Disruptive Events and Demographic Behaviour
Explaining the Shifts in Fertility in Rwanda

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Maatschappelijke ontwrichting en demografisch gedrag

Een verklaring van de veranderingen in de vruchtbaarheid in Rwanda

(met een samenvatting in het Nederlands)

Proefschrift

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Preface

This PhD thesis results from research undertaken in the Department of International Development Studies of the University of Utrecht. This dissertation would have never reached this stage without the help and support of others.

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1 INTRODUCTION

1.1 Research objectives

An important fertility decline was registered all over the world in the last four decades with different speeds depending on the social and economic development of regions. The theory of the demographic transition points to decreasing child mortality, educational expansion, economic growth and modernisation as drivers of this decline. Yet, with relatively limited socio-economic progress and decrease in child mortality sub-Saharan African countries also experienced fertility decline in the same period. Some researchers portray the transition in African countries in the 1980s as crisis-led fertility decline. Eloundou-Enyegue (2000) claimed that the economic downturn in Cameroun contributed substantially to the fertility decline, and Woldemicael (2008) linked the border conflict between Eritrea and Ethiopia to a drop in fertility rates.

During the late eighties Rwanda suffered from a severe economic crisis that deteriorated the living conditions of its people. This profound economic crisis has been linked to the decline of fertility between 1983 and 1992 when the total fertility rate fell from 8.3 to 6.2 and the desired family size from 6.3 to 4.2 children per woman (Olson 1994, Uvin 1998). As such the start of the Rwandan fertility decline seems to fit in a crisis-led fertility decline as discussed in the eighties and early nineties in the framework of the African economic crises and structural adjustment programmes.

However, in the 1990s the fertility decline came to a halt in several countries in sub-Saharan Africa. Rwanda is among those Sub-Saharan countries which experienced a stall in fertility decline in the 1990s before resuming its course after year 2005 (Table 1).

The aim of this thesis is to find the factors that may account for the shifts in fertility decline in Rwanda. Two points might be noted. The first one is that the period before the stall in fertility decline in Rwanda was characterised by great efforts invested in family planning programs with the creation of the *Office National de la Population* (ONAPO) (May, Mukamanzi and Vekemans 1990). The second point is that the stall in fertility decline in Rwanda occurred in the same the period as the civil war, which culminated in the 1994 genocide and its aftermath that distressed the country severely for over a decade. The total fertility rate in 2005 (6.1) was at the same level of that of 1992 (6.2).

Table 1: Trends in the Total Fertility Rate (1978 – 2012)

Year	Total Fertility Rates	Sources
1978	8.6	Rwanda Population and Housing Census
1983	8.5	Rwandan Fertility Survey
1991	6.9	Rwanda Population and Housing Census
1992	6.2	Demographic and Health Survey
2000	5.8	Demographic and Health Survey
2005	6.1	Demographic and Health Survey
2007-8	5.5	Interim Demographic and Health Survey
2010	4.6	Demographic and Health Survey
2012	4.0	Rwanda Population and Housing Census

The impact of disrupting events such as (civil) wars are rarely discussed as possible cause for stalling fertility declines, Woldemicael (2008) being an exception. Caldwell (2004: 384), referring to the works of Binion and Maverick, mentions that in explaining the demographic change many give much thought to long-term events such as economic activities and overlook short-term human experience which could play a significant, even triggering, role.

One of the main objectives of this thesis will be to assess to what extent the war and genocide in Rwanda have impacted the demographic behaviour during the events and in the aftermath and thus may be responsible for the stall in fertility decline, by uncovering the mechanisms that relate disrupting events to fertility.

This thesis also intends to explore the drivers of the second shift when fertility decline resumed its course. Is the improvement of living conditions a sufficient requisite for fertility decline? What are the other mechanisms that may lead to this decline? During and after the genocide Rwanda has experienced a massive displacement of people both within the country and towards neighbouring countries. This thesis brings additional empirical evidence to the inconclusive existing literature on the impact of conflict related migration on fertility. In explaining this relationship some scholars assume that civil war leads to lower fertility in the short run, due to separation of spouses, delay of marriage and postponement of pregnancies awaiting better times whereas others expect higher levels of fertility particularly with violent conflicts in poor countries, due to the replacement of children lost, violent acts against women, and an insecure future. Two successive chapters will discuss in detail the fertility of migrants depending on their migration status as well as the motives of their displacement.

1.2 Rwanda's disrupting events in the 1990s

1.2.1 Some numbers

Rwanda is a small densely populated landlocked country situated in the Eastern part of sub-Saharan Africa. During the genocide of 1994 many of the 7.8 million inhabitants lost their life, most of them in a time span of about three months, nearly all Tutsi. It should be noted that numbers vary (Verpoorten 2010, Burnet 2008, Gribbin 2005, Straus 2004, Douma 2000, Prunier 1995). The 2001 census conducted by the Ministry of Local Government claimed 937,000 victims whereas the United Nations Agencies such as the International Criminal Tribunal for Rwanda estimated their number at 800,000. This traumatic social upheaval took place after a period of several years of hostilities and turmoil with many casualties, increasing economic insecurity and decreasing social cohesion causing huge displacements of the population. Between 1990 and 1994 a civil war was sweeping the country. Often only the ethnic component of the conflicts in Rwanda is emphasized. Tutsi opposed to Hutu, but in fact the political background of the conflict was more complicated. Tensions existed as well between Hutu from the South and Central part of the country who were excluded from political power and economic improvement after the coup of 1973, and the Hutu from the North-Western part who replaced them as political elites after the coup (Prunier 1995, Storey 2001). Besides the genocide killings many other Rwandans lives were to mourn during the war and hostilities in the period 1990-1998. The number of battle deaths was estimated at 18,000 and the collateral death toll at 80,000 – 90,000 victims. Besides, thousands of refugees died from hardship and epidemics in refugee camps (Verpoorten 2010, Prunier 1995) which afterwards made international organisations (UNHCR, WHO) developed better standards for service provision in refugee camps to avoid future disasters in this field (Spiegel et al. 2010).

1.2.2 Exclusion and changing power relations

The Rwandan civil war is rooted in the country's historical, colonial, political and economic experiences and was rock bottom in conflicts that already set out before the achievement of Independence in 1962 and continued ever since (Piron and McKay 2004). After the so-called "1959 revolution", when Hutu deposed the Tutsi elite, thousands of Tutsi were killed and hundreds of thousands fled the country for the first time. Again in 1963 and 1973 large numbers of Tutsi became exiles as result of ethnic violence and oppression. These refugees were later defined as "old-case load for repatriation of Rwandans living in exile" during the

negotiations in Arusha in the early nineties. Processes of exclusion, unequal power relations and alternating elites that controlled access to resources, in particular to land, are amongst others at the base of these tensions and conflicts (Uvin 2001, Storey 2001, Verwimp 2005, Huggins and Musahara 2004). The ethnic group that took power and delivered the elite, changed several times in Rwandan's modern history (Piron and McKay 2004) and access to secondary education was a privilege of these elites. But, for the poor Rwandans living scattered on the hilly countryside the distinction between Hutu and Tutsi was of minor importance in their daily struggle for subsistence (De Walque and Verwimp 2009). More than 90 percent of the working population earned a living by cultivating small plots that, as a result of a high population growth, got more fragmented over the generations (De Walque and Verwimp 2009, Huggins and Musahara 2004, Storey 2001).

1.2.3 Economic crisis and environmental disasters

Economic stress characterised the prelude of the disrupting events. During the late eighties Rwanda suffered from a severe economic crisis that deteriorated the living conditions of its people. The food production which had increased since the 1960s dropped drastically in the middle of 1980s. This was mainly due to structural factors such as land pressure, erosion, and poverty, together with a top-down development policy (Desforges 1999, Fearon and Laitin 2003), but was reinforced by coincidental environmental disasters such as drought in 1984, excessive rain in 1987, plant disease in 1988 and famine in 1989 in particular in Southern Rwanda. Together with a drop of the coffee prices on the international market (Rwanda's main export crop and source of exchange income) this caused such deteriorating economic conditions that the government was forced to a Structural Adjustment Programme (SAP) agreement with IMF and World Bank in 1990. At the start of the 1990s Rwanda was one of the ten poorest countries of the world in terms of income per head, and as a consequence of the SAP measures the Rwanda people had to deal with the well-known effects such as devaluation of the currency, increased taxes and user fees, and reduced subsidies (Storey 2001). After the genocide the food production totally fell, the public service infrastructure of the country was severely disordered and large numbers of the population were on the move.

1.2.4 Massive internal and international migration

Around two million people (political leaders, the army, the 'Interahamwe' civilian militia and ordinary civilians) that participated in the conflict left the country and sought refuge in camps in neighbouring countries, while another million became internally displaced (Gribbin 2005, Verpoorten 2010). After mid-1994, when the former Rwanda Patriotic Front (RPF) had established a new order, people started to return – particularly the ones that went into exile during former conflict periods, the so-called old case load. Of the new case load, 1.7 million refugees stayed in the camps at least till 1996 (Verpoorten 2010). In the remaining years of the decade Rwandan society had to incorporate various substantial waves of returnees and their numbers were constantly increasing due the decreasing international support for refugee camps and the change in attitude of the host countries towards the refugees. Within the country, internal migration flows continued to be large as well: return of displaced internal persons, rising rural-urban migration geared to the capital city, and resettlement in the frameworks of the new government's *Imidugudu programme* launched in 1996/7 (Hilhorst and van Leeuwen 1999, van Leeuwen 2001). The Imidugudu is a low cost housing programme introduced in Rwanda to resettle the thousands of people who returned mostly from neighbouring countries as well as those who were internally displaced. Among them the old-case load refugees who spent up to 35 years in exile.

1.2.5 Impact on population structure and policy

The gravity of all these disruptive events had far reaching consequences in other fields of society and politics as well as those relating to demography. Firstly, the composition of the population according to sex and age changed. The Rwandan society feminized as substantially more men than women died or fled the country (Burnet 2008, De Walque and Verwimp 2009). Although many men returned after a while the sex ratios among adults stayed skewed as the census of 2002 and the latest DHS surveys (2010) clearly illustrated. Social and family relations altered, which is often observed as attendant effects of war and revolution (Caldwell 2004, Burnet 2008). The number of female headed households went up and women were increasingly invited by new government policies to participate in public activities.

Secondly, the population policy, which started under donor's pressure to tackle the population growth, had not been among the priorities of the Habyarimana regime and faded further into

the background in the second half of the 1990s, when priorities shifted to building up the new society (De Walque and Verwimp 2009).

1.3 Theoretical framework

The actual fertility levels are an outcome of fertility preferences and fertility control and the disruptive events occurring in the nineties will have affected both. Mechanisms that are expected to regulate the relationship between disrupting event and intentional fertility are an increase of pregnancies and births shortly after the genocide as a result of reunification of spouses and resumed celebrations of marriages (Agadjanian and Prata 2002, Caldwell 2004, Kulu 2005, Heuveline and Poch 2007). Furthermore, the stall in fertility decline may also be related to the following drivers of high fertility: lack of progress in economic performance, rising mortality rates, in particular for infants and young children, deteriorating education levels of young women and lower priority assigned to family planning programs (Shapiro and Gebreselassie 2008, Schoumaker 2009). In a situation of disruptive event we can assume that unintentional fertility might be as important as intentional fertility in determining the fertility level. The unintentional fertility outcomes are assumed to be driven by the massive displacement of people during the genocide and its aftermath which caused involuntary separation of spouses and by postponement of marriages but also short breastfeeding duration and infant or siblings' mortality. This huge internal and international migration might have played an important role in lowering the exposure to intercourse and consequently lower number of pregnancies. A sustained crises-induced fertility decline may be a consequence of dissolution of unions by death or by migration for many years. But, lower fertility outcomes could probably also be due to difficult living conditions such as famine, lack of medical care and psychological, and thus contribute to reduced fecundity and more miscarriages (Woldemicael 2008). Yet, effects opposite to this can be expected as according to some studies (De Smedt 1998) young Rwandan refugees in refugee camps enter into a premature relationship as a response to economic deprivation and in search for protection. Another opposite effect is the increased number of births from coerced sexual intercourse.

Theoretically, an upturn in intentional fertility can be expected, as substantial numbers of parents lost one or more children as well as other family or community members, due to the disruptive events. Increased mortality leads to higher fertility due to replacement and the insurance effect (Rahman 1998; Lindstrom and Berhamu 1999).

Verwimp and Van Bavel (2005) discussed the importance of these effects on fertility among new-case load refugees. There may be distinct fertility behaviour responses between old and new-case load refugees due to their diverse migration and resettlement histories and the different levels of access to contraceptives where they lived. Thus, including the migration history may bring more insight in the relationship between the disruptive event and fertility in Rwanda.

1.4   Structure of the thesis and research objectives

The questions addressed in this thesis are detailed in three chapters on crises led fertility and two chapters on forced migration and fertility. In the second chapter entitled *"The impact of disruptive events on fertility decline: the case of Rwanda"*, the odds of having given (multiple) births in the aftermath of the genocide are analysed. The chapter describes the trends in fertility, child and sibling mortality, union formation and dissolution, contraceptive use, and attitudes with respect to ideal family size and family planning between 1992 and 2000. The main question addressed is to what extent mortality experience, marriages formation and dissolution, migration status, and access to contraceptives had an impact on the number of births between 1995 and 2000. Particular attention is paid to the fertility response to a loss of children and sibling in the 1994 hostilities as opposed to the response to deaths before and after 1994.

The focus of the third chapter entitled *"Role of conflict in shaping fertility preferences in Rwanda"* is to explore to what extent the increase in desired family size in Rwanda in the aftermath of the 1994 genocide can be attributed to a rise in mortality experience, both of children and siblings, and/or to the slowing down of the urbanization process and the fact that educational expansion came to a halt. One might also expect an extra effect of the disrupting event itself on the mind-set of women involved either through third party effects which favour more pro-natalist attitudes or because the loss of family through war brings about extra uncertainty in deciding on the ideal number of children.

The fourth chapter entitled *"Changes in Fertility Decline in Rwanda: A Decomposition Analysis"* deals specifically with the actual fertility and analyses the change in characteristics and reproductive behaviour of women and their contributions to levels of fertility for two different periods: 1992-2000 and 2000-2010. The explanatory variables of interest that are

likely to influence the number of pregnancies women had for the two different periods are marital status, whether or not the woman experienced the death of one or more children, the number of living children they had before our observation period, and the contraceptive use at the moment of the interview. Woman's age, education, and place of residence will be used as control variables. This chapter will disentangle the contribution of each independent variable in terms of change in endowments (composition) or change in coefficients (behaviour) for the two selected periods. Behaviour might have played a leading role in the catching-up of fertility decline between 2000 and 2010.

The fifth chapter, entitled **"Conflict related migration and fertility in Rwanda: exiles, refugees and displaced women"**, unveils the impact of various types of non-voluntary migration on fertility behaviour in Rwanda in the aftermath of the genocide. The data allowed the analysis of all pregnancies women had ever had regardless of their outcome, and the replacement of lost pregnancies is included in the Poisson regression model. Theoretically forced migration constitutes a broad category of migrants who have little choice but to leave their usual habitat and move to another place, making the migration exogenous to choices and decision on fertility. The literature on the effects of conflict related migration on fertility is inconclusive. Some scholars assume that civil war leads to lower fertility in the short run, due to separation of spouses, delay of marriage and postponement of pregnancies awaiting better times whereas others researchers expected a higher level of fertility, particularly with violent conflicts in poor countries, due to the replacement of children lost, violent acts against women, and an insecure future. Based on these two opposing expectations this chapter looks for an answer as to what extent various types of forced migrant women may display different fertility behaviour compared to voluntary migrants and non-migrants.

