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The Effects of Government Policies towards Contraception Use in Women

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ABSTRACT

Education is considered an important factor in the relationship between fertility and contraception use. The objective of this paper is to analyze if fertility rates in countries are reduced due to government policies, specifically, direct support towards the use of birth control methods for women relative to countries with indirect support. Therefore, this paper compares Honduras and Belize, who provides direct and indirect support towards contraceptives, respectively. First, the coefficient on nationality tells us if women in Honduras are using more birth control methods than women in Belize. Second, after running a Poisson model, even though Honduras gives direct support for contraception use and Belize gives indirect support, we found there is no difference between the birth rates in Honduras relative to Belize, .188 ($p< 0.1$) Third, even though Honduras gives direct subsidies for contraception and Belize gives indirect subsidies, there is no difference in the frequency of contraception use between women from Honduras relative to women from Belize, 0.567 ($p<0.1$). As the coefficient on nationality resulted statistically insignificant in both models, we can conclude the determinant in the reduction of fertility rates in countries is the effectiveness of their contraception programs, regardless of the type of birth control support they grant women. Governments can make their programs more successful if they complement them with schooling. These educational programs along with effective contraceptive ones, will teach girls and women the benefits that come along with limiting their reproductive behavior.

Keywords: Contraceptive usage, Birth rate, Government Policy, Family planning programmers

RESUMEN

La educación es considerada un factor muy importante en la relación entre el nivel de natalidad y el uso de anticonceptivos en un país. El propósito de este artículo es analizar si los niveles de natalidad son reducidos debido a las políticas gubernamentales, específicamente, el apoyo directo hacia el control de natalidad en comparación a los países que dan apoyo indirecto. Por lo tanto, en el presente documento se comparan Honduras y Belice, que proporcionan apoyo directo e indirecto a la anticoncepción, respectivamente. Primero, el coeficiente en la variable de nacionalidad nos dice si las mujeres en Honduras están usando más anticonceptivos que las mujeres en Belice. Segundo, después de utilizar un modelo Poisson, encontramos que aunque Honduras da apoyo directo para el uso de métodos anticonceptivos, no hay diferencia entre los niveles de natalidad en Honduras en comparación con Belice, .188 ($p<0.1$) Tercero, aunque Honduras da subsidios directos para anticonceptivos y Belice da subsidios indirectos, no hay diferencia en la frecuencia de uso de anticonceptivos entre las mujeres de Honduras en comparación con las mujeres de Belice, 0.567 ($p<0.1$). Como el coeficiente en nacionalidad resultó estadísticamente insignificante en los dos modelos, podemos concluir que el factor determinante en la reducción de los niveles de natalidad en los países es la efectividad de los programas de anticoncepción, sin importar el tipo de apoyo que el gobierno da a las mujeres. Los gobiernos pueden hacer sus programas más efectivos si los complementan con la escolaridad. Estos programas de educación adjunto con programas de anticoncepción efectivos, pueden enseñar tanto a las niñas como a las mujeres los beneficios que se obtienen al limitar su comportamiento reproductivo.

Palabras Clave: Práctica anticonceptiva, Tasa de natalidad, Política Gubernamental, Programas de planificación familiar

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1. INTRODUCTION

"The dominant behavioural pathway linking education to fertility, is of course, the use of contraceptives" (Cleland, 2004, p. 190). The focus of this thesis paper is to analyze if fertility rates in countries are reduced due to government policies, specifically, direct support towards the use of birth control methods for women relative to countries with indirect support.

Women's lives, skills, and status have enormously changed since the second half of the 20th century. There has been a vast amount of research done in order to improve women's welfare as well as their economic conditions, especially in developing countries. "Not surprisingly, therefore, developing countries are generally characterized by an extremely low standard of living, high rates of infant mortality, short life expectancy, and high rates of illiteracy" (Blau, Ferber, Winkler, 2002, p. 416). Consequently, due to the low levels of income, women in developing countries have minimal access to health care services, proper nutrition and opportunities for education. As women lack access or knowledge to education and health care services, not only they risk their own lives during childbirth but also the lives of their newborns. Therefore, the World Bank, along with the United Nations has made an effort to encourage governments to modify their center of attention to the control of women's reproductive behavior.

Education is considered to be the most important growth determinant in countries, as well as a major influence for fertility rates. Education has been one of the most employed factors by economists and demographers in their analyses to evaluate households' socio-economic status as well as developmental growth in countries. Fertility is a choice commonly made by the mother, the father, or both. This decision is done based on the amount of satisfaction, productivity, and financial returns each child will provide them. As women become better educated they become more conscious of how many children they are able to sustain. Therefore, women with fewer children are more likely to maximize each of their child's lives. This is accomplished through the better allocation of the available resources among their children. Women with higher levels of education are able to better evaluate their decision of having another child.

