Marriage, Fertility and Health Care Seeking Behavior in Rwanda

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Abstract

The impact of conflict and war on the demographic process and in particular on decision making by women is an empirical question. Using three rounds of DHS data from Rwanda, this paper examines the age at first marriage and age patterns at motherhood. Using the Cox proportional hazard model we estimate the determinants of age at marriage and motherhood. Since the DHS does not have any variables related to conflict, we indirectly assess the impact of conflict. We examine whether the behavior of cohort of women growing up during the genocide period is different from women who grew up before the genocide occurred. We find that comparing the two groups there has been an increase in the age at marriage and motherhood among women who grew up during the genocide. As a caveat, it is also true that worldwide, the age at marriage has increased. We also model the proximate determinants of maternal health care seeking behavior (place of delivery). We find that visits for ante natal care is a key determinant of whether the woman seeks either institutional care or professional assistance at home as compared to delivering at home without any help. Women from richer households are less likely to deliver a child at home without any professional help. In order to understand the impact of conflict in Rwanda, we pool three rounds of DHS data. The survey year dummies are statistically significant indicating that children born after 1995 were more likely to be born at home without professional assistance.

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1. Introduction

Countries in sub Saharan Africa are yet to complete the demographic transition. Recent trends in fertility transition in sub-Saharan Africa show that a few countries, such as Kenya, Ghana and Cameroon are experiencing stalling of the transition process. In addition, Rwanda is one of the countries experiencing stalling of the process of fertility transition. With a per capita income of $ 220 per year, Rwanda is ranked 159 of 177 in the United Nations Development Programme's 2004 Human Development Index.

From the point of view of demographic process, Rwanda is a peculiar case because over a million people died in the genocide in 1994. At the same time the population increased because of the return of over a million former refugees who were living in exile till the end of the war and genocide (Rwanda Demographic Health Survey 2005). In 2002, Rwanda's population stood at 8,128,553.

Studies have documented fertility declines in time of crisis; viz. war and famine in Ethiopia (Lindstrom and Berhanu 1999) and acute economic crisis (Eloundou-Enyegue 1992). It is conjectured that in Rwanda, the genocide in 1994 slowed down the demographic transition, i.e. slowed the sharp decline in fertility observed over the period 1983 – 1992 (Rwanda Demographic Health Survey 2005). The total fertility rate (TFR) declined from 8.5 in 1983 to 6.2 in 1992 and by 2005 had marginally declined to 6.1. In fact, while rural TFR decreased from 6.3 in 1992 to 5.9 in 2000, urban TFR increased from 4.5 to 5.8. In the year 2005, the TFR in rural Rwanda was 6.3 and in urban areas it was 4.9.

In 2005, in Rwanda, the fertility rate among women in the age group 15-19 was 42 births per 1000. This increases to 235 births per 1000 among women in the age group 20-24 years and further to 305 per 1,000 among women in the age group 25 – 29. The fertility rate remains high among women 30-34 years old (273 per 1,000) and 35 – 39 years old (211 per 1,000 at age 35-39). There is a sharp decline in fertility to 32 births per 1000 among women at the end of the child bearing years, i.e. those who are 45 – 49 years old.

It is pertinent to note that the fertility rates are the highest for the women in the age group 25 – 34 years (Table 1). At the time of the genocide, women in this cohort were in the age group 14 – 23 years. This cohort was exposed to the conflict at the beginning of their marital years or during their early child bearing years. An understanding of the reproductive behavior of women across various age cohorts can be gained by examining the age specific fertility rates in years preceding the survey (Table 2).

Among the factors that contribute to the demographic transition include changes in decline in infant and child mortality rates, delayed marriage, and postponement of child bearing.

There is evidence to suggest that post genocide there was a marked deterioration in child health outcomes (Table 3). There are five measures of early child mortality. Neonatal mortality is the probability of dying in the first month of life while post neonatal mortality is the probability of dying between the neonatal period and the first birthday; calculated as the difference between

infant and neonatal mortality. Infant mortality is the probability of dying before the first birthday while child mortality is the probability of dying between the first and fifth birthdays. Finally, under-five mortality is the probability of dying before the fifth birthday. Post genocide (i.e. 5-9 years preceding the Rwanda Demographic Health Survey 2005) there was a sharp increase in post-neonatal mortality, infant mortality, child mortality and under five mortality rates. In the last four years, i.e. since 2001 it is apparent that there has been a sharp decline in childhood mortality rates.