With the sixth chapter entitled **"Conflict Related Migration and Fertility in Rural Rwanda"** the analysis moves one step further by collecting life-history data on rural women in the years preceding 2008. In this chapter biographic information linking migrations to fertility outcomes are analysed in detail and distant as well as proximate determinants of fertility behaviour are scrutinized and related hypothesis are tested. Conflict-induced migrants may revise their fertility downward in the period close to the migration event, but we expect a rapid increase of fertility shortly after, in particular among returnees due to a lack of supply and limited access to family planning services, early or forced marriages and intercourse and/or replacement of children lost in the war or genocide.

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2 THE IMPACT OF DISRUPTING EVENTS ON FERTILITY DECLINE: THE CASE OF RWANDA

Part of the chapter is under review as a research paper co-authored by Annelet Broekhuis and Pieter Hooimeijer

Abstract

This study contributes to an understanding of the stall of fertility decline in Rwanda in the 1990s by focusing on the short and mid-term demographic effects of the genocide and its aftermath that distressed the country severely. The first step of the analysis describes childbearing, changes in marriage pattern, as well as fertility preference and mortality experiences of the mother using the successive Rwanda Demographic and Health Surveys of 1992, 2000 and 2005. In the second part a generalised ordered logistic regression was used to model the likelihood of giving births after the genocide.

The in-depth analysis of drivers that influenced the number of children born between 1995 and 2000 indicates that in particular the loss of children in 1994 is associated with more births. Even after controlling for other characteristics, the results show clearly that the death of siblings has no impact on women's fertility outcomes.

2.1 Introduction

Fertility decline is on its way in Rwanda where the total fertility rate (TFR) declined from 8.6 in 1978 to 4.6 in 2010. Looking to a more detailed course of this demographic trend derived from several sources it is obvious that the decrease stalled since the early nineties till the year 2005. Rwanda is not the only country in Sub-Saharan Africa that showed a stall in its fertility decline, which[1] in general is been connected with the lack of progress in economic performance, rising mortality rates, in particular for infants and young children, deteriorating education levels of young women and lower priority assigned to family planning programs The impact of disturbing social events such as (civil) wars are not directly discussed as possible mediate or intermediate cause for stalling fertility declines in these studies (Bongaarts 2003, Shapiro and Gebreselassie 2008, Schoumaker 2009)[2]. For Rwanda this seems an omission (Jayaraman, Gebreselassie and Chandrasekhar 2009).

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[1] Schoumaker (2009) labelled part of the observed stalls as spurious due to inferior data quality, but considered Rwanda as an example of stalling fertility.

[2] Caldwell (2004: 384) referring to the works of Binion and Maverick, stated that "…historians and demographers are so committed to showing that demographic change is driven by long-term, especially

This study seeks to contribute to an understanding of the Rwandan stall in fertility decline by focusing on the short-term demographic effects of the civil war, genocide in 1994 and its direct aftermath that distressed the country severely.

Actual fertility levels are seen as an outcome of fertility preferences and fertility control. The disruptive events occurring in the nineties probably affected both. Results from other studies (Rindfuss and Sweet 1977, Hobcraft 1996, Klaht, Deeb and Courbage 1997, Lindstrom and Berhamu 1999, Kulczycki and Saxena 2005, Scherbov and Vianen 2002, Agadjanian and Prata 2001, Blanc 2004) show that unintentional negative effects of disturbing events in terms of death of family members, separation of spouses, marriage postponement, malfunctioning of reproductive health services and increased psychological stress, combined with intentional behaviour change caused by concomitant economic deterioration and increased subsistence insecurity can influence fertility behaviour and level in different ways. Moreover, the effects differ for the short and the long run and probably also according to the stage of the fertility transition as suggested by Caldwell (2004:401). Great social upheavals tend to depress fertility decline for a while at the early transition phases, while it accelerates the decline in case of social crises in a late transition phase.

A theoretical elaboration on the relation between disruptive events and the major intermediate variables that shape fertility during the early phase of the transition is presented first. After the introduction of the used data sets, the demographic trends for the period 1990 – 2000 are shown through descriptive figures and tables, which are followed by a general ordered logistic regression analysis. The partial proportional odds of giving births in the five years following the genocide are computed with the objective to see if these outcomes contributed to an understanding of the stalling fertility decline in Rwanda between 1995 and 2000 and in particular what the role was of the genocide. Which women had an increased fertility in this period?

2.2 Disrupting events and fertility decline during early demographic transition

With a TFR of above 6 children at the beginning of the 1990s Rwanda was still in the early phase of the fertility decline (Bongaarts, 2003). Infant mortality had decreased but was, with 85 out of 1000 infants (DHS 1992), still rather high. According to the traditional demographic

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economic, movements that they recoil from suggestions that short-term human experience could play a significant, even triggering, role."

transition theory (DTT) during that early stage only a limited percentage of the couples regulates fertility consciously by using effective contraceptive methods although wanted fertility already decreased more than the actual fertility level. The contraceptive use in Rwanda increased during the 1980s but was still low. Under these conditions the short-term effect of major disruptive events on fertility is expected to be in the first place unintentional and a direct outcome of separations of spouses that, in combination with postponement of marriages during the hard time as a result of a depressed socio-economic situation, leads to a lower number of women at risk of pregnancy[3]. Referring to the well-known classical frameworks of intermediate variables that determine fertility (Davis and Blake 1956, Bongaarts 1978) the expected effects concern a lower exposure to intercourse resulting in lower age specific fertility rates and finally a lower TFR. Blanc (2004) indeed found for Eritrea that the border conflict with Ethiopia at the end of the 1990s caused a reduction in the proportion of women exposed to the risk of pregnancy due to military mobilization and displacement related to that war as well as the postponement of marriage. Difficult living conditions during war could add to a fertility decline as famine, lack of medical care and psychological stress contribute to lower fertility mediated by a reduced fecundity and miscarriages (Woldemicael 2008).

Analyses using historical or contemporary data have shown examples of a temporary drop in births, followed by a rebound shortly after the disrupting events have ended as a result of reunification of spouses, of resumed celebrations of marriages with consequently more conceptions in the year after (Agadjanian and Prata 2002, Caldwell 2004, Hill 2004, Heuveline and Poch 2007).

After the disrupting events or in case the turmoil continues for a longer period the fertility level can follow various courses. The fertility decline might stall or even go in an opposite direction as remarked in the cases of conflicts areas in the Middle East among Iranian and Palestinian couples (Fargues 2000, Abbasi-Shavazi 2001 and Marwan 2003 cited in Woldemicael 2008). But as suggested by some researchers another scenario is also possible, notably that of a crises-induced sustained fertility decline (Eloundou-Enyegue, Stokes and Cornwell 2000). In that case changes in fertility are probably intentional and a response on deteriorating living circumstances or important social changes. Lindstrom and Berhamu (1999) found that mechanism for Ethiopia during its crises of 1974-1991. Marital fertility

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[3] However, violence against women (rape), which is often the case during wars, shall moderate this effect. Also many women were abused during the turmoil of the 1990s in Rwanda and in refugee camps outside the country (McGinn 2000)

stayed high but fluctuated (drop and rebound) during the first years of the crisis. However, from the 1980s onwards, marital fertility declined and drops and rebounds became less common, despite or perhaps better due to ongoing political and economic insecurity. According to the authors (1999:259) the "multi dimensionality of the Ethiopian crisis may be the key factor in explaining the fertility decline" that was not seen yet in other sub-Saharan countries. A few years later this alternative route of fertility decline was discussed also for Eritrea by Woldemicael (2008) who found that the border war with Ethiopia indeed contributed to a large drop in TFR of around 2.5 child between 1995 and 2002 and contributed possibly also to a decline in marital fertility in the longer run, which had already set in before the disturbing events.

Theoretically, the decrease in wanted fertility in the first phase of the transition could stagnate as due to the disruptive events mortality levels jumped up and substantial numbers of parents loose one or more children as well as other family or community members. For Rwanda this is likely the case (Verpoorten 2010, De Walque and Verwimp 2009), and this increased mortality experience may strengthen the direct and indirect relations between mortality and fertility often studied by demographers as replacement effect and insurance effect (Rutstein, 1974; Rahman, 1998; Lindstrom and Berhamu 1999). Verwimp and Van Bavel (2005) showed the importance of these effects on fertility among refugees. In this case the increased fear for future infant and child mortality could lead towards an increased fertility and population growth after disrupting events. Finally, *the physiological effect* of infant and child mortality on fertility could influence actual fertility. This effect is directly linked to a decrease in inter-birth intervals as a consequence mainly of shortening the breastfeeding duration which is supposed to speed-up the return of menses and ovulation and the conception of the next child.

Contrary to these assumed smoothing effect of temporary peaking mortality levels on fertility decline for the short and medium range, are the effects of dissolution of unions by death of one of the spouses or separation as result of displacement and headlong flight. As during all disrupting events as civil wars and revolutions often more men than women lost their life, as was found for Cambodia (Heuveline and Poch 2007) and Rwanda (De Walque and Verwimp 2009) and more men flee the country for several years, even a stronger continuation of fertility decline before the disruptive events could be expected. Again opposite effects to this could be expected as according to some studies (De Smedt 1998) very young Rwandan

refugees in refugee camps enter into a relationship as a response on economic deprivation in search for protection.

The period under study in this paper (in particular the years 1995-2000) was one of enormous population displacements. Those migration experiences and the final place of resettlement when the turmoil eased off might well have influenced fertility behaviour. People who were on the move or in refugee camps had no or less access to family planning services. Part of the returnees, in particular those that had gone in exile in earlier decades, moved to urban settlements, especially to the capital Kigali, where traditionally access to family planning facility was easier compared to the countryside and where restoration of the remnants of the health service infrastructure started first.

Short term fluctuations in fertility can occur due to the effect of the disrupting event on intercourse regularity (separation of partners), marriage formation or dissolution, risk of conceptions (no access to contraceptive methods) and of course pregnancy outcome. Loss of family members might lead to intentional replacement. Taking into account the discussion presented above, the following demographic effects caused by the genocide are expected.

1. a drop in the level of entering first union and later of births slightly before 1994 followed by a rebound of those two events after the event. As people are expected to marry or cohabitate first and get children afterwards, the comparison between the trend in union formation and first birth will look the same with several months to a year of difference;

2. the use of modern contraceptive methods will be disrupted;

3. a temporary increase in infant mortality and sibling mortality;

4. an increase of the ideal number of children desired by women as a response to direct or indirect mortality experiences.

2.3 Data

For the description of the developments in fertility and its proximate determinants, data from the successive Rwanda Demographic and Health Survey (DHS) of 1992, 2000 and 2005 are used, which included respectively 6,551, 10,421 and 11,321 women aged 15 to 49 years. The quality of DHS data has improved since the 1980's and all the reports from various countries

in collaboration with Macro International have in their appendixes tables on data quality assessment (Pullum 2006). Concerning the completeness, the data gathered in the surveys meet the required standards for avoiding biases: the percentage of respondents with missing information – month and year – on the birth history for the last fifteen years preceding the survey for the three RHDS 1992, 2000 and 2005 are respectively 0.3%, 0.1% and 0.1%. For women not officially married (living in union) these proportions were respectively 0.4%, 0.3% and 0.1%.

Critique remains for the use of retrospectives data, such as likelihood of censoring effects, date misreporting due to memory lacks or to unprofessional interviewers who shift children outside the calendar period to reduce their workload on time consuming questions related to children's health (Potter 1977, Retherford and Alam 1985, Opiyo and Levin, 2008). Despite these birth histories limitations the DHS are suitable to be used to measure the age specific fertility rates in order to avoid the influence of age and sex composition in the level of fertility. The availability in the RDHS of the date at birth of children and the age of their mothers allows the calculation of age specific fertility rates based on number of births in each calendar year. As a valuable measure of the actual childbearing performance of women, the yearly number of live births per 1,000 women according to five-year age-groups, are calculated.

The main variables are those with precise date that allow a relatively long period of retrospective analysis for more than five years (known also as the calendar period in the DHS). It concerns the exact dates of respondent's birth and entering a stable union (marriage or living together), and dates or her children's birth (and eventual death after).

The age at first union which has to be interpreted as date at first stable relationship causing exposure to pregnancies ('*date of start of the first marriage or union*') is described at first. The date at first union is related to women who are officially married at the moment of the survey and those whose marital status was '*living together, widowed, or separated.*'.

The second variable is the date at birth which is very important in the DHS birth history construction and the third is the age at child's death in months from which the date at death could be computed by adding this to the age at birth. The date at birth and the date at death were used for measuring the age specific fertility rates as well as the infant and child mortality rates. Other variables of importance are date at death of the respondents' siblings.

Finally, the mind-set of women concerning her desirable offspring is measured through the question about ideal family size at the moment of the interview. Among all the fertility preferences indicators the ideal number of children is supposed to be the one that could

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specifically illustrate the idea of mind-set change as it is applicable to women with or without children at the moment of the interview. In addition the answers to the questions about contraceptive use are included.

In the following sections descriptions of the fertility trend and the development of its proximate determinants are presented. The last section (10) contains the general ordered logistic regression analysis based on the data from the RDHS 2000. The purpose of this final analysis is to check statistically which predictors of the births that occurred in the period between 1995 and 2000, may have contributed to the particular stall of fertility decline Rwanda experienced in this period.

2.4 A stagnating fertility decline

What do the retrospective data from the RDHSes of 1992, 2000 and 2005 tell about the course of the fertility decline during the decade of the disturbing events? The monthly pattern of the number of births shown for the period 1988-99 using the 2000 RDHS set is very capricious, as remarked as well by Hill (2004); the highest peaks seem to occur in the midst of the year 1994 just after the genocide. The total number of births for 1994 from this set is indeed exceptional high and is followed by a lower number for the year after. This observation is insufficient to draw the conclusion - as Hill did- , that disturbing events (civil war, genocide or enormous refugee movements, economic instability) did not affected fertility in Rwanda. Notably, this trend in number of births per year does not show up when the same period is considered using data collected five years later (2005 RDHS). Probably the exaggerated heap in number of births in 1994 in the 2000 set has to be attributed at least partly to the shift of reported births out of the five year calendar period by interviewers to avoid collecting information on these children's health.

To construct a better picture of the fertility course and to avoid large memory lapses, the results of the three consecutive surveys are used for calculating age specific fertility rates for single years in the period 1988-2004, using the survey of 2000 to cover more years than that of the 5-year calendar period (1992-1999). But the results that will be displayed will not go beyond the year 2000. Subsequently these age period-specific fertility rates are used to calculated the TFR at age 40 and at age 45 instead of at age 50. In addition, to deal with the probable misreporting error (dating events outside the calendar period) in particular for the set

of 2000, the moving average of those TFRs (Figure 1) are calculated in order to distinguish the general trend of the course of the fertility between 1988 and 2004.

Looking in more detail now to the course of this moving average of the TFR it becomes clear that the fertility decline stopped on the eve of the decade that brought Rwanda so much misery and afterwards went up again. In the midst of the decade the fertility peaked to become less high in the years of the large population movements and subsequently stagnated more or less on the same level during the final years of the millennium (Figure 1). Remarkably, the initial increase of the TFR can be attributed in particular to a higher fertility among younger women, while this tendency is not that strong among older women. The general fertility trend in the decade under study is confirmed as calculations are made on the retrospective data from the 2005 RDHS data set. Compared to the 1980s the fertility decline stagnated after 1992. Neither a specific drop in fertility, nor a strong rebound, as noticed in other countries during wars, was found. Only after 2005 the decline continued its course.