This project compares two Central American countries, Belize and Honduras (see Figure 1). Since 1976, Honduras has given direct support towards contraception use, whereas, Belize gave no support until 1996 when the government changed their policies to indirect support towards contraception use. "Direct support entails the provision of family planning services through Government-run facilities, such as hospitals, clinics, health posts and health centres and through Government fieldworkers… By 2001, 92 per cent of all countries supported family planning programs and contraceptives, either directly (75 per cent), through government facilities, or indirectly (17 per cent), through support of non-governmental activities, such as those operated by family planning associations" (United Nations Secretariat, Fertility, Contraception and Population Policies, 2003, p. 7).

2. DATA AND METHODS

This section will explain the sources of the data used in my analysis, definition of variables, choice of statistical model, and choice of hypotheses to prove my research question. Moreover, this section will provide a summary of indicators that affect fertility rates in countries.

The data for this study was provided by Centro Centroamericano de Población, Universidad de Costa Rica. The surveys were conducted in 1991 in all Central America, but the countries of interest in this analysis are Belize and Honduras (see Table 1 and 2). Centro Centroamericano de Población developed standardized questionnaires regarding health, household and fertility issues for women who aged between 15 to 49 years old. In Belize there were a total of 2,656 completed interviews. The urban and rural areas were shown in a separate form (Centro Centroamericano de Población, 1991). While, in the Honduras there were a total of 8088 completed surveys. In order to select the sample, the regions were first stratified by the eight regions of health. Then, they were stratified by residence: big cities (Tegucigalpa, San Pedro Sula), other urban areas, and other rural areas (Centro Centroamericano de Población, 1991).

The core questions of the Centro Centroamericano de Población's questionnaire included complete birth history, which contained information on determinants of fertility, such as breast-feeding and contraception use and cost. The information on marriage history was limited to current marital status. In addition, it included socio-economic factors affecting fertility, such as women's education level and employment or performance of any sort of task that remunerated women. The information on household occupation was limited to women's education; there is no information regarding the husband's occupation.

There has been a lot of research done on the topic of the effects of contraception and education on fertility rates. It is important to recall that my hypothesis and the models are designed to differentiate the effects caused on fertility rates and contraception use due to the contraception policies of Belize and Honduras (see Table 3). As mentioned earlier, Belize gives indirect support towards family planning, while Honduras gives direct support. The following equations are directly related to my research question: are fertility rates lower in countries that give direct support towards contraception use, relative to governments that provide indirect support towards family planning methods, other things being equal?

2.1 First Hypothesis

Based on Rodríguez's work (1996) and my available data, I hypothesize that women who receive direct support for contraception use will have lower fertility rates relative to women that receive indirect support for contraception use. The dependent variable defined for each woman who has been in a union, is the total number of live births. The decision to focus on live births rather than total births derives from the fact that depending on the number of live births a woman has to sustain, her working attitude is different from a woman who has had

children but did not survive. The explanatory variables include four demographic controls and two socio- economic factors.

The demographic controls are age, religion, marital status and if currently using any type of contraceptive method. Religion was measured in the same way in both surveys. Women were asked if they belonged to any religion and how religious they were. The only difference was found in the Belize survey, where women were asked how regularly they attended religious services. I should note that contraception use cannot be analyzed, without knowing what the religious percentages of the examined countries are. Honduras' population is 97% Roman Catholic and 3% Protestant (CIA the World Fact Book, Honduras). While, in Belize the population's religion is composed of 49.6% Roman Catholic, 27% Protestant, 14% other, and 9.4% are non religious. The Protestants are divided into 7.4% Pentecostal, 5.3% Anglican, 5.2% Seventh-day Adventist, 4.1% Mennonite, 3.5% Methodist, and 1.5% Jehovah's Witnesses (CIA the World Fact Book, Belize, 2000). As shown by these statistics both countries prevalent religion is Roman Catholicism. Therefore, religion does play an important role in the use of contraception, as Catholicism opposes the use of any contraceptive method.

Moreover, current contraception use was measured the same in both countries. Women were given a list of various birth control methods. They were asked if they had ever heard or used any of the methods mentioned. Then, they were asked if they are currently using any of these methods. In addition, the inclusion of women's marital status variable will allow us to see how a woman's autonomy is influenced. A woman's marital status can sometimes be a predictor of their household decision- making power. Women, who are married, separated, divorced, separated, or in a union will have different views and decisions to make regarding fertility levels and household investments and savings, relative to single women.

