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Modelling Drivers of Fertility in Rwanda

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Abstract: **The study examined the extent to which maternal age at first birth, birth intervals, maternal education, preferred family size (ideal number of children) and age at first cohabitation influence fertility. Data from the Rwanda Demographic and Health Survey 2014 (RDHS, 2014) were analyzed mainly focusing on women dataset. The overall sample of the survey was 12,699 household (from 492 clusters). However, multiple regression model was used as the main tool of analysis in this study to examine the overall association between the above stated variables on fertility (R) and the degree to which the stated explanatory variables influence fertility (R^2). Standardized residuals (errors), p-values, multicollinearity function and normality of errors were used to test the validity of the model (the accuracy of the model). By use of P-value statistic, table I shows that Age at first birth, Birth intervals, Maternal education, Ideal number of children, and Age at first cohabitation are significantly associated with fertility (P-value<0.05). Nevertheless, R^2 is 0.349 indicating that 35% of the variation of fertility is determined by Age at first birth, Birth intervals, maternal education, Ideal number of children, and Age at first cohabitation. Therefore, table III shows that the model is accurate since Sig. <0.05, residuals are between ±1.96 (-1.96≤errors≤+1.96), the errors are normally distributed and there is absence of multicollinearity (VIF<10 and tolerance >.02). The results in equation 2 revealed that, for every one unit increase in Ideal number of children, fertility increases by 59 percent as all other independent variables remain unchanged. This has a serious implication to the Rwandan Government. Here the Government should increase the frequency of sensitization on family planning issues. However, for every one additional year of schooling, we predict 0.332 (33 percent) decrease in fertility when other predictor variables remain unchanged. It is seen that better educated women have more attitude towards fertility control.**

Keywords: **Fertility, Age at first birth, Birth intervals, Maternal education, Ideal number of children, and Age at first cohabitation.**

1. INTRODUCTION

1.1 Background: During the 1960s, 1970s, and 1980s, as fertility decline spread throughout, much of the Third World, sub-Saharan Africa was distinguished as the only major region in the world without any indication of onset of fertility transition (Lesthaeghe, 1989). By the early 1990s, however, it began to be apparent that change was taking place, and that fertility in at least a few African nations was beginning to fall whereas some of the countries were indicating a stalling of the transition. Over the past years, several studies have documented, first, the spread of fertility transition throughout the region (Tabutin, 1997; Cohen, 1998; Tabutin and Schoumaker, 2001; Garenne and Joseph, 2002; Shapiro and Tambashe, 2002; Shapiro et al., 2003), and more recently, the stalling of the transition in some countries that had been at the forefront of fertility decline in sub-Saharan Africa (Bongaarts, 2005, 2007; Westoff and Cross, 2005).

From the point of view of demographic process, Rwanda is a peculiar case because over a million people died in the genocide in 1994 and at the same time the population increased because of the return of over a million of former refugees who were living in exile till the end of the war and genocide (RDHS, 2005). This created a high attention to the government of Rwanda where much effort on family planning initiatives were put in place. This was done by educating people about the worthiness of family planning and facilitating those who were willing through providing pills, sterilizing and other means such as traditional contraceptive methods (Urunigi) which have been helpful in lowering fertility trends, though the problem still exist.

1.2 Statement of the problem:

According to studies carried out in many countries, fertility has been found to be associated with age at first child, birth intervals, education, family size preference, age at first cohabitation among others (Cleland & Shireen 1996). Later age at first child, high birth intervals, higher educational attainment among others were found to be correlated with small family size.

Information provided by several studies conducted in Rwanda i.e. Rwanda Demographic and Health Surveys (RDHS), the Integrated Household and living Condition Surveys (EICV), Censuses and others do not scrutinize the operational influence of the above stated variables on fertility and only focuses on fertility differentials according to educational attainment, area of residence, age at first birth, contraceptive prevalence, province and wealth quintile as factors influencing fertility.

In terms of literature therefore, there is limited empirical research on how the above stated variables influence fertility in Rwanda and therefore, little is known about the influence of such variables on fertility.

It is in this perspective that the researcher used multiple regression model as the main tool of analysis to study the extent to which the above stated variables influence fertility in Rwanda.

1.3 Objectives of the research:

1.3.1 General Objective:

The main objective of this research was to model fertility and its associated factors in Rwanda.

1.3.2 Specific objectives:

1. To analyze the degree of the relationship between maternal education, age at first child, ideal number of children, age at first cohabitation, birth intervals, and fertility.

