{\beta}\right) \end{aligned}$$

which is the same equation as (2). Plugging it in previous equations we obtain following equation for logit:

$$\mathrm{P}(y = 1|\mathbf{x}) = G(\beta_0 + \mathbf{x}\boldsymbol{\beta}) = \frac{\exp(\beta_0 + \mathbf{x}\boldsymbol{\beta})}{1 + \exp(\beta_0 + \mathbf{x}\boldsymbol{\beta})}$$

and following equation for probit:

$$\mathrm{P}(y = 1|\mathbf{x}) = G(\beta_0 + \mathbf{x}\boldsymbol{\beta}) = \Phi(\beta_0 + \mathbf{x}\boldsymbol{\beta}) \equiv \int_{-\infty}^{\beta_0 + \mathbf{x}\boldsymbol{\beta}} \phi(v)\mathrm{d}v$$

The drawback of the logit and probit models is the interpretation of the β coefficients comparing to the linear probability model. This is resulting from the nonlinear nature of $\mathrm{G}(\cdot)$. To measure the effect of x_j on the probability of success $\mathrm{P}(y = 1|\mathbf{x})$, partial derivative with respect to x_j has to be calculated:

$$\frac{\partial p(\mathbf{x})}{\partial x_j} = g\left(\beta_0 + \mathbf{x}\boldsymbol{\beta}\right)\beta_j, \quad \text{where} \quad g(z) \equiv \frac{dG}{dz}(z).$$

Given that G(·) is strictly increasing cumulative distribution function and that g is a probability density function, for all z holds that $g(z) > 0$. Consequently, the partial effect of x_j on the probability of success always has the same sign as β_j for all j. In case of x_1 being a binary explanatory variable, the partial effect of changing x_1 from 0 to 1, holding all other variables fixed, is computed as follows:

$$G\left(\beta_0 + \beta_1 + \beta_2 x_2 + \ldots + \beta_k x_k\right) - G\left(\beta_0 + \beta_2 x_2 + \ldots + \beta_k x_k\right)$$

In case of categorical variables (such as wealth quintile in our case), the effect on the probability of x_k going from c_k to c_{k+1} is computed:

$$\begin{aligned} &G\left[\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k\left(c_k + 1\right)\right] \\ &-G\left(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k c_k\right) \end{aligned} \tag{5.5}$$

Magnitude is more difficult to estimate since the regression estimates are reported in the log-odds form. However, several options can be used for interpretation. The first method for estimating logit and probit models is that each explanatory variable can be replaced with its sample average, then, if we multiply it by $\hat{\beta}_j$, we get the partial effect of x_j for the "average person", this is called the partial effect at the average (PEA). Unfortunately, it does not make sense to use it for binary variables, for example looking at the respondent's place of residence in our case, we would say that the average person lives in 64.8% urban areas. The second method is average partial effect, or the average marginal effect (AME), which averages the individual partial effect across the sample. Because both the AME and the PEA depend on the approximation of equation (), neither of them makes much sense for our case, since most of the explanatory variables are discrete. Instead, we need to use equation (5) for computing discrete analog of the partial effect:

$$\begin{aligned} &G\left[\hat{\beta}_0 + \hat{\beta}_1 \bar{x}_1 + \ldots + \hat{\beta}_{k-1}\bar{x}_{k-1} + \hat{\beta}_k\left(c_k + 1\right)\right] \\ &-G\left(\hat{\beta}_0 + \hat{\beta}_1 \bar{x}_1 + \ldots + \hat{\beta}_{k-1}\bar{x}_{k-1} + \hat{\beta}_k c_k\right) \end{aligned},$$

where $G(z) = exp(z)/[1+exp(z)]$ in the logit and G is the standard normal cumulative distribution function in the probit. Then the average partial effect is computed as follows:

$$\begin{aligned} n^{-1}\sum_{i=1}^{n} \Big\{ &G\left[\hat{\beta}_0 + \hat{\beta}_1 x_{i1} + \ldots + \hat{\beta}_{k-1} x_{ik-1} + \hat{\beta}_k\left(c_k + 1\right)\right] \\ &-G\left(\hat{\beta}_0 + \hat{\beta}_1 x_{i1} + \ldots + \hat{\beta}_{k-1} x_{ik-1} + \hat{\beta}_k c_k\right)\Big\} \end{aligned}$$

Because all explanatory variables other than x_k are being held fixed at their observed values, the partial effect is obtained. For a goodness-of-fit measure, the traditional R-squared cannot be used and instead of it, pseudo R-squared by McFadden is introduced. It is computed as $1 - L_{ur}/L_o$, where L_{ur} represents the log-likelihood function for the estimated model, and L_o stands for the log-likelihood function in the restricted model with only an intercept. The interpretation of the pseudo R-squared is the same as the interpretation of the traditional one, it indicates to what extent is the variation in data explained.

5.2 Estimation and interpretation of models

For the estimation of our binary response models with unequal selection probabilities, we use the Horvitz–Thompson estimator, which is frequently applied in survey analyses. The Horvitz–Thompson estimator is a method for estimating the mean and total of a pseudo-population in a stratified sample. The stratification and inverse probability weighting of the data was explained in the previous chapter. However, the output of the svyglm() function, which is used for analyzing our data in R is not maximum likelihood. Even if our models are assumed to be true, it would not be possible to compare our models using likelihood ratio tests, since the models fitted by svyglm() do not have methods for the generic likelihood-ratio test and thus Wald tests must be computed (Lumley 2011). In general, the Wald test compares restricted and unrestricted models. Moreover, the Wald statistic is fundamentally the F statistics after a transformation and it is distributed asymptotically according to the chi-square distribution with number of degrees of freedom being equal to the number of restrictions, which are tested (Wooldridge 2015).

6 Empirical Results

In this section, we apply the methodology from the previous section and present and discuss the results of our empirical models. To discover the impact of our independent variables on our explanatory ones, we use probit and logit models. Furthermore, this section is divided into three parts according to our dependent variables; in each part probit and logit models are used. The first part of the analysis focuses on the contraception use variable. The second part is devoted to the unmet need for family planning, and the last one investigates the effect of our dependent variables on the decision making about contraception. The data were analyzed in R studio using the survey package primarily due to the applied weights. Moreover, the regression of the model without applying the weights can be found in Appendix B. Also, the models for restricted dataset can be seen in Appendix C.

6.1 Current contraceptive method

The reason behind choosing logit and probit models was discussed in Methodology. The first model presents the differences between women who use any type of contraception - tradition, folkloric, and modern - and those who use none.

Unfortunately, the generic likelihood-ration test cannot be used to find the best fitting model (Lumley 2011). Thus, a Wald test is run on several models, comparing the restricted and unrestricted model. The Wald test is a method finding out if explanatory variables are significant; in other words, if they add something to a model. If they are not significant, they can be deleted from the model without affecting it in any meaningful way. Running the Wald test across several models, we could reject the null hypothesis for most of the variables. The null hypothesis claims that all of our chosen coefficients are equal to 0 at a 10% significance level. In the case, when we fail to reject the null hypothesis, the variables are included in our hypothesis from section 4. Therefore, they are kept in the model anyways and the following unrestricted model is used:

$$\begin{aligned} P(use = 1|\mathbf{x}) = & G\,(\beta_0 + \beta_1 age + \beta_2 education \; + \beta_3 residence + \beta_4 wealth\_1 + \beta_5 wealth\_2 \\ & + \beta_6 welath\_3 + \beta_7 wealth\_4 + \beta_8 rel\_caltholic + \beta_9 rel\_protestant \\ & + \beta_{10} rel\_other + \beta_{11} preg\_after + \beta_{12} FP\_w\_healthworker + \beta_{13} condom \\ & + \beta_{14} nosex + \beta_{15} know\_method\_25 + \beta_{16} know\_method\_6 + \beta_{17} prom\_agree \\ & + \beta_{18} prom\_dont\_know + \beta_{19} know\_ovulatory + \beta_{20} women\_bussines\_agree \\ & + \beta_{21} women\_bussines\_dont\_know + \beta_{22} pref\_ster + \beta_{23} pref\_undecide \\ & + \beta_{24} pref\_nomore + \beta_{25} wait\_more + \beta_{26} wait\_unsure\_time) \end{aligned}$$

The function G(·) represents either a logistic or probit function. As it is described in the previous

section, the interpretation of logic and probit model is not straightforward. Therefore, Average Marginal Effect (AME) is applied. By using the theoretical knowledge, results for both logit and probit are estimated in Table 6.1. AME are provided for both models as well. For the comparison and robustness check, the model is also estimated without applying weights, and it can be seen in Appendix B.

Overall, we can see that the AME are very similar in terms of significance and value for both logit and probit. Almost half of the variables is significant, in particular, all of the wealth quintiles are significant and yield negative sign. The variable *wealth_5*, the highest wealth quintile, was chosen as a base variable. Comparing the variable *wealth_5* to the lower wealth quintiles, we can support the findings by Decker and Constantine (2011) that wealth indexes are related to the contraception use. We can also support the findings by Decker and Constantine (2011) that education and living in urban areas positively affect contraception use. Any of the religious group were significant. In terms of the attitudes, knowledge, and fertility preferences, hypotheses introduced in section Data can be tested using this model. We can interpret the effects by using the AME.

Hypothesis 3: *Men's knowledge of contraception has a significant positive effect on contraception use.*

We can see that sign of both *know_method_25* and *know_method_6* is positive; however, only knowledge of six and more method is significant at a 5% level. Correspondingly, a knowledge of six and more contraception methods increases the probability of women using contraception on average by almost 8%. It may be a result of men having higher knowledge care more and try to be more involved in their spouses' lives.