In addition the socio-economic factors in this model are all numeric variables, and include wife's education and their occupation. Educational attainment was measured the same way in both countries with a question of highest grade or years of education obtained; therefore I can derive years of schooling. Also, the current or most recent occupation of women is recorded in the same way in both countries, where they were asked if they performed any type of job where they received money in exchange. Then, they were asked what type of work they performed and where did they work. In the survey for Belize, the questions were more detailed as women were asked if they worked full or part time, if they were self employed and the age they began working.

The Statistical Model

The model I used in this analysis is a model whose dependent variable denotes the number of live births. Let Y_i, denote the total number of live births for the *i-th* woman in the sample. Let X_{i1}, X_{i2}, X_{i3}, and X_{i4} be the demographic controls which represent age, religion, marital status, and women currently using contraceptive methods respectively. Let Xi5 be the socio-economic factor for education level and let X_{i6} be the one for women currently participating in the labor force.

The first model I analyzed was based on Germán Rodríguez's (1996) article. My prediction for this model is: *women who receive direct support for contraception use will have a lower fertility rate than women with indirect support for contraception use, other things being equal.* Therefore, I expect the number of live births a woman has to be affected by: age (AGE), education level (EDU), direct support towards contraception use (DIRS), marital status (MST), religion (REL), religious intensity (RIN), contraception use (CON), and current labor force participation (LBF).

We predict that the following independent variables have a negative relation with a woman's total number of children:

- Age squared: The marginal effect of age changes in older women because births peak at a certain age. In other words, women have children later in life, but after some time they stop having children. This is due to the fact that as women become older they are no longer able to conceive. The relationship is concave as age increases at a decreasing rate.
- Education level: As women become better educated, they are able to make better informed decisions regarding their households, fertility levels, and community issues. In addition, with more years of education women are able to earn enough to support their families without the help from their children. This enables children to attend school. The higher the level of education of women, the more women will delay having children.
- Direct support towards contraception use: On average, women who seek birth control supplies and assistance from countries that give direct support for contraception will have fewer children. These countries have more funding for various contraceptive supplies as well as better equipped facilities.
- Protestant and other religions: Women who practice these religions will have fewer births. As their doctrines do not condemn contraception, they are able to use any variety of family planning methods. This is relative to Catholic women who are condemned for the use of any type of contraception and are the "left- out category" in this group[2].
- Non religious: Women who do not practice any religion will have fewer births. This is attributable to the fact that non religious women do not fear any kind of condemnation when using any method of family planning, as opposed to Catholic women.
- Religious intensity: Women who attend religious services less than once or once or twice a month are more likely to have fewer births as their devotion to their religion's doctrines are not very strong. Thus, they do not fear condemnation for the use of contraceptive methods.
- Contraception use: On average, women who currently use any type of family planning method control their reproductive behavior. Therefore, they have fewer children.

[2] When including dummy variables, which are variables that have a value of either 1 or 0, one category has to be left out. This is done to avoid multicollinearity.

- Current labor force participation: Women with less number of children are more likely to engage in any type of remunerated job, especially outside the home. This increases women's opportunity cost of bearing children, which motivates them to have fewer children.

We predict the following independent variables have a positive effect on a woman's total number of children:

- Age1: The age variable increases at a decreasing rate. On average women usually have children when they get older. After some time they stop having children as they are not able to conceive anymore due to biological limitations caused by age. Thus, the older women are, the more children they will conceive.
- Education squared: As education increases at a decreasing rate, the marginal effect on the education variable is more likely to change with more years of education. In other words, the more educated women are, the longer they will delay their fertility rates by controlling them through contraception.
- Marital status: On average, women wait until older to get in a committed relationship and start a family. Therefore, relative to single women, the "left- out category" in this group, women that are: married and in a union are more likely to have more children.
- Religious intensity: Religious, somewhat, and very religious women are more likely to have more children relative to non religious women, the "left- out category" in this group. Also, women who attend 3 to 4 or 5 or more religious services per month are more probable to have higher fertility rates than non religious women. This is due to their stronger religious convictions as they fear condemnation for the use of contraception.
- Did not respond: Women who didn't respond to the religious affiliation question are more likely to have more live births as they do not precisely belong to any denomination.

The live births equation for Belize and Honduras is postulated to look as follows:

LIV= f (AGE1, AGE2, EDU1, EDU2, DIRS, MAR, SEP, DIV, WID, ORELI, 1RELI,
+ - - + - + + + + - -

3RELI, 5RELI, NRES2, NREL, PRO, OTH, NRES1, UNI, CON, LBF, NCON)
+ + - - - - + + - - -

2.2 Second Hypothesis

Based on John Cleland's (2004) model and my available data, I hypothesize that direct subsidies of contraception result in greater use, than indirect subsidies of contraception, other things being equal. Also, I must acknowledge the fact that this hypothesis is similar to the previous one. The difference lies that this model will enable us the factors that influence a woman's decision to have fewer children, through the usage of any birth control method. While, the previous model showed us the determinants affecting fertility rates in women.