Figure 1: Total fertility Rate at age 40 and 45 based on three-year moving averages
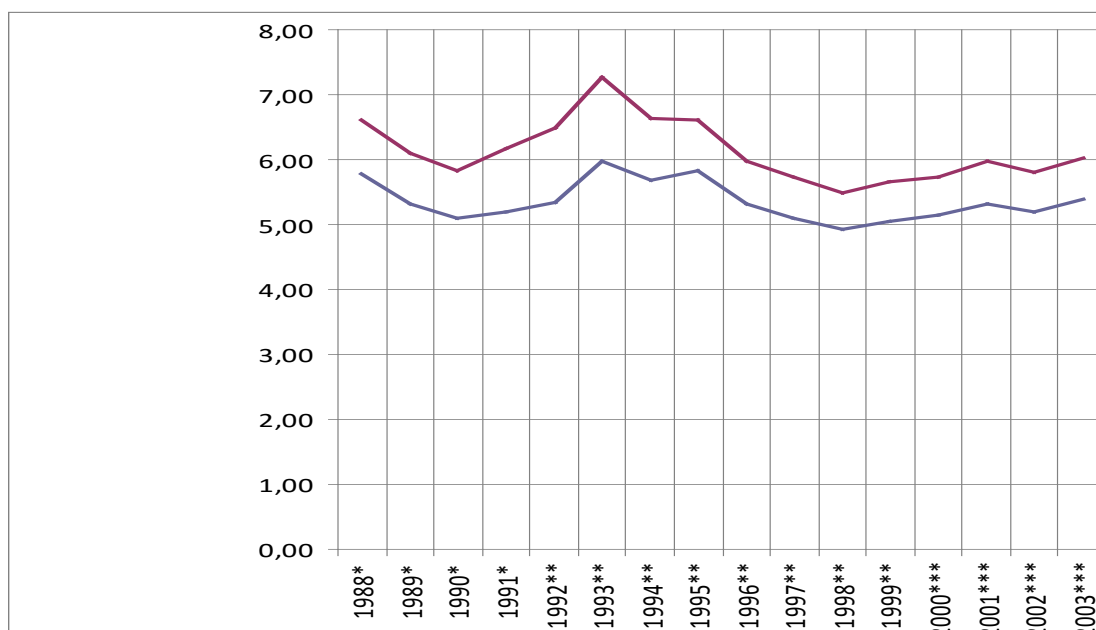
Source RDHS *1992, **2000 and *** 2005

The question that comes across now is why the fertility decline stagnated during the 1990s and why women in the midst of the 1990s had higher fertility compared to the periods before and after? Had it to do with changes in the mind-set as response on increasing insecurity and on on-going deteriorating economic situation? Was it a demographic response on increasing

mortality rates, or was it linked to changes in intermediate variables such as changes in nuptiality pattern and lack of access to family planning facilities?

2.5 Changes in union and marriage patterns

During the 1990s and in particular in the period of the genocide and its aftermath changes occurred in the marriage and cohabitation pattern in terms of age at entering first marriage or union and composition of the female population according to civil status. These two changes are expected to have a contradictory effect on general fertility levels. In 1992 the legal and official age of first marriage in Rwanda has been reset from 18 to 21 years in order to realise the objectives of the population policy already dating from the 1980s[4]. Yet, only small percentages of the women are involved in steady relationships before age 20, official and unofficial[5], and the effect of the enforcement of this new legislation on fertility is probably limited. The average age at first marriage of the female population of the three consecutive DHS surveys showed a tiny upward trend from age 19.9 to age 20.1. However, the composition of the female population according to marital status changed substantially between 1992 and 2000.

The total proportion of women, (ever) married or living together, has decreased slightly – respectively from 67.9% in 1992 to 65.9% in 2000, but per age groups large differences are observed. For the 20-29 year age group this percentage rose somewhat during the nineties, while it decreased substantially for women in all age groups above 30, due to separations and death of the partner, direct consequences of the turmoil. Based on the change in the composition according to civil status one could expect a drop in general fertility, however an analysis of the course of the annual frequency of entering first marriage (union) is needed as an increase of births could occur in a context of unregulated fertility.

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[4] In Rwanda, Presidential Decree No. 102/05 of March 13, 1992 executed Law No. 42/1988, which was not enforced after its passage in October 1988.

[5] In Rwanda, consistent proportion of the population cohabitate even at older ages; a situation that is tolerated when men cannot yet afford to marry, meaning that they have no access to land to build a house and produce food, neither can pay for a wedding ceremony and bride price (Olson 1994).

Figure 2: Standardized number of women entering in first union (married or living together) according to the RDHS of 2000 and 2005.
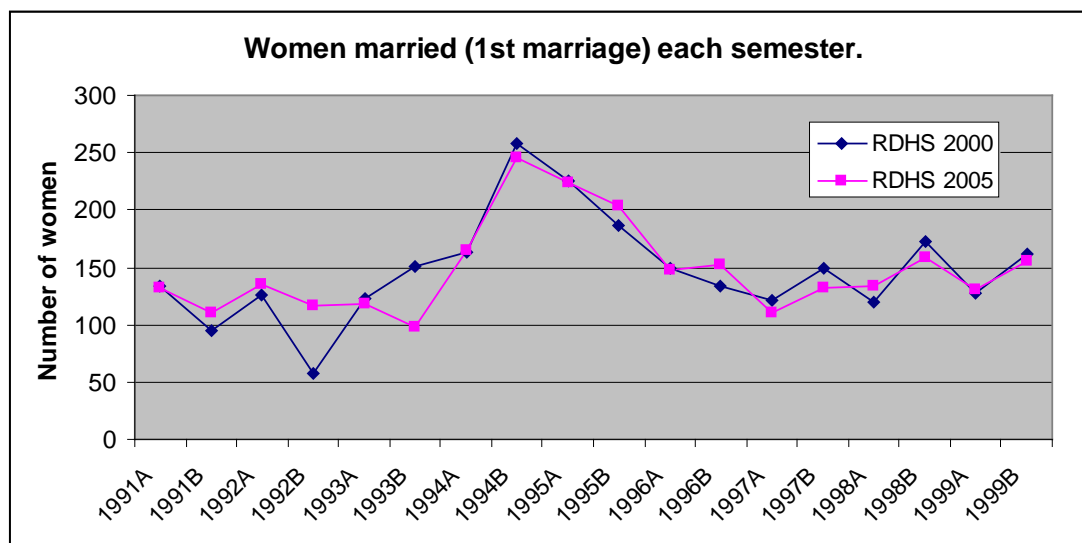
As figure two illustrates, an increase of the number of women marrying for the first time or starting to cohabitate occurred in the second semester of 1994 and the first one of 1995 (Figure 2). In addition it shows that the frequencies after this peak stayed slightly higher than in the period before the genocide. The dry season (July, August and September,) which coincides with a period of inactivity in the agriculture sector is appreciated for marriages, but this usual preference do not explain the unexpected increase in 1994. Could it be a catch up for people who postponed that important event due to war and genocide? Or does this higher frequency point at vulnerable young women that looked for protection in union or marriage in harsh time?

Summarizing the possible effects of the discussed developments of nuptiality measures for the course of the TFR, the conclusion is that these effects partly cancel each other out.

2.6 Changes in contraceptive prevalence

Attention is given now to clues in the field of access to and use of contraceptives. It is expected in particular that the use of modern family planning methods became problematic due to destroyed family planning services causing more unplanned births.

The observed developments in attitudes and practices concerning family planning between 1983 and 2005 indeed show a disruption of the trend during the 1990s. While the percentage of women with a steady partner that was using contraceptives (modern and traditional)

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doubled between 1983 and 1992, this number diminished dramatically afterwards. A tiny 4% of the women not being pregnant and not wanting a next child in 2000 regulated their fertility by means of a modern anti-conceptive method against 13% in 1992. The percentages of women that ever used traditional methods hardly changes (17 and 16% respectively), but the part that ever used modern methods declined from 17 to 13%. In particular this decline relates to problems in the supply of modern family planning means.

Asked about their attitudes concerning family planning and the reasons for not using contraceptive methods, the answers of women revealed that in 2000 considerably more men and women thought negatively about family planning than measured in 1992. Although the percentage of women who stated that family planning means were difficult to obtain went up from 0.2 to 4.6 % as a reason for not using it, the proportion of non-users that disapproved the use of family planning methods (for religious reasons, or disapproval of partner, woman herself or both) doubled to 20%. In addition to that the matter of family planning became less a topic for discussion between spouses and partners and showed a decrease from 43 to 30%. These changes can be interpreted as results of a down played population policy in this field or as changes in the mind-set of the people in concern of fertility regulation. As the developments after 2000 showed a restoration of more positive attitudes and practices geared to birth regulation compared to the situation in 2000, the negative effects of disturbing events on family planning attitudes seem to weaken; however, the level of appreciation of 1992 was not yet achieved in 2005.

Reasons that could be responsible for the observed downward trend in – the need for - birth regulation after 1992 might be found in higher mortality levels, more precisely in the death of children and siblings during the disturbing events[6], leading to higher percentages of women wanting a next child, or even a higher desired ideal family size compared to the period before the disturbing events of genocide, war and mass population movements.

2.7 Mortality of children and siblings

Was the temporary increase in fertility a response on higher mortality? Based on the fact that the procreation behaviour of a couple may be influenced by mortality experiences (Rutstein, 1974; Friedlander, 1977; Rahman, 1998) two trends in mortality are analysed: deaths of children and that of the siblings of the interviewed women.

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[6] RDHS 1992, 2000 and 2005

Looking to the percentages of women that reported the death of a child, no indication is found for a substantial increase of women reporting the death of a child (table 3) between the sets. Yet when focussing the attention on infant and child mortality by calendar year and going back fifteen years before the survey, stagnation in the decline of both infant and child mortality is seen between 1994 and 2000.

To avoid the above mentioned misreporting of events (dating them before the calendar period used in the survey) the calculations are based on the 2005 RDHS set. Figure 3 show mortality peaks as well. The first heaping period coincides with the genocide whereas the second could be attributable to the massive repatriation movements which took place under very difficult conditions.

Figure 3: The trend in infant mortality and under five mortality rates (RDHS 2000)
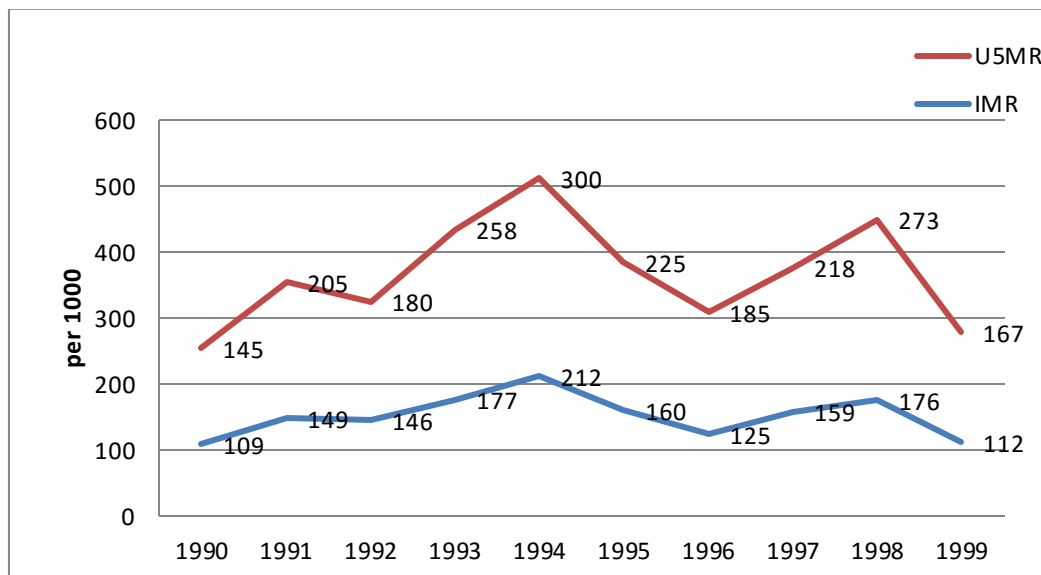
Based on the hypothesis that the reproduction behaviour of a couple could be influenced by mortality levels experienced in their community, the description is expanded to the mortality of siblings as a proxy for community level mortality.

The percentages of dead siblings in the exact calendar year when the death of siblings happened are as follows. More than a half (55%) of reported dead siblings reported in 2000 deceased in 1994, while those reported for the peak (in total 57 %) in 2005 are distributed over the years 1993, 1994 and 1995 probably due to memory lapses. While the effect of the disturbing events on the mortality risks of infants and young children for the surviving women showed in general a higher level and in particular during the second half of the 1990s, the loss of adult family members concentrated at the period of the genocide. Both mortality

experiences could have enforced tendencies of replacement and insurance effects on parents contributing to a higher realised and ideal family size.

2.8 Ideal number of children

During the 1990s the desired family size increased temporary. On average women wanted 4.2 children in 1992, 4.9 in 2000 and 4.5 in 2005. The increase between 1992 and 2000 is particularly the result of higher percentages of women wanting six children or more or who gave a non-numerical response (such as "That is up-to-God") and a decrease of women wanting a 'modern' type of family with three children or even less.

Even though this indicator of the ideal number of children was measured at the time of the interview and could therefore not allow a detailed yearly analysis back in the time, it indeed shows through the 2000 RDHS survey that respondents might have been affected either through the death of siblings or own children. However, table 1 shows that there is no major difference in the ideal number of children in 2000 by introducing the mortality experience after having standardised for age and number of children ever born.

Table 2: Average percentage of women by ideal number of children and child survival experience[4]

		Ideal number of children					
RDHS	Mort.Exp	0 - 2	3	4	5	6+& NN	S/Total (4+)
1992	No	12.6	12.5	36.7	16.1	22.0	74.8
	Yes	11.6	12.2	35.6	18.8	21.8	76.2
2000	No	8.0	9.4	38.0	15.1	29.5	82.6
	Yes	9.0	9.2	30.6	17.2	34.0	81.8

[4] *Standardised for: - Age and Number of children ever born*

2.9 A general ordered logistic regression analysis

To arrive at a more in-depth analysis a general ordered logistic regression model is constructed, analysing the number of births per woman that occurred in the period between 1995 and 2000 and identifying predictors that may have led to the stall of fertility decline. Which women gave birth to higher numbers of children? Could their behaviour be linked to

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the disturbing events? The appropriate dataset to analyse this particular period after to the genocide is the retrospective survey RDHS 2000.

The dependent variable is the number of births women gave during the five years period after the genocide (1995-2000), classified as zero, one, two and three or more (very few gave birth to more than three). The general ordered logistics regression is an appropriate method to analyse such a count variable with an open ended category. The regression coefficients represent the effect of the independent variables on the steps from zero up to three and more births, by contrasting women with at least one birth to those that did not give birth, the women with at least two births with the ones with one birth or less, and women with three or more births with the ones with two or less. If the effect of an independent variable differs significantly between the birth-orders separate coefficients are calculated.

Three mechanisms could link the genocide to fertility in the period after. First the loss of children will lead to replacement fertility afterwards. Also the loss of siblings might have enticed couples to decide to have more children afterwards. Second, the collapse of the health infrastructure could have led to higher levels of unmet need of contraception and therefore to more births. Third, widowhood and separation due to hostilities and displacement would have the opposite effect as it leads to less intercourse and therefore fewer births.
As the DHS records the month and year of death for all children and siblings that did not survive to the moment of the interview, we were able to calculate the number of losses in each year for each woman in the sample. We included the number of losses before 1994, in 1994 and after 1994 as variables in the model. Unfortunately marital status and unmet need were only recorded at the time of the interview and we could not include these as time-varying variables.

In estimating the effects of these mechanisms, one obviously needs to control for other variables that would determine the number of births in the period of observation. As demographic control variables woman's age and the number of living children at the beginning of period (1st January 1995), are added as important intermediate fertility predictors. Number of children in 1995 is a continuous variable. Age of the mother in 1995 is classified in 5-year groups, starting with age 20-24.

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Two socio-economic control variables are included: education and migration status. The thought behind their classification is that women with more than primary education and women in urban environments are expected to have a lower number of births.

2.9.1 Results of the model

The control variables all have the expected signs. The dummy variables for age show that all categories have higher fertility than the 40-plus category. The youngest (20-24 in 1995) stand out in having the highest log-odds ratios of bearing at least one child (3.596) in the following 5 years. The number of living children in 1995 has the expected negative sign and the coefficient increases with the birth order, the more children a woman had the less she has added. The dummies for no and limited education have the expected sign, but are not significant. Women in rural areas got more children than those in urban areas.