2. To measure the contribution of each predictor variable (Independent variable) on fertility.

3. To test the goodness of fit of the model.

1.4 Operational hypotheses:

Education, age at first child, ideal number of children, birth intervals, age at first cohabitation and fertility are not significantly associated.

1.4.1 Model testing hypothesis:

H_o: $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$, and $\beta_5 = 0$ (there is no relationship),

H_i: $\beta_i \neq 0$ (at least one of the predictor variables is associated with fertility).

1.4.2 Hypothesis testing of the goodness of the model:

At 95% level of confidence, the deviations of the data points from the model exceed ±1.96, high autocorrelation among the predictor variables exist, and errors are not normally distributed.

2. METHODOLOGY

2.1 Introduction:

The analysis of this study was based on the secondary data drawn from Rwanda Demographic and Health Survey (RDHS 2014/2015), mainly focusing on women dataset. The target population in this study is women aged 15-49 years who are in reproductive period living in sampled households.

2.2 Sample coverage:

All 492 enumeration areas (Clusters) selected for the sample were surveyed for 2014/2015 RDHS. A total of 12,793 households were selected, of which 12,717 were successfully interviewed at the time of the survey. Among these households, 12,699 completed the Household Questionnaire, yielding a response rate of 99.9 percent. Of these, 2,895 were urban dwellers, while 9,804 resided in rural areas.

In the 12, 699 households surveyed, 13,564 women aged 15-49 were identified as being eligible for the individual interview; interviews were completed with 13,497 of these women, yielding a response rate of 99.5 percent.

Table 2.1 Results of the household and individual interview

Number of households, number of interviews, and response rates, according to residence (unweighted), Rwanda 2014-2015									
					Residence				
Results				**Urban**		**Rural**		**Total**	
Households interviews									
Households selected				2939		9854		12793	
Households occupied				2911		9806		12717	
Households interviewed				2895		9804		12699	
Households response rate				99.5		100		99.9	
Interviews with women aged 15-49									
Number of eligible women				3,446		10,118		13,564	
Number of eligible women interviewed				3,427		10,070		13,497	
Eligible women response rate				99.4		99.5		99.5	
[1] Households interviewed / households occupied									
[2] Respondents interviewed / eligible respondents									

Source: RDHS 2014-2015

2.3 Data analysis:

In the analysis of this study, multiple regression model was preferred because of its appropriateness in testing the relationship between a given dependent variable and a set of independent variables.

Multiple regression model relates Y to a function of **X** and **ß.**

$$Y \approx f(X, \beta)$$

$$Y = \beta_0 + \sum \beta_i X_j + \varepsilon$$

i=1, 2,……………………,n
j=1,2,……………………..,k.

After examining the association between the dependent variable (fertility) and each of the independent variable, multiple regression model was used as the main tool of data analysis in this study to examine the overall association between the above stated explanatory variables (maternal age at first birth, birth intervals, ideal number of children, educational attainment, age at first cohabitation) and fertility by use of **R** (Coefficient of correlation). Then, $\mathbf{R^2}$ (Coefficient of determination) was used to assess to what extent (%) the above stated variables influence fertility.

The multiple regression method would be a procedure for using data to find the regression equation.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon \ldots\ldots\ldots\ldots (1)$$

where,

β_1, β_2, β_3, β_4, and β_5

Are parameters of Ideal number of children, Educational attainment, age at first cohabitation, age at first birth, and birth intervals respectively, and ε the random variable referred to as the error term.

Y is the total number of births (fertility) whereas $X_1, X_2, X_3, X_4,$ and X_5 are the variables of family size preference (ideal number of children), Educational attainment, age at first cohabitation, age at first birth and birth intervals respectively.

2.4. Estimation of parameters:

Returning our attention to the straight line case in Equation (1): Given a random sample from a population, we estimate the population parameters and obtain the multiple regression model:

$$\hat{y} = \beta_0 + \hat{\beta}_1 X_1 + \hat{\beta}_2 X_2 + \hat{\beta}_3 X_3 + \hat{\beta}_4 X_4 + \hat{\beta}_5 X_5 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$\hat{y}$ is the estimated total number of births (fertility), and $\hat{\beta}_0$, $\hat{\beta}_1$, $\hat{\beta}_2$, $\hat{\beta}_3$, $\hat{\beta}_4$ and $\hat{\beta}_5$ are estimators of

β_0, β_1, β_2, β_3, β_4, and β_5

Under regression the following analysis was performed.