The dependent variable defined is any woman who currently uses any type of contraception. The explanatory variables include four demographic controls and two socio-economic factors. The demographic controls are age, religion, marital status, and where the contraception was obtained.

Religion was measured in the same way in both countries. First women were asked if they belonged to any particular religion and if so, how often they attended religious services. The demographic control, family planning supplier, was chosen because the questionnaire did not ask women the amount they currently pay for contraception use. The family planning supplier was measured by where women obtained their current contraceptive method. This provides us with information about whether women paid or not for contraception. Contraception in both countries is free, and can be obtained in the public hospital or health clinics. Contraception can also be purchased at the pharmacy evidently at some cost. It is important to note that as Belize gives indirect support towards family planning and Honduras gives direct support, Belize receives less funding for contraception in relation to Honduras. This is due to Belize's funding which is provided by foreign aid only, while Honduras' funding is sponsored by foreign aid as well as by the government itself.

As in the previous model some of these factors were measured the same way in the first model. The socio-economic factors are all treated as numeric variables. They include women's education level and if they currently participate in the labor force. Educational attainment was measured the same way in both countries with a question of the highest grade or year obtained. With this information I can derive the years of schooling. As mentioned before, the women's labor force participation factor was measured with questions regarding if at the time of the survey they performed any job where they were remunerated.

The Statistical Model

The model I will use to test this prediction in my analysis is a model with a dependent variable of use contraceptive use. Let Y_i denote any woman who currently uses any contraceptive method. The demographic controls are X_{i1}, X_{i2}, X_{i3}, and X_{i4} which denote age, religion, marital status, and where contraception was obtained, respectively. In addition, the socio-economic factors are Xi5 and Xi6 which respectively denote women's educational level and current labor force participation.

The second model was based on John Cleland's work. The prediction for this model is: *direct subsidies of contraception result in greater use, than indirect subsidies of contraception, other things being equal*. Therefore, I expect women's decisions to use any contraceptive method to be affected by: age (AGE), education level (EDU), direct support towards contraception use (DIRS), marital status (MAR), religion (REL), religious intensity (RIN), current labor force participation (LBF), and contraceptive method supplier (CSU).

We predict that the following independent variables will have a negative effect on a woman's decision to use any contraceptive method:

- Age squared: The marginal effect of age changes in older women because the age variable increases at a decreasing rate. This is due to women usually having children later in life, by the usage of any contraceptive method. In addition, women also reach an age where they can no longer conceive due to biological reasons.
- Education squared: The marginal effect of education changes with more years of education as the education variable decreases at an increasing rate. Women who are better educated are more likely to use contraception, thus they will delay having children.
- Religious intensity: Women who attend religious services 3 to 4 or 5 or more times per month are more likely to use less methods of contraception. This strong devotion to their religion and doctrines make them fear condemnation for the use of any type of birth control method.

The following independent variables are predicted to have a positive effect on a woman's decision to use any contraceptive method:

- Age 1: The age variable increases at a decreasing rate. On average, women usually have children later in life. Until they reach an appropriate age to conceive they control their reproductive behavior with the use of contraceptive methods. However, later in life women also reach an age where they can no longer conceive due to biological reasons.
- Education level: As women become better educated, they are able to make better informed decisions regarding their households, fertility levels, and community issues. Also better educated women are able to read, learn, and better understand the advantages and directions for using any type of contraceptive method. Thus, better educated women are more likely to use contraceptives, and have fewer children.
- Direct support towards contraception use: On average, women that seek contraceptive assistance and supplies from a country that provides direct support towards birth control methods will use more contraception. These countries have more funding for various contraceptive supplies as well as better equipped facilities.
- Marital status: On average, relative to single women, the "left- out category" in this group, women that are: married and in a union are more likely to use more birth control methods. Relative to the "left- out category" women who fall in these categories are more likely to be older and more experienced in the use of contraceptive methods. Thus, these women tend to use contraceptives methods in order to prevent unintended pregnancies.
- Protestant, other religions and non religious: Women who fall in these categories are more likely to use more contraceptive methods relative to Catholic women, the "left- out category" in this group. They do not fear condemnation for the use of contraception.
- Religious intensity: Women who attend religious services less than once or once or twice per month are more likely to use more contraception. This is due to their doctrines and convictions not being that strong relative to the "left- out category". Hence, they do not fear condemnation for the use of birth control methods.