The main variables of interest reflect the mortality experience before during and after the year of the genocide. The most striking difference is between the loss of children and the loss of siblings. Sibling loss is not related in any way with the number of births in 1995-2000. We had expected a positive sign for the year 1994 in particular. More than 30% of the women in our sample lost at least one sibling in that one year (half of them lost more than one) as opposed to less than 25% in the five years following 1994. A possible response could have been to have more children to build a support network for the future. As it turns out the coefficient for 1994 is very close to zero.

The loss of children does have an effect on the number of births, yet the interpretation should be cautious. The number of children that died before 1994 does not lead to higher fertility after 1994, but this does not necessarily mean that there is no replacement as many could have replaced the loss of a child before 1994. The replacement of losses after 1994 seems limited, but the losses will be more recent and the time to replace them is therefore shorter. Nevertheless the effect of the loss of children in 1994 is strikingly high. The coefficient shows that for each child that died, the log odds to have at least one are raised with 1,216, to have at least two with 0.850 and to have three or more with 0.736. It is fair to conclude that the desire to replace the children that people lost during the genocide must have been strong, or at least that replacement fertility contributed to the large number of children that was born in the wake of the civil war and genocide.

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Table 3: Partial proportional odds of having births between 1995 and 2000

Births categories	1 + versus 0		(S. E.)	2+ versus <2		(S. E.)	3+ versus <3		(S. E.)
	Coefficients		(S. E.)	Coefficients		(S. E.)	Coefficients		(S. E.)
Mortality experience									
# children died bf 1994	-0.082	***	0.027	-0.082	***	0.027	-0.082	***	0.027
# children died in 1994	1.216	***	0.144	0.850	***	0.091	0.736	***	0.090
# children died 1995-2000	0.246	***	0.066	0.246	***	0.066	0.246	***	0.066
# siblings died bf 1994	-0.017		0.018	-0.017		0.018	-0.017		0.018
# siblings died in 1994	-0.041	*	0.023	-0.041	*	0.023	-0.041	*	0.023
# sibling died 1995-2000	0.031		0.040	0.031		0.040	0.031		0.040
Contraceptive use (ref. users)									
Unmet need	0.213	*	0.123	0.213	*	0.123	0.213	*	0.123
No need	-1.264	***	0.154	-0.468	***	0.125	-0.474	***	0.140
Marital status (ref. widow/separated)									
Never married/in a union	-0.416	**	0.190	-0.416	**	0.190	-0.416	**	0.190
Currently married/in a union	0.838	***	0.085	1.492	***	0.087	1.458	***	0.173
Age in 1995 (ref. 40-45)									
20-24	3.596	***	0.191	2.611	***	0.168	2.215	***	0.204
25-29	2.648	***	0.162	2.450	***	0.154	2.217	***	0.189
30-34	2.020	***	0.128	2.020	***	0.128	2.020	***	0.128
35-39	1.210	***	0.122	1.210	***	0.122	1.210	***	0.122
# of living children 1995	-0.002		0.024	-0.044	*	0.024	-0.145	***	0.037
Education level (ref. secondary+)									
No education	0.141		0.103	0.141		0.103	0.141		0.103
Primary	0.141		0.094	0.141		0.094	0.141		0.094
Migration status (ref. rural-always)									
Rural-migrant	0.462	***	0.117	0.221	**	0.098	-0.282	**	0.124
Rural-Always	0.560	***	0.119	0.239	**	0.106	-0.167		0.140
Urban-Always	-0.046		0.153	-0.046		0.153	-0.046		0.153
Intercept	*-1.104*	***	0.249	*-3.451*	***	0.229	*-4.975*	***	0.299

***: p<0.001; **: p<0.05; *:p<0.10

Lack of access to family planning services probably had a negligible effect. Although we are not sure that the ones that reported at the time of the interview to have preferred to limit

childbearing were devoid of means to do so during the whole period, we do find that the effect on the number of birth of being in unmet needs in 2000 is very small indeed.

Without widowhood and separation fertility would have been significantly higher. The women that were married or in a union at the time of the interview, report far more births, than the ones that were formerly married or in a union. The ones that were never married or never in a union report fewer births.

2.10 Conclusion

This paper contributes to the discussion on involuntary negative effects of disturbing events and of intentional behaviour change that influence the fertility level in the period after the turmoil in Rwanda. It contributes to the understanding that the stagnation in the fertility decline between 1992 and 2000 is influenced by the disturbing events. As such the course of the Rwandan fertility decline fits in the statement of Caldwell (2004) that "great social upheavals tend to depress fertility decline for a while at the early transition stage", mentioned in the introduction of this chapter. The most striking conclusion of the analyses conducted in this chapter is that the probably crises-induced fertility decline of the 1980s in Rwanda did not continue its course during the turbulent 1990s despite effects of changes in the population composition according to marital status (decrease of married or cohabiting women of 30 years and older), instability due to the still large number of uprooted people, and hard living conditions combined with insecurity. Instead, part of the Rwandan people developed in this period a more pro-natalist attitude with a preference for a large family, and with a more negative attitude to family planning, which led to a high number of births in the studied period 1995-2000. This change in fertility attitude and behaviour is probably linked to a wish to replace the death of family members. The performed in-depth analysis of factors that influenced the number of children born between 1995 and 2000 indicates that in particular the loss of children in 1994 is associated with more births. We admit that the facilities for women who wanted to reduce their offspring were very limited in this period, which could have been an obstacle for the ones wanting to limit family size, but we tend to the conclusion that the stall in fertility decline above all was intentional, led by a desire for more children.

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3   ROLE OF CONFLICT IN SHAPING FERTILITY PREFERENCES IN RWANDA

Abstract

Conflicts affect the social and economic conditions that could account for the stall in fertility decline in Sub-Saharan Africa. In Rwanda the total fertility rate decreased very rapidly to 6.1 in the eighties but stalled at that level in the nineties. Part of the stall can be attributed to a lack of fertility control, but the question is whether social upheaval also affects fertility preferences. We identify three mechanisms through which the Rwanda conflict have led to a preference for larger families: mortality experience, modernization, and the attitudes of third parties.

Using data from DHS, we tested the contribution of these mechanisms to the preference for small, medium or large families. With the exception of sibling mortality, there is a strong impact of these mechanisms on the preference for large families, yet they do not fully account for the shifts in preferences over the years.

Key words: Conflict, Fertility preferences, Mortality experience, Migration history. Ordinal logistic regression.

3.1   Introduction

The second phase of the demographic transition (DT) is the period in which fertility declines rapidly and ends when the total fertility rate reaches replacement level. Most countries in the world have gone through this phase and many, like China, actually have below replacement fertility. Sub-Saharan Africa is the only continent where the DT develops differently. In eight countries the fertility decline stalled at the early phase of the transition in the nineties of the previous century (Shapiro & Gebreselassie 2008). Various explanations have been put forward for this phenomenon: high levels of infant and child mortality, economic stagnation, deterioration of reproductive health services, and lack of educational expansion (Bongaarts 2007, Schoumaker 2009). Some literature points to the effects of severe disruptive events like natural disasters and civil wars on these social and economic conditions that may account for

the stall in fertility decline. For Rwanda this approach seems to be appropriate. The total fertility rate decreased very rapidly in the eighties (from 8.5 in 1983 to 6.2 in 1992) but stalled at that level in the nineties (6.1 in 2005). Recent data show that the demographic transition might have resumed its course recently (5.5 in 2008 and 4.6 in 2010).

In a previous paper we described how this stall in fertility decline coincided with changes in mortality experience, marriage patterns and discontinuation of family planning programs during the disruptive events in the early nineties (civil war, genocide, massive population movements). It is clear that the high fertility is at least partly due to a lack of fertility control. The actual use of modern contraceptive devices decreased after 1992 and the levels of unmet needs for reproductive health services increased. It is less clear to what extent higher fertility preferences play a role as well. The aim of this contribution is to isolate the role of fertility preferences by analysing the shifts in desired family size in the period 1992-2008. We will identify various mechanisms that could account for the change in the preference for small, medium and large family size in Rwanda.

3.2 Theoretical background and hypotheses

Desired family size or ideal number of children can be used an as important indicator of fertility preferences (De Silva 1991; Bankole and Westoff 1998). The more often cited determinants of desired family size are grouped into demographic factors such as age at marriage, mortality experience or gender preference, as well as socio-economic factors like level of education, current or childhood place of residence. This paper will take up these issues by grouping them in three main mechanisms: mortality experience, modernization process and the attitudes or influence of third parties.

3.2.1 The mortality experience mechanism

With the genocide in which 800.000 people lost their lives, the decreasing level of mortality at the end of the 1980s in Rwanda increased in the 1990s and remained persistently high during the last years of the decade. (RDHS, 2000; Housing and Population Census, 2002). Rathavuth (2009) describes the trends of neonatal, infant and under-five mortality to show how the mortality was high between 1995 and 2000.

A reconstruction of mortality levels by Garenne and Gakusi (2005) displays mortality increase since the beginning of the civil war with a peak in 1994 due to genocide and a rise again in 1998 probably to the hardship of life due to return migration. Although the mortality reached all the strata of the population, Schindler and Brück (2011) relate the death of siblings, considered as strong indicator of exposure to the genocide, with fertility but only for the short run.

The early contributions on the decline in mortality and fertility from Frank Notestein (1953) saw *societal modernization* as the dominant cause. However, as early as 1963 Kingsley Davis stated the *improved survival* to be the central cause. An abundance of empirical evidence on the relationship between mortality and fertility has been gathered since. LeGrand et al. (2003) distinguish three pathways by which women or couples are going from child mortality to fertility: physiological, replacement and insurance (or holding) mechanisms. The first two mechanisms deal with individual (conscious or not) response by the woman who lost her child. The proper way to study that is to look at the birth intervals and the desire to have an additional child. The concern in this paper is the third mechanism that is more focused on people's perceptions and understandings and on reconciling the desired number of children with their risks of dying.

In other words, the insurance hypothesis implies that the fear of losing children influences the ideal number of births. In countries like Rwanda this hypothesis can be extended to the loss of siblings, because this loss could contribute to the perception of the risk of losing one's own children. Siblings, just as adult children, are an important part of the social support system in hard times. The high prevalence of deaths in the period 1992-1995 might account for the peak in fertility preferences in the years after.

3.2.2 The modernisation mechanism

Without going into detailed argumentations on the modernization theory our analysis refers to the modernisation mechanism in two ways. The first is to relate it with the role of woman's education. The relation between women's education and the family size has been analysed in various ways. Those include direct and indirect effect of women's education on actual family size (Janowitz, 1976; McCarthy and Oni, 1987; Jejeebhoy, 1995), the interrelation between woman's education, child survival and family size desires (Jejeebhoy, 1995) and the expected longer duration of education for the children that reduces the number women want (McCarthy

and Oni, 1987). There is some evidence that the real change in women's preferences occur among those who reached secondary or higher levels of education (Uche and Isugo, 1994).

Furthermore, this relationship changes over time and depends on contextual factors being stronger or remaining the same in countries at early stages of fertility transition rather than being reduced except for the more developed countries characterized by a consistent fertility decline (Jejeebhoy, 1995).

Based on this evidence from the literature, women's level of education will be included in our analyses in order to investigate how the fertility preferences can change with or remain constant without further educational expansion.

Women's occupation as well as husband or partner's occupation could be used as proxy of socio-economic factors related to the ideal number of children. For women the occupation does not only constitute an indicator of household wealth, but it also illustrates her autonomy in decision making. The type of occupation could also lead to a different valuation of children as either a cost or a benefit in terms of an extra hand on the farm.

The education and occupation of the husband would add to the wealth effects and together they are expected to lead to a desire for smaller families, because an increase in wealth shifts the quantity/quality trade-off of children, and because more educated couples will easily discuss family planning and will be open to the use of contraceptive methods (Cochrane 1990, Ezeh et al. 1993).

The second factor related to the modernization mechanism is urbanization which links the childhood and current place of residence. It has been documented that women living in rural areas have distinctly higher fertility preferences than urban women, even after accounting for the difference in occupation and educational level (Knodel et al. 1996). The additional impact of place of residence on fertility intentions could be due to socio-cultural factor linked to modernization and to different urban and rural labour market conditions.

This raises the question whether migrants from the countryside bring to the city more traditional values on fertility or assimilate to more modern views either before or after the move to the city. This is known as adaptation hypothesis which relies on the idea that fertility behaviour of migrant will change from childhood dominant behaviour to resemble the fertility preferences dominant at destination (Kulu, 2005). For rapidly urbanizing countries like Rwanda this is an important issue, and we will categorize women according to their place of residence at the moment of interview and to where they spent the childhood in our models.

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3.2.3 Attitudes of third parties

The attitudes of the husband or partner as well as other community members, like parents or mothers in law, are the third mechanism that may account for the change in fertility preferences in developing countries. Third parties might have an effect on the reported fertility preferences of women as they are affected by the society which is a patriarchy in most of the cases in sub-Saharan Africa. It is therefore unlikely that the fertility preference could be explained by individual characteristics only, even for educated and employed women as the role of male is still preponderant (Woldemicael, 2007). The complication of including in research and reproductive health programs direct measurement of women's autonomy has encouraged scholars to expand their analysis on other variables like religion, access to media and partner's individual characteristics such as approval of family planning or even discussion about it. As it is a multi-dimensional concept it has been defined in relation with men or other women in terms of culture, religious beliefs, traditions and economic environments and sometimes as women status. Therefore the concept is difficult to capture with a single measure (Goni and Saito, 2009). In this paper, we expect the attitudinal variables related to third parties such as approval of family planning or its discussion among partners would be a way of regulating the future fertility by reducing the fertility preferences as a joint decision making may bring women close to expected results than individual characteristics.

3.2.4 Some control variables

The ideal number of children could also be related to the age of women as their reproductive capacity declines dramatically after the fourth decade of life. One could think about a positive relationship between the desire for larger families and age in two ways. The first mechanism could be that young women cope better with the modern reproductive means than their older sisters who may replicate more traditional reproductive norms. The second is the rationalisation of the actual number of children into a preferred number.

Based on the fact that in Rwanda almost all the births occur in marriage we expect the fertility preference to be higher for married women than those formerly married or those who declare to be single.

There is evidence in the literature that marriage formation slows down in the period of crisis and is catching up directly after the disrupting event (Nobles & Buttenheim, 2006). Assuming conscious fertility control within marriage, women or couples will delay births voluntarily and

those who are not married will delay the formation of a stable partnership and will favour smaller family as a consequence of economic hardships (Palloni et al. 1996; Lindstrom et al. 1999).

The central hypothesis of this paper is that the increase in desired family size in Rwanda in the aftermath of the 1994 genocide can be attributed at least in part to a rise in mortality experience, both of children and siblings, but is also supported by the slowing down of the urbanization process and the fact that educational expansion came to a halt. However, these mechanisms may not fully account for the change in fertility preferences over the years. There might be an extra effect of the disrupting event itself on the mind-set of women involved either through third party effects which favour more pro-natalist attitudes or because the loss of family through war brings about extra uncertainty in deciding on the ideal number of children.

3.3 Data description and methods

In his classical contribution Pullum (1983) described some characteristics to be considered when analysing the desired family size in less developed countries. In the latter the ideal number of children can be illustrated a *projected ideal* (e.g. for one's daughter), as a *personal ideal* (what is best for one's family) or as a *generalized ideal* (what is best for the community or country). Even if it is measured as a personal ideal, more general considerations might come into play. The desired size will be more indicative of the mind-set, than a prediction of the actual fertility over the life course.
Depending on the level of autonomy of the woman in the country of survey, third parties might influences the response consciously (if present at the interview) or subconsciously, and the declared number would basically indicate the one with a relative convenience for the respondent.

