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**EFFECTS OF VIOLENT CONFLICT ON WOMEN AND CHILDREN  
SEXUAL BEHAVIOUR, FERTILITY, AND INFANT MORTALITY IN  
RWANDA AND THE DEMOCRATIC REPUBLIC OF CONGO**

Elina Elveborg Lindskog





# Effects of violent conflict on women and children

Sexual behavior, fertility, and infant mortality in Rwanda and the Democratic Republic of Congo

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## Introduction

This thesis deals with the relationship between violent conflict and sexual and reproductive behavior in Rwanda and the Democratic Republic of Congo (DRC). The aim of the thesis is to contribute to the literature on how war affects demographic outcomes across individual life courses. The analyses link data measuring the intensity and frequency of violent conflict with women's sexual and birth histories and infant deaths across time and place.

The thesis is set in the context of tropical Africa, Rwanda and the DRC, countries that are characterized by social and economic upheaval and war. There are similarities in the characteristics of the violent conflicts in Rwanda and the DRC as the war spilled over from Rwanda into the DRC and Rwanda has a long history of close ties to the DRC, especially East DRC. Both of these countries are furthermore characterized by poverty, high fertility, high infant and maternal mortality that were intensified during the war period, as well as by war-rape.

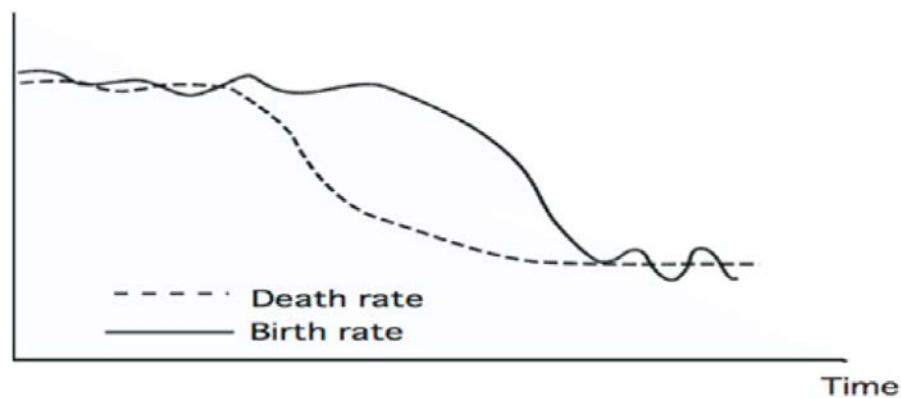
The effect of war on sexual behavior, fertility and infant mortality depends on when the event occurs in the life course. The first study analyses the effect of violent conflict on the risk of women's premarital first sexual intercourse in Rwanda. It concludes that in times of intense conflict the risk of premarital first sex increased. The second study explores the link between war and fertility in the DRC, where the war seems to have delayed the transition to lower fertility. The third paper investigates the relationship between war and infant mortality in the DRC. The study shows that the greater the intensity of conflict events or deaths during the Congolese war the higher was infant mortality, but only during the post-neonatal period.

## Demographic transition in sub-Saharan Africa

To better understand war effects on reproductive health and behavior and infant mortality in Rwanda and the DRC, the thesis must be situated in the context of general trends and differentials in sub-Saharan Africa.

Notestein (1945) developed a more formal theory of the demographic transition, drawing on Thompson's (1929) interpretation of demographic history. The theory explains movements over time from high mortality and fertility to low mortality and fertility (see figure 1). The demographic transition relates to changes in reproductive behavior at the societal level that transform a traditional pre-industrial state to a highly developed and modernized society.