The objective of this paper is to understand the impact of genocide on demographic processes. It should be noted that Rwanda Demographic Health Survey 2005 data does not have any information on whether and how the women or the households were affected by the events in 1994. Nor is there information on the ethnic group to which the household belongs.

Thus our results should be interpreted with caution in the sense that the findings cannot be attributed directly to genocide. We seek to observe whether the behavior of cohort of women growing up during the genocide period is different from women who grew up before the genocide.

To this end, we focus on three issues in the context of Rwanda: age at first marriage, age at first child and maternal health care seeking behavior. We use data from Rwanda Demographic Health Survey 2005 to estimate a Cox proportional hazard models to identify the proximate determinants of age at marriage and age at first child. In particular the focus is on whether the behavior of women in the age group 15-25 years who were exposed to conflict is different from the behavior of women in the age group 26 – 35 years. We also pool data from Rwanda Demographic Health Survey for the years 1992, 2000 and 2005 and re-estimate the Cox proportional hazard model. One reason for expecting a change in age at marriage is because of the change in the sex ratio following the genocide. In 2005, for every 100 women there were only 88 men and there are differences in the sex ratio across the different age categories.

In order to focus on maternal health care seeking behavior, we pool the data for the years 1992, 2000 and 2005 and estimate a multinomial logit model to model the place of delivery, viz. at home without any professional assistance, in an institution, and at home with professional assistance.

2. In Relation to Literature

There is a large literature focusing on age at marriage, age at first child and reproductive and child health outcomes. It is in the recent past that the focus has turned to understanding how conflict affects the demographic transition and demographic outcomes.

Crisis can lead to delays in marriage and in the onset of childbearing, especially in urban places (Foster 1993). Ghobarah, Huth and Russett (2003) argue that health care systems suffer long term damage on account of civil wars. Based on an analysis of a cross national World Health Organization data set, they also find that women and children suffer disproportionately from the long term effects of civil war. Bundervoet and Verwimp (2005) found that civil war and economic sanctions affected the anthropometric outcomes of children living in rural Burundi.

Akresh and Verwimp (2006) find that girls born in regions of Rwanda affected by crop failure and strife have lower height for age z-scores. They do not find any such effect on the health of boys. In the context of Rwanda, Verwimp and Bavel (2005) find that refugee women had higher fertility but their children also had lower chances of survival. They find that new born girls were likely to be at a greater disadvantage compared to new born boys

Marriage patterns are a key proximate determinant of fertility. Early marriage can be associated with early child bearing. Delayed marriage reduces the number of years available for childbearing. It often conjectured that education plays an important role in determining age at marriage and fertility decisions. Women who are well educated and participating in the workforce might opt to delay their marriage, delay motherhood and also restrict family size. It is also true that there are numerous other socio economic factors affecting such decisions. Jejeebhoy (1995) found that education is one of the key determinants of delay in age at marriage though the impact might be felt only for an education level beyond a certain threshold.

Various studies have consistently shown that maternal education has a statistically significant positive effect on the likelihood that a woman uses reproductive health services. Education makes a difference through a multitude of mechanisms in order to influence service use, including increasing female decision-making power, awareness of health services, changing marriage patterns, greater self-confidence and creating shifts in household dynamics. Better educated women are more aware of health problems, know more about the availability of health care services, and use this information more effectively to maintain or achieve good health status. Mother's education may also act as a proxy variable of a number of background variables representing women's higher socioeconomic status, thus enabling her to seek proper medical care whenever she perceives it necessary. The evidence on the impact of women's employment outside the home on demand for health care has been mixed.

The benefits of antenatal visits may be most significant in developing countries where morbidity and mortality levels among reproductive-age women are high.

There is evidence of a strong association between birth order and use of health care services. Because of perceived risk associated with first pregnancy, a woman is more likely to seek maternal health care services for first order than higher-order births. Having more children may also cause resource constraints, which have a negative effect on health care utilization. Women with a large number of children underutilize available health services because too many demands on their time force them to forgo health care.

It is well known that increased income has a positive effect on the utilization of modern health care services. Measures of income and wealth have also been shown to be important predictors of use of pregnancy care.

Furthermore, the utilization of maternal health services is influenced by the characteristics of the health care delivery system, among other things, including physical availability of services, distance and/or time to a facility, economic and other costs associated with use of services, cultural and social factors that may impede access, and quality of services.