- Contraceptive method supplier: On average, women who seek any kind of family planning supplier learn about the advantages and the different types of birth control methods. Therefore, they are more likely to have fewer children.
- Currently working: Women who perform any remunerated task increase their opportunity cost of bearing children, especially if they are able to work outside the household. This provides an incentive for women to control their fertility levels, hence use any type of family planning method.

The contraception use equation for Belize and Honduras is postulated to look as follows:

CON= f (AGE1, AGE2, EDU1, EDU2, DIRS, MAR, UNI, DIV, WID, SEP, 0RELI,
+ - + - + + + + + + -

1RELI, 3RELI, 5RELI, NRES2, NREL, PRO, OTH, NRES1, CSU, LBF)
- - - + + + + + + +

3. RESULTS

3.1 Data Description

Following are the summary statistics of the relevant variables from the data from Belize and Honduras. Both surveys were conducted in 1991 by Centro Centroamericano de Población, Universidad de Costa Rica. The data was available in Stata9. This institution also provided the questionnaires used in the surveys with their respective dictionaries (See Table 1).

3.2 First Model

After analyzing the data sets from Belize and Honduras separately, the data sets from both countries were appended so they could be analyzed at the same time. In other words, the Belize data set was added to the end of the Honduras dataset. Thus, to get consistent results the variables for both countries had to mean and be named the same.

First, the P- value is a measure of significance. A p- value can range from 0 to 1.0. With a significance level, ά, fixed at 10%, and a test of significance which yields a p- value less than 0.1, then the coefficient is said to be statistically significant. In other words, 90% of the time we can reject the null hypothesis that $\beta = 0$. If the test of significance gives a p-value of 1.0, then we fail to reject the null hypothesis, and $\beta = 0$.

Moreover, live births is a count variable. Count variables are measured by a nonnegative integer over a given time period. They are relatively rare and are assumed to be generated by a Poisson process. A Poisson distribution conveys the probability of a number of events occurring during a fixed amount of time. These events are independent of the time since the last event. Thus, running an Ordinary Least Squares with a count variable as a dependent variable provides biased and inconsistent results. This is due to "Ordinary Least Squares

assume a symmetric distribution of errors while a Poisson regression is skewed. Second, Ordinary Least Squares can sometimes predict values that are negative, while Poisson regressions are non- negative. Finally, Ordinary Least Squares assume a constant variance, while in Poisson regressions the variance increases as the mean increases" (Children's Mercy, 2007). Therefore, both Ordinary Least Squares and Poisson regressions were run to compare both results. The Poisson model distribution is a better fit with count data as opposed to Ordinary Least Squares, thus we consider the Poisson's results.

After running a Poisson regression the Goodness- of- fit test was done to see if all of the regression coefficients are simultaneously equal to zero. The established alpha level of 0.1 and the small p- value from the Likelihood Ratio test $p<0.00001$, lead me to conclude that at least one of the regression coefficients in the model is not equal to zero. Therefore, a Nominal Binomial regression was done to check for over- dispersion in the data. Over-dispersion is a phenomenon when the data displays more variability than predicted by the variance and it is measured by the parameter alpha. If alpha is greater than zero, the response variable, live births, is over- dispersed. If alpha is less than zero, the response variable is under- dispersed. The Nominal Binomial regression was not able to find the maximum as these functions are not globally convex. Thus, we report it as a Poisson regression.

Finally, the religious intensity variable was dropped from all the models. This was due to collinearity found between the religion and religious intensity variables. Collinearity is any linear relationship among independent variables in a regression. It was causing statistical insignificant results for both variables mentioned above. In addition, an interactive term was added to this model. This was done to see if there is a difference in the number of children current female contraceptive users have relative to the country where they get their birth control attention and supplies. This interactive term is the product of the nationality variable and the current contraception use one.

These tests lead us to fail to reject the null hypothesis that $\beta = 0$. The effects were quite significant because people and the government expect that a country which receives direct support towards the use of contraception in women will have lower rates of fertility relative to a country with indirect support (see Table 4). Therefore, as the government directly finances the usage of contraceptives methods, they expect a positive response, lower fertility rates.

3.3 Second Model

As the religious intensity variable was eliminated from the previous model, this variable was also eliminated in this model. This was due to present collinearity between religious intensity and the religion variables. In addition, when running the Ordinary Least Squares regressions for Belize, the dependent variable Y_i contraception use, and the variable for family planning supplier showed evident perfect multicollinearity. Multicollinearity can be defined as: "…The normal equations of least squares (4.3.3.) cannot be solved for the estimator $\hat{\beta}$… If one of the explanatory variables is constant over the sample, it is a multiple of the unity variable included to account for the intercept" (Intriligator, Bodkin,

Hsiao, 1996, p. 126). In other words, the perfect lining, illustrated as blank results after running the regressions, was due to everyone using birth control and getting it from the same family planning supplier. In order for the regression to run properly, the family planning supplier variable was eliminated from this model.