2.4.1 Coefficient of determination (R^2):

This measures the variability of the total number of births (fertility) that is explained by the variability of age at first birth, birth intervals, age at first cohabitation, family size preference and education attainment respectively. R^2 is also interpreted in percentages to indicate the overall percentage contribution of all predictors (independent variables) on fertility. Adjusted R^2 was also used for more clarification and appropriateness.

$R^2 = \frac{SSR}{SST} = 1 - \frac{SSE}{SST}$, where SSR denotes Sum of Squares due to regression;

SSR = $\sum_{i=1}^{n} (\hat{y}_i - \bar{y})^2$

SSE denotes Sum of Squares due to error; SSE = $\sum_{i=1}^{n} (y_i - \hat{y}_i)^2$ and

SST denotes Total Sum of Squares; SST = $\sum_{i=1}^{n} (y_i - \bar{y})^2$

2.5 Hypotheses testing and decision rules:

2.5.1 Test for significance (Sig.):

This tests the null hypothesis that: Fertility and maternal age at first birth, birth intervals, age at first cohabitation, preferred family size and education are not linearly related. This is where the P-Value expressed as Sig. is greater than α expressed as 0.05 (P-Value > 0.05).

Decision rule:

If P-Value < 0.05, the null hypothesis is rejected and conclude that fertility and the above stated predictors are significantly associated.

2.5.2 Model testing hypothesis:

$H_0 : \beta_0, \beta_1, \beta_2, \beta_3, \beta_4, and \beta_5 = 0$ (There is no relationship),

$H_1 : \beta_i \neq 0$ (At least one of the predictor variables is associated with fertility).

This was used to test for the appropriateness of the assumed model. The acceptance or rejection of the above Ho is done on the basis of the P-value approach.

Decision rule:

On the basis of the P-value (P-value < 0.05), the researcher rejects the null hypothesis (H_0) when at least one of the predictor variables are associated with fertility ($\beta_i \neq 0$).

2.5.3 Testing the accuracy of the model:

To test how well the model fits the data, the following conditions would be satisfied;

- **Standardized residuals:**

The Standardized residuals are the deviations of the data points from the model. In an average sample, 95% of standardized residuals should lie between ±1.96. Any case for which the absolute values of the standardized residual exceed this boundary (±1.96), the predictor is likely to be an outlier, and the model would not be good.

Decision rule:

If the standardized residuals for age at first birth, birth intervals, age at first cohabitation, family preference and education lie between these boundaries (±1.96) for 95% C.I, then all of the predictors would be significant, meaning that the model is suitably fitted.

In this case, the Researcher rejects the null hypothesis and conclude that the model is good to estimate fetility since the deviations of the data points from the model lie between (±1.96).

- **Test of Multicolinearity:**

Multicollinearity exists when there is a high autocorrelation among the predictor variables. As a result, these particular variables become insignificant, leading to inaccuracy of the model. For the multicollinearity to occur, the following conditions have to be fulfilled:

1. The Variance Inflation Factor computed as; $VIF_j = \frac{1}{1-R_j^2}$ should be greater than 10. As a guideline, a VIF greater than 10 indicates a multicollinearity problem (Myers, 1990),

where R_j^2 is the coefficient of determination of the model that includes all the predictors.

2. Tolerance computed as $Tolerance = 1 - R_j^2$ must be less than 0.2. According to Menard (1995), a tolerance value lower than 0.20 suggests a multicollinearity problem.

If the VIFs for each of the above predictors are greater than 10 (VIF>10) and the tolerance for each of the above predictors are less than 0.2 (T <0.2), this indicates the presence of multicollinearity in the model. As a result, the model is not good, meaning that it will be inappropriate to estimate fertility.

Decision rule:

If the VIFs for maternal age at first birth, birth intervals, age at first cohabitation, preferred family size and education are less than 10 (VIF<10) and the tolerances for each predictors are greater than 0.2 (T > 0.2), this proves the absence of multicollinearity in the model. As a result, the Researcher rejected the null hypothesis and concluded that; the model is accurate (well fitted).

- **Testing normality of errors:**

The normality of errors were tested by the regretted residuals using the normal distribution curve. positively or negatively skewed errors would be the indicator that the model is not good.

Decision rule:

If errors (residuals) are neither negatively nor positively skewed (show normal distribution), the null hypothesis is rejected and the researcher concludes that the model is good to estimate fertility.