3. Data and Methods

3.1 Data

We use the nationally representative 1992, 2000 and 2005 Rwanda Demographic and Health Survey data. We primarily use the 2005 data for studying the determinants of age at first marriage and age at first birth. In a separate specification we pool all the three rounds. The unit of analysis is the age at which the women married and the age at which the women delivered a child.

We pool the three rounds of data for the analysis on place of delivery. The unit of analysis for place of delivery is the most recent birth in the five years preceding the survey.

The 1992, 2000 and 2005 data sets cover a total of 6,551, 10,421 and 11,321 women in the age group 15-49 years respectively. Details on the survey procedures and sampling design are available in individual survey reports (Rwanda Demographic Health Survey 1992, 2000, 2005).

3.2 Empirical Model: Age at Marriage & Age at First Child

We estimate the Cox proportional hazard model to model the age at first marriage and age at first child.

Based on the reading of the literature we include the following variables in order to model the proximate determinants of age at marriage. We include location where the woman she resides (rural, urban), where she grew up (urban, rural), her religion (catholic, protestant, adventist, others including muslims), whether the woman had a pre nuptial child and region dummies. We also control for education of the woman, viz. illiterate, primary schooling, above primary schooling.

In model 1, we use the 2005 survey data. We use the year of birth in order to identify a woman's exposure to conflict. We create a dummy which takes the value 1 if the age of the woman at the time of the survey is between 15 – 25 years. The dummy takes the value 0 the age of the woman at the time of the survey is between 25 – 35 years. Women aged 15 – 25 years old at the time of the survey would have been exposed to the conflict at a critical age, viz. when they begin to consider decisions pertaining to marriage and fertility.

In the second model we again use the 2005 survey data. We introduce an interaction term, that of education of the women with the dummy identifying whether women were exposed to the genocide. In this specification we do not include education or the dummy indicating whether a woman was exposed to genocide.

3.3 Empirical Model: Place of Delivery

We estimate a multinomial logit model[1] where dependent variable is one of the three outcomes: deliver at home without assistance, institutional delivery, deliver at home with professional assistance. The base category is delivering at home without assistance.

In addition to the standard regressors that have been used in the literature (antenatal visits, age at birth, birth order, education, work status, wealth index) we include the province dummies.

We pool the three cross section data for the years 1992, 2000 and 2005. One advantage of pooling is that it increases the sample size. In order to be able to pool it is necessary that the relationship between dependent variable and some of the independent variables need to be constant over time.

In the analysis we include a time dummy for each cross section. The reference category is the year 1992. We estimate two separate models, first with all the women in the sample and then separately for women aged 15 – 30 years.

We tested for the IIA assumption and find that the null hypothesis of IIA cannot be rejected. This allows us to estimate multinomial logit model.

Instead of reporting the coefficients of the multinomial logit model, we provide estimates of the relative risk ratios (RRR) or odds ratios. The odds ratio does not depend on other choices and this follows from the assumption of independence of disturbances. The RRRs show the effects of the regressors on the probability of institutional delivery, delivery at home with professional assistance relative to the likelihood of delivering child at home with no assistance. If a parameter estimate is greater (less) than one it indicates that the regressor is associated with a probability of the outcome that is greater (smaller) than the probability of the base case.

4. Results

4.1 Age at Marriage and Age at First Child

We first discuss the results of the first model where we use cohort dummy variable to indicate the individual's exposure to the conflict. The results are reported in Table 4. Compared to the cohort that is not exposed to the conflict those exposed are at a lower risk of entering age at first marriage. It is 53 percent lower. Education, current residence, religion and birth of child before marriage have significant effects. As expected those with higher level of education are at lower risk of first marriage and this risk goes further down with increasing school attendance. Those residing in rural areas enter first marriage at an earlier age than their urban

[1] Instead of estimating a multinomial logit model it might be more appropriate to estimate a multi level model. One could estimate a two level model where two levels are place of birth and the cluster.

counterparts. It is 18 percent higher for rural residents. Childhood place of residence does not have a significant effect on risk of first marriage. Compared to Catholics, the hazard rate for Protestants and Muslims (traditional) is higher. The Cox models show that premarital childbirth has significant effect on age at first marriage. The likelihood of those with premarital child is 64 percent lower than those without a child. Presence of a child could make the women less attractive in the marriage market. We also find variation across the provinces. Compared to Butare, the risk is lower in Cyangugu and Gitarama while it is higher in Byumba, Gikongoro, Gisenyi, Kibungo, Kigali Rurale and Ruhengeri. Results presented in Table 5 is based on analysis where we do not include the education and cohort variables but include a variable created by interacting education levels and cohort exposure to conflict. Our results do not change. We once again find that higher level of education reduces hazard rates.