Contraception use is a limited dependent variable, more specifically a binary dependent variable. This variable takes one of two values: 0 or 1, thus a Probit regression was run in this model. Probit models are assumed to follow a binomial distribution. In a number of successes, *n*, of independent yes or no experiments each yields successes with a probability *p*. The parameters are usually estimated by maximum likelihood. The coefficients found in Probit regressions are slopes times marginal probability, but running a dProbit regression gave us the marginal effects of the independent variables. These are the probabilities of success *p* following a Probit regression. In other words, the dProbit regression provided us with the individual slopes of each of the independent variables with respect to contraception use.

From these tests, we fail to reject the null hypothesis that $\beta = 0$. The effects on these results were also highly significant. If a country provides direct subsidies for contraception use, the government as well as people, will expect women to use more contraceptive methods relative to a country with indirect subsidies (see Table 5).

4. DISCUSSION

Overall after analyzing my results, I failed to prove my hypothesis where countries with direct support from the government towards birth control methods have lower number of children relative to countries with indirect support from the government. In other words, even though Honduras gives direct support for contraception use and Belize gives indirect support, there is no difference in the number of children in Honduras relative to Belize.

From the first model, we can conclude, as the coefficient on the direct support variable resulted statistically insignificant across samples, we fail to reject the null hypothesis that $\beta = 0$. From these results we can conclude the following, the coefficient on direct support towards the usage of contraceptive methods resulted statistically insignificant across samples ($p = .188$), thus we fail to reject the null hypothesis that $\beta = 0$.

In addition, from the second model, we conclude that even though Honduras gives direct subsidies for contraception and Belize gives indirect subsidies, there is no difference in the frequency of contraception use between women from Honduras relative to Belizean women. This was due to the coefficient on direct support towards contraception use which resulted statistically insignificant insignificant across samples ($p = .567$), thus we fail to reject the null hypothesis that $\beta = 0$.

These results showed us a strong negative relationship between women of a certain nationality with a specific type of government support towards contraceptives, and the actual use of birth control methods by women. This study showed that Belizean women,

despite that their government gives indirect support for the use of contraception, use more birth control methods than Honduran women who receive direct support from the government for the use of contraceptives. These results showed us that the determinant in the reduction of fertility rates is not the type of government policy towards the use of birth control methods, instead the effectiveness of the family planning programs implemented by each government.

4.1 Study Limitations and Future Research

This study provides an analysis of the relationship between fertility rates, education, nationality and government policies in a Central American context. From this study we were able to determine that the following variables negatively affect fertility rates in countries: education, women who belong to other religious affiliations, and those who currently participate in the labor force. On the other hand, contraception use is negatively affected by women who do not affiliate themselves with any religion, as well as the country where they receive their contraceptive attention and supplies. In other words, the family planning programs each country establishes influence women's fertility rates.

The data from these two countries was obtained from Centro Centroamericano de Población, Universidad de Costa Rica. Even though the data this institution provided me was very solid there is one important variable that is not included in the survey, family income. The variable on family income would have given us an idea about the socio-economic status of women answering the survey. This variable would have made the analysis more complete and stronger.

Finally, for future research it could be useful to consider more Central American countries in order to have a broader array of countries to compare. It is important to compare countries with similar socio- economic and cultural backgrounds in order to obtain congruent results. This can be done to expand research and obtain more precise information about the effective family planning programs compared to the unproductive ones.

5. CONCLUSION

Education is considered the most important growth determinant in countries, as well as a major influence for fertility rates. High fertility rates affect both households and nations. In households, high fertility rates reduce welfare, while in countries high fertility rates slow socio- economic development. Therefore, in order to reduce fertility rates in countries, the World Bank together, with the United Nations and several governments has seen the need to promote educational attainment, especially in women. Women who are better educated are able to understand the advantages of using contraceptives methods, thus having fewer children. They are also able to learn about the different types of contraceptive methods available, which one suits them the best, as well as their correct use. Therefore, in the past thirty years governments have given serious consideration to the need to reduce fertility rates in their countries. This has been done through coupling education with their contraception policies. One of the most important initiatives undertaken by the

governments has been the establishment of free family planning clinics and suppliers around their countries. This has enabled the accessibility of contraceptive methods to all women, regardless of their socio- economic status.