**Figure 1.** The demographic transition

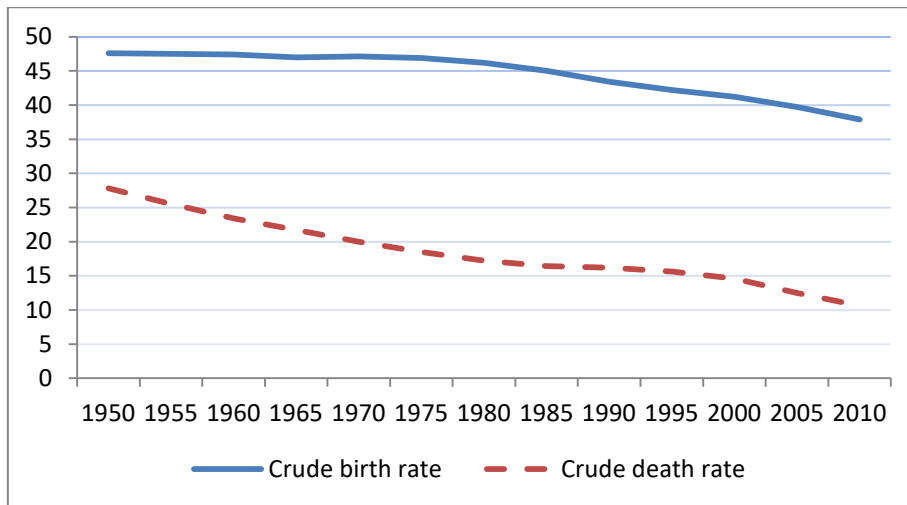


Source: Malmberg, 2008:7.

Notestein offers two explanations for fertility decline. First, in pre-modern societies fertility is kept high by the maintenance of a series of props such as religion, education, community customs, marriage habits etc. High fertility was essential for societal survival as mortality levels were persistently high. However, when mortality began to fall in these countries the props were not needed to the same extent as earlier and social adjustments were made in response to the changes (Caldwell, 1976). The lag effect of high fertility with declining mortality causes rapid population growth that stabilizes once fertility starts to decline.

It is difficult to determine when mortality rates started to decline in sub-Saharan Africa due to lack of data, but by the early 1950s mortality had definitely started to decline and sub-Saharan Africa had thereby entered into the initial phase of the demographic transition (Malmberg, 2008). Figure 2 shows a gradual decline in the mortality rate since the 1950s, whereas the birth rate remained stable until the 1980s when it started to decline. The divergence in birth and death rates enhanced population growth with a peak in the 1980s, when African women gave birth on average to 7 children during their reproductive years (Ibid). The total fertility rate has then declined and in the mid-2000s, sub-Saharan African women gave birth on average to 5.1 children, still very high (Ibid).

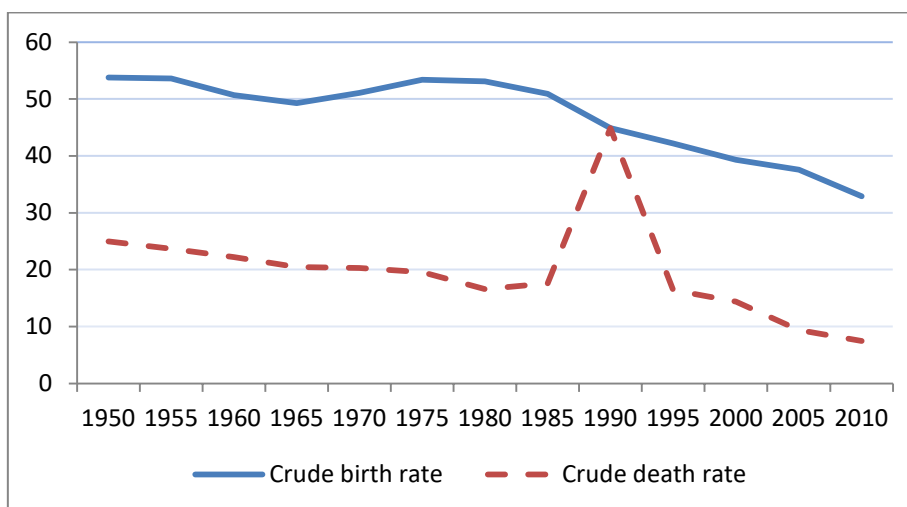
**Figure 2.** Demographic transition in sub-Saharan Africa (1950-2015\*).



Source: United Nations, Population Division (2016). <http://esa.un.org/unpd/wpp/DataQuery/>  
 \* The calendar years represent five year intervals, ending in 2015.

The timing and the speed of mortality and fertility decline varied across countries due to diversity in traditions, level of political and economic development and government support of family planning services and activities (Kirk & Pillet, 1998). Figure 3 shows that the mortality rate in Rwanda had begun to gradually decline after the 1950s. The figure also shows a clear increase in the mortality rate during the civil war and the genocide (1990-1994). The birth rate remained high, but fluctuated around levels at the time of independence in 1960. This period was marked by violence and migration across the borders by Tutsi to mainly East DRC and Uganda.