3. RESEARCH FINDINGS

3.1 Introduction:

This section concentrates on the analysis and interpretation of data from the respondents in relation to the objectives and hypothesis of the researcher. In this section, the researcher analysed and interpreted data using the RDHS 2014 women dataset. It is on this note that the researcher used multiple regression model as the main tool of data analysis as a way of analysing, interpreting and presenting results. The data presented in this chapter are mainly data collected from females who are in reproductive period (15-49 years) as well as those who completed their reproductive period.

The model is made of three tables specified as; Model summary table, Analysis Of Variance (ANOVA) table and the table of coefficients.

3.2 Model summary:

Model summary table is used to explain the overall relationship between the stated predictor variables and fertility (**measured by R)** and the extent (%) to which these variables influence fertility (**measured by R^2**).

Table 3.1: Model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578[a]	.370	.349	1.153
a. Predictors: (Constant), Ideal number of children, Educational attainment, Age at first cohabitation, age at first birth, birth intervals				

Source: Rwanda Demographic and Health Survey 2014 women dataset

Table 3.1 illustrates the correlation coefficient (R), the coefficient of determination (R2) and the adjusted coefficient of determination (Adj. R2). It is observed that the correlation coefficient (R) is .578a. This indicates that there is strong positive correlation between the above predictors and fertility (measured by total children ever born to a woman). The adjusted coefficient of determination (Adjusted R2) is 0.349 indicating that 35% of the variation of fertility is determined by maternal age at first birth, birth intervals, age at first cohabitation, ideal family preference and education attainment.

3.3 ANOVA Table:

ANOVA Table contains the statistics which are used to test the hypothesis that was set by the researcher. It contains the P-value (expressed as Sig.) which is compared with α to either reject or don't reject the hypothesis. If the p-value is less than α, the researcher rejects the null hypothesis (Ho), and if the p-value > α, the researcher doesn't reject the null hypothesis.

Table 3. 2: ANOVA Table

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9704.104	5	1940.821	418.562	.000[a]
	Residual	36580.321	7889	4.637		
	Total	46284.425	7894			
a. Predictors: (Constant), Ideal number of children, Educational attainment, Age at first cohabitation, age at first birth, birth intervals						
b. Dependent Variable: Total children ever born						

Source: Rwanda Demographic and Health Survey 2014women dataset

Table 3.2 illustrates the test for the appropriateness of the assumed model. Basing on the p-value approach, the P-value is 0.000 and α is 0.05. α (Alfa) is the level of significance which indicates the probability at which the null hypothesis can be rejected. In this case, the estimated model is significant since the p-value is less than 0.05, and therefore, there is a significant linear relationship between fertility and the above predictor variables. For this reason, the results of the test are not in favour of the hypothesis which stated that "Maternal age at first birth, birth intervals, age at first cohabitation, education, family size preference and fertility are not significantly associated".

3.4: The table of coefficients:

This contains the statistics that are used to test the accuracy of the model.

Table 3.3: Coefficients (Beta values)

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	4.402	.122		30.27	.000		
	Ideal number of children	.591	.020	.305	21.19	.000	.987	1.013
	Educational attainment	-.332	.024	-.141	-13.72	.000	.952	1.051
	Age at first cohabitation	-.312	.044	-.099	-7.16	.000	.528	1.892
	Age at first birth	-.403	.044	-.124	-9.09	.000	.536	1.864
	Birth intervals	-.558	.039	-.144	-14.36	.000	.995	1.005
a. Dependent Variable: Total children ever born								

Source: Rwanda Demographic and Health Survey 2014 women dataset

The above model illustrates the test for the significance of every parameter. In this case, Ideal number of children, Educational attainment, Age at first cohabitation, Age at first birth and Birth intervals are sufficient to make a significant contribution on fertility (P-Value<0.05).

The findings do not accept the hypothetical expectation which states that;

$H_0 : \beta_0, \beta_1, \beta_2, \beta_3, \beta_4, and \beta_5 = 0$ (There is no relationship)

$H_1 : \beta_i \neq 0$ (At least one of the predictor variables is associated with fertility).

Therefore, since the P-values (expressed as sig) for each of the predictor variables are less than alpha (P-Value<0.05), all the predictor variables are significantly associated with fertility at 95% level of significance (Table 3).