Since 1976, Honduras has given direct support towards contraception; while in 1996 Belize changed its contraceptive policies from no support to indirect support. These policies allowed us to analyze whether fertility rates were reduced due to direct or indirect support towards contraceptive methods. Regardless if countries give direct or indirect birth control support, empirically, we find that an effective contraceptive program in countries reduces the countries' fertility rates. Therefore, evidence showed that the family planning program in Belize is more effective in relation to the program in Honduras. Belizean women are more likely to use contraception. Consequently, women in Honduras are having more children relative to Belizean women.

This analysis illustrates the crucial factor here is not to only give women as many methods as possible. Women need to be educated on the variety of contraceptive methods available, as well as their correct use. Governments need to invest in preparing the staff working in the family planning clinics and suppliers, rather than solely focusing on the attainment of supplies. Women need to be educated in the importance and advantages of birth control methods. Equally important is to teach women how to use these methods as well as how to follow the directions correctly.

In conclusion, governments can make their programs more successful if they complement them with schooling, besides solely investing in training the staff. Evidence has shown that an extra year of education increases women's socio- economic status. Governments can put into action an informative program, regarding birth control methods, to be taught in schools across countries. These programs will educate young girls about how to use contraceptive methods, where they can obtain these family planning methods, as well as how to properly use them. These educational programs along with effective contraceptive ones, will teach girls as well as women the benefits that come along with limiting their number of children. Therefore, lower fertility rates in countries will be achieved if governments establish effective contraceptive programs as well as encourage women's educational attainment. Lower fertility rates give women higher levels of welfare and household empowerment, which result in a positive impact on the socio- economic development of countries.

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Figure 1: Map of Central America, showing Belize and Honduras

Table 1: Belize Data Profile

	1990	2000	2004	2005
GDP (current US$)	--	832.0 million	1billion	1.1 billion
GDP growth (annual %)	--	12.3	4.6	3.1
Total population (thousands)	189	250	283	--
Female population (% of total)	49	49	49	--
Total fertility rate (births per woman)	4.5	3.4	3	--
Adolescent fertility rate (births per 1,000 women ages 15-19)	--	93	82	--
Infant mortality rate (per 1,000 live births)	39	34	32	--
Gross primary enrollment ratio (% of age group) Female	111	115	123	--
Gross secondary enrollment ratio (% of age group) Female	47	70	87	--
Gross tertiary enrollment ratio (% of age group) Female	--	--	4	--
Progression to grade 5 (% of cohort) female	--	66	79	--
Female primary completion rate	93	97	104	--
Contraceptive prevalence rate (% of women aged 15-49)	47	56	--	--
Women traveling > 1 hour to family planning facilities (%)	--	--	--	--
Pregnant women receiving prenatal care (%)	--	--	--	--
Births attended by trained health staff (% of total births)	77	83	--	--
Maternal mortality rate (per 100,000 live births)	--	140	--	--
Adolescent fertility rate (births per 1,000 women ages 15-19)	--	93	82	--
Female (% of total labor force)	27	32	34	--
Unemployment rates- female (% of female labor force)	--	20.3	15.3	--

Source: World Bank. "Belize Data Profile."
http://devdata.worldbank.org/external/CPProfile.asp?PTYPE=CP&CCODE=BLZ

Table 2: Honduras Data Profile

	1990	2000	2004
GDP (current US $)	--	6.0 billion	7.4 billion
GDP growth (annual %)	--	5.8	4.6
Total population (millions)	4.9	6.4	7
Female population (% of total)	49.7	49.6	49.6
Total fertility rate (births per woman)	5.1	4	3.6
Adolescent fertility rate (births per 1,000 women ages 15-19)	--	107	99
Infant mortality rate (per 1,000 live births)	44	33	31
Gross primary enrollment ratio (% of age group) Female	110	107	118
Gross secondary enrollment ratio (% of age group) Female	37	--	--
Gross tertiary enrollment ratio (% of age group) Female	8	16	20
Progression to grade 5 (% of cohort) female	--	--	69
Female primary completion rate	62	--	82
Contraceptive prevalence rate (% of women aged 15-49)	47	62	--
Women traveling > 1 hour to family planning facilities (%)	--	--	--
Pregnant women receiving prenatal care (%)	--	--	--
Births attended by trained health staff (% of total births)	45	56	--
Maternal mortality rate (per 100,000 live births)	--	110	--
Adolescent fertility rate (births per 1,000 women ages 15-19)	--	107	99
Female (% of total labor force)	28	34	37
Unemployment rates- female (% of female labor force)	6.2	3.9	4.7

Source: World Bank. "Honduras Data Profile."
http://devdata.worldbank.org/external/CPProfile.asp?PTYPE=CP&CCODE=HND