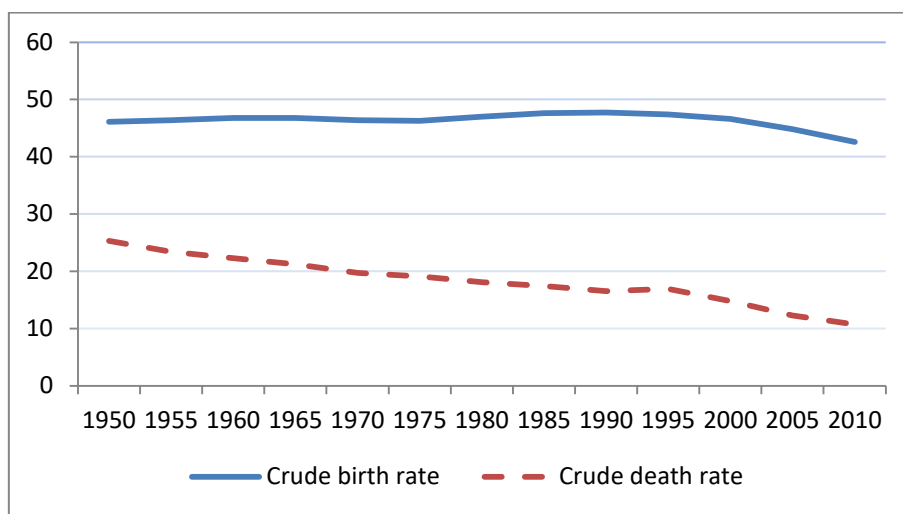
**Figure 3.** Demographic transition in Rwanda (1950-2015\*).



Source: United Nations, Population Division (2016). <http://esa.un.org/unpd/wpp/DataQuery/>  
 \* The calendar years represent five year intervals, ending in 2015.

The onset of the fertility decline was estimated to be in 1981 in urban areas and 4 years later (1985) in rural areas (Garenne & Joseph, 2002). Figure 4 shows that the DRC deviates from the general pattern of the demographic transition, being one of the last countries in sub-Saharan Africa to have embarked on the fertility transition (Shapiro & Tambashe, 2001). Mortality rates have only gradually declined since the 1950s, with a small bump during the Congolese War (1996-2003), while fertility levels have remained high and stable during the twentieth century. Figure 4 shows that fertility started to decline just after the turn of the century.

**Figure 4.** Demographic transition in the DRC (1950-2015\*).



Source: United Nations, Population Division (2016). <http://esa.un.org/unpd/wpp/DataQuery/>

\* The calendar years are presented with a five year interval, ending in 2015.

### Reproductive health and behavior in sub-Saharan Africa

During the last 20 years the proportion of young women who marry at an early age has declined in sub-Saharan Africa (Mensh et al., 2006). The benefits of delayed marriage are argued to be a trade-off for an increase in premarital sex (Ibid). Premarital sexual activity is high and increasing throughout the region (Meekers 1994; Mensch et al. 2006). It is not clear whether the increase in premarital sex relates to an extended period of exposure between puberty and marriage or to higher rates of sexual experience while unmarried. Meekers (1994) argues for changes in norms, as there is much greater tolerance nowadays towards premarital sexual intercourse in societies in which it was earlier condemned. Another report published by the Alan Guttmacher Institute also argue that there has been a change over the last several decades in developing countries related to norms and values regarding premarital sexual activity



and delayed marriage (AGI, 1998). Mensch and colleagues (2006) conducted a study in 27 sub-Saharan African countries and found that the proportion of young women who are sexually active has indeed increased but the cause is dichotomized. In some countries the increase is due to greater exposure and in other countries the increase is due to a higher rate of premarital sex. In six of the countries (Rwanda being one of them), increased premarital sexual activity was attributed to both increased exposure and increased rates of premarital sex (Ibid). The DRC was not included in the study.

The level of premarital sexual activity varies considerably between countries and socio-economic groups (Meekers, 1994; Mensch et al., 2006). In matrilineal societies, for example, lineage is more important than marriage agreements. Thus, children are generally considered a welcome addition to a woman's lineage regardless whether or not a woman is married at the time of the birth. The more predominant patrilineal societies are less tolerant of premarital sexual relations for women (Gage-Brandon & Meekers, 1993).