Hypothesis 7: *Disagreement with the statement that contraception is a women's business positively affects contraception use.*

The sign of *women_bussines_disagree* is positive; nevertheless, this hypothesis cannot be supported, since our variable is not significant even at the 10% level.

Hypothesis 10: *Use of a condom during last sex has a positive effect on contraception use.*

By using a condom during last sex, the chance of using contraception, in general, is increased by 7.1%. This hypothesis is supported at a 1% significance level. If the couple used condom during the last sexual intercourse, there is a high probability that they use it regularly.

Table 6.1: The Logit and Probit regression and Average Marginal Effects 1

Dependent variable: Contraception use				
	Logit	AME	Probit	AME
age	−0.017	−0.002	−0.009	−0.001
	(0.012)	(0.001)	(0.006)	(0.001)
education	0.072**	0.006**	0.4**	0.007**
	(0.032)	(0.003)	(0.017)	(0.021)
residence	2.356***	0.210***	1.129***	0.185***
	(0.424)	(0.039)	(0.188)	(0.032)
wealth 1	−1.170***	−0.108***	−0.64***	−0.105***
	(0.386)	(0.035)	(0.202)	(0.033)
wealth 2	−0.679*	−0.062*	−0.384*	−0.063*
	(0.406)	(0.035)	(0.217)	(0.035)
wealth 3	−0.777**	−0.068**	−0.430**	−0.071**
	(0.325)	(0.029)	(0.173)	(0.028)
wealth 4	−0.895***	−0.082***	−0.507***	−0.083***
	(0.336)	(0.030)	(0.183)	(0.030)
rel_catholic	−0.202	−0.016	−0.087	−0.014
	(0.332)	(0.031)	(0.180)	(0.030)
rel_prostestant	0.278	0.027	0.159	0.026
	(0.334)	(0.030)	(0.178)	(0.029)
rel_other	−0.428	−0.033	−0.211	−0.035
	(0.343)	(0.031)	(0.187)	(0.031)
know_ovulatory	−0.200	−0.019	−0.153	−0.025
	(0.458)	(0.042)	(0.241)	(0.040)
preg_after	−0.233	−0.021	−0.132	−0.022
	(0.240)	(0.022)	(0.127)	(0.021)
FP_ w_healthworker	−0.140	−0.012	−0.074	−0.012
	(0.264)	(0.024)	(0.146)	(0.024)
condom	0.772***	0.071***	0.450***	0.074***
	(0.281)	(0.026)	(0.159)	(0.027)
nosex	0.171	0.016	0.160	0.026
	(0.553)	(0.050)	(0.292)	(0.050)
know_method_25	0.574	0.056	0.309	0.051
	(0.415)	(0.037)	(0.192)	(0.032)
know_method_6	0.836**	0.080**	0.448**	0.074**
	(0.413)	(0.038)	(0.192)	(0.032)
promiscuous agree	−0.032	−0.0002	−0.021	−0.03
	(0.273)	(0.025)	(0.144)	(0.024)
promiscuous_dont_know	1.162***	0.104***	0.628***	0.103***
	(0.410)	(0.037)	(0.218)	(0.036)
women_bussines_disagree	0.395	0.034	0.209	0.034
	(0.241)	(0.022)	(0.128)	(0.021)
women_bussines_dontknow	−1.402**	−0.127**	−0.698**	−0.115**
	(0.674)	(0.061)	(0.333)	(0.055)
pref_ster	−13.925***	−1.266***	−4.387***	−0.720***
	(0.590)	(0.101)	(0.302)	(0.064)
pref_undecide	0.317	0.032	0.209	0.034
	(0.448)	(0.045)	(0.254)	(0.042)
pref_nomore	0.476	0.043	0.291	0.048
	(0.421)	(0.039)	(0.215)	(0.036)
waiting_unsure_time	0.735	0.065	0.407	0.070
	(0.483)	(0.044)	(0.250)	(0.041)
waiting_more	0.869**	0.080**	0.527***	0.087***
	(0.395)	(0.036)	(0.202)	(0.034)
Constant	−4.761***		−2.582***	
	(0.840)		(0.412)	
Observations	2,349	2,349	2,349	2,349
Pseudo R^2	0.153		0.151	
Note:				*p<0.1; **p<0.05; ***p<0.01

Hypothesis 12: *Wanting no more children has a positive effect on not using contraception.*

Hypothesis 12 cannot be supported even at a 10% significance level.

Hypothesis 13: *Preferred waiting time higher than a year is positively correlated with contraception use.*

We can support Hypothesis 13 at a 5% significance level. Waiting more than a year before having a/another child approximately increases the chance of using contraception by 8%. If the woman wants a baby within a year, it does not make sense to use contraception for her; therefore, the chance of using contraception increases for the ones who want a child later.

Overall, three out of five the hypotheses tested are stated to be statistically significant and they have the expected sign. Hypotheses 7, 12, and 13 cannot be supported because of the statistical insignificance.

6.2 Unmet need for family planning

The second model presents the differences between women who have unmet needs for family planning and those who do not have any. Having unmet need includes both limiting and spacing children.

Again, The Wald test was run on several models. Nevertheless, after consideration of its results and our hypotheses, we decided to keep all of the variables. Following model is used:

$$\begin{aligned} P(unmet = 1|\mathbf{x}) = & G\,(\beta_0 + \beta_1 age + \beta_2 education \; + \beta_3 residence + \beta_4 wealth\_1 + \beta_5 wealth\_2 \\ & + \beta_6 welath\_3 + \beta_7 wealth\_4 + \beta_8 rel\_caltholic + \beta_9 rel\_protestant \\ & + \beta_{10} rel\_other + \beta_{11} preg\_after + \beta_{12} FP\_w\_healthworker + \beta_{13} condom \\ & + \beta_{14} nosex + \beta_{15} know\_method\_25 + \beta_{16} know\_method\_6 + \beta_{17} prom\_agree \\ & + \beta_{18} prom\_dont\_know + \beta_{19} know\_ovulatory + \beta_{20} w\_bussines\_agree \\ & + \beta_{21} w\_bussines\_dont\_know + \beta_{22} pref\_ster + \beta_{23} pref\_undecide \\ & + \beta_{24} pref\_nomore + \beta_{25} wait\_more + \beta_{26} wait\_unsure\_time) \end{aligned}$$

The probit and logit regression are shown in Table 3.2. Overall, it can be seen that Catholics and Protestants are more likely to have lower unmet needs, in particular, the probability of

having unmet needs for Catholics is 7.4% lower than for those without religion. This can be attributed to the fact that religious people have more children in general (Heaton and Goodman 1985). Having correct knowledge of the possibility of getting pregnant after birth and before the return of the period is significant at 5%. The coefficient yields a positive sign, which suggests that having the correct knowledge is associated with a 5,8% probability to have unmet need. The higher unmet need for contraception might be because that couples know that it is possible to get pregnant before period return; therefore, they want to prevent another pregnancy.

Hypothesis 5: *Agreement with the statement that women who use contraception become promiscuous has a significant positive effect on women having an unmet need.*

The predicted sign of variable *promiscious_agree* corresponds with AME; however, this hypothesis is unable to be supported at any significance level.

Hypothesis 8: *Discussing FP with a health worker has a negative effect on having an unmet need.*

Even though the predicted sign corresponds with AME, this hypothesis cannot be supported even at a 10% significance level.

Hypothesis 11: *Not using a condom not use during the last sex positively affects women having unmet needs.*

The predicted sign of our variable *condom* does correspond with AME; nevertheless, Hypothesis 11 cannot be supported at any significance level.

Hypothesis 14: *Preferred waiting time being less than a year has a negative effect on having an unmet need.*

If the preferred time for having another baby is less than a year, the chance for women having unmet need decreases by almost 13%. Hypothesis 14 is supported at a 1% significance level. If a couple wants another baby within a year, family planning is not necessary; therefore, the unmet need for family planning decreases.

To sum up, only the last hypothesis can be supported. The rest of the hypotheses cannot be supported due to the statistical insignificance.

Table 6.2: The Logit and Probit regression and Average Marginal Effects 2

Dependent variable: Unmet need				
	Logit	AME	Probit	AME
age	−0.007	−0.002	−0.004	−0.002
	(0.007)	(0.002)	(0.004)	(0.002)
education	−0.018	−0.004	−0.011	−0.004
	(0.017)	(0.004)	(0.010)	(0.004)
residence	−0.1005	−0.023	−0.064	−0.024
	(0.146)	(0.033)	(0.090)	(0.033)
wealth1	0.284	0.065	0.178	0.066
	(0.220)	(0.050)	(0.134)	(0.049)
wealth2	0.277	0.063	0.174	0.065
	(0.197)	(0.045)	(0.120)	(0.044)
wealth3	0.340*	0.077*	0.211*	0.078*
	(0.196)	(0.044)	(0.120)	(0.044)
wealth4	0.233	0.053	0.146	0.054
	(0.203)	(0.046)	(0.124)	(0.046)
rel_catholic	−0.325*	−0.074*	−0.201*	−0.074*
	(0.171)	(0.039)	(0.106)	(0.039)
rel_protestant	−0.328*	−0.075*	−0.200*	−0.074*
	(0.179)	(0.041)	(0.110)	(0.041)
rel_other	0.030	0.007	0.021	0.008
	(0.233)	(0.053)	(0.144)	(0.053)
know_ovulatory	0.492**	0.112**	0.304**	0.113**
	(0.243)	(0.055)	(0.151)	(0.055)
preg_after	0.255**	0.058**	0.158**	0.058**
	(0.124)	(0.028)	(0.076)	(0.028)
FP_w_healthworker	−0.043	−0.010	−0.028	−0.010
	(0.155)	(0.035)	(0.095)	(0.035)
no_condom	0.237	0.054	0.143	0.052
	(0.193)	(0.044)	(0.117)	(0.043)
nosex	-0.137	-0.031	-0.083	-0.031
	(0.327)	(0.074)	(0.201)	(0.074)
know_method_25	−0.155	−0.035	−0.094	−0.035
	(0.160)	(0.036)	(0.098)	(0.036)
know_method_6	−0.104	−0.024	−0.065	−0.024
	(0.181)	(0.041)	(0.111)	(0.041)
promiscuous_agree	0.061	0.014	0.037	0.014
	(0.141)	(0.032)	(0.087)	(0.032)
promiscuous_dontknow	−0.017	−0.004	−0.018	−0.007
	(0.181)	(0.042)	(0.113)	(0.042)
women_bussines_agree	0.081	0.019	0.052	0.019
	(0.146)	(0.033)	(0.090)	(0.033)
women_bussines_dontknow	−0.284	−0.065	−0.169	−0.063
	(0.236)	(0.053)	(0.144)	(0.053)
pref_ster	0.097	0.022	0.061	0.022
	(0.050)	(0.102)	(0.278)	(0.103)
pref_undecide	−0.035	−0.008	−0.022	−0.008
	(0.238)	(0.054)	(0.147)	(0.054)
pref_nomore	−0.049	−0.011	−0.031	−0.012
	(0.181)	(0.041)	(0.112)	(0.041)
waiting_unsure_time	−0.047	−0.011	−0.030	−0.011
	(0.190)	(0.043)	(0.117)	(0.043)
waiting_year	−0.620***	−0.141***	−0.376***	−0.139***
	(0.226)	(0.052)	(0.136)	(0.050)
Constant	−0.300		−0.185	
	(0.347)		(0.213)	
Observations	876	876	876	876
Pseudo R^2	0.0281		0.0282	
Note:				*p<0.1; **p<0.05; ***p<0.01