Table 3: Data Description

VARIABLE	*OBS*	*MEAN*	*STD. DEV.*	*MIN*	*MAX*
Live Births **(LIV)**	7796	4.031.939	2.786.687	0	20
AGE **(AGE1)**	10744	2.796.733	9.129.869	15	49
AGE Squared **(AGE2)**	10744	8.655.183	5.536.613	225	2401
Education level 1 **(EDU1)**	10742	1.346.611	7.053.635	0	37
Education level 2 **(EDU2)**	10742	2.310.854	2.301.875	0	1369
Married **(MAR)**	12749	0.2516276	0.4339653	0	1
In a union **(UNI)**	12749	0.268727	0.443315	0	1
Divorced **(DIV)**	12749	0.0036866	0.0606074	0	1
Widows **(WID)**	12749	0.0110597	0.104586	0	1
Separated **(SEP)**	12749	0.0763197	0.2655194	0	1
Protestant **(PRO)**	12901	0.2140144	0.4101528	0	1
Non religious **(NREL)**	12901	0.0883652	0.2838363	0	1
Other religions **(OTH)**	12901	0.0042632	0.0651567	0	1
Did not respond to the religious affiliation question **(NRES1)**	12901	0.6275483	0.4834765	0	1
Currently working **(LBF)**	12901	0.2750174	0.4465404	0	1
Direct support **(DIRS)**	12901	0.6386327	0.4804153	0	1
Currently using contraception **(CON)**	12901	0.2758701	0.446969	0	1
Interactive term, product of nationality and current contraception users **(NCON)**	12901	0.1982792	0.3987191	0	1

Table 4: Presentation and Interpretation of Results

	Dependent Variable: Live Births	
	Equation 2.1	**Equation 2.2**
	OLS	**Poisson**
R^2/ Pseudo R^2	0.4930	0.2059
n	7794	7794
Intercept	-5.084263	-2.67422
P- value	0	0
AGE1	0.3545585	0.1817855
P- value	0	0
AGE2	-0.0022882	-0.0019605
P- value	0	0
EDU1	-0.0792834	-0.008826
P- value	0	0.055
EDU2	-0.0014045	-0.0008095
P- value	0.002	0
MAR	1.129814	0.461327
P- value	0	0
UNI	1.183039	0.4760939
P- value	0	0
DIV	-0.329733	0.0634407
P- value	0.291	0.514
WID	0.819122	0.4038225
P- value	0	0
SEP	0.4241923	0.2804726
P- value	0	0
PRO	0.0938162	0.0230719
P- value	0.083	0.088
NREL	0.1621907	0.0385366
P- value	0.03	0.046
OTH	-0.1890196	-0.0388814
P- value	0.545	0.633
NORE	0.1630231	0.0563272
P- value	0.806	0.756
LBF	-0.5391268	-0.1241516
P- value	0	0
DIRS	1.177166	0.2403236
P- value	0.078	0.188
CON	-0.0054968	0.0011487
P- value	0.951	0.961
NCON	-0.19306	-0.0420735
P- value	0.064	0.116

Table 5: Presentation and Interpretation of Results

	Dependent Variable: Contraception Use		
	Equation 3.1	**Equation 3.2**	**Equation 3.3**
	OLS	**Probit**	**Dprobit**
R^2/ Pseudo R^2	0.2228	0.2214	0.2214
n	10741	10741	10741
Intercept	-0.5965196	-4.839959	
P-value	0	0	
AGE1	0.0341246	0.1683011	0.0522367
P-value	0	0	0
AGE2	-0.0004585	-0.0023327	-0.000724
P-value	0	0	0
EDU1	0.0231157	0.071221	0.0221053
P-value	0	0	0
EDU2	-0.0003821	-0.0011113	-0.0003449
P-value	0	0	0
MAR	0.3905213	1.609048	0.5455823
P-value	0	0	0
UNI	0.3253781	1.493114	0.5030273
P-value	0	0	0
DIV	0.1188806	0.7786314	0.2883325
P-value	0.052	0	0
WID	-0.0056533	0.3450808	0.1185379
P-value	0.878	0.02	0.02
SEP	0.0837972	0.7147613	0.256986
P-value	0	0	0
PRO	0.0370936	0.14776	0.0469894
P-value	0	0	0
NREL	0.0085387	0.0439066	0.0137929
P-value	0.521	0.36	0.36
OTH	0.1004752	0.3341584	0.1146502
P-value	0.074	0.091	0.091
NORE	-0.1317079	-0.3600393	-0.1183257
P-value	0.267	0.397	0.397
LBF	0.1002623	0.3745298	0.1209432
P-value	0	0	0
DIRS	-0.0532469	-0.24522	-0.0792612
P-value	0.656	0.567	0.567