Within countries, premarital sex varies by gender, urban/rural residence and education. Tolerance is greater for men's sexual behavior than for women's. The 1998 Rwandan Sexual Behavior and Condom Use Survey found that 40% of men were sexually active by the age of 18 years compared to 29% of the women, and men were furthermore more likely to have multiple partners (Calvés, 1998). A study based on 24 countries in sub-Saharan Africa found that never-married men and women in urban areas were more likely than those in rural areas to report sex in the past year, and urban women were more likely to report age-disparate relationships and multiple partnerships compared to rural women (Doyle et al., 2012). Early sexual debut, marriage and childbearing were found to be more common among youth with low education level compared to youth with higher education (Ibid). On the other hand, having multiple or age-disparate partners was more common among youth with relatively high education (Ibid).

Premarital sex is often unprotected by contraception, thus resulting in an increase in sexually transmitted infections and premarital childbearing, which may result in abortion or infanticide. Because abortion is restricted in most sub-Saharan countries, many young women seek illegal procedures, which increase the risk of adverse health effects (Meekers, 1994). Across 24 sub-Saharan African countries, never-married women age 15-19 who used a condom at last sex varied greatly; the highest use was observed in Southern Africa and the lowest in West and Central Africa, followed by East Africa (Doyle et al., 2012). Among Rwandan youth aged 15-24 years who reported ever having sex only 16% of the boys reported ever using a condom compared to 12% of the girls (Babalola et al., 2002).

The main determinant of fertility decline in sub-Saharan Africa is argued to be the use of modern contraceptives (Kirk & Pillet, 1998). In the DRC the use of modern contraceptives is low and only 6.7% of women aged 15-49 use modern contraceptives (DRC DHS 2007). The use of modern contraceptives in the DRC falls into a geographical pattern. West DRC is characterized by a matrilineal culture and women have more opportunity and better access to contraceptives, whereas East DRC is marked by continuous conflict and must rely on aid from NGOs to improve access to contraception (Kandala et al., 2015). The mining provinces on the other hand do not have access to NGOs and are characterized by a persistence of a pronatalist culture, which is associated with low levels of education and gender inequality and many women lack access to family planning and health care (Ibid). Traditional means of birth control -- withdrawal, breastfeeding and post-partum sexual abstinence -- have a long history of practice in Africa. Withdrawal was recently found to still be the most frequently used method among HIV-negative women in Rwanda (Elul et al. 2009).

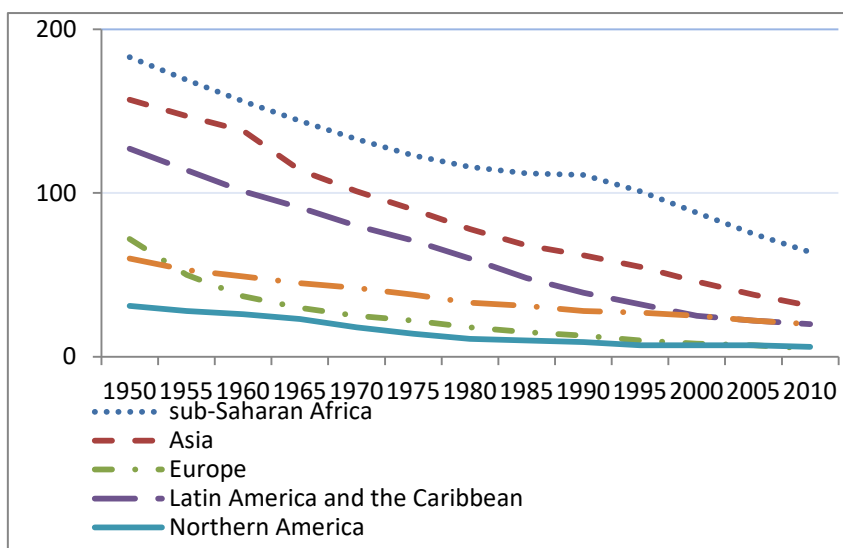
Fertility declines when first births are delayed, birth spacing is increased, and childbearing is terminated at an earlier age. In sub-Saharan Africa, some delay has been observed in first births among adolescents through increased schooling (Gupta & Mahy, 2003). Birth spacing is negatively influenced by substituting bottle-feeding for breast milk because the length of post-partum sexual abstinence is reduced as well as the length of lactational amenorrhea (Romaniuk, 1980). Changes in these practices will therefore have a negative effect on birth spacing if not compensated by contraceptive use (Romaniuk, 2011; Lesthaeghe, 2014). There will be little effect of contraception on completed fertility if contraceptives simply replace traditional forms of birth spacing (van de Walle & Foster, 1990). Terminating childbearing requires the use of effective contraceptive methods after the last wanted birth. The real breakthrough for the fertility transition in sub-Saharan Africa will come about once women stop having additional births after they have reached the desired family size (Lesthaeghe, 2014; Romaniuk, 2011). Contraception demand must be met and sub-Saharan Africa has the highest unmet need compared to Latin America, Asia and North Africa (Bongaarts & Casterline, 2012).