6.3 Decision making

The last model estimates the effects of explanatory variables on decision making about contraception use. In particular, it examines how the independent variables influence men's involvement in deciding about contraception use.

The Wald test was run on several models, comparing the restricted and unrestricted model. The results of the logit regression of considered models can be seen in Table 6.3. For all of the restricted models, we were unable to reject the null hypothesis which states that all of our chosen coefficients are equal to 0 at a 10% significance level. For the result of the Wald test, see Appendix D. After consideration of results from the Wald test and all the factors influencing the unmet need in the related literature, the following model is suggested:

$$\begin{aligned} P(decision = 1|\mathbf{x}) = & G\,(\beta_0 + \beta_1 age + \beta_2 education \; + \beta_3 residence + \beta_4 preg\_after \\ & + \beta_5 FP\_w\_healthworker + \beta_6 condom + \beta_7 nosex \\ & + \beta_8 know\_method\_25 + \beta_9 know\_method\_6 + \beta_{10} prom\_agree \\ & + \beta_{11} prom\_dont\_know + \beta_{12} know\_ovulatory + \beta_{13} w\_bussines\_agree \\ & + \beta_{14} w\_bussines\_dont\_know + \beta_{15} pref\_ster + \beta_{16} pref\_undecide \\ & + \beta_{17} pref\_nomore + \beta_{18} wait\_more + \beta_{19} wait\_unsure\_time) \end{aligned}$$

The result of the regression can be seen in Table 6.4. In general, from the background characteristic variables, only *age* shows significance. It has a negative effect at a 5% level of significant level, the AME is equal to -0.011, which means that one year younger men have a 1.2% higher probability of being involved in the decision of contraception use. Discussing family planning with the health worker is significant at a 1% level. Beyond that, the coefficient surprisingly yields a negative sign, which suggests that the men who discussed the family planning are 15% more likely not to be involved in the decision about contraception. Thus only the women are left to decide about it on their own. The different sign could be partly attributed to the fact that the sample is not large and that the ratio of discussing FP with health worker to not discussing it is higher among women who use contraception than among who do not use it. Moreover, the probability of men being involved in the decision is 32.8% higher for those not wanting more children and 37.5% for men who are not sure about wanting another child.

Table 6.3: Restricted vs. Unrestricted model - Logit regression

Dependent variable: Decision making				
	(1)	(2)	(3)	(4)
age	-0.094**	-0.107***	-0.094**	-0.102***
	(0.039)	(0.035)	(0.041)	(0.035)
education	0.007	0.001	-0.159	-0.003
	(0.091)	(0.087)	(0.096)	(0.091)
residence	-0.412	-0.408	-0.403	-0.568
	(0.807)	(0.789)	(0.822)	(0.885)
wealth1			-0.849	-0.520
			(0.955)	(0.997)
wealth2			0.619	0.082
			(1.024)	(1.074)
wealth3			-0.600	-0.360
			(0.608)	(0.630)
wealth4			0.124	0.420
			(0.624)	(0.659)
rel_catholic		1.018		0.822
		(0.992)		(1.050)
rel_protestant		0.360		0.125
		(0.870)		(0.988)
rel_other		1.532		1.395
		(1.236)		(1.288)
know_ovulatory	-1.680	-1.723*	-1.659	-1.658*
	(1.082)	(0.991)	(1.035)	(0.969)
preg_after	0.243	0.229	0.344	0.387
	(0.583)	0.562	(0.629)	(0.630)
FP_w_healthworker	-1.310***	-1.153***	-1.338***	-1.229***
	(0.447)	(0.424)	(0.408)	(0.447)
condom	-0.308	-0464	-0.501	-0.446
	(0.504)	(0.539)	(0.533)	(0.548)
nosex	-1.168	-1.704	-1.074	-1.366
	(1.283)	(1.492)	(1.392)	(1.659)
know_method_25	0.369	0.265	-0.207	-0.316
	(1.108)	(1.181)	(1.008)	(1.186)
know_method_6	1.407	1.312	1.004	0.900
	(1.018)	(1.095)	(1.022)	(1.118)
promiscuous_agree	-0.692	-0.593	-0.751	-0.674
	(0.512)	(0.491)	(0.517)	(0.505)
promiscuous_dontknow	-0.157	-0.070	-0.094	-0.581
	(0.828)	(0.945)	(0.833)	(0.956)
women_bussines_disagree	-0.924*	-0.941*	-0.831*	-0.841*
	(0.485)	(0.515)	(0.476)	(0.498)
women_bussines_dontknow	-0.667	-0.031	-0.523	0.068
	(1.529)	(1.618)	(1.769)	(1.856)
pref_undecide	3.204**	3.724**	3.217**	3.623**
	(1.374)	(1.539)	(1.452)	(1.622)
pref_nomore	2.803***	3.206***	2.671**	2.961***
	(1.029)	(1.071)	(1.042)	(1.041)
waiting_unsure_time	2.672***	3.521**	2.600**	3.239**
	(1.014)	(1.408)	(1.026)	(1.396)
waiting_more	1.691*	2.099**	1.7221*	2.103**
	(0.938)	(0.971)	(0.9111)	(0.957)
Constant	3.500*	3.131	4.266	3.659
	(2.305)	(2.258)	(2.225)	(2.416)
Observations	295	295	295	295
Pseudo R^2	0.156	0.169	0.169	0.180
Note:				*p<0.1; **p<0.05; ***p<0.01

Hypothesis 1: *Men's incorrect knowledge of the fertile period (ovulatory cycle) has a positive effect on men deciding on using contraception.*

With not knowing the ovulatory cycle, the chance of men being involved in making the decision increases by approximately 17%, this hypothesis can be supported at a 10% significance level. If a man does not have a correct knowledge of the fertile period, most probably he does not know the method of periodic abstinence; therefore, he tends to be more involved in the decision about using modern contraception.

Hypothesis 2: *Men's correct knowledge of getting pregnant after birth before the period return has a positive impact on men deciding on using contraception.*

The predicted sign of variable *preg_after* corresponds with the AME, however, the hypothesis cannot be supported as the variable is not significant at any level.

Hypothesis 4: *Men's knowledge of contraception has a significant positive effect on the decision to use contraception by men.*

Despite the fact that the predicted sign match with AME sign, the variable is not significant at any level either, thus the hypothesis cannot be supported.

Hypothesis 6: *Disagreement with the statement that contraception is a woman business positively affects the men's involvement in a decision about using contraception.*

Although the variable *women_bussines_disagree* is significant at a 10% level, the resulting average marginal effect yielded an opposite sign than we expected. For this reason, Hypothesis 6 cannot be supported. Even though the resulting opposite sign is not expected from a logical view, this relation was found in studies by MacQuarrie et al. (2015).

Hypothesis 9: *Use of a condom during last sex has a positive effect on men deciding about using contraception.*

AME yielded a different sign comparing to our predicted one; however, we cannot support Hypothesis 9 at any significance level.

To conclude, most of our hypotheses could not be supported, three due to being statistically insignificant and one because of the practical insignificance. We can only support Hypothesis 1 at a 10% significant level.