3.5 Description of model coefficients:

The coefficients in **Table 3.3** can be further represented and explained in the following model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 .... (1)$$

The estimated model:

$$\hat{Y} = 0.811 + .591 X_1 - .332 X_2 - .312 X_3 - .403 X_4 - .558 X_5 .... (2)$$

Where: **β0** is the constant if all other predictors are 0

β_1, β_2, β_3, β_4, and β_5 are the coefficients (parameters) of Ideal number of children, Educational attainment, Age at first cohabitation, Age at first birth, and Birth intervals respectively. However, **ŷ** is the estimated total number of births (fertility), X_1 Ideal number of children, X_2 is Educational attainment, X_3 is Age at first cohabitation, X_4 is Age at first birth**,** and X_5 is Birth intervals**.**

Interpretation of predictors (beta values):

The above estimated model shows that, for every one unit increase in Ideal number of children, we predict 0.591 (59 percent) increase in fertility when all other predictor variables remain constant. However, for every one additional year of schooling, we predict 0.332 (33 percent) decrease in fertility when other predictor variables remain unchanged. Then, for every one unit increase in age at first marriage, fertility decreases by 0.312 (31 percent) as all other independent variable remain unchanged. Nevertheless, each additional year of age at first birth predicts 0.403 (40 percent) decrease in fertility as other predictor variables remain constant. For each additional increase in birth interval, fertility decreases by 0.558 (56 percent) as all other variables remain unchanged.

3.6 How well does the model fit the data? (Testing the accuracy of the model)

To test the accuracy of the model, we look for standardized residuals (errors), multicollinearity and normality of errors.

3.6.1 Standardized residuals:

Standardized residuals are the deviations of the data points from the model. Here, our standardized residuals are expressed in **Table 3.3** as **"Std. Error".**

In an average sample, 95% of standardized residuals should lie between ±1.96. Any case for which the absolute values of the standardized residual exceed this boundary (±1.96), the predictor is likely to be an outlier. In this case, the standardized residuals for family size preference (ideal number of children), educational attainment, age at first cohabitation, age at first birth and birth intervals are 0.020, 0.024, 0.044, 0.044 and 0.039 respectively **(Table 3.3).** Since the standardized residuals for these predictors are between ±1.96 for 95% C.I, the assumption of "independence of errors" was not violated meaning that all of the predictors are significant (Osborne & Waters, 2002), and the model is suitably fitted (no any outlier).

3.6.2 Multicollinearity:

Multicollinearity exists when there is a high autocorrelation among the predictor variables. As a result, these particular variables become insignificant, leading to inaccuracy of the model. For the multicollinearity to occur, the following conditions have to be fulfilled:

- The Variance Inflation Factor (VIF) should be greater than 10 (Myers, 1990) and
- Tolerance must be less than 0.2 (Menard, 1995).

In this case, the VIFs for family size preference (ideal number of children), educational attainment, age at first cohabitation, age at first birth and birth intervals **(Table 3.3)** are 1.013, 1.051, 1.892, 1.864 and 1.005 respectively. However, the tolerance for each of the above predictors is 0.987, 0.952, 0.528, 0.536 and 0.995. Then, the VIFs for each of the above predictors are less than 10 (VIF<10) and the tolerances for each predictor are greater than 0.2. Therefore, this proves the absence of multicollinearity in the above model, and this satisfies the assumption of "low collinearity (Darlington, 1968; Keith, 2006)" and as a result, our model is accurate (well fitted).

3.6.3 Normality of errors:

Normality of the residuals is an assumption of running a linear model. So, if the residuals are normal, it means that the assumption is valid and model inference (model predictions) should also be valid.