### **Infant mortality in sub-Saharan Africa**

Infant mortality has dropped worldwide since the 1950s, but sub-Saharan Africa still has the highest infant mortality rates (Rajaratnam et al., 2010). The decline starting in the 1950s stalled

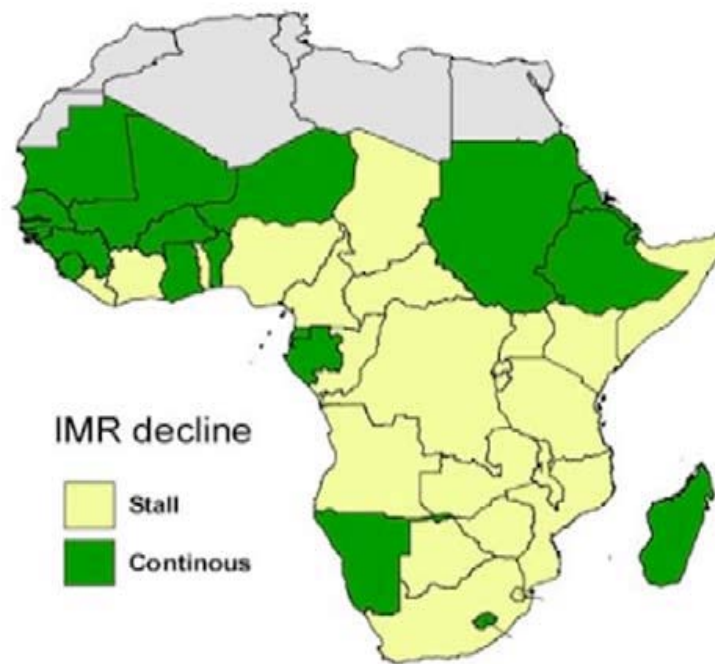
during the 1980s and 1990s, which may very possibly relate to the many ongoing civil wars in sub-Saharan Africa at this time period.

**Figure 5.** Infant mortality in the world, 1950-2015\* (infant deaths per 1,000 live births, both sexes).



Source: United Nations, Population Division (2016). <http://esa.un.org/unpd/wpp/DataQuery/>  
 \* The calendar years represent five year intervals, ending in 2015.

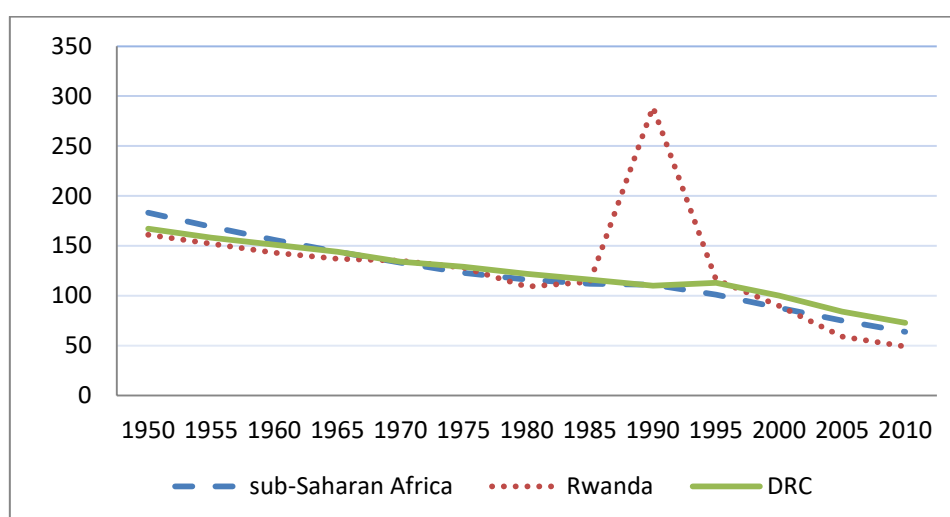
The map below (Malmberg 2008:11) indicates that the reduction in infant mortality has been continuous in about half of the countries in sub-Saharan Africa. These countries had an infant mortality rate of above 150 per thousand births in the early 1950s, but then declined to under 100 per thousand births (Ibid). In the countries marked as “stalling” infant mortality declined until the 1980s, but was then reversed or halted with infant mortality rates remaining above 100 per thousand births (Ibid).