Table 6.4: The Logit and Probit regression and Average Marginal Effects 3

Dependent variable: Decision making				
	Logit	AME	Probit	AME
age	-0.094**	-0.011***	-0.050**	-0.011**
	(0.039)	(0.004)	(0.021)	(0.004)
education	0.007	0.001	0.004	0.001
	(0.091)	(0.012)	(0.046)	(0.010)
residence	-0.412	-0.048	-0.193	-0.041
	(0.807)	(0.093)	(0.466)	(0.097)
know_ovulatory	-1.680	-0.197	-0.986	-0.210
	(1.082)	(0.131)	(0.645)	(0.142)
preg_after	0.243	0.029	0.158	0.034
	(0.583)	(0.068)	(0.308)	(0.066)
FP_w_healthworker	-1.310***	-0.153***	-0.699***	-0.149***
	(0.447)	(0.051)	(0.218)	(0.048)
condom	-0.308	-0.036	-0.137	-0.029
	(0.504)	(0.057)	(0.265)	(0.055)
nosex	-1.168	-0.135	-0.585	-0.123
	(1.283)	(0.143)	(0.732)	(0.149)
know_method_25	0.369	0.043	0.205	0.044
	(1.108)	(0.132)	(0.610)	(0.133)
know_method_6	1.407	0.165	0.764	0.163
	(1.018)	(0.128)	(0.571)	(0.130)
promiscuous_agree	-0.692	-0.081	-0.377	-0.080
	(0.512)	(0.060)	(0.273)	(0.057)
promiscuous_dontknow	-0.157	-0.018	-0.015	-0.003
	(0.828)	(0.097)	(0.434)	(0.092)
women_bussines_disagree	-0.924*	-0.108*	-0.527**	-0.112**
	(0.485)	(0.059)	(0.251)	(0.056)
women_bussines_dontknow	-0.667	-0.078	-0.452	-0.096
	(1.529)	(0.182)	(0.845)	(0.184)
pref_undecide	3.204**	0.375*	1.667**	0.355**
	(1.374)	(1.151)	(0.752)	(0.151)
pref_nomore	2.803***	0.328***	1.524**	0.324***
	(1.029)	(0.115)	(0.590)	(0.123)
waiting_unsure_time	2.672***	0.313***	1.463**	0.312**
	(1.014)	(0.121)	(0.591)	(0.128)
waiting_more	1.691*	0.198*	0.971*	0.312*
	(0.938)	(0.111)	(0.558)	(0.121)
Constant	3.500*		1.903	
	(2.305)		(1.161)	
Observations	295	295	295	295
Pseudo R^2	0.156		0.157	
Note:				*p<0.1; **p<0.05; ***p<0.01

6.4 Correlation vs. Causality

Before we can conclude our result, it is necessary to distinguish between correlation and causality. Correlation measures the size and direction of the relationship between the pair of variables; in other words, it shows us how the variables are changed together. Even though causality and correlation can both exist simultaneously, correlation, unlike causality, does not imply that a change in one variable causes a change of the value for other variables. Correlation only indicates that there can be a relationship between the variables. Although this thesis contains clear examples, identifying the difference between causality and correlation can be difficult.

We consider our results to be correlational, and we need to be aware that the significance of our independent variable does not automatically imply a causality on the outcome of any of our dependent variables. Some of our variables can substitute for unobserved factors such as the discussion between couples about contraception, misconceptions about family planning, or the impact of a health facility; therefore, the interpretation of causality may be tricky. The statistically significant outcome may be examined in future research to inspect the exact associations.

7 Conclusion

The main goal of this thesis was to explore how men's knowledge of contraception, attitudes towards it, and fertility preferences influence their spouses' contraception use, unmet need, and the matter of who decides about contraception. In order to find out to what extend men influence their wives' unmet needs and decisions, the econometric models for binary variables were chosen and several regressions were run on a sample of 2,405 couples from Angola. This thesis was inspired by researches from other countries, mainly by Shattuck et al. (2011), Assaf and Davis (2018), and it focused only on Angola, where the relationship concerning background characteristics, attitude, knowledge, and fertility preferences, has not been investigated.

In terms of data used in our analysis, they were gathered by the Demographic and Health Surveys Program. Due to the recommendation on their website, the data were weighted in order to achieve a more representative sample. Since all three of our dependent variables were remade to binary, the logit and probit regressions were used for all of them. The average marginal effects helped with the interpretation of the regressions.

Firstly, contraception use was examined. Also, the hypotheses which we mostly adopted from already mentioned researches were tested. We found out that men's knowledge of contraception has a positive effect on women's use of contraception. To be precise, knowledge of six and more methods increases the probability of women using contraception by approximately 8%. Moreover, the results showed a positive effect of using a condom during last sex, leading to more than 7% higher probability of women using contraception. Additionally, a positive effect held as well if the preferred time before having another baby is longer than a year.

Secondly, probit and logit models were applied to estimate the effect of men's attitude, knowledge, and fertility preferences on the women's unmet need for family planning. Most of our hypotheses could not be supported due to the statistical insignificance of the variables. However, we could support the hypothesis that states that if the men's preferred waiting time before having another baby is less than a year, the women is less unlikely to have unmet need.

Last but not least, we examined what influences the fact if a man is involved in decision making about contraception or not. Two out of four hypotheses could not be confirmed because of the statistical insignificance. We could not confirm the hypothesis that disagreement with the statement that contraception is a woman business, positively affects the men's involvement in a decision about using contraception due to the practical significance. Even though, the resulting sign was unpredicted, it was also found in a study by MacQuarrie et al. (2015). Additionally,

men who do know the fertile period and thus periodic abstinence method are 17% more likely to be involved in the decision about contraception use.

In addition, the thesis is well aware that it has several limitations. Firstly, the newest data available were from 2015/2016. Since then, the family planning programs may have expanded and the data could have changed, therefore the results do not have to correspond with the current situation in Angola. Secondly, several men had more than one wife, but data was taken only for one of the wives. Despite these shortages, the thesis was able to work with sufficient and reliable data which led to reliable results.

Future research examining the men's influence could be done by controlling for variables concerning decision making in a household, particularly in the matter of who dcides about healthcare, spending earnings, and visiting relatives. Another possible option could be extending the research to other countries, where the relationship has not been examined in this way. Moreover, another approach could be controlling for domestic violence variables. Unfortunately, the DHS program provides these data only for some countries.

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Appendix A: Inconsistent data - tables

Table 7.1: Background characteristics of respondents - inconsistent data

	Women			Men		
Background characteristics	Weighted percent	Weighted number	Unweighted number	Weighted percent	Weighted number	Unweighted number
Age						
15-19	7.7	146	169	1	16	21
20-24	20.2	384	403	10	193	209
25-29	20.5	390	387	19	355	348
30-34	17.7	336	344	18	346	325
35-39	15.4	293	283	16	307	294
40-44	11.6	221	203	15	286	311
45-49	6.8	130	120	14	260	245
15-59	na	na	na	7	136	156
Religion						
Catholic	41.6	790	779	41	774	777
Protestant	33.8	642	715	30	572	631
Other religion	19.4	368	313	12	231	216
Without religion	5.2	99	102	17	323	285
Residence						
Urban	35.5	675	826	36	675	826
Rural	64.5	1,224	1083	64	1,224	1,083
Education						
No education	26.5	504	604	8	154	203
Incomplete primary	32.0	609	600	26	486	490
Complete primary	5.5	105	114	9	164	168
Incomplete secondary	25.0	475	415	35	665	631
Complete secondary	7.1	135	123	14	268	277
Higher	3.8	73	53	8	161	140
Wealth quintile						
Lowest	16.5	314	410	17	314	410
Second	19.1	363	403	19	363	403
Middle	22.3	423	403	22	423	403
Fourth	20.8	395	347	21	395	347
Highest	21.3	405	346	21	405	346
Region						
Cabinda	2.4	45	111	2	45	111
Zaire	2.6	49	130	3	49	130
Uíge	4.9	94	107	5	94	107
Luanda	36.1	685	218	36	685	218
Cuanza Norte	1.3	24	86	1	24	86
Cuanza Sul	9.1	173	121	9	173	121
Malanje	2.8	53	77	3	53	77
Lunda Norte	2.8	53	103	3	53	103
Benguela	7.6	144	106	8	144	106
Huambo	7.6	144	114	8	144	114
Bié	5.3	100	117	5	100	117
Moxico	1.4	27	59	1	27	59
Cuando Cubango	1.2	23	61	1	23	61
Namibe	1.1	20	100	1	20	100
Huíla	9.0	170	132	9	170	132
Cunene	2.2	41	68	2	41	68
Lunda Sul	1.8	33	109	2	33	109
Bengo	1.0	20	90	1	20	90
TOTAL	100	1,889	1,909	100	1,889	1,909

Table 7.2: Descriptive statistics for dependent variables - inconsistent data

Variable	Mean	St. Dev	Min	Max
Unmet need	0.370	0.483	0	1
Using contraception	0.134	0.341	0	1
*Decision maker**	0.732	0.443	0	1

N=1,889; for *Unmet need* and *Using contraception*
*N=1,663 for *Decision maker*

Table 7.3: Descriptive statistics for independent variables - inconsistent data

Variable	Mean	St. Dev	Min	Max
Age	35.663	8.976	16	54
Education	7.472	4.214	0	24
Number of known method	6.884	4.303	0	15
Dummy variables				
Residence urban	0.645	0.479	0	1
Know ovulatory cycle	0.063	0.243	0	1
Pregnant after giving birth	0.583	0.493	0	1
Discussed FP with Heathworker	0.234	0.424	0	1
Categorical variables				
Wealth				
Lowest	0.165	0.371	0	1
Second	0.191	0.393	0	1
Middle	0.222	0.416	0	1
Fourth	0.208	0.406	0	1
Highest	0.213	0.410	0	1
Religion				
Catholic	0.407	0.491	0	1
Protestant	0.301	0.459	0	1
Other religion	0.121	0.327	0	1
Without religion	0.170	0.376	0	1
Promiscuous				
Agree	0.399	0.490	0	1
Disagree	0.472	0.499	0	1
Don't know	0.129	0.335	0	1
Women business				
Agree	0.411	0.492	0	1
Disagree	0.459	0.459	0	1
Don't know	0.131	0.337	0	1
Condom				
Used	0.141	0.348	0	1
Not used	0.859	0.348	0	1
No sex during last year	0.016	0.124	0	1
Fertility preferences				
Wants another	0.590	0.492	0	1
Undecided	0.294	0.286	0	1
No more	0.296	0.456	0	1
Sterilized or Declared infecund	0.027	0.161	0	1
Preferred waiting time				
Wants within a year	0.116	0.320	0	1
Wants after 1+ year	0.338	0.473	0	1
Unsure timing	0.136	0.343	0	1
Undecided	0.090	0.286	0	1
No more	0.294	0.456	0	1
Sterilized or Declared infecund	0.027	0.161	0	1