Similar models are estimated for age at first birth. We do not include premarital birth as one of the independent variable. It is evident from Table 6 that age at first birth also follows similar pattern as age at first marriage. Higher levels of education lower risks of age at first birth. Place of current residence and place of childhood residence do not seem to have a significant impact. Once again there are differences across the provinces. Those exposed to the conflict are at a lower risk. We find similar results (Table 7) when we interact the conflict and education dummies.

We also estimated a model by pooling the three cross sections (results not reported here). We included a year round dummy (1992, 2000, 2005) in the analysis. When we pool all the women in the three rounds we find that the hazard ratio for the 2000 dummy as well as the 2005 dummy is less than one[2]. Recognizing that the age distribution of the population changed we re-estimated the model considering women only in the age group 15 – 25 years. In this case we found the hazard ratio for the 2000 dummy greater than 1 and significant suggesting that women were likely to marry earlier. However the hazard ratio for the 2005 dummy was significant and less than 1, suggesting the situation had changed[3].

4.2 Place of Delivery

The results of the multinomial model on place of delivery are presented in Tables 8 and 9. While Table 8 presents the results for the pooled data for women of all ages, Table 9 presents results for the pooled data for women aged 15 – 30 years. Here we discuss the key findings based on the estimates of the multinomial logit model.

In line with the existing literature, we find that number of visits for antenatal care is a key determinant of whether the woman seeks institutional care or professional assistance at home as compared to delivering at home without any help. This result comes out clearly when we estimate

[2] We found a similar result when we pooled all women and reestimated the age at which first child was born.

[3] We found a similar result when we pooled women aged 15 – 25 years and reestimated the age at which first child was born.

the model with all women in the age group 19 – 49 years. We get a slightly different result for the restricted sample, i.e. women in the age group 15 – 49. We find that compared to a woman who does not go for antenatal check up, a woman who goes for antenatal check is more likely to deliver in a health facility instead of at home without assistance.

We find that birth order matters, i.e. older children are more likely to be born at home without assistance rather than at health facility or at home with professional assistance. We should point out that this effect is not observable for women with more than seven children. We also find that women who are educated are more likely to seek assistance or deliver at home rather than delivering at home without assistance. We do not find that women who are working are more likely not to deliver at home without assistance. Wealth matters in the sense that children from households in the fourth and fifth quantiles are less likely to be born in at home without assistance.

We now turn to a discussion of the year or the dummy for the survey year. We find that children born in the five years preceding the 2000 survey are less likely to be born in health facility and more likely to be born at home without assistance. We also find that children born in the five years preceding the 2005 survey are less likely to be born in health facility and more likely to be born at home without assistance. However there is a difference.

Consider the following two outcomes, viz. delivery in a hospital versus delivery at home without assistance. The RRR for the year dummy for 2000 is 0.62 and the RRR for the year dummy for 2005 is 0.87. This implies that in 2000 the ratio of probability of delivering at hospital and probability of delivering at home without assistance is smaller than the ratio of probability of delivering at hospital and probability of delivering at home without assistance in 2005. We find a similar result when we focus only on women in the age group 15 – 30 years.

From this it is not immediately clearly whether the difference in the two RRR's is because of a worsening in availability and access to health care services following the genocide and then a gradual improvement in availability and access to such services. Unfortunately, the survey data does not have information on access to health services.

However it is not an unreasonable conjecture that there could have been a disruption in availability and access to health services. Households could have relied more on the traditional birth attendants. The Rwanda Service Provision Survey 2001 states that the Ministry of Health in Rwanda, has instituted a program for training the traditional birth attendants and also for developing and strengthening the links between the health system and the traditional birth attendants. Such an initiative can improve health outcomes and improve delivery care. In 2003, a new national population policy was formulated in Rwanda emphasizing the need to improve the quality of life and also affecting the demographic (fertility, mortality) processes.

It is possible that the combined effect of these measures could explain the difference in RRR's.