As we are not using the desired family size as a predictor of future actual fertility, but are interested in whether personal and collective experience affect the mind-set when it comes to fertility preferences, these issues do not hamper our analyses but will be taken into account in defining the models and used in the interpretation of the results.

In this paper, we use the Rwanda Demographic Health Surveys (RDHS) of 1992, 2000, 2005 and the interim RDHS of 2008. The use of the latter instead of the 2010 RDHS was based on the different formulation of the variable on the urbanisation. In the four previous datasets this variable has three categories (Kigali, Small cities and Countryside) whereas in 2010 the variable been replaced by a categorisation of region (Kigali, South, West, North and East) instead of urbanisation. In addition to data on the birth histories of women, background characteristics of women aged 15 to 49 years old and their husband if any were collected at the moment of the survey.

The dependent variable used in this study is a question in the RDHS designed to measure the fertility preferences using the *ideal number of children* as stated by both women having children or not. The question in the RDHS is phrased as: "*If you could go back to the time when you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be? Or if you could have exactly the number of children you want, what would that be*?" This variable has responses from zero children to twenty and more and one category of nonnumeric responses. Women who stated that their ideal number of children is twenty or more as well as those who expressed it as a non-numerical answer (e.g. "*it is God's will*"), are taken together with women who declared a very high number of desired offspring.

There are two reasons to doubt that the dependent variable is of ratio level. The first reason is that the intervals between the numbers listed are not proportional. In a context were practically no one wants less than three children, one might wonder about the difference between one, two and three. At the other end of the distribution the difference between seven, eight, nine, or more might not be a deliberate choice, but to be triggered by the need to give a finite number. The second reason is the relative utility of any given number. One more or one less could be acceptable. We solved this by treating the ideal number of children as an ordinal variable, taking *Zero-Three* children as one category, *Four* and *Five* as separate categories and *Six and over* as a measure of wanting many children.

The explanatory factors as stated in the theoretical background are grouped into mortality experience, modernization process, and attitudes of third parties. The first independent variables are mortality of offspring and siblings' mortality which are grouped into three categories each: no mortality experience, the respondent experienced one or two losses, and those who experienced the death of three or more. The mortality of offspring is related to all

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children who died as stated by the respondents whereas the death of siblings is associated to brothers and sisters of respondents that died in the period of the genocide (1993, 1994 and 1995). The second group of explanatory variables are education and urbanisation. Women's highest level of education is categorized as non-educated, incomplete primary, completed primary, incomplete secondary, secondary or plus. The migration history combines the actual place of residence with the childhood place of residence and is used to measure the extent to which the place where one's lives has impact on the fertility preference in terms of individual or collective choices. The third group is the approval of family planning by the partner and the discussion of family planning by the couple. In addition, age and marital status are included as control variables. Women selected for the purpose of this study are aged from 20 years to 49 years old.

We used ordinal logistic regression to model the woman's ideal number of children because of the ordinal nature of the outcome variable, but also because it offers interesting analytic options such as going beyond simple significance testing, summarizing the association of interest of all levels of outcome and assessing confounding and interaction effects for all independent variables (Scott et al. 1997).

The ordinal logistic regression, often referred to as the proportional odds model (Norris et al. 2006), or cumulative logit, is an extension of the binary logistic regression and an appropriate method of analysis for grouped continuous response variable (Lall, R. et al. 2002). This ordinal model consists of n-1 logit equations, assuming the odds of each equation to be proportional, also known as the parallel lines assumption. Its functional form is:

$$Ln(\theta j) = \alpha j - \beta i \mathrm{X} i$$

Where j ranges from 1 to the number of categories minus one

And (θ_j) = probability (score $\leq$ j) / (1- probability (score $\leq$ j))

The α_j's is referred to as a threshold or intercept. Each category of the independent variables except the highest (here: reference category) has its own threshold. In our analysis, α_1 = the log-odd of wanting three or less children, α_2 = the log-odd of wanting four or less and α_3 = the log-odd of wanting five or less. The rest wants six or more children.

A positive parameter is subtracted from this threshold, indicating lower chances of wanting few children and higher chances of wanting more. The higher the parameter the more children women desire. As the model is proportional each logit has the same β coefficient.

Allison (1999) concluded that this approach may be invalid and even misleading when comparing groups, as the dispersion in the response probabilities could be not uniform across groups, violating the assumption of parallel lines. The risks of violating this assumption are reduced if the model is well specified and includes interaction effects to account for heterogeneity within groups (Williams 2009), but there is no guarantee that it captures unequal dispersion.

Therefore we use the heterogeneous choice models also known as location-scale models. The location model gives the shift in the response probability to either right or left, while the scale model explicitly models the dispersion in the response probabilities (Jansen M. et al. 2009). This model offers, in addition to the shifts in the ideal number of children, more clarity about the heterogeneity within certain specified groups. The model is extended and redefined as follows:

$$Logit[P(Y \leq j \mid x)] = \frac{\alpha j - \beta x}{\exp(\gamma x)}$$

With γ being a vector of parameter estimates referring to the scale model (Jansen M. et al. 2009). This shows that when γ=0 the location-scale model is reduced to the cumulative logit model. The higher γ, the larger is the dispersion for the groups defined by the explanatory variables and when it is lower than zero this means the groups defined by the explanatory variables are more homogeneous in terms of ideal number of children.

3.4 Results

Four data sets (1992, 2000, 2005 and 2008) of women aged from 20 to 49 years old have been used for the analysis (Table 1). Unfortunately no data were collected in 1996, which would have given information directly after the disruptive event of the 1994 genocide. Collecting data was clearly not the first priority in the years after the traumatic event.

Figure 4 shows the shifts in family preferences between the years in the form of cumulative percentages of the desired number of children. In 1992 close to 30% wanted no more than 3 children, 70% see four or less as the ideal and 85 want less than six children. In 2000 the ideal number of children is much higher. Less than 20% want to stop at three and 50% indicate that they want more than 4 children, and 30% even want 6 or more. In 2005 the pattern illustrates that the fertility preference of women is close to the one in 1992. The fertility preference in 2008 is radically different if compared to previous years. Of all women aged 20-49 no less than 60% state that three children or less is the ideal number and 90% indicate a maximum of four. This huge shift raises some methodological doubt. The 'sensitizing' campaign of the government of Rwanda after 2005 promoting three children as the ideal family size might have led to socially desirable responses in the 2008 interim RDHS rather than an expression of a consciously change in the fertility behaviour of women.

Figure 4: Relation between year of interview and ideal number of children
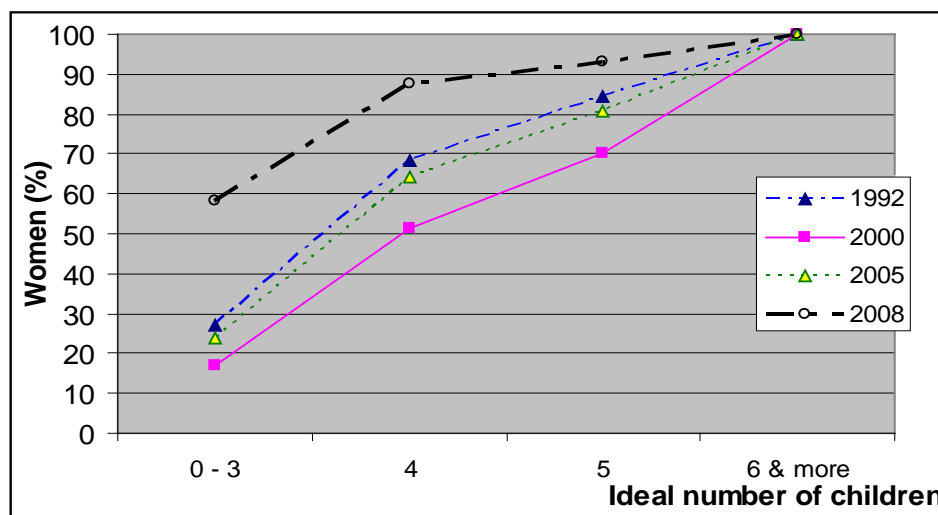
Table 4 gives the descriptive statistics for each year of interview. We expected to observe more women that had lost at least one child in the 2000 set, in particular compared to both 1992 and 2008. We found out that infant and child mortality rates were already very high in 1992 and in 2000 and they deviated only marginally from the first Rwanda demographic and health survey. We do find much higher numbers of formerly married (widowed or separated) women in 2000 and 2005 than in 1992 and in 2008. The data show that urbanization, which is expected to lead to a smaller number of ideal children over time, is on its way in Rwanda but only at a slow pace. The proportion of respondents in the rural neighbourhoods gradually decreases as people prefer to live in small cities or in the capital as those areas are relatively well equipped in terms of infrastructures and offer more socio-economic opportunities. The

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proportion living in small cities increased gradually whereas in Kigali the increase is particularly important in 2000. In general, the educational expansion seems to have increased steadily as the proportion of non-educated went from 40.4% in 1992 to 24% in 2008. But a closer look at all types of level of education show that the main changes appear in 2000 where the proportions of women with primary and secondary level education have more than doubled. This might be an effect of the return of large numbers of Rwandese living in exile in Burundi, Uganda and Congo before the regime change in 1994. Efforts to stimulate enrolment in primary education have been a major priority of the new administration and could account for the rising levels of (completed) primary education after 2000.

Unfortunately we do not have data on the attitudes on family planning for 1992 and 2008, but the data show the low level of approval in 2000 and 2005. Only 54% of the women indicate that their husbands approve family planning and more than 40% has never discussed it. Five years later approval rates have gone up to 62% and 70% has discussed family planning at least once.

The outcomes from the location-scale models in Table 5 and 6 come from two stepwise analyses. The first analysis (Table 5 and Model 3) is a general model that tests the assumptions from Demographic Transition Theory. All mechanisms defined in that theory show up with the correct sign. The year of interview, the mortality experience (death of own children), the level of education, the place of residence, the marital status and the respondent's age are all related to the ideal number of children. The mortality experience, the age of respondent and place of residence (with Kigali as reference category) are clearly positively related to large family size preference. Women who experienced many deaths of their children are more likely to desire a large family than the one who lost fewer or did not lose any child. Women aged 30 and over are more likely to prefer a large family than their younger sisters and living outside Kigali increases the likelihood of preferring a large number of children.

Table 4: Descriptive statistics by year of interview

Variables	1992	2000	2005	2008
Ideal number of children				
0 − 3	26.7%	17.5%	23.1%	54.2%
4	40.8%	35.7%	41.8%	31.8%
5	15.6%	17.7%	15.3%	6.1%
6 +	16.9%	29.1%	19.8%	7.9%
Mortality experience (Children)				
0	61.5%	59.8%	63.2%	71.8%
1	19.6%	20.7%	19.5%	16.3%
2	9.6%	10.0%	9.3%	6.9%
3	4.8%	5.2%	4.3%	3.0%
4 +	4.5%	4.3%	3.7%	2.1%
Level of education				
No education	40.4%	32.2%	27.3%	23.9%
Inc. primary	42.2%	36.0%	49.5%	45.0%
Primary	6.7%	17.8%	11.6%	18.1%
Inc. secondary	8.9%	10.0%	7.7%	7.2%
Secondary	1.3%	3.1%	2.9%	4.1%
Higher	0.5%	0.9%	1.0%	1.7%
Type of Place of residence				
Countryside	82.5%	75.9%	77.4%	74.1%
Small cities	6.4%	10.2%	13.2%	15.5%
Kigali	11.1%	13.9%	9.4%	10.4%
Marital status				
Never married	16.5%	15.7%	20.7%	22.1%
Currently married	70.5%	61.4%	61.8%	63.4%
Formerly married	13.0%	22.8%	17.5%	14.5%
Age				
20 − 29	46.2%	45.9%	47.0%	49.8%
30 − 39	34.6%	31.5%	29.7%	28.8%
40 − 49	19.2%	22.6%	23.3%	21.4%
Siblings Mortality				
None	-	23.5%	20.2	-
One or more	-	76.5%	79.8	-
Migration status				
Countryside ‹ Countryside	-	74.8%	76.0%	-
Countryside ‹ Small City	-	0.6%	0.5%	-
Countryside ‹ Kigali	-	0.3%	0.4%	-
Small City ‹ Countryside	-	6.4%	9.6%	-
Small City ‹ Small City	-	3.4%	3.3%	-
Small City ‹ Kigali	-	0.3%	0.3%	-
Kigali ‹ Countryside	-	8.9%	6.1%	-
Kigali ‹ Small City	-	1.9%	1.2%	-
Kigali ‹ Kigali	-	3.1%	2.0%	-
Husband approves FP				
Disapprove	-	18.3%	15.8%	-
Approve	-	54.0%	62.4%	-
Don't know	-	27.7%	21.8%	-
Discussion about FP				
Never	-	42.1%	30.5%	-
Once or twice	-	23.2%	27.0%	-
More often	-	34.7%	42.5%	-
Valid	5079	7694	8726	5879

Table 5: Risk factors of large family size preference (1992 – 2008)

Parameter	Model 1		Model 2		Model 3	
	Location	Scale	Location	Scale	Location	Scale
Threshold [0 - 3]	-0.800***		-0.423***		-0.265***	
Threshold [4]	1.122***		1.608***		1.682***	
Threshold [5]	1.988***		2.517***		2.549***	
Year [1992]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Year [2000]	0.702***	0.053*	0.853***	0.042	0.824***	0.036
Year [2005]	0.223***	0.035	0.251***	0.039	0.254***	0.041
Year [2008]	-1.420***	0.049	-1.499***	0.142***	-1.430***	0.140***
Child mortality [None]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Child mortality [1-2]	0.288***	-0.018	0.139***	-0.002	0.100***	0.007
Child mortality [3 +]	0.366***	0.020	0.156***	0.038	0.119**	0.066
Age [20 - 29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Age [30 - 39]	0.362***	0.125***	0.312***	0.141***	0.264***	0.149***
Age [40 - 49]	0.356***	0.101**	0.292***	0.129***	0.277***	0.153***
[2000] * [20-29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
[2000] * [30-39]	-0.150*	-0.040	-0.133	-0.018	-0.077	-0.023
[2000] * [40-49]	0.071	0.145**	0.041	0.161***	0.120	0.149
[2005] * [20-29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
[2005] * [30-39]	-0.166**	-0.118**	-0.092	-0.102**	-0.073	-0.117**
[2005] * [40-49]	0.007	0.011	0.062	-0.005	0.109	-0.028
[2008] * [20-29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
[2008] * [30-39]	0.275***	-0.002	0.422***	-0.036	-0.073	-0.117**
[2008] * [40-49]	0.502***	0.098	0.607***	0.072	0.109	-0.028
[None + Inc. Primary]			0[a]	0[a]	0[a]	0[a]
[Primary]			-0.292***	-0.067***	-0.282***	-0.065***
[Inc. Secondary]			-0.693***	-0.106***	-0.659***	-0.109***
[Secondary +]			-1.260***	0.033	-1.213***	-0.029
Kigali			0[a]		0[a]	
Small city			0.351***		0.334***	
Countryside			0.740***		0.673***	
Never married					0[a]	0[a]
Currently married					0.309***	-0.077***
Formerly married					-0.190***	-0.040
Valid cases	**27379**		**27379**		**27379**	

Lastly, taking into consideration the marital status, the category of women "*currently married*" shows log odds ratios of 0.309 and the category of "*formerly married*" women is negatively deviating (-0.190) from the reference category ("*Never married*") in terms of ideal number of children. The culture and the policy in Rwanda are not in favour of extramarital births and remarriage for widowed or separated women. It is a phenomenon which is affected by a very low social acceptance. Formerly married women might therefore equate their ideal number to their actual number of children.