N=1,889

Table 7.4: Need and demand for family planning among women - inconsistent data

Characteristics	Unmet need for FP: For spacing	Unmet need for FP: For limiting	Unmet need for FP: **Total**	Met need for FP (currently using): For spacing	Met need for FP (currently using): For limiting	Met need for FP (currently using): **Total**	Total demand for planning[i]: For spacing	Total demand for planning[i]: For limiting	Total demand for planning[i]: **Total**	Number of women	Percentage of demand satisfied[ii]
Age											
15-19	28.6	4.8	33.3	9.5	0.0	9.5	38.1	4.8	42.9	21	9.5
Age											
15-19	25.0	6.3	31.3	0.0	0.0	0.0	25.0	6.3	31.3	16	0.0
20-24	35.2	4.1	39.4	8.8	2.1	10.9	44.0	6.2	50.3	193	21.6
25-29	26.8	6.2	33.0	12.7	1.1	13.8	39.4	7.3	46.8	355	29.5
30-34	31.2	9.0	40.2	14.7	7.2	22.0	46.0	16.2	62.1	346	35.3
35-39	24.4	18.2	42.7	9.4	6.8	16.3	33.9	25.1	59.0	307	27.6
40-44	16.4	18.9	35.3	2.8	7.7	10.5	19.2	26.6	45.8	286	22.9
45-49	17.2	24.1	41.4	4.2	6.1	10.3	21.5	30.3	51.7	261	20.0
15-59	4.4	14.0	18.4	0.0	3.7	3.7	4.4	17.6	22.1	136	16.7
Residence											
Urban	24.7	12.9	37.6	1.5	0.4	1.9	26.2	13.3	39.5	676	4.9
Rural	23.0	13.6	36.6	12.2	7.7	19.9	35.1	21.3	56.5	1,224	35.2
Education											
No education	25.3	14.3	39.6	1.9	0.6	2.6	27.3	14.9	42.2	154	6.2
Incomplete primary	21.4	15.2	36.6	1.2	1.6	2.9	22.6	16.8	39.4	487	7.3
Complete primary	26.2	17.7	43.9	0.6	9.1	9.8	26.8	26.8	53.7	164	18.2
Incomplete secondary	24.8	15.0	39.8	9.6	4.1	13.7	34.4	19.1	53.5	665	25.6
Complete secondary	23.9	7.5	31.3	14.6	9.3	23.9	38.4	16.8	55.2	268	43.2
Higher	20.4	5.6	25.9	28.4	13.0	41.4	48.8	18.5	67.3	162	61.5
Wealth quintile											
Lowest	21.3	15.9	37.3	2.9	3.8	6.7	24.2	19.7	43.9	314	15.2
Second	26.8	11.0	37.8	6.4	5.8	12.2	33.1	16.9	50.0	362	24.3
Middle	23.9	14.2	38.1	7.6	3.3	10.9	31.4	17.5	48.9	423	22.2
Fourth	23.0	16.7	39.7	6.8	4.3	11.1	29.9	21.0	50.9	395	21.9
Highest	22.7	9.1	31.9	16.8	7.9	24.7	39.5	17.0	56.5	405	43.7
Religion											
Catholic	21.2	13.6	34.8	6.8	4.8	11.6	28.0	18.3	46.4	774	25.1
Protestant	21.9	13.5	35.3	8.0	7.0	15.0	29.9	20.5	50.3	572	29.9
Other religion	23.2	17.2	40.3	13.3	3.4	16.7	36.5	20.6	57.1	233	29.3
Without religion	32.8	10.2	43.0	9.0	3.4	12.4	41.8	13.6	55.4	323	22.3
Knowledge of ovulatory cycle											
Uncorrect knowlege	23.1	12.9	36.0	8.5	4.9	13.4	31.6	17.8	49.4	1,780	27.1
Correct knowledge	31.7	19.2	50.8	6.7	7.5	14.2	38.3	26.7	65.0	120	21.8
Can women get pregnant after birth and before period											
Uncorrect knowlege	21.2	12.9	34.1	6.4	3.3	9.7	27.7	16.2	43.9	791	22.2
Correct knowledge	25.3	13.7	39.0	9.7	6.3	16.1	35.1	20.0	55.1	1,109	29.1
Number of known contrapetion method											
0-2	22.3	15.6	37.9	0.7	2.0	2.7	22.9	17.6	40.5	449	6.6
2-5	26.5	9.9	36.4	4.0	3.7	7.8	30.5	13.6	44.1	374	17.6
More than 5	23.2	13.6	36.8	13.1	6.9	19.9	36.3	20.5	56.8	1,078	35.1
Women who use contraception become promiscuous											
Disagree	22.0	14.9	36.9	9.6	5.0	14.6	31.6	19.8	51.4	968	28.3
Agree	27.2	11.6	38.8	7.5	6.2	13.7	34.7	17.8	52.5	585	26.1
Don't know	21.8	11.8	33.6	6.3	3.7	10.1	28.2	15.5	43.7	348	23.0
Contraception is women bussines											
Disagree	21.1	14.2	35.3	10.3	7.5	17.7	31.4	21.7	53.0	896	33.5
Agree	27.5	12.7	40.2	7.9	3.4	11.4	35.4	16.1	51.5	757	22.1
Don't know	20.9	12.7	33.6	2.9	0.8	3.7	23.8	13.5	37.3	244	9.9
Discuss FP with healthworker											
No	23.7	13.2	36.9	7.8	4.1	11.8	31.5	17.3	48.7	1,455	24.3
Yes	23.1	13.9	37.1	10.3	8.3	18.7	33.5	22.2	55.7	445	33.5
Condom used during last sex											
No	23.6	13.9	37.5	6.6	4.2	10.8	30.2	18.1	48.3	1,601	22.4
Yes	23.1	11.2	34.3	19.8	10.1	29.9	42.9	21.3	64.2	268	46.5
No sex during last year	29.0	6.5	35.5	3.2	3.2	6.5	32.3	9.7	41.9	31	15.4
Fertility preferences											
Wants another	27.2	9.4	36.6	11.0	3.1	14.1	38.2	12.5	50.7	1,120	27.8
Undecided	27.5	11.7	39.2	4.7	5.3	9.9	32.2	17.0	49.1	171	20.2
No more	15.9	20.7	36.6	5.0	9.5	14.5	20.9	30.2	51.1	560	28.3
Sterilized or Declared infecund	16.0	26.0	42.0	0.0	0.0	0.0	16.0	26.0	42.0	50	0.0
Prefered waiting time											
Wants within a year	16.0	7.3	23.3	5.0	1.8	6.8	21.0	9.1	30.1	219	22.7
Wants after 1+ year	30.4	10.3	40.7	12.9	3.6	16.5	43.4	13.9	57.3	641	28.9
Unsure timing	29.1	8.5	37.6	11.2	2.7	14.0	40.3	11.2	51.6	258	27.1
Undecided	27.5	11.7	39.2	4.7	5.3	9.9	32.2	17.0	49.1	171	20.2
No more	15.9	20.7	36.6	5.0	9.5	14.5	20.9	30.2	51.1	560	28.3
Sterilized or Declared infecund	16.0	26.0	42.0	0.0	0.0	0.0	16.0	26.0	42.0	50	0.0
TOTAL	23.6	13.3	37.0	8.4	5.1	13.4	32.0	18.4	50.4	1,899	26.6

Note: Total demand is computed as the sum of unmet need and met need.[1]
Percentage of demand satisfied is computed as met need for FP divided by total demand for FP.[2]