Source: Malmberg 2008:11.

Rwanda and the DRC are among the countries with stalling infant mortality decline. Figure 6 clearly shows that the stall occurred during the conflict periods in both countries. However, in the aftermath of the conflict infant mortality began to again decline and is now below 100 per thousand births. Infant mortality is lower in Rwanda compared to the DRC, where infant mortality is among the highest in sub-Saharan Africa. Risk factors associated with child mortality are unhygienic and unsafe environments combined with inadequate nutrition and infectious diseases (Jones et al. 2003).

**Figure 6.** Infant mortality, 1950-2015\* (infant deaths per 1,000 live births, both sexes).



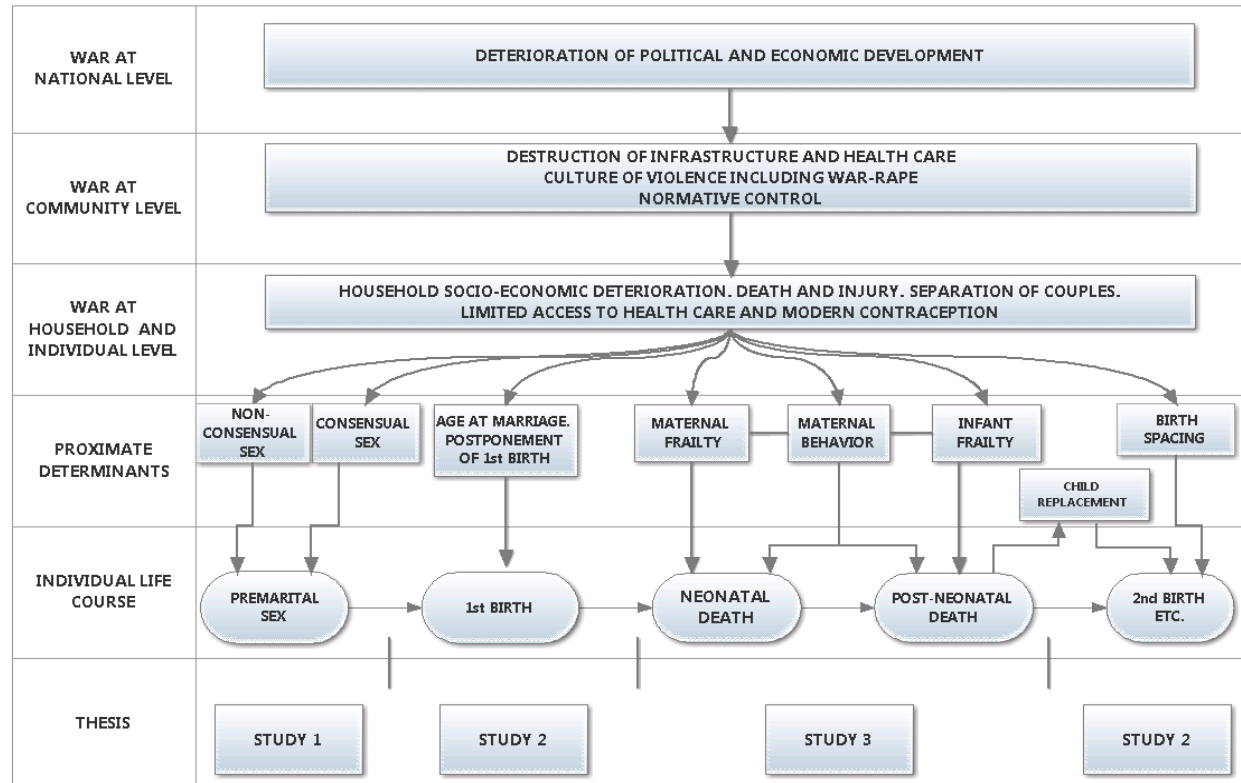
Source: United Nations, Population Division (2016).<http://esa.un.org/unpd/wpp/DataQuery>  
\* The calendar years represent five year intervals, ending in 2015.