When we consider the following two outcomes, viz. delivery at home without professional assistance versus delivery at home without assistance we find that only the year 2000 dummy is significant and less than one. The dummy for the year 2005 is insignificant. This is true for both models, i.e. the sample with women aged 15 – 49 years and sample with women aged 15

– 30 years. The Rwanda Service Provision Survey 2001 noted that on account of a varied set of reasons, many women preferred to seek the help of the traditional birth attendant.

Finally we find that there are large differences across the provinces. This is not surprising for the following reasons. First, the impact of genocide across the provinces was not uniform. Second, there are differences in the poverty levels across the provinces in both 1990 and 2000. Third, there are substantial differences in the change in poverty levels over 1990-2000 across the provinces (Justino and Verwimp 2006).

5. Conclusion

The impact of conflict and war on the demographic process and in particular on decision making by women is an empirical question. Using the Cox proportional hazard model we estimated the determinants of age at marriage and motherhood. In order to shed light on impact of conflict, we examine whether the behavior of cohort of women growing up during the genocide period is different from women who grew up before the genocide occurred. We find that comparing the two groups there has been an increase in the age at marriage and motherhood among women who grew up during the genocide. As a caveat, it is also true that worldwide the age at marriage has increased. On the issue of maternal health care seeking behavior, we find that visits for ante natal care is a key determinant of whether the woman seeks either institutional care or professional assistance at home as compared to delivering at home without any help. We also find that the survey or time dummies are statistically significant indicating that children born after 1995 were more likely to be born at home without professional assistance suggesting a worsening in the availability of health care services.

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Table 1: Trends in Age-specific Fertility Rates and Total Fertility Rates in Rwanda

Age	1992	2000	2005
15-19	60	52	42
20-24	227	240	235
25-29	294	272	305
30-34	270	257	273
35-39	214	190	211
40-44	135	123	117
45-49	46	33	32
TFR	6.2	5.8	6.1

Note: Age-specific fertility rates are per 1,000 women.
Source: RDHS 2005 - Table 4.3

Table 2: Age-specific Fertility Rates for Five-year Periods Preceding the 2005 Survey, by Mother's Age at the Time of the Birth

	Number of years preceding survey			
Age Group	0-4	5-9	10-14	15-19
15-19	44	71	53	62
20-24	232	264	236	257
25-29	292	310	321	338
30-34	261	283	289	[334]
35-39	207	232	[259]	-
40-44	118	[166]	-	-
45-49	[34]	-	-	-

Note: Age-specific fertility rates are per 1,000 women. Estimates in brackets are truncated.
Source: RDHS 2005 - Table 4.4

Table 3: Early Childhood Mortality Rates

Years Preceding the Survey	Neonatal Mortality	Post-neonatal Mortality	Infant Mortality	Child Mortality	Under Five Mortality
0-4	37	49	86	72	152
5-9	52	69	121	109	217
10-14	56	62	118	91	198

Deaths Per 1000 Live Births
Source: RDHS 2005 - Table 11.1

Table 4: Cox Regression Hazard Ratios
Age at Marriage – Cohort Dummy

	Hazard Ratio	SE	p-value
Current Residence (Urban)			
Rural	1.18	0.07	0.01
Location Grew Up (City)			
Countryside	1.06	0.08	0.47
Religion (Catholic)			
Protestant	1.11	0.04	0.01
Adventist	1.07	0.06	0.22
Muslims & Others	1.38	0.15	0.00
Education (Illiterate)			
Primary	0.76	0.03	0.00
Above Primary	0.47	0.03	0.00
Prenuptial Birth (No)			
Prenuptial Birth (Yes)	0.36	0.03	0.00
Conflict Cohort (Not Exposed)			
Exposed	0.47	0.02	0.00
Province Dummies (City of Kigali)			
Kigali Ngali	1.08	0.12	0.46
Gitarama	0.76	0.08	0.01
Butare	0.89	0.09	0.25
Gikongoro	1.27	0.15	0.05
Cyangugu	0.89	0.11	0.36
Kibuye	0.99	0.11	0.96
Gisenyi	1.47	0.16	0.00
Ruhengeri	1.49	0.16	0.00
Byumba	1.47	0.17	0.00
Umutara	1.30	0.15	0.02
Kibungo	1.29	0.16	0.03
N=7920			