Table 7.5: Use of contraceptive methods - inconsistent data

Variable	No method	Folkloric method	Traditional method	Modern method	**Total**	Number of women
Age						
15-19	90.5	0.0	0.0	9.5	100.0	21
Age						
15-19	*	*	*	*	*	16
20-24	89.1	0.0	0.0	10.9	100.0	193
25-29	86.4	0.3	0.8	12.4	100.0	354
30-34	78.3	0.0	1.4	20.2	100.0	346
35-39	83.7	0.0	2.6	13.7	100.0	307
40-44	89.9	0.0	0.3	9.8	100.0	286
45-49	89.6	0.0	0.8	9.6	100.0	260
15-59	96.4	0.0	0.0	3.6	100.0	137
Residence						
Urban	98.1	0.0	0.3	1.6	100.0	675
Rural	80.2	0.1	1.5	18.3	100.0	1,225
Education						
No education	98.1	0.0	0.0	1.9	100.0	154
Incomplete primary	97.3	0.0	0.4	2.3	100.0	486
Complete primary	89.7	0.0	3.0	7.3	100.0	165
Incomplete secondary	86.2	0.2	0.5	13.2	100.0	666
Complete secondary	76.1	0.0	0.7	23.1	100.0	268
Higher	59.0	0.0	5.0	36.0	100.0	161
Wealth quintile						
Lowest	93.3	0.0	0.6	6.1	100.0	313
Second	87.9	0.3	0.8	11.0	100.0	363
Middle	89.1	0.0	1.7	9.2	100.0	423
Fourth	89.1	0.0	0.0	10.9	100.0	394
Highest	75.3	0.0	2.0	22.7	100.0	405
Religion						
Catholic	88.4	0.0	0.6	11.0	100.0	774
Protestant	84.8	0.2	1.9	13.1	100.0	572
Other religion	83.2	0.0	0.9	15.9	100.0	232
Without religion	87.6	0.0	0.6	11.8	100.0	323
Knowledge of ovulatory cycle						
Uncorrect knowlege	86.6	0.1	1.0	12.3	100.0	1,780
Correct knowledge	85.1	0.0	1.7	13.2	100.0	121
Can women get pregnant after birth and before period						
Uncorrect knowlege	90.3	0.0	1.0	8.7	100.0	791
Correct knowledge	83.9	0.1	1.1	14.9	100.0	1,108
Number of known contrapetion method						
0-2	97.5	0.0	0.9	1.6	100.0	448
2-5	92.2	0.3	1.9	5.6	100.0	374
More than 5	80.1	0.0	0.8	19.1	100.0	1,078
Women who use contraception become promiscuous						
Disagree	85.4	0.1	0.7	13.7	100.0	968
Agree	86.3	0.0	1.2	12.5	100.0	585
Don't know	89.9	0.0	1.7	8.4	100.0	347
Contraception is women bussines						
Disagree	82.3	0.1	1.2	16.4	100.0	896
Agree	88.5	0.0	0.9	10.5	100.0	759
Don't know	96.3	0.0	0.8	2.9	100.0	245
Discuss FP with healthworker						
No	88.2	0.1	1.4	10.4	100.0	1,455
Yes	81.3	0.0	0.0	18.7	100.0	444
Condom used during last sex						
No	89.1	0.1	1.2	9.5	100.0	1,603
Yes	70.1	0.0	0.0	29.9	100.0	268
No sex during last year	93.3	0.0	0.0	6.7	100.0	30
Fertility preferences						
Wants another	85.8	0.1	1.2	12.8	100.0	1,121
Undecided	90.1	0.0	2.3	7.6	100.0	171
No more	85.5	0.0	0.5	14.0	100.0	559
Sterilized or Declared infecund	100.0	0.0	0.0	0.0	100.0	50
Prefered waiting time						
Wants within a year	93.2	0.0	0.5	6.4	100.0	220
Wants after 1+ year	83.4	0.2	1.4	15.1	100.0	643
Unsure timing	86.0	0.0	1.2	12.8	100.0	258
Undecided	90.1	0.0	2.3	7.6	100.0	171
No more	85.5	0.0	0.5	14.0	100.0	559
Sterilized or Declared infecund	100.0	0.0	0.0	0.0	100.0	50
TOTAL	86.6	0.1	1.1	12.3	100.0	1,899

Table 7.6: Decision making - inconsistent data

	Among women who currently use family planning						Among women who currently do not use family planning					
Variable	Mainly wife	Mainly husband	Wife and husband jointly	Other	Total	Number of women	Mainly wife	Mainly husband	Wife and husband jointly	Other	Total	Number of women
Age												
Age												
15-19	*	*	*	*	*	0	*	*	*	*	*	9
20-24	9.5	4.8	85.7	0.0	100.0	21	15.9	27.0	54.8	2.4	100.0	126
25-29	12.5	6.3	79.2	2.1	100.0	48	24.5	21.3	52.2	2.0	100.0	253
30-34	15.8	25.0	59.2	0.0	100.0	76	24.1	32.9	36.8	6.1	100.0	228
35-39	16.3	12.2	71.4	0.0	100.0	49	36.0	20.7	41.4	1.8	100.0	221
40-44	*	*	*	*	*	27	23.8	23.3	51.1	1.8	100.0	223
45-49	*	*	*	*	*	27	23.0	26.1	40.1	10.8	100.0	221
15-59	*	*	*	*	*	5	14.8	28.1	50.0	7.0	100.0	128
Residence												
Urban	*	*	*	*	*	11	16.0	31.4	45.2	7.4	100.0	564
Rural	16.9	12.8	70.4	0.0	100.0	243	29.6	21.6	46.4	2.4	100.0	844
Education												
No education	*	*	*	*	*	3	17.6	27.5	46.6	8.4	100.0	132
Incomplete primary	*	*	*	*	*	12	22.0	31.6	39.8	6.7	100.0	404
Complete primary	*	*	*	*	*	16	19.7	35.2	40.2	4.9	100.0	122
Incomplete secondary	17.6	16.5	65.9	0.0	100.0	91	24.6	21.2	51.2	3.0	100.0	496
Complete secondary	4.6	12.3	83.1	0.0	100.0	65	32.8	22.4	44.3	0.6	100.0	173
Higher	25.4	6.0	68.7	0.0	100.0	67	30.9	9.9	55.6	3.7	100.0	81
Wealth quintile												
Lowest	*	*	*	*	*	21	21.7	29.1	44.5	4.7	100.0	254
Second	6.8	34.1	59.1	0.0	100.0	44	17.2	31.4	46.7	4.6	100.0	262
Middle	20.0	8.9	68.9	2.2	100.0	45	26.6	27.2	40.4	5.7	100.0	334
Fourth	6.8	4.5	88.6	0.0	100.0	44	27.5	21.0	48.5	3.0	100.0	305
Highest	21.2	10.1	68.7	0.0	100.0	99	26.0	19.3	50.8	3.9	100.0	254
Religion												
Catholic	17.8	11.1	70.0	1.1	100.0	90	22.4	23.6	48.4	5.6	100.0	576
Protestant	14.9	6.9	78.2	0.0	100.0	87	21.0	27.4	48.7	2.9	100.0	419
Other religion	7.9	34.2	57.9	0.0	100.0	38	32.9	19.7	41.0	6.4	100.0	172
Without religion	25.0	12.5	62.5	0.0	100.0	40	27.7	31.0	38.4	2.9	100.0	241
Knowledge of ovulatory cycle												
Uncorrect knowlege	14.3	12.2	73.4	0.0	100.0	237	24.4	25.2	45.8	4.6	100.0	1,317
Correct knowledge	*	*	*	*	*	17	20.7	30.4	47.8	1.1	100.0	92
Can women get pregnant after birth and before period												
Uncorrect knowlege	13.0	15.6	70.1	1.3	100.0	77	16.8	27.8	49.5	5.9	100.0	612
Correct knowledge	18.1	11.9	70.1	0.0	100.0	177	29.8	23.7	43.2	3.3	100.0	797
Number of known contraception method												
0-2	*	*	*	*	*	11	19.4	27.4	46.3	6.9	100.0	376
2-5	11.1	33.3	51.9	3.7	100.0	27	17.9	32.1	44.7	5.3	100.0	302
More than 5	16.3	11.2	72.6	0.0	100.0	215	29.1	21.8	46.2	2.9	100.0	731
Women who use contraception become promiscuous												
Disagree	16.3	12.8	70.9	0.0	100.0	141	22.8	24.1	47.7	5.4	100.0	738
Agree	20.3	11.4	68.4	0.0	100.0	79	28.1	25.6	42.6	3.7	100.0	407
Don't know	5.9	20.6	70.6	2.9	100.0	34	22.1	29.3	46.0	2.7	100.0	264
Contraception is women bussines												
Disagree	18.9	9.4	71.1	0.6	100.0	159	23.0	21.5	48.4	7.1	100.0	634
Agree	10.5	18.6	70.9	0.0	100.0	86	27.5	26.0	44.6	1.9	100.0	581
Don't know	*	*	*	*	*	9	17.5	37.6	41.8	3.1	100.0	194
Discuss FP with healthworker												
No	10.5	15.8	73.1	0.6	100.0	171	22.1	26.2	46.5	5.3	100.0	1,101
Yes	28.0	7.3	64.6	0.0	100.0	82	31.6	23.1	44.0	1.3	100.0	307
Condom used during last sex												
No	12.9	9.9	76.6	0.6	100.0	171	24.4	25.9	45.3	4.4	100.0	1,223
Yes	23.8	18.8	57.5	0.0	100.0	80	20.6	24.4	51.9	3.1	100.0	161
No sex during last year	*	*	*	*	*	2	30.8	15.4	38.5	15.4	100.0	25
Fertility preferences												
Wants another	16.6	11.5	71.3	100.0	100.0	157	23.2	26.2	46.9	3.7	100.0	803
Undecided	*	*	*	*	*	17	16.4	19.4	56.0	8.2	100.0	134
No more	17.5	15.0	67.5	0.0	100.0	80	27.2	26.7	42.1	4.0	100.0	423
Sterilized or Declared infecund	na	na	na	na	na	na	34.0	20.0	36.0	10.0	100.0	50
Prefered waiting time												
Wants within a year	*	*	*	*	*	16	12.5	18.5	63.0	6.0	100.0	184
Wants after 1+ year	13.5	10.6	75.1	0.8	100.0	104	29.3	27.0	41.1	2.5	100.0	433
Unsure timing	13.9	16.7	72.2	0.0	100.0	36	19.4	31.7	44.1	4.8	100.0	186
Undecided	*	*	*	*	*	17	16.4	19.4	56.0	8.2	100.0	134
No more	17.5	15.0	67.5	0.0	100.0	80	27.2	26.7	42.1	4.0	100.0	423
Sterilized or Declared infecund	na	na	na	na	na	na	34.0	20.0	36.0	10.0	100.0	50
TOTAL	16.5	12.6	70.1	0.4	100.0	254	24.1	25.6	45.9	4.5	100.0	1,409

Note: Table excludes currently pregnant women. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