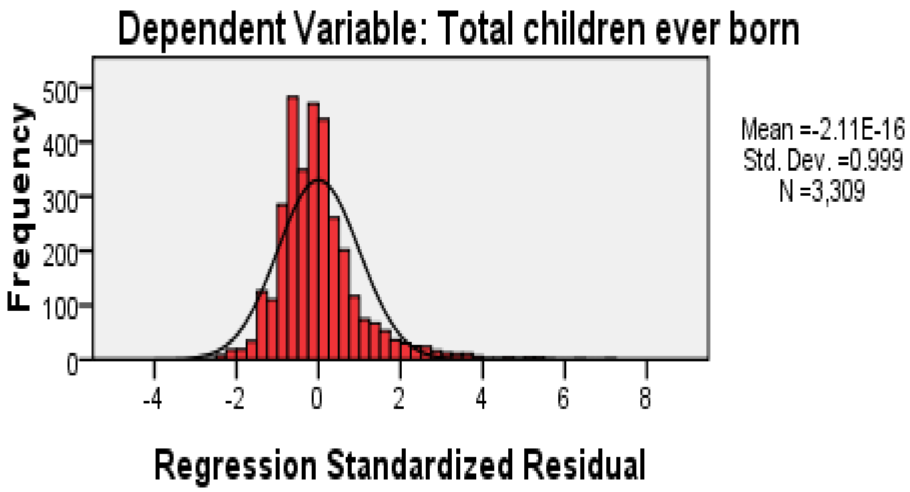

Figure 1

Figure 1 clarifies that, the errors are approximately normally distributed. This further proves that the model is accurate.

Finally, since the model met the above 3 conditions i.e.

1) -1.96≤errors≤+1.96,

2) absence of multicollinearity (VIF<10 and tolerance >.02) and

3) normally distributed errors,

It implies that the stated model is accurate to estimate fertility.

However, the Researcher's hypothetical expectation of the goodness of the model stated that, "at 95% level of confidence, the deviations of the data points from the model exceed ±1.96, high autocorrelation among the predictor variables exist, and errors are not normally distributed".

Therefore, the above three conditions indicated by the findings disprove the hypothesis of the goodness of the model and conclude that, the model is good (accurate) to estimate fertility.

4. CONCLUSION

The objectives of this study were to determine the levels of fertility, examining the relationship between fertility and its associated factors in Rwanda, and assessing the goodness of the model. The findings revealed that age at first child, Education, age at first cohabitation, Family size preference, birth intervals and fertility are statistically associated (p-Value<0.05), and the model was good to estimate fertility. This shows that the results were in line with the stated objectives of the study. In addition, the findings rejected the stated hypotheses and conclude that, there is a significant association between fertility and its stated associated factors (P-Value< 0.05), and the examined tests proved that the model is accurate to estimate fertility (-1.96≤errors≤+1.96, VIF<10 and Tolerance <0.2, and normality of errors).

4.1 Recommendations:

4.1.1 The government agenda:

The results in **equation 2** revealed that, for every one unit increase in Ideal number of children, fertility increases by 59 percent as all other independent variables remain unchanged. This has a serious implication to the policy. High fertility preference affects contraceptive use through socio-cultural and attitudinal factors, such as considering children to be potential economic assets and attaching high value to large families (Schoemaker, 2005). It is in this perspective that the Government should increase the frequency of sensitization on family planning issues through the radio, television and newspapers, and the local authorities should use community work (umuganda) as the opportunity to continue sensitizing the population on birth control issues.

However, for every one additional year at which the Mother spends at school, we predict 0.332 (33 percent) decrease in fertility when other predictor variables remain unchanged **(equation 2).** It is seen that better educated women have more attitude towards fertility control as they are more likely to seek professional advice, and use a contraceptive technique (Bhrolchain, 1988).

In addition, age at first birth / age at first cohabitation is a transition mark to a woman into motherhood. Delaying age at first cohabitation / age at first birth is an important mechanism that contributes to decreasing the quantum of fertility. This is indicated in the above model **(equation 2)** where each unit increase of maternal age at first cohabitation contributes to 31.2 percent decrease in fertility, and each additional year of maternal age at first birth contributes 40.3 percent decrease in fertility as other variables remain constant. Advancing age is associated with prolongation in the average time for achieving conception (Fertil, 2014). As clarified by many studies (Singh et al, 2002), the influence of maternal age at first marriage and age at first birth was oftenly considered to be a product of education, where high educational attainment (secondary and higher) was found to be correlated with later age at first child /age at first cohabitation, leading to small family size due to shortened reproductive period. In this case, making sure that universal education is implemented in both rural and urban areas and ensuring that all women attend all levels of education can be among the most powerful weapons to combating high fertility by delaying age at first birth and age at first cohabitation (Vashisht et al, 1991).

4.1.2 The research agenda:

Multiple regression model is a new tool of fertility analysis in Rwanda. Therefore, other researchers are encouraged to continue working on it to supplement other tools of fertility analysis that have been applied in Rwanda, to continue informing policy and adding new information to the existing body of knowledge.

The study was limited only on females' education. Therefore, further studies need to be conducted on both females and males.

The study was also conducted on the Rwandan perspective. Therefore, using the same model, further studies need to cover some selected African Countries to compare their fertility differentials.

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