Note: RDHS 2005 data is used

Table 5: Cox Regression Hazard Ratios
Age at Marriage – Interaction Cohort and Education Dummy Using 2005 Data

	Hazard Ratio	SE	p-value
Current Residence (Urban)			
Rural	1.18	0.07	0.01
Location Grew Up (City)			
Countryside	1.05	0.08	0.53
Religion (Catholic)			
Protestant	1.11	0.04	0.01
Adventist	1.06	0.06	0.25
Muslims & Others	1.38	0.15	0.00
Education (Illiterate Not Exposed to Conflict)			
Primary Not Exposed to Conflict	0.87	0.04	0.01
Above Primary Not Exposed to Conflict	0.58	0.04	0.00
Illiterate Exposed to Conflict	0.72	0.06	0.00
Primary Exposed to Conflict	0.38	0.02	0.00
Above Primary Exposed to Conflict	0.15	0.02	0.00
Prenuptial Birth (No)			
Prenuptial Birth (Yes)	0.36	0.03	0.00
Province Dummies			
Kigali Ngali	1.08	0.12	0.51
Gitarama	0.76	0.08	0.01
Butare	0.88	0.09	0.24
Gikongoro	1.26	0.15	0.06
Cyangugu	0.87	0.11	0.28
Kibuye	0.98	0.11	0.86
Gisenyi	1.46	0.16	0.00
Ruhengeri	1.50	0.16	0.00
Byumba	1.46	0.17	0.00
Umutara	1.30	0.15	0.02
Kibungo	1.27	0.15	0.05
N = 7920			

Note: RDHS 2005 data is used

Table 6: Cox Regression Hazard Ratios
Age at First Child with Cohort Dummy

	Hazard Ratio	SE	p-value
Current Residence (Urban)			
Rural	1.09	0.06	0.13
Location Grew Up (City)			
Countryside	0.97	0.07	0.69
Religion (Catholic)			
Protestant	1.11	0.04	0.00
Adventist	1.06	0.05	0.23
Muslims & Others	1.57	0.16	0.00
Education (Illiterate)			
Primary	0.80	0.03	0.00
Above Primary	0.52	0.03	0.00
Conflict Cohort (Not Exposed)			
Exposed	0.61	0.02	0.00
Province Dummies			
Province	1.02	0.11	0.83
Gitarama	0.76	0.07	0.00
Butare	0.85	0.09	0.13
Gikongoro	1.18	0.13	0.13
Cyangugu	0.91	0.11	0.41
Kibuye	0.99	0.11	0.96
Gisenyi	1.31	0.13	0.01
Ruhengeri	1.40	0.15	0.00
Byumba	1.42	0.15	0.00
Umutara	1.24	0.14	0.06
Kibungo	1.23	0.14	0.06
N = 7920			

Note: RDHS 2005 data is used

Table 7: Table 6: Cox Regression Hazard Ratios
Age at First Child – Interaction Cohort and Education Dummy

	Hazard Ratio	SE	p-value
Current Residence (Urban)			
Rural	1.09	0.06	0.12
Location Grew Up (City)			
Countryside	0.97	0.07	0.65
Religion (Catholic)			
Protestant	1.11	0.04	0.00
Adventist	1.06	0.05	0.25
Muslims & Others	1.57	0.16	0.00
Education (Illiterate Not Exposed to Conflict)			
Primary Not Exposed to Conflict	0.92	0.04	0.07
Above Primary Not Exposed to Conflict	0.63	0.04	0.00
Illiterate Exposed to Conflict	0.93	0.07	0.32
Primary Exposed to Conflict	0.52	0.03	0.00
Above Primary Exposed to Conflict	0.25	0.04	0.00
Province Dummies			
Kigali Ngali	1.01	0.11	0.89
Gitarama	0.75	0.07	0.00
Butare	0.85	0.09	0.13
Gikongoro	1.18	0.13	0.13
Cyangugu	0.89	0.10	0.32
Kibuye	0.98	0.11	0.85
Gisenyi	1.29	0.13	0.01
Ruhengeri	1.40	0.15	0.00
Byumba	1.41	0.15	0.00
Umutara	1.24	0.14	0.06
Kibungo	1.21	0.14	0.09
N = 7920			
Note: RDHS 2005 data is used			