Appendix B: Regressions of unweighted data

Table 7.7: The Logit and Probit regression for unweighted data 1

Dependent variable: Contraception use				
	Logit	AME	Probit	AME
age	-0.025***	-0.002***	-0.013**	-0.002**
	(0.010)	(0.001)	(0.005)	(0.001)
education	0.038	0.003*	0.022*	0.003*
	(0.024)	(0.002)	(0.013)	(0.002)
residence	2.318***	0.177***	1.146***	0.161***
	(0.291)	(0.022)	(0.134)	(0.019)
wealth1	-1.337***	-0.102***	-0.748***	-0.105***
	(0.297)	(0.023)	(0.157)	(0.022)
wealth2	-0.968***	-0.074***	-0.549***	-0.077***
	(0.258)	(0.020)	(0.139)	(0.019)
wealth3	-0.499**	-0.038**	-0.302**	-0.042**
	(0.233)	(0.018)	(0.129)	(0.018)
wealth4	-0.429*	-0.033*	-0.266**	-0.037** 7
	(0.235)	(0.018)	(0.130)	(0.018)
rel_catholic	0.425	0.032*	0.233*	0.033*
	(0.263)	(0.020)	(0.137)	(0.019)
rel_protestant	0.343	0.026	0.170	0.024
	(0.275)	(0.021)	(0.144)	(0.020)
rel_other	0.193	0.015	0.079	0.011
	(0.311)	(0.024)	(0.166)	(0.023)
know_ovulatory	-0.367	-0.028	-0.228	-0.032
	(0.300)	(0.023)	(0.162)	(0.023)
preg_after	0.034	0.003	0.017	0.002
	(0.166)	(0.013)	(0.089)	(0.012)
FP_w_healthworker	-0.050	-0.004	-0.032	-0.004
	(0.180)	(0.014)	(0.099)	(0.014)
condom	0.552***	0.042***	0.317***	0.044***
	(0.188)	(0.014)	(0.107)	(0.015)
nosex	0.153	0.012	0.128	0.018
	(0.468)	(0.036)	(0.242)	(0.034)
know_method_25	0.799**	0.061**	0.389**	0.055**
	(0.337)	(0.026)	(0.158)	(0.022)
know_method_6	0.840**	0.064**	0.387**	0.054**
	(0.326)	(0.025)	(0.153)	(0.022)
promiscuous_agree	-0.007	-0.001	0.005	0.001
	(0.168)	(0.013)	(0.091)	(0.013)
promiscuous_dontknow	0.659**	0.050**	0.357**	0.050**
	(0.311)	(0.024)	(0.163)	(0.023)
women_bussines_disagree	0.300*	0.023*	0.157*	0.022*
	(0.162)	(0.012)	(0.088)	(0.012)
women_bussines_dontknow	-0.984**	-0.075**	-0.471**	-0.066**
	(0.483)	(0.037)	(0.232)	(0.033)
f_ster	-14.529	-1.107	-4.411	-0.618
	(460.463)	(35.086)	(106.347)	(14.900)
undecide	0.160	0.022	0.092	0.013
	(0.387)	(0.030)	(0.204)	(0.029)
f_nomore	0.463	0.035	0.277*	0.039*
	(0.318)	(0.024)	(0.167)	(0.023)
waiting_unsuretime	0.389	0.030	0.212	0.030
	(0.347)	(0.027)	(0.182)	(0.026)
waiting_more	0.606**	0.046**	0.349**	0.050**
	(0.304)	(0.023)	(0.159)	(0.023)
Constant	-4.531***		-2.390***	
	(0.646)		(0.324)	
Observations	2,405	2,405	2,405	2,405
Pseudo R^2	0.123		0.123	
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7.8: The Logit and Probit regression for unweighted data 2

Dependent variable: Unmet need				
	Logit	AME	Probit	AME
age	-0.010**	-0.002**	-0.006**	-0.002**
	(0.005)	(0.001)	(0.003)	(0.001)
education	-0.005	-0.001	-0.003	-0.001
	(0.014)	(0.003)	(0.008)	(0.003)
residence	-0.072	-0.016	-0.047	-0.017
	(0.113)	(0.026)	(0.069)	(0.026)
wealth1	0.117	0.027	0.073	0.027
	(0.164)	(0.038)	(0.100)	(0.037)
wealth2	0.409***	0.094***	0.254***	0.095***
	(0.151)	(0.035)	(0.092)	(0.034)
wealth3	0.233	0.054	0.144	0.054
	(0.148)	(0.034)	(0.090)	(0.034)
wealth4	0.066	0.015	0.041	0.015
	(0.150)	(0.034)	(0.091)	(0.034)
rel_catholic	-0.332**	-0.076**	-0.206**	-0.077**
	(0.131)	(0.030)	(0.081)	(0.030)
rel_protestant	-0.208	-0.048	-0.130	-0.048
	(0.136)	(0.031)	(0.084)	(0.031)
rel_other	-0.110	-0.025	-0.068	-0.025
	(0.171)	(0.039)	(0.105)	(0.039)
know_ovulatory	0.093	0.021	0.056	0.021
	(0.168)	(0.039)	(0.103)	(0.039)
preg_after	0.181*	0.042*	0.111*	0.042*
	(0.094)	(0.021)	(0.057)	(0.021)
FP_w_healthworker	0.043	0.010	0.027	0.010
	(0.117)	(0.027)	(0.072)	(0.027)
no_condom	0.009	0.019	0.002	0.001
	(0.145)	(0.058)	(0.089)	(0.033)
nosex	0.084	0.031	0.053	0.020
	(0.251)	(0.074)	(0.154)	(0.058)
know_method_25	-0.125	-0.029	-0.078	-0.029
	(0.126)	(0.029)	(0.077)	(0.029)
know_method_6	-0.040	-0.009	-0.025	-0.010
	(0.129)	(0.030)	(0.079)	(0.030)
promiscuous_agree	0.092	0.021	0.056	0.021
	(0.103)	(0.024)	(0.063)	(0.024)
promiscuous_dontknow	0.067	0.015	0.038	0.014
	(0.155)	(0.036)	(0.095)	(0.035)
women_bussines_agree	0.014	0.003	0.011	0.004
	(0.098)	(0.023)	(0.060)	(0.022)
women_bussines_dontknow	-0.167	-0.038	-0.101	-0.038
	(0.174)	(0.040)	(0.106)	(0.040)
pref_ster	-0.235	-0.054	-0.145	-0.054
	(0.301)	(0.069)	(0.181)	(0.068)
pref_undecide	0.050	0.011	0.030	0.011
	(0.164)	(0.038)	(0.100)	(0.037)
pref_nomore	0.106	0.024	0.064	0.024
	(0.120)	(0.028)	(0.074)	(0.027)
waiting_unsure_time	0.157	0.036	0.096	0.036
	(0.132)	(0.030)	(0.081)	(0.030)
waiting_year	-0.303**	-0.070**	-0.184**	-0.069**
	(0.151)	(0.035)	(0.091)	(0.034)
Constant	-0.160		-0.096	
	(0.304)		(0.186)	
Observations	796	796	796	796
Pseudo R^2	0.0166		0.0167	
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7.9: The Logit and Probit regression for unweighted data 3

Dependent variable: Decision making				
	Logit	AME	Probit	AME
age	-0.043*	-0.007*	-0.025*	-0.007*
	(0.025)	(0.004)	(0.015)	(0.004)
education	0.043	0.007	0.024	0.007
	(0.050)	(0.008)	(0.030)	(0.008)
residence	-1.178	-0.188	-0.578	-0.160
	(0.791)	(0.125)	(0.439)	(0.120)
know_ovulatory	-0.532	-0.085	-0.346	-0.096
	(0.635)	(0.101)	(0.376)	(0.104)
preg_after	0.019	0.003	-0.000	0.000
	(0.388)	(0.062)	(0.223)	(0.062)
FP_w_healthworker	-0.410	-0.065	-0.217	-0.060
	(0.404)	(0.064)	(0.233)	(0.064)
condom	0.277	0.044	0.170	0.047
	(0.428)	(0.068)	(0.244)	(0.067)
nosex	0.321	0.051	0.208	0.058
	(1.212)	(0.193)	(0.677)	(0.187)
know_method_25	-1.123	-0.179	-0.656	-0.181
	(0.910)	(0.144)	(0.510)	(0.140)
know_method_6	-0.245	-0.039	-0.168	-0.047
	(0.874)	(0.140)	(0.486)	(0.134)
promiscuous_agree	-0.364	-0.058	-0.201	-0.055
	(0.370)	(0.059)	(0.214)	(0.059)
promiscuous_dontknow	-0.353	-0.056	-0.144	-0.040
	(0.738)	(0.118)	(0.425)	(0.117)
women_bussines_disagree	-0.283	-0.045	-0.172	-0.048
	(0.370)	(0.059)	(0.212)	(0.059)
women_bussines_dontknow	-0.504	-0.081	-0.355	-0.098
	(1.125)	(0.184)	(0.675)	(0.186)
pref_undecide	2.629**	0.420***	0.145**	0.400***
	(1.023)	(0.157)	(0.567)	(0.152)
pref_nomore	1.566**	0.250**	0.897**	0.248**
	(0.658)	(0.101)	(0.367)	(0.107)
waiting_unsuretime	1.598**	0.255**	0.917**	0.253**
	(0.762)	(0.118)	(0.449)	(0.121)
waiting_more	1.327**	0.212**	0.777**	0.215**
	(0.615)	(0.095)	(0.374)	(0.101)
Constant	2.842*		1.603*	
	(1.597)		(1.064)	
Observations	236	236	236	236
Pseudo R^2	0.085		0.082	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix C: Inconsistent data - regressions