### War and women's reproductive lives

Many developing and traditional societies are characterized by poor health particularly women's reproductive health, and high infant and maternal mortality, which makes childbearing responsibilities more difficult (Khan & Shirmeen, 2006). These indicators are a function of demographic and social structures as well as the political and economic environment (Mock et al., 2004; Muhwezi et al., 2011). War and violent conflict poses a life-threatening situation in which the demographic and social structures as well as the economic and political order are disrupted (Mock et al., 2004; Iqbal, 2006; Muhwezi et al., 2011).

Figure 7 illustrates pathways through which war may influence women's reproductive lives. At the national level war undermines sustainable development as military expenses are prioritized, relocating government resources from social services to finance the army (Kiros & Hogan, 2001). At the community level, war has a negative effect on the physical infrastructure such as railroads, roads, water systems, etc, which affects the organization of food production and increases the risk of malnutrition and starvation (Kiros & Hogan, 2001; van Herp, 2003). The destruction of health care facilities and the loss of health staff through migration and casualties limit access to health care, including modern contraception. War disrupts everyday life and the consequences can be severe through the loss of livestock, crops, death and trauma (Mock et al., 2004). War may also separate couples when seeking refuge.

Figure 7. Theoretical pathways from war to life course events.



These disruptions in the fabric of daily life directly influence the proximate determinants of premarital sex, fertility and infant mortality. Sexual violence, war rape and sexual slavery may result in unplanned and unwanted pregnancies and sexually transmitted infections. Social disruption and disruption of families may weaken parental and community monitoring and protection. This places, especially, young women who are dependent on men outside the immediate family for physical protection and financial support, in a more vulnerable position. Women may be forced into sexual acts in return for protection (HRW, 2004; Milillo, 2006). Consensual sex can also be linked to the disruption of families, because physical closeness to a trusted person is comforting when facing danger (Cohan & Cole, 2002).

War may delay age at marriage as young men and women are drawn into the military or militias. The genocide in Cambodia and Rwanda both provide evidence that men were targeted to a higher extent than women. This resulted in a skewed gender ratio after the genocides, which affected the marriage market negatively (de Walque, 2006; Jayaraman, 2009). However, in Cambodia the age-discrepancy was reduced to meet the shortage of men (de Walque, 2006). Economic shocks have been found to have a negative effect on fertility (Caldwell, 2004) and as war disrupts the economy at the national level it is possible that an outbreak of war may have similar effects on fertility (Urdal & Che, 2013). Reduced economic status of the household and uncertainty of the future may therefore lead to postponement of first births (Lindstrom & Berhanu, 1999).

The proximate determinants for the second and higher birth order are linked to previous life course experiences at the individual level. Marital fertility may be reduced through longer birth spacing related to uncertainty of the future and economic hardship, but also through the separation of couples due to migration, temporary displacement, enrollment in the military or militias or death. However, marital fertility may also operate in the opposite direction during war as parents may choose the short-term benefits from having many children compared to the long-term benefits of fewer children. The death of a child may lead to a child replacement effect and increase fertility.

Proximate determinants of infant mortality are maternal behavior and maternal and infant frailty. Maternal behavior affects both maternal and infant frailty and can be linked to the socio-economic status of the household, housing conditions, means of transportation, access to information and health care. Neonatal deaths are more closely linked to the health of the mother during pregnancy and at delivery while post-neonatal deaths are more closely linked to

the health of the infant. Infants that are exclusively breastfed have a much better protection against infections, diarrhoea and pneumonia compared to weaned infants (Victora et al., 1989). Malnutrition is more associated with weaned post-neonatal infants who are also more exposed to unclean drinking water.

The last row in figure 7 brings us to the life course dimension of the thesis. Each of the studies in the thesis captures life course events at different time periods in their life. War will have different effects depending on when it happens in the life course of a woman.

The potential pathways from war to sexual and fertility behavior and infant mortality will depend on the societal context in which war develops and the nature of the conflict across time. For example, where contraceptive use is already low the destruction of the health sector and limited access to modern contraceptives will not have the same impact as where contraceptive use is relatively high or increasing. The same is true for accessibility of health care; rural populations living in war-torn areas may not have had higher access to health care in the pre-war period compared to the war period.