Table 6: Risk factors of large family size preference (2000 – 2005)

2000–2005 Parameter	Model 4		Model 5		Model 6	
	Location	Scale	Location	Scale	Location	Scale
Threshold [0 - 3]	-1.459***		-1.894***		-2.272***	
Threshold [4]	0.332***		-0.050		-0.506***	
Threshold [5]	1.134***		0.778***		0.315***	
Year [2000]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Year [2005]	-0.442***	-0.012***	-0.551***	-0.008	-0.528***	0.078**
Child mortality [None]	0[a]	0[a]	0[a]	0[a]	0[a]	
Child mortality [1-2]	0.254***	-0.021	0.093***	-0.005	0.054	
Child mortality [3 +]	0.328***	0.015	0.100	0.026	-0.142**	
Siblings' mortality [None]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
[1-2]	-0.143***	-0.071***	-0.095***	-0.058***	-0.096***	-0.049*
[3+]	-0.345***	-0.061*	-0.150***	-0.054	-0.123*	0.001
Age [20 - 29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
Age [30 - 39]	0.212***	0.091***	0.179***	0.120***	0.286***	0.202***
Age [40 - 49]	0.418***	0.252***	0.325***	0.289***	0.364***	0.389***
[2005] * [20-29]	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]
[2005] * [30-39]	-0.016	-0.085**	0.034	-0.075*	0.045	-0.186***
[2005] * [40-49]	-0.054	-0.158***	0.023	-0.164***	0.075	-0.277***
[None + Inc. Primary]			0[a]	0[a]	0[a]	0[a]
[Primary]			-0.296***	-0.082***	-0.300***	-0.055*
[Inc. Secondary +]			-0.615***	-0.145***	-0.494***	-0.154***
[Secondary +]			-1.197***	-0.098*	-1.132***	0.047
[Countryside - Countryside]			0[a]	0[a]	0[a]	0[a]
[Countryside -Small city]			-0.093	0.164	-0.093	0.312*
[Countryside - Kigali]			-0.375**	-0.339**	-0.479**	-0.351**
[Small city - Countryside]			-0.331***	-0.124***	-0.272***	-0.104**
[Small city - Small city]			-0.444***	0.000	-0.230*	0.138*
[Small city - Kigali]			-0.658***	-0.137	-0.484**	-0.193
[Kigali - Countryside]			-0.711***	-0.080**	-0.739***	-0.070
[Kigali - Small city]			-0.474***	0.017	-0.516***	0.085
[Kigali - Kigali]			-0.923***	-0.050	-0.774***	-0.001
Partner [Disapproves]					0[a]	0[a]
Partner [Approves]					-0.353***	-0.194***
[Don't know]					-0.086	-0.057
Discuss FP [Never]					0[a]	0[a]
Discuss FP [Once or twice]					-0.054	0.006
Discuss FP [More often]					-0.254***	-0.083**
Valid cases	16420		16352		9918	

Model 6 (Table 6) differs from Model 3 (Table 5) in two aspects. The first is that 1992 and 2008 data-sets were dropped, because the information on mortality of siblings as well as

family planning approval and its discussion by the couple were not included. The second is that Model 6 includes a variable that reflects the migration history combining the current and the childhood place of residence and the year of interview and age of respondents have been combined into one variable.

The period 2000 and 2005 is close to the period of the genocide and could therefore give a better image of the short-term impact of that disruptive event on fertility preference. Although the offspring mortality appears to be positively (0.254 to 0.328) related to family size preferences, this relationship progressively loses its significance when including variables related to modernisation progress and even becomes negative when attitudes of the partner enter the model.

We hypothesized the loss of siblings would also lead to a higher desired number of children. The death of siblings shows a limited and negative significant relationship with the preference for a large family. This means that women who lost their siblings due to the civil war and the genocide do not particularly desire a high number of children. As expected there is a negative association between partners who approve or discuss family planning as well as the education level along with the ideal family size.

Again as expected the age of respondents is positively related with the fertility preference meaning that younger women are less likely to prefer large family size than there elder sisters. As in the previous model with the four data sets (Table 5) we that found that the women aged 30-39 and 40-49 years old are not homogeneous in terms of ideal number of children as the scale model shows clear positive and significant estimates. Again, this could mean that these age groups consist both of people that have been witness to the genocide and of people that returned to the country afterwards. Unfortunately the data does not allow a classification of people that left the country previously and returned after the period of atrocities, but we can reconstruct a variable showing whether people remained in the countryside, moved to a small city or to the capital Kigali, testing the hypothesis that urbanization corresponds to a desire for smaller families.

The migration history does have the expected effect. In particular people moving to Kigali from the countryside show lower numbers of desired children (-0.739), compared to those that stayed. The smaller cities are indeed somewhere in between, but those who moved to these places from Kigali clearly want fewer children (-0.484). Again, as expected, women who live

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in Kigali and did not move since their childhood have the lowest estimates of preference for large family size (-0.774).

Model 6 pertains to currently married women which enables the inclusion of the husband approval of family planning and discussion with partner about the family planning. Even though Rwanda is not a very strict patriarchal society we did expect a substantial influence of the husband attitudes towards reproductive health on the desired number of children as reported by women. The parameters are in line with this hypothesis and indicate a significant effect (-0.353) if both approve of family planning and if partners discuss it as a couple (-0.254). Women who declared that they had a discussion about family planning with their partner only once or twice are not significantly different from those who had never discussed the matter.

Even after controlling for mortality experience and other risk factors, the year 2000 stands out as the year in which ideal family size is higher. Although this might be the result of unobserved heterogeneity, it could mean that the mind-set in general is more in favour of more children after a disruptive event.

3.5   Discussions and Conclusion

The relevant fact is that preference for large family size is very high in 2000 compared to all other years regardless of the level of mortality experience. The variable year of interview shows the very high increase in the preference for large families in the year 2000 and a very steady drop in the years after. The loss of explanatory power of the mortality experience after inclusion of education and urbanisation variables indicates that its role maybe different in exceptional circumstances.

As stated in the methodology section, the scale model offers the opportunity to address the issue of heterogeneity in the ideal number of children within groups of women. On the whole most scale effects are either not significant or small, with the exception of the parameters for the year 2008 and the higher age groups. As these parameters are positive it means that heterogeneous responses are more common in 2008, indicating that there might be minority groups that still favour large families. The dispersion in the higher age groups might indicate unobserved heterogeneity between cohorts that might be linked to experience of the genocide

not captured by the actual loss of children. The scale parameter is in particular substantial for the highest age group in 2000.

This paper aims to contribute to the debate on the stalling fertility decline in Sub-Saharan Africa, by analysing the role of disruptive events in shaping the fertility preferences in Rwanda using the Rwanda DHS datasets from 1992 to 2008.

We are not measuring ideal family size as a proximate determinant of actual fertility but as a general opinion as to how much children would be appropriate to women in Rwanda either prospectively for young women or retrospectively for their elder sisters. This relative definition emphasizes the orientation of this study whether the fertility preference may have been affected by the civil war and the genocide in Rwanda.

This paper captures three mechanisms through which disruptive events may account for the change in the fertility preference level. The first mechanism is the mortality experience, the direct consequence of major crises. The proxies used in this study to capture the mortality experience that is expected to lead to desire a large family were the mortality of offspring and the mortality of respondents' siblings. The second mechanism refers to common trends like further educational expansion and rapid urbanization, which are known to lead to desires for smaller families and are generally interrupted as a result of major crises. The third mechanism expands our views to the attitudinal variables of third parties that may account in the change of fertility preferences after a disruptive event. These variables are husband's approval of family planning and its discussion within the couple.

Using data from four consecutive Demographic and Health Surveys we were able to show for Rwanda over a period of sixteen years that infant and child mortality remained at a high level, with only slight improvements after 2005. Educational expansion slowed down in this period. Urbanization progressed at a relatively slow but steady pace during this period.

The multivariate analyses indeed corroborate the existing insights that these factors play a decisive role in the desired family size, and part of the stall in the fertility decline can therefore be related to the fact that the determinants of fertility preferences hardly changed over time. The expected influence of mortality experience on the fertility preference related to the insurance hypothesis was not found as important as the modernization process. The migration status stresses the facts that living or having lived in Kigali contributes a lot to desire smaller families and furthermore, the level of education has a strong effect on the

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desired family size. Young generations are less likely to prefer large families. The approval or the discussion of family planning within the couple is also contributing significantly to lower fertility preference.

The scale model does show that the highest age groups in particular are heterogeneous in their fertility preferences in 2000. We speculated that this might be linked to their country of residence during the genocide. Many people returned from exile after the end of the genocide and this might account for the heterogeneity within this group. Unfortunately, the data do not allow us to bring this distinction into our models. Even after controlling for the factors that contribute to the explanation of the ideal family size, the year 2000 and to a lesser extent 2005 stand out in having exceptional high levels of desired fertility. This provides some support that violent deaths change the overall mind-set of the population to more pro-natalist attitudes. A more in depth analysis of the effects of children's mortality showed that these are indeed stronger in the aftermath of the genocide in Rwanda. However, we found no support that the loss of siblings also contributes to the explanation of wanting more children.

It is clearly seen that fertility decline may resume in the years to come. Further educational expansion and urbanization and decreasing levels of infant and child mortality will certainly bring down the desired number of children. Also the mind-set seems to have shifted, considering the huge shift in the reported ideal family size in 2008. This might be result of the 'sensitizing' campaign by the Rwandan government, which could have led respondents in the questionnaire to include "what is good for the country" in their response to the question on the personal ideal with respect to the number of children. However, a decrease in ideal family size alone is not enough to bring down actual fertility. Access to reproductive services is a requisite to arrive at the ideal family size.

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4 CHANGES IN FERTILITY DECLINE IN RWANDA: A DECOMPOSITION ANALYSIS.

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Abstract

After having stalled in the 1990s, fertility in Rwanda resumed its downward trajectory between 2005 and 2010. The total fertility rate declined from 6.1 to 4.6 and modern contraceptive use increased. However, it is unclear which determinants lay behind the previous stall and the recent strong drop in fertility. This paper contributes to an on-going debate on the impact of social upheavals on fertility decline. We use a decomposition analysis, focussing on the change in characteristics and reproductive behaviour of women and their contributions to levels of fertility during 1992-2000 and 2000-2010. Results show that due to widowhood and separation the proportion of women who were married decreased between 1992 and 2000, but their fertility increased in the same period due to replacement fertility and an unmet need for family planning. After 2000, postponement of marriage and lower infant mortality contributed to lower fertility, but the most important effect is the overall lower fertility due not only to improved family planning provision, but perhaps also to the sensitizing campaigns of the Rwandan government.

Keywords: fertility decline, social upheaval, Rwanda, decomposition analysis

4.1 Introduction

Rwanda is a recent success story of rapid fertility decline in Sub-Saharan Africa. The total fertility rate (TFR) dropped from 6.1 children per woman in 2005 to 4.6 in 2010. The use of modern contraception among women living in a union increased from 10 to 45% in the same period. This impressive decline came after a period of stalled fertility levels in the 1990s, like many other countries in Sub-Saharan Africa (Bongaarts, 2006; Shapiro & Gebreselassie, 2008). Although the stall of fertility was evident, it is not yet clear precisely which determinants lay behind it. The lack of a clear explanation also applies to the recent strong drop in fertility.

A detailed analysis of the causes that contributed to changes in fertility in Rwanda, and the extent of their impact, is beyond the scope of this paper. We focus rather on changes in the

composition (endowments) of the female population and in their reproductive behaviour (effects), and the contributions of both sources to the level of fertility. We will distinguish two periods in the analysis: the period of limited change in the TFR, using available data from the Rwanda Demographic and Health Surveys of 1992 and 2000, and the period of the recent decline, for which we use the RDHS of 2000 and 2010. To present a clear picture of the changes in the effect of selected explanatory variables on fertility, we use a decomposition analysis. This method allows a comparison between two different periods. It also expresses the contributions of all the included explanatory variables in terms changes in composition and in terms of the change in the effects of those characteristics. (Yun, 2004; Powers and Pullum, 2006; Powers and Yun, 2009).

The Rwandan context differed substantially during the two periods under study. The 1990s are on record as a black page in Rwanda's recent history, marked by civil war, genocide, mass movements of refugees and economic deterioration. The first decade of the new millennium can be characterized by an impressive improvement and recovery of the political and economic situation of the country. For that reason we start with an overview of the relevant background followed by a presentation of the theoretical framework based on results from other studies on the relation between changes in socio-economic contexts and fertility

4.2 Background

Rwanda is still a poor country with an economy based on agriculture. Its Human Development Index, however, improved impressively from 0.313 in 2000 to 0.425 in 2010. During the 1980s and 1990s the country's development was hampered by political tensions, environmental stress and economic deterioration. The Rwandan civil war and genocide (1994) came not out of the blue but were rooted in the country's historical, colonial, political and economic experiences. Conflicts were already in place before the achievement of Independence in 1962[7] and have continued ever since (Piron and McKay 2004). Processes of exclusion, unequal and changing power relations and alternating elites that controlled access to resources, in particular access to land, are amongst others at the base of these tensions and conflicts (Storey 2001). The ethnic group in power and comprising the elite has changed

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[7] After the 1959 revolution, when Hutu deposed the Tutsi elite, thousands of Tutsi were killed and hundreds of thousands fled the country for the first time. Again in 1963 and 1973 large numbers of Tutsi became exiles as result of ethnic violence and oppression. These refugees were the so-called "old-case load of Rwandans living in exile", as defined during the negotiations in Arusha in the early nineties

several times in Rwandan's modern history (Piron and McKay 2004), but the poor Rwandans[8] living scattered on the hilly countryside had to face a daily struggle for subsistence. More than 90 per cent of the working population earned a living by cultivating small and fragmented plots that, as a result of high population growth, decreased substantially over the generations (Storey 2001).

Economic stress characterised the prelude of the social upheaval. During the late 1980s Rwanda suffered from a severe economic crisis that deteriorated the living conditions of its people. That profound economic crisis has been linked with the decline of fertility between 1983 and 1992, when the total fertility rate fell from 8.3 to 6.2 and the desired family size from 6.3 to 4.2 children per woman (Olson, 1994; Uvin, 1998). Rwanda seems to have followed a pattern of crisis-led fertility decline in the 1980s and early nineties.

After the war and genocide in 1994, food production fell drastically, the public service infrastructure of the country was severely disrupted, and large numbers of the population were on the move. Around two million Rwandans[9] sought protection in refugee camps in neighbouring countries, while another million became internally displaced persons (Gribbin, 2005; Verpoorten, 2010). After mid-1994, when the Rwanda Patriotic Front (RPF) established a new order, refugees started to return – particularly the so-called old case load that had fled the country during former conflict periods[10]. However, 1.7 million refugees of the new case load stayed in camps at least till 1996 (Verpoorten 2010). In the remaining years of the decade Rwanda had to incorporate substantial waves of returnees[11], who often found their houses and land destroyed or occupied. Within the country internal migration flows continued to be strong as well: return of internally displaced persons, rising rural-urban migration to the capital city, and resettlement in the frameworks of the new government's Imidugudu[12] programme launched in 1996/7 (van Leeuwen 2001).

The gravity of all these disruptive events had far-reaching consequences in other fields of society and politics as well those related to demography. Firstly, the composition of the population by sex and age had changed. The Rwandan society feminized as substantially

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[8] Access to secondary education however was a privilege of certain groups.

[9] Political leaders, the army, the 'Interahamwe' civilian militia and ordinary civilians who participated in the killings of Tutsi and even some kidnapped women.

[10] As a.o. agreed upon between RPF and the Habyarimana regime during the Arusha Peace Negotiations in 1992 and 1993. The number of returnees was estimated on 600,000 for the year after the genocide.

[11] In the last months of 1996 a massive flow of more than one million returnees (New Case Load) was seen as a consequence of the decreasing international support for refugee camps and the changed attitude (violence) in the host countries towards the refugees.