Table 7.10: The Logit and Probit regression and AME 1 - inconsistent data

Dependent variable: Contraception use				
	Logit	AME	Probit	AME
age	−0.024*	−0.002*	−0.013*	−0.002*
	(0.027)	(0.001)	(0.007)	(0.001)
education	0.105***	0.010***	0.058**	0.010**
	(0.034)	(0.003)	(0.019)	(0.003)
residence	2.178***	0.202***	1.078***	0.180***
	(0.454)	(0.044)	(0.211)	(0.036)
wealth 1	−0.825*	−0.076*	−0.468**	−0.078**
	(0.434)	(0.040)	(0.236)	(0.039)
wealth 2	−0.041	−0.076	−0.259	−0.043
	(0.482)	(0.044)	(0.264)	(0.043)
wealth 3	−0.670*	−0.062*	−0.399**	−0.066**
	(0.350)	(0.032)	(0.193)	(0.032)
wealth 4	−0.856**	−0.080**	−0.485**	−0.081**
	(0.394)	(0.036)	(0.215)	(0.035)
rel_catholic	−0.266	−0.025	−0.132	−0.022
	(0.372)	(0.035)	(0.203)	(0.034)
rel_prostestant	0.284	0.026	0.153	0.026
	(0.359)	(0.033)	(0.194)	(0.032)
rel_other	−0.453	−0.042	−0.251	−0.042
	(0.363)	(0.034)	(0.204)	(0.034)
know_ovulatory	−0.096	−0.009	−0.079	−0.013
	(0.494)	(0.060)	(0.267)	(0.044)
preg_after	−0.175	−0.013	−0.109	−0.018
	(0.282)	(0.026)	(0.151)	(0.025)
FP_ w_healthworker	−0.151	−0.014	−0.084	−0.014
	(0.303)	(0.028)	(0.169)	(0.028)
condom	0.751***	0.070***	0.440***	0.073***
	(0.295)	(0.028)	(0.169)	(0.029)
no_sex	−0.174	−0.016	−0.027	−0.005
	(0.711)	(0.066)	(0.361)	(0.060)
know_method_25	0.570	0.053	0.297	0.050
	(0.442)	(0.041)	(0.214)	(0.036)
know_method_6	0.956**	0.089**	0.498**	0.083**
	(0.429)	(0.041)	(0.205)	(0.035)
promiscuous agree	−0.048	−0.005	−0.009	−0.002
	(0.273)	(0.029)	(0.168)	(0.028)
promiscuous_dont_know	1.350***	0.125***	0.746***	0.124***
	(0.452)	(0.042)	(0.244)	(0.041)
women_bussines_disagree	0.481*	0.045*	0.274*	0.046*
	(0.263)	(0.025)	(0.143)	(0.024)
women_bussines_dontknow	−1.334*	−0.124*	−0.679*	−0.113*
	(0.755)	(0.070)	(0.380)	(0.063)
pref_ster	−14.777***	−1.372***	−4.347***	−0.724***
	(0.613)	(0.111)	(0.323)	(0.069)
pref_undecide	0.323	0.030	0.184	0.031
	(0.552)	(0.051)	(0.283)	(0.047)
pref_nomore	0.573	0.053	0.346	0.058
	(0.440)	(0.041)	(0.2226)	(0.038)
waiting_unsure_time	0.952*	0.088*	0.533**	0.088
	(0.512)	(0.048)	(0.269)	(0.045)
waiting_more	0.960**	0.089**	0.574***	0.096***
	(0.423)	(0.040)	(0.219)	(0.037)
Constant	−4.964***		−2.695***	
	(0.892)		(0.443)	
Observations	1,889	1,889	1,889	1,889
Pseudo R^2	0.171		0.171	
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7.11: The Logit and Probit regression and AME 2 - inconsistent data

Dependent variable: Unmet need				
	Logit	AME	Probit	AME
age	−0.009	−0.002	−0.006	−0.002
	(0.007)	(0.002)	(0.005)	(0.002)
education	−0.022	−0.005	−0.014	−0.005
	(0.018)	(0.004)	(0.011)	(0.004)
residence	−0.111	−0.025	−0.071	−0.026
	(0.169)	(0.038)	(0.104)	(0.038)
wealth1	0.333	0.075	0.213	0.078
	(0.252)	(0.057)	(0.154)	(0.056)
wealth2	0.265	0.060	0.168	0.062
	(0.230)	(0.052)	(0.140)	(0.051)
wealth3	0.311	0.070	0.196	0.072
	(0.224)	(0.050)	(0.136)	(0.050)
wealth4	0.366	0.082	0.146*	0.085*
	(0.227)	(0.051)	(0.139)	(0.051)
rel_catholic	−0.300	−0.067	−0.186	−0.068*
	(0.189)	(0.042)	(0.117)	(0.043)
rel_protestant	−0.341*	−0.077*	−0.208*	−0.076*
	(0.197)	(0.044)	(0.121)	(0.044)
rel_other	0.032	0.007	0.022	0.008
	(0.260)	(0.058)	(0.161)	(0.059)
know_ovulatory	0.607**	0.136**	0.376**	0.138**
	(0.274)	(0.061)	(0.169)	(0.061)
preg_after	0.273**	0.061**	0.169**	0.062**
	(0.139)	(0.031)	(0.085)	(0.031)
FP_w_healthworker	−0.002	−0.001	−0.002	−0.001
	(0.187)	(0.042)	(0.114)	(0.042)
no_condom	0.232	0.052	0.141	0.052
	(0.225)	(0.050)	(0.136)	(0.050)
nosex	-0.247	-0.055	-0.158	-0.058
	(0.371)	(0.083)	(0.225)	(0.082)
know_method_25	−0.129	−0.029	−0.076	−0.028
	(0.178)	(0.040)	(0.109)	(0.040)
know_method_6	−0.045	−0.010	−0.029	−0.011
	(0.200)	(0.045)	(0.123)	(0.045)
promiscuous_agree	0.025	0.006	0.016	0.006
	(0.163)	(0.036)	(0.100)	(0.037)
promiscuous_dontknow	−0.202	−0.045	−0.133	−0.048
	(0.202)	(0.045)	(0.123)	(0.045)
women_bussines_agree	0.104	0.023	0.064	0.023
	(0.175)	(0.039)	(0.108)	(0.039)
women_bussines_dontknow	−0.068	−0.015	−0.036	−0.013
	(0.249)	(0.056)	(0.1152)	(0.055)
pref_ster	0.052	0.012	0.061	0.012
	(0.463)	(0.104)	(0.286)	(0.105)
pref_undecide	−0.006	−0.001	−0.000	−0.001
	(0.274)	(0.062)	(0.169)	(0.062)
pref_nomore	−0.098	−0.022	−0.063	−0.023
	(0.201)	(0.045)	(0.124)	(0.045)
waiting_unsure_time	−0.101	−0.023	−0.063	−0.023
	(0.227)	(0.051)	(0.140)	(0.051)
waiting_year	−0.829***	−0.186***	−0.532***	−0.184***
	(0.264)	(0.060)	(0.1157)	(0.057)
Constant	−0.213		−0.136	
	(0.374)		(0.229)	
Observations	702	702	702	702
Pseudo R^2	0.036		0.036	
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7.12: The Logit and Probit regression and AME 3 - inconsistent data

Dependent variable: Decision making				
	Logit	AME	Probit	AME
age	-0.091*	-0.012**	-0.049*	-0.011**
	(0.047)	(0.006)	(0.025)	(0.005)
education	0.071	0.009	0.034	0.008
	(0.091)	(0.012)	(0.046)	(0.011)
residence	0.251	0.032	0.152	0.035
	(0.906)	(0.117)	(0.512)	(0.120)
know_ovulatory	-1.364	-0.175	-0.794	-0.184
	(1.069)	(0.140)	(0.629)	(0.148)
preg_after	-0.172	-0.022	-0.069	-0.016
	(0.532)	(0.068)	(0.287)	(0.067)
FP_w_healthworker	-1.549***	-0.198***	-0.817***	-0.149***
	(0.446)	(0.058)	(0.237)	(0.048)
condom	-0.748	-0.096	-0.376	-0.029
	(0.630)	(0.076)	(0.331)	(0.055)
nosex	-1.494	-0.191	-0.815	-0.123
	(1.392)	(0.174)	(0.810)	(0.149)
know_method_25	1.360	0.174	0.656	0.044
	(1.146)	(0.148)	(0.632)	(0.133)
know_method_6	1.549	0.198	0.838	0.163
	(1.051)	(0.139)	(0.594)	(0.130)
promiscuous_agree	-0.372	-0.048	-0.193	-0.045
	(0.502)	(0.065)	(0.271)	(0.116)
promiscuous_dontknow	-0.-27	-0.003	0.033	0.008
	(0.966)	(0.124)	(0.500)	(0.116)
women_bussines_disagree	-0.703*	-0.090	-0.393	-0.091
	(0.539)	(0.070)	(0.277)	(0.065)
women_bussines_dontknow	-0.546	-0.070	-0.353	-0.082
	(1.590)	(0.206)	(0.873)	(0.205)
pref_undecide	3.351**	0.428**	1.756**	0.407**
	(1.632)	(0.184)	(0.827)	(0.172)
pref_nomore	3.170***	0.406***	1.702***	0.395***
	(1.018)	(0.115)	(0.578)	(0.122)
waiting_unsure_time	3.556***	0.455***	1.909***	0.443**
	(1.098)	(0.126)	(0.619)	(0.131)
waiting_more	2.292*	0.293**	1.271**	0.295**
	(0.960)	(0.117)	(0.556)	(0.124)
Constant	1.627		0.919	
	(2.146)		(1.214)	
Observations	254	254	254	254
Pseudo R^2	0.171		0.157	
Note:				*p<0.1; **p<0.05; ***p<0.01

Appendix D: Wald test results

Table 7.13: Wald tests results

Wald test	$F = 0.900$ (on 4 and 111 df)
(M1 nested in M2)	$\Pr(> F) = 0.467$
Wald test	$F = 0.807$ (on 3 and 112 df)
(M1 nested in M3)	$\Pr(> F) = 0.493$
Wald test	$F = 0.729$ (on 7 and 108 df)
(M1 nested in M4)	$\Pr(> F) = 0.648$
Wald test	$F = 0.687$ (on 4 and 108 df)
(M2 nested in M4)	$\Pr(> F) = 0.602$
Wald test	$F = 0.724$ (on 3 and 108 df)
(M3 nested in M4)	$\Pr(> F) = 0.540$