Table 8: Multinomial Logit: Place of Delivery (Pooled Cross Section Women Aged 15 – 49 Years)				
Base Category	Health Facility		Home with Professional Assistance	
Delivered at Home	RRR	SE	RRR	SE
Antenatal Visits (None)				
Between 1 - 2 Visits	3.19*	0.46	1.38+	0.21
3 Visits	5.73*	0.83	1.58*	0.24
Over 3 Visits	8.84*	1.35	1.49+	0.26
Age at Birth of Child				
Age	1.02*	0.01	0.99	0.01
Birth Order (First Child)				
Second or Third Child	0.25*	0.02	0.59*	0.06
Fourth or Fifth Child	0.19*	0.02	0.55*	0.07
Sixth or Seventh Child	0.14*	0.02	0.57*	0.1
Eighth Child and Above	0.16*	0.02	0.52*	0.11
Education (None)				
Primary	1.38*	0.08	1.13^	0.08
Above Primary	5.23*	0.49	1.94*	0.3
Work Status (Not Working)				
Working	0.75*	0.05	1.11	0.11
Wealth Index (Bottom 20 %)				
Wealth Index 2nd Quintile	1.03	0.08	1.02	0.11
Wealth Index 3rd Quintile	1.17+	0.09	1.2 ^	0.12
Wealth Index 4th Quintile	1.46*	0.11	1.26+	0.13
Wealth Index 5th Quintile	3.78*	0.31	1.47*	0.18
Year Dummy (1992 Survey)				
2000 Survey	0.62*	0.04	0.39*	0.04
2005 Survey	0.87+	0.06	0.88+	0.07
Province Dummies (Butare)				
Byumba	0.76*	0.08	0.58*	0.08
Cyangugu	1.32*	0.15	1.28^	0.18
Gikongoro	0.41*	0.05	0.35*	0.06
Gisenyi	0.70*	0.08	0.52*	0.08
Gitarama	1.08	0.12	0.64*	0.09
Kibungo	0.59*	0.07	1.12	0.15
Kibuye	0.77+	0.09	0.25*	0.05
Kigali Ville (Pvk)	1.67*	0.19	0.67+	0.12
Kigali Rurale	0.74*	0.08	0.39*	0.06
Ruhengeri	0.69*	0.08	0.31*	0.05
N= 12506				

Table 9: Multinomial Logit: Place of Delivery (Pooled Cross Section Women Aged 15 – 30 Years)				
Base Category	Health Facility		Home with Professional Assistance	
Delivered at Home	RRR	SE	RRR	SE
Antenatal Visits (None)				
Between 1 - 2 Visits	2.48*	0.45	1.26	0.27
3 Visits	4.74*	0.87	1.4	0.31
Over 3 Visits	7.14*	1.39	1.47	0.36
Age at Birth of Child				
Age	1.02	0.01	0.98	0.02
Birth Order (First Child)				
Second or Third Child	0.27*	0.02	0.62*	0.07
Fourth or Fifth Child	0.2*	0.02	0.54*	0.09
Sixth or Seventh Child	0.19*	0.05	0.78	0.25
Eighth Child and Above	1.16	0.92	1.92	2.2
Education (None)				
Primary	1.48*	0.12	1.13	0.12
Above Primary	5.45*	0.71	1.9*	0.4
Work Status (Not Working)				
Working	0.73*	0.06	1.18	0.16
Wealth Index (Bottom 20 %)				
Wealth Index 2nd Quintile	0.97	0.1	0.92	0.13
Wealth Index 3rd Quintile	1.16	0.12	1.05	0.15
Wealth Index 4th Quintile	1.34*	0.14	1.24	0.17
Wealth Index 5th Quintile	3.38*	0.38	1.4+	0.24
Year Dummy (1992 Survey)				
2000 Survey	0.55*	0.05	0.43*	0.06
2005 Survey	0.82+	0.07	1	0.12
Province Dummies (Butare)				
Byumba	0.64*	0.09	0.57*	0.1
Cyangugu	1.09	0.18	1.04	0.21
Gikongoro	0.33*	0.06	0.28*	0.07
Gisenyi	0.55*	0.08	0.45*	0.09
Gitarama	1.07	0.16	0.48*	0.11
Kibungo	0.5*	0.08	0.97	0.18
Kibuye	0.69+	0.11	0.2*	0.06
Kigali Ville (Pvk)	1.27	0.2	0.52+	0.13
Kigali Rurale	0.59*	0.09	0.25*	0.06
Ruhengeri	0.55*	0.08	0.27*	0.06

N = 6461