[12] A low cost housing program introduced in Rwanda soon after the Genocide, with the aim of resettling the thousands of people who returned, mostly from neighbouring countries, as well as those who were internally displaced. Among them were also the "old" groups of refugees who had spent up to 35 years in exile.

more men than women died in battle actions or fled the country (Burnet 2008, De Walque and Verwimp 2009). Although many men returned after a while, the sex ratios among adults stayed skewed as the census of 2002 and the latest DHS surveys clearly illustrate. Social and family relations altered, which is often seen as attendant effects of social upheaval (Caldwell, 2004; Burnet, 2008). The number of female-headed households rose, and increasingly women were invited by new government policy to participate in public activities.

Secondly, the population policy that started after 1981 under donors' pressure to tackle the high rate of population growth[13], with the creation of the National Office of Population (ONAPO) (May, Mukamanzi and Vekemans, 1990), faded into the background in the second half of the 1990s. Building up the new society and restoring peace and reconciliation became more important policy foci than population growth reduction. Only some years afterwards could the government reformulate population and public health policies.

The fundamental change in Rwandan development began in 2000-2001 with the creation of Vision 2020, through a broad-based, participatory consultative process. The development strategy presented as Vision 2020 aimed at the reconstruction of the nation, its social capital and its regional and global integration, which were seen as mandatory for sustainable development (Ministry of Health, 2006). In 2003 the National Reproductive Health Policy specified policies related to the health sector consistent with the Cairo Conference on population and development (1994), the Beijing Conference on women (1995), and the international discussion of Millennium Development Goals. Several policies geared toward development objectives were initiated, including better access to health services by the introduction in 2001 of the community-based insurance scheme (May and Kamurase , 2009). Serious concerns about the rapid increase of the population arose after the publication of the 2005 RDHS results, which showed that the TFR was even higher than in 2000, rising from 5.8 to 6.1 children per woman. Since 2000, the struggle to reduce fertility in Rwanda has been characterised not only by new policies, such as the family planning policy in 2006, but also by the strong commitment of the Government and Parliamentarians to this aim. Successive initiatives that may be considered as important events in addressing population challenges in Rwanda include the creation in 2003 of the Rwandan Parliamentarians' Network for Population and Development, the presentation in 2005 by the Futures Group of the RAPID Model[14] in the Parliament , and the inclusion of population challenges in the second

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[13] Family planning was not among the priorities of the Habyarimana regime (De Walque and Verwimp 2009).
[14] Computer model which combines socio-economic and demographic data to make a.o. scenarios demonstrating the effect of population growth on other sectors.

generation of the Economic Development and Poverty Reduction Strategy 2008-2012 (EDPRS). A large sensitisation campaign in family planning was financially boosted by the support of partners such as UNFPA, USAID and Twubakane Project (MoH, 2009). This allowed the construction of "*secondary posts*" for reproductive services close to religiously affiliated health facilities, more training of staff, and increased the supply and access to family planning commodities (MoH, 2008; USAID-Rwanda, 2009).

4.3 Theoretical framework

In general theories on fertility decline, fertility is linked to gradual, fundamental and structural changes in a society. Disrupting events like wars and revolutions, can have a temporary, disruptive effect on the course of the decline as is shown in analyses using historical or contemporary data.   Examples of a temporary drop in births followed by a rebound shortly after the disrupting events as a result of the reunification of spouses and of resumed celebrations of marriages leading to more conceptions in the year after, are found in cases all over the world. (Caldwell 2004, Hill 2004, Heuveline and Poch 2007).

After the disrupting events or in case the turmoil continues for a longer period, the fertility level can follow various courses.   The fertility decline might stall or even go in an opposite direction as observed among Iranian and Palestinian couples in the cases of conflicts in the Middle East (Fargues 2004). Some researchers suggest that another scenario is also possible, notably that of a crises-induced sustained fertility decline (Eloundou-Enyegue, Stokes and Cornwell 2000). In this case changes in fertility are probably intentional and a response to deteriorating living circumstances. Lindstrom and Berhamu (1999) found that for Ethiopia during its crises of 1974-1991.Marital fertility stayed high but fluctuated (drop and rebound) during the first years of the crisis. However, from the 1980s onwards, marital fertility declined due to on-going political and economic insecurity. According to the authors (1999:259) the "multi dimensionality of the Ethiopian crisis may be the key factor in explaining the fertility decline" that was not observed in other sub-Saharan countries. A few years later this alternative route of fertility decline was discussed also for Eritrea by Woldemicael (2008) who found that the border war with Ethiopia indeed contributed to a large drop in TFR of around 2.5 child between 1995 and 2002 and possibly contributed also to the decline in marital fertility in the longer run that had already set in before the disturbing event.

The impact of a social upheaval on demography depends on the phase of the crisis. During each stage of the conflict demographic behaviour will be influenced by voluntary as well as involuntary forces. Randall (2005) has grouped these forces in five groups: biological, biosocial, psychological, socio-economic and political. Each force may have an upward or downward effect on actual fertility depending on the stage of the conflict. The characteristics of the affected population and the events that they have been exposed to, will also be an important determinant of the effects of humanitarian crises on actual fertility (Hill, 2004).

We assume that actual fertility levels are an outcome of fertility preferences and fertility control and that the severe social upheavals in Rwanda that occurred in the early nineties affected both. Following Caldwell (2004) who stated that great social upheavals tend to depress fertility decline for a decade or longer at the early transition stage, while it accelerates the decline in case of crises in the late transitional phase we expect a stagnating fertility decline in Rwanda during the 1990s and a continuation of the decline after the turn of the millennium. The short run or immediate effects of the disturbing events were: higher mortality, deferred marriages, mass migration and huge refugee flows. The indirect or longer term effects were the disruption of families due to the separation of spouses and the destruction of reproductive health services.

Most births in Rwanda occur in formal unions; births outside wedlock are rare. Consequently, the disruption of family cohesion, deferred marriages or separations due to death or migration as a result of the disturbing events can have played an important role in decreasing the fertility during or shortly after 1994 as the proportion of married couples decreased. The breakdown of reproductive health facilities will have an opposite effect, just as forced sexual intercourse. Early marriages (Verwimp and Bavel, 2005) as a survival strategy may have contribute (to a lesser extent) to the increase of unwanted pregnancies and possibly higher fertility. Access to modern family planning methods was problematic after 1994, which caused more unplanned births. The observed developments in attitudes and practices concerning family planning between 1983 and 2005 show a disruption of the positive trends during the 1990s. While the percentage of women with a steady partner that was using contraceptives (modern and traditional) doubled between 1983 and 1992, the number diminished dramatically   between 1992 and 2000 (RDHS 1992, 2000).

Fertility preferences will also change in the wake of disruptive events. Probably as a result of the loss of children or other family members during the 1990s, the desired family size increased temporary. The change in ideal number of children women would like to have during their reproductive life between 1992 and 2000 is particularly the result of higher

percentages of women wanting five children or more as this proportion went respectively from 33.5% to 51.6% (RDHS, 1992 and 2000) The sensitizing campaign by the Rwandan government proclaimed three children as the ideal family size. The effects of such a campaign is hard to measure, but the fact is that the proportion of women whose ideal number is five children or more decreased substantially to 12.5% in 2010.

This may end up changing the actual fertility.

4.4 Data and methods

4.4.1 Data

We used three Rwanda Demographic and Health Surveys (RDHS) of 1992, 2000, 2010 that include data on women aged 15 to 49 years old. The quality of DHS data in collaboration with Macro International has greatly improved since the 1980's and all the country reports have tables on data quality assessment (Pullum 2006). Critique remains for the use of retrospective data, such as the likelihood of censoring effects, date misreporting due to memory lacks or to unprofessional interviewers who shift children outside the calendar period to reduce their workload on time consuming questions related to children's health (Potter 1977; Retherford and Iqbal 1985; Opiyo and Levin, 2008). Despite this critique, the data gathered in the Rwanda DHS surveys meet the required standards for avoiding biases.

We excluded women aged 15-19 from the analysis as they were either too young or not sexually active to change the general trend in actual fertility outcomes. The remaining samples included 5079 women for RDHS 1992, 7694 women for RDHS 2000 and 10708 women for RDHS 2010.

In defining the outcome variable we started with the total number of pregnancies that occurred during the 24 months period prior to the surveys which resulted in a birth and the pregnancies recorded at the moment of the interview. However, the low number of women who had more than one pregnancy in these two years led us to transform this dependent variable into a dummy variable of either yes or no (experience of a pregnancy during 24 months before the interview) as an indicator of actual fertility

The explanatory variables of interest that are likely to influence the number of pregnancies women had in this period are marital status, whether or not the woman experienced the death of one or more children, the number of living children they had before our observation period

and the contraceptive use at the moment of the interview. Woman's age, education and place of residence were used as control variables. All these variables are used in order to decompose the changes in fertility between the two periods and isolate the contribution of the change in the composition of the population from the change which is due to shifts in the behaviour of the population.

4.4.2 Methods

As we are interested in identifying characteristics that may explain the difference in actual fertility between 1992 and 2010 in Rwanda, the appropriate technique is the decomposition analysis. We used the Oaxaca decomposition model in STATA (version 11.2). This method allows the decomposition of changes over time in levels of an outcome variable into those due to differences in observable characteristics (*endowments*) and those due to the different effects of these characteristics (*coefficients*). The method decomposes differences in means using the classical linear model, as well as differences in proportions using logit or probit models, with options to provide normalized solutions for dummy variables, covariate grouping, weighing, and survey design adjustments (Yun, 2004; Jann, 2008). As our dependent variable is binary we applied the logit model to analyse the changes in actual fertility between 1992-2000, and between 2000 and 2010.

The Oaxaca module in STATA enables us to distinguish clearly the part of the difference in actual fertility between 1992 and 2000 on the one hand and 2000 and 2010 on the other hand explained by compositional effects (endowments), by behavioural effects (coefficients) and by combined interaction effects.

4.5 Descriptive statistics

Table 7 and 8 present the changes over time in the statistics of some demographic characteristics of the sample populations that are important for our analysis. The results illustrate that during the two periods under study (1992-2000 and 2000-2010) opposing demographic changes occurred.

4.5.1 Marital status.

During the period of the genocide and its aftermath changes occurred in the marriage and cohabitation patterns.

Table 7: Percentage of women aged 20-49 according to selected characteristics and change between 1992 and 2000, and 2000 and 2010 respectively

Variable	Category	1992	2000	Change	2000	2010	Change
Marital status	Never married	15.3	14.6	-0.7	14.6	23.0	+8.4
	In a union	72.0	62.1	-9.9	62.1	63.2	+1.1
	Widowed	5.2	10.7	+5.5	10.7	6.9	-3.8
	Separated	7.4	12.6	+5.2	12.6	6.8	-5.8
Child mortality	None	83.1	76.7	-6.4	76.7	91.5	+14.8
	One or more	16.9	23.3	+6.4	23.3	8.5	-14.8
Number of living children 24 months prior to the interview	0 - 2	51.9	56.7	+4.8	56.7	59.2	+2.5
	3	12.4	12.0	-0.4	12.0	12.3	+0.3
	4	10.8	10.2	-0.6	10.2	10.6	+0.4
	5 +	25.0	21.0	-4.0	21.0	17.9	-3.1
Contraceptive use	Not using	82.7	90.4	+7.7	90.4	64.2	-26.2
	Folklor./traditional	6.6	5.2	-1.4	5.2	4.2	-1.0
	Modern	10.7	4.4	-6.3	4.4	31.7	+27.3
Woman's age	20 – 24	24.5	24.5	0	24.5	25.2	+0.7
	25 – 29	20.6	20.5	-0.1	20.5	23.3	+2.8
	30 – 34	20.3	16.3	-4.0	16.3	17.0	+0.7
	35 – 39	14.6	15.4	+0.8	15.4	13.3	-2.1
	40 – 44	12.1	13.4	+1.3	13.4	10.8	-2.6
	45 – 49	7.8	9.9	+2.1	9.9	10.4	+0.5
Education level	No education	42.9	34.5	-8.4	34.5	18.9	-15.6
	Primary	49.7	54.2	+4.5	54.2	67.1	+12.9
	Secondary/High	7.4	11.3	+3.9	11.3	13.9	+2.6
Place of residence	Urban	6.2	16.1	+9.9	16.1	15.0	-0.9
	Rural	93.8	83.9	-9.9	83.9	85.0	+2.1
Total		100%	100%		100%	100%	
Number of women		**5079**	**7694**		**7694**	**10708**	

The percentage of women being widowed or separated is much higher in 2000 than in 1992 and the percentage of women in a union, which are more at risk of becoming pregnant, is much lower. These changes are expected to have a negative effect on total fertility rates. After 2000 the composition of the female population according to marital status changed again. Most striking is the increase in percentage (not yet) married women, which is due to the skewed sex ratio and a practice of later marriage.

4.5.2 Child mortality

Based on the fact that the procreation behaviour of a couple may be influenced by mortality experiences (Rahman, 1998) we analysed the trends in mortality of children reported by women during the last seven years before the date of the interview. The proportion of women that experienced the death of one or more children went up between 1992 and 2000[15]. After 2000 the opposite trend occurred – child mortality decreased, only 8,5% had suffered the loss of a child in 2010 as opposed to 23.3 in 2000. All other things kept equal, in 1992-2000 these changes will have led to an increase in actual fertility as couples might want to replace the deceased or reproduce more to make sure some will survive. The drop in child mortality 2000 will have a downward effect on fertility as couples feel more confident about the survival of their offspring.

4.5.3 Contraceptive use

The change in percentages of women using contraception also changed remarkably during the two study periods. The use of contraception was still limited in 1992, but the situation deteriorated further and in 2000 only a very limited number of women used effective modern methods. However in 2010 (Table 8), this proportion increased more than seven times from 4.4% (2000) to 31.7% (2010). This shift in the use of contraception patterns may have contributed a lot in the change in actual fertility in the two periods.

4.5.4 Actual fertility

The percentage of women being pregnant in the last 24 months prior to the date of the interview did hardly change between 1992 and 2000 in line with the expected stall in fertility decline in this period. Yet, there are marked differences in behaviour between categories. The (smaller) category of women in a union had far higher odds of being pregnant in 2000 than in 1992 (the odd ratio is 1.14- see Table 8). After 2000 this percentage drops dramatically, the odd ratio of 2010/2000 is only 0.65. The never married contribute little to the overall fertility in each year, but show higher percentages of pregnancies in 2010 compared to 2000.

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[15] We consider only deaths that occurred in the last seven years without including the ones happening in the last twenty four months. With this we intend to capture the deaths that may be related to the genocide period with the 2000 RDHS dataset.

The effect of losing children also changes over time. Women that had lost at least one child in the seven years before 2000 have higher odds to be pregnant again at the time of the interview in 2000 than the same categories in 1992 and 2010. This might indicate that the cause of the death (more violent deaths in the period of the genocide, few violent deaths after 2000) affects the decision of replacement.