## Summary of the empirical studies

### Study 1 – Violent Conflict and Sexual Behavior in Rwanda

**Background:** Early and premarital sexual intercourse can be linked to a host of problems in the sub-Saharan African context including unwanted pregnancies and exposure to sexually transmitted infections. This study explores the relationship between violent conflict and premarital first sexual intercourse in Rwanda, a country that experienced violent conflicts leading up to the genocide in 1994, alongside high HIV prevalence.

**Methods:** The RDHS from 1992, 2000 and 2005 provides information on sexual histories for 27,773 women aged 15-49 years. Response rates for the surveys were 94.3%, 98.1%, and 98%, respectively. The UCDP GED conflict data is matched to the RDHS on region and year and provides annual data on violent conflicts in Rwanda. I estimate piece-wise constant proportional-hazard models for the risk of premarital first sexual intercourse from age 12 years.

**Results:** Analyses show an increased risk of premarital first sexual intercourse during the conflict years of 1993 and 1994. The conflict indicators provide strong evidence of a conflict effect on premarital sex in Rwanda.

**Conclusion:** The results are consistent with social disruption and weak community and parental control during the period of violent conflict that may otherwise inhibit young women's experience of first premarital sex.

### Study 2 – War effect on fertility behavior in the Democratic Republic of Congo

**Background:** Wartime fertility decline and post-war rebound in fertility have been observed in both Western societies after the World Wars and in war-affected areas of developing countries. The Democratic Republic of Congo (DRC) seems to deviate from this pattern, maintaining a high total fertility rate despite the Congolese wars of 1996-2003 and lingering conflict in East DRC. This study explores the relationship between war and fertility by linking individual reproductive life courses to the occurrence and intensity of conflict.

**Methods:** The study uses piece-wise constant proportional hazard models to estimate effects on fertility of violent conflict. The DHS survey is nationally representative and includes 18,827 women between ages 15-49 and the response rate was 98.6%. The DHS data was matched with conflict data from the Uppsala Conflict Data program Geo-referenced Event Dataset on region and year. Measures of violent conflict are linked in time and place to women's reproductive histories reported in the DHS.

**Results:** The first birth risk increased during the Congolese war and in the period immediately following. Higher-order birth risks plateaued during the war but decreased thereafter. Taken together, the results are consistent with a postponement and eventual onset of a fertility transition in the DRC.

**Conclusion:** The study deepens the understanding of how war affects parity-specific births in a high fertility context encompassing the live birth histories of Congolese women across time. Additional research including refined measures of migration and behavioral factors associated with fertility across time would allow for more nuanced assessments of demographic consequences and implications of war.

### **Study 3 – The effect of war on infant mortality in the Democratic Republic of Congo**

**Background:** The Democratic Republic of Congo (DRC) has suffered from war and lingering conflicts in East DRC and has one of the highest infant mortality rates in the world. Prior research has documented increases in infant and child mortality associated with war, but the empirical evidence is limited in several respects. Measures of conflict are quite crude or conflict is not tightly linked to periods of exposure to infant death. Few studies have distinguished between the effects of war on neonatal versus post-neonatal infants. No study has considered possible differences between women who give birth during wartime and those who do not that may be related to greater infant mortality.

**Methods:** The analysis used the nationally representative sample of 15,103 mothers and 53,768 children from the 2007 and 2013/2014 Demographic Health Survey in the DRC and indicators of conflict events and conflict deaths from the 2013 Uppsala Conflict Data. To account for unobserved heterogeneity across women, a multi-level modeling approach was followed by

grouping all births for each woman and estimating random intercepts in discrete time event history models.

**Results:** Post-neonatal mortality increased during the Congolese wars, and was highest where conflict events and deaths were extreme. Neonatal mortality was not associated with conflict levels. Infant mortality was not higher in East DRC, where conflicts continued during the post Congolese war period. Models specifying unobserved differences between mothers who give birth during war and those who have children in peacetime did not reduce the estimated effect of war, i.e., no support was found for selectivity in the sample of births during war.

**Conclusion:** Differences in effects of the Congolese war on neonatal versus post-neonatal mortality suggest that conflict influences the conditions of infants' lives more than the aspects of mothers' pregnancy conditions and delivery that are relevant for infant mortality. These differences may, however, be specific to the nature of conflict and prior conditions in the DRC. Because of continued political instability, violent conflict may be expected to continue in contexts such as the DRC; we must therefore continue to document, analyze and monitor the mechanisms through which war influences infant mortality.

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