Table 8: Percentage of women that were pregnant in the last 24 months and odds ratios by selected characteristics (1992, 2000 and 2010)

Variable	Category	1992	2000	2010	2000/1992	2010/2000
		%	%	%	OR	OR
Marital status	Never married	6.1	5.4	8.8	0.89	1.63
	In a union	52.2	59.6	38.7	1.14	0.65
	Widowed	13.0	11.4	7.7	0.88	0.68
	Separated	21.8	19.8	22.4	0.91	1.13
Woman's child mortality experience	None	40.0	39.6	28.0	0.99	0.71
	One or more	45.2	47.8	34.0	1.06	0.71
Number of living children 24 months prior to the interview	0 - 2	42.3	44.8	32.8	1.06	0.73
	3	49.3	45.5	29.7	0.92	0.65
	4	42.0	41.2	22.1	0.98	0.54
	5+	33.3	30.7	17.4	0.92	0.57
Contraceptive use	Not using	43.7	41.6	31.3	0.95	0.75
	Folkloric/traditional	33.4	41.8	27.5	1.25	0.66
	Modern	23.4	41.0	23.0	1.75	0.56
Age	20 – 24	39.1	43.4	30.1	1.11	0.69
	25 – 29	53.3	56.9	41.3	1.07	0.73
	30 – 34	51.1	53.0	35.9	1.04	0.68
	35 – 39	41.9	41.4	25.0	0.99	0.60
	40 – 44	25.7	27.0	15.3	1.05	0.57
	45 – 49	8.6	6.5	2.5	0.76	0.38
Education level	No education	41.1	39.3	26.5	0.96	0.67
	Primary	42.0	43.8	30.9	1.04	0.71
	Modern	31.7	37.4	19.9	1.18	0.53
Place of residence	Urban	33.0	36.4	24.4	1.10	0.67
	Rural	41.4	42.5	29.3	1.03	0.69
Total number of women		**5079**	**7694**	**10708**		

A striking result is the change in percentage of pregnant women that use contraceptives. In 1992 the ones that use a method (in particular modern method have lower odds of being pregnant. Yet in 2000 there is no difference in actual fertility between women that are not

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using with those that were using contraception regardless the type of method applied. In 2010 contraceptive use is much more effective again in avoiding pregnancies, leading to a double effect on actual fertility of both wider (Table 7) and more effective use (Table 8).

For the period between 2000 and 2010 there is a remarkable change in terms of actual fertility as the number of pregnancies in the last 24 months for all women went down (all odd ratios are lower than 1) except for never married women and for separated women. This fact may indicate that social control on fertility behaviour is diminishing. A more in-depth analysis using a multivariate decomposition may bring more clarity in the contribution of each explanatory variable in terms of compositional or behavioural effects.

4.6   Results

The overall difference in actual fertility between 1992 and 2000 displays a relatively limited increase from 40.9 to 41.6 percent[16]. The difference in the mean between the two years is very small and not significant. However, this is a composite of a negative effect of the net compositional change and a positive effect of the net behavioural change. Stated differently, if the composition of the female population had remained the same between 1992 and 2000 fertility would have been 2.5 percent higher. If the behaviour had not changed, fertility would have been 5% lower. The latter effect is partly compensated by the interaction between the endowments and the coefficients (Table 9).

Table 9: Mean value of fertility predicted between 1992 and 2000

Overall	Coef. (x100)	Sig.
Group 1: 2000	41.553	0.000
Group 2: 1992	40.865	0.000
Total difference	0.688	0.459
Difference due to endowments	-2.543	0.000
Difference due to coefficients	4.948	0.000
Difference due to interaction	-1.717	0.000

A closer look at the (multivariate) parameters reveals which categories contribute most to the opposing shift in actual fertility between the years. The category of currently married women displays the highest share in explaining the fertility gap from endowments (Table 1010). Their

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[16] The logit model produces proportions rather than percentages. We multiplied all coefficients by 100 for ease of interpretation and refer to it as percentages.

decrease in proportion has contributed much in lowering the actual fertility in 2000 if compared to 1992. Without this change in endowment fertility would have been 2.76 percent-points higher. Another category that has contributed significantly in terms of endowment is the increase in the share of women not using contraception and the decrease in the number that used modern contraceptives. All other effects are insignificant or small.

Table 11: Contribution of selected explanatory variables to the gap in actual fertility outcomes between 1992 and 2000

	Endowments		Coefficients		Interaction	
Marital status	Coef.x100	Sig.	Coef. x100	Sig.	Coef. x100	Sig.
Never married	0.226	0.273	-0.114	0.867	0.004	0.867
In a union	-2.764	0.000	4.701	0.027	-0.478	0.004
Widowed	0.007	0.960	-0.255	0.281	-0.196	0.265
Separated	0.137	0.183	-0.070	0.784	-0.036	0.787
Child mortality						
No death	0.031	0.522	-3.397	0.007	0.194	0.006
One or more	0.031	0.522	0.690	0.007	0.194	0.006
Living children						
0- 2	-0.147	0.026	-1.959	0.116	-0.136	0.130
3	0.004	0.655	0.158	0.624	-0.003	0.728
4	-0.001	0.921	0.250	0.392	-0.011	0.507
5 +	-0.166	0.007	0.045	0.944	-0.005	0.944
Contraceptive use						
Not using	1.002	0.000	-6.837	0.000	-0.474	0.001
Folkloric &Traditional	0.023	0.321	-0.202	0.325	0.032	0.348
Modern methods	0.717	0.000	1.216	0.001	-0.530	0.001
Age						
20 - 24	0.001	0.997	1.473	0.086	0.000	0.997
25 - 29	-0.021	0.868	0.923	0.126	-0.004	0.868
30 - 34	-0.432	0.000	0.078	0.878	-0.011	0.878
35 - 39	0.008	0.521	-0.347	0.366	-0.013	0.496
40 - 44	-0.152	0.055	-0.067	0.859	-0.005	0.860
45 - 49	-0.744	0.000	-0.624	0.172	-0.122	0.138
Intercept			8.616	0.002		

Controlled for education and place of residence

After controlling for the endowment effect, the coefficient effect becomes more pronounced (Table 10). The intercept (8.6) shows that there is an overall shift to higher fertility in 2000 if compared to how women behaved in 1992. Other things being equal, the shift in actual fertility between the two periods is even higher for currently married women and for women that are using modern contraceptive. The endowment effect of the decrease in the share of

women in a union is more than off-set by the coefficient effect of the shift in their behaviour. The model also shows the paradoxical effect of the use of contraception. The larger share of women not using any means contributes to the higher fertility in 2000, but within this category the actual fertility stayed behind other categories. The smaller share of those using contraception also contributes to higher fertility in 2000, but the effectiveness of this use in avoiding pregnancies is lower, further contributing to higher fertility in 2000.

The coefficient effect of child mortality is negative for those not having lost children and positive for the ones that did, indicating that without the (violent) deaths fertility would have been lower and that replacement was more common in the period leading to 2000.

The comparison between the level of actual fertility in 2000 and the one in 2010 displays a completely different structure with an overall drop in fertility of 13 percent-points due to the endowment effects, and the coefficient effects plus a negative interaction effects of the two (Table 11).

Table 12: Mean value of fertility predicted between 2000 and 2010

Overall	Coef. (x100)	Sig.
Group 1 : 2010	28.549	0.000
Group 2 : 2000	41.553	0.000
Total difference	-13.004	0.000
Difference due to endowments	-5.226	0.000
Difference due to coefficients	-3.213	0.000
Difference due to interaction	-4.566	0.000

As regards to endowment effects (Table 12), the categories that contribute the most to the drop of actual fertility between 2000 and 2010 are the rising share of women that were never married, the decreasing share of women not using contraception and rising share of women using modern contraceptive methods. As mortality experience was declining for the same period the compositional effect on actual fertility shows up to be negative, due to lower levels of replacement fertility (Table 12).

Table 13: Contribution of selected explanatory variables to the difference in actual fertility outcomes between 2000 and 2010

	Endowments		Coefficients		Interaction	
Marital status	*Coef.x100*	*Sig.*	*Coef. x100*	*Sig.*	*Coef. x100*	*Sig.*
Never married	-2.552	*0.000*	0.635	*0.275*	0.353	*0.255*
In a union	0.350	*0.147*	-6.532	*0.006*	-0.112	*0.161*
Widowed	0.119	*0.074*	0.223	*0.600*	-0.075	*0.588*
Separated	-0.112	*0.147*	0.515	*0.156*	-0.227	*0.153*
Child mortality						
No death	-0.478	*0.000*	2.907	*0.015*	0.539	*0.012*
One or more	-0.478	*0.000*	-0.884	*0.015*	0.539	*0.012*
Living children						
0- 2	-0.136	*0.007*	6.500	*0.001*	0.273	*0.009*
3	-0.001	*0.762*	-0.114	*0.679*	-0.003	*0.737*
4	0.007	*0.488*	-0.649	*0.023*	-0.024	*0.440*
5 +	-0.134	*0.004*	-0.869	*0.113*	0.126	*0.110*
Contraception use						
Not using	-1.821	*0.000*	7.856	*0.002*	-2.187	*0.000*
Folklor.&Traditional	0.037	*0.048*	0.226	*0.163*	-0.042	*0.184*
Modern method	-0.903	*0.045*	-0.573	*0.001*	-3.411	*0.000*
Age						
20 - 24	0.152	*0.328*	-0.464	*0.532*	-0.012	*0.592*
25 - 29	0.536	*0.000*	-0.272	*0.608*	-0.036	*0.599*
30 - 34	0.077	*0.226*	0.112	*0.759*	0.005	*0.770*
35 - 39	0.011	*0.658*	0.672	*0.067*	-0.086	*0.117*
40 - 44	0.309	*0.000*	0.560	*0.157*	-0.105	*0.179*
45 - 49	-0.171	*0.373*	-0.598	*0.204*	-0.025	*0.484*
Intercept			-13.457	0.000		

Controlled for education and place of residence

Regarding the coefficient effects between 2000 and 2010 we see that there is an overall shift towards lower fertility (the intercept is -13.5). Opposed to the period 1992-2000 the women in a union are now much less inclined to become pregnant. The large drop in fertility was even lager in this group. The replacement effect also switches, indicating that women tend less to remedy the loss of a child by another pregnancy in 2010 compared to 2000, which is consistent with the opposed finding in the period 1992-2000.

There are two major exceptions to the overall drop in actual fertility, women that have less than three children and the ones not using contraception. It certainly looks that not using modern contraceptives in 2010 is a deliberate choice among those that want to get pregnant. The much lower coefficient effect among those having three children or more might indicate that the sensitizing campaign of three children as the ideal has found 'fertile' grounds.

4.7 Discussion and conclusion

The Blinder-Oaxaca decomposition model originates from analyses of the wage gap between men and women (Blinder 1973, Oaxaca 1973, Jann 2008). After controlling for the differences in endowments (hence the term) the resulting differences could be ascribed to unmeasured phenomena, like discrimination in the labour market, but there is no guarantee that other sources of unobserved heterogeneity could be more important. One is on solid statistical ground in interpreting endowment effects, but the interpretation of the coefficient effect remain speculative and relies more on plausibility than on proof. With this caveat in mind we nevertheless feel that our outcomes will contribute to a better understanding, not just of the compositional but also of the behavioural effects.

Although the proportion of currently married women decreased between 1992 and 2000 (-9.9%) their fertility increased in the same period. This can only partly be attributed to the decrease in the use of modern contraceptive as a result of voluntary behaviour or of unmet need for family planning as the government's efforts were focussed on peace, repatriation, rehabilitation, reconciliation and programs for family planning were abandoned. Yet even after controlling for these effects we found behavioural change towards higher fertility in this period. We speculate that pro-natalist attitudes were more common in 2000, which is supported by the higher ideal family size in this year.

Things changed after 2000 when the government decided to involve all the legislative and administrative authorities from the Senate to the level of the village in their sensitizing campaign and reproductive health policies. This shift is reflected in the behaviour of the people. By 2010 fertility was revised downward and having large families was little by little relegated as outdated behaviour. The declining fertility among married women and the low fertility that characterises women that have more than two living children supports the idea that the combination of raising awareness and providing reproductive health services has been successful limiting the high population growth in Rwanda.

Mortality experience appears to be differentially related with the actual fertility. It appears that women that lost one or more children between 1992 and 2000 engaged more in replacing their loss than the ones that experienced that event between 2000 and 2010. We speculated that the cause of the loss might enter the decision of replacement, yet the overall decrease in mortality level after 2000 might also have made people more confident about the survival of their offspring and thus focus more on the quality of children than the quantity.

The results in this paper add to the theoretical debate on the impact of upheavals on fertility especially in the early phase of fertility decline. Our contribution shows the multi-dimensionality of this relation. On the one hand deaths, mass migrations and refugee flows led to widowhood and separation and thus to less intercourse and pregnancies. On the other hand the high level of child mortality, the destruction of health facilities and lack of supply of reproductive services contributed to higher fertility in the aftermath of the war and genocide. Yet the combined effects of these were not sufficient to explain the stall in fertility decline in this period. Other behavioural responses that contribute to higher fertility, probably the changing attitudes towards the ideal family size, should be taken into account as well.

This is even more pertinent in our analyses of the period after 2000/2005, when the fertility decline seems to have resumed its downward course. The lower level of child mortality and the revitalisation of (reproductive) health facilities can only account for part of the very rapid decline in actual fertility. Shifts in behaviour turned out to be more important than changes in the structure in explaining this decline. This could be related to the strong campaign to limit family size, but might also be an effect of the social, economic and political stability in the country. Decomposition analyses proved to be an effective instrument in detailing this multi-dimensionality, even if it does not provide direct insight in the causes of the behavioural change.

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5 CONFLICT RELATED MIGRATION AND FERTILITY IN RWANDA: EXILES, REFUGEES AND DISPLACED WOMEN.

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Abstract

Research on the effects of conflict-related migration on fertility is inconclusive. On the one hand it is assumed that (civil) war leads to lower fertility in the short run, due to separation of spouses, delay of marriage and postponement of pregnancies awaiting better times. On the other hand a higher level of fertility is expected in the longer run, particularly with violent conflicts in poor countries, due to the replacement of children lost, coerced sexual intercourse, limited or lack of contraceptive use and an insecure future. Using data from the 2000/2001 Integrated Household Living Condition Survey for Rwanda (EICV1), this study analyses the total number of pregnancies of six categories of women aged 20-49 in 2000: internally displaced persons, refugees, people that went into exile before the 1994 genocide broke out, those that moved for economic reasons, for personal reasons and those who have never left their community as the reference category. After controlling for age effects, the research shows that, as expected, voluntary migrants have lower fertility than the ones that never left their community. In contrast, displaced persons and refugees have a higher number of pregnancies and this higher number can be attributed completely to the replacement of the loss of pregnancies and new-born children. Women that went into exile before the conflict became violent have lower fertility, yet after controlling for educational status and wealth they display more pregnancies than any other group. Conflict-related migration leads to higher fertility, but only because of the higher loss of pregnancies and infant mortality in the wake of the hostilities.

Keywords: migration, conflict, fertility, pregnancies, genocide, Rwanda

5.1 Introduction

The post-genocide period in Rwanda (1994-2000) has been characterised by a stall in the fertility decline (Rutayisire et al. 2013, 2014). In this period the country experienced also massive internal and external migration flows. This was not the first time that people were forced to migrate due to severe socio-political conflict. The years 1959 and 1973 are known too for substantial flows of inhabitants who went into exile to escape repression, but not a

massive as the numbers in 1994. After the regime change that ended the genocide, 2 million people fled the country and 1 million were internally displaced as a result of the conflict. . The repatriation of the exiles from before 1994 followed immediately after the regime changed. The repatriation programmes, which were implemented from 1996 onwards, referred to them as old case-load returnees and defined the returnees that left the country after the genocide as the new case load. In this article we explore whether the stall in fertility decline in the post-genocide period of Rwanda is related to these conflict-related migration flows.

The relationship between forced migration and fertility has been under-theorised (Généreux, 2007) and the literature is inconclusive. The expectations in case of a conflict are that in the short run the separation of spouses will lower the fertility levels but that in the longer run fertility may rise as a response to economic insecurity, loss of children who died in hostilities and lack of fertility control due to the break-down of reproductive health services (Agadjanian and Ndola, 2002).

The challenge of this paper is to measure the effects of the various forms of migration on the level of fertility in Rwanda, and to isolate the mechanisms related to forced migration that may have contributed to the stall in fertility decline from 1995 to 2000. Looking back from the year 2000, we analyse the determinants of the number of pregnancies for those that went in exile, for refugees and internally displaced persons and compare them to the number of pregnancies of women who never left their community or were engaged in voluntary types of migration.

5.2 Brief background on Rwanda

During the genocide of 1994 over 900.000 victims (MINALOC, 2004), nearly all Tutsi, lost their lives out of a total of 7.8 million inhabitants This traumatic disrupting event took place after a period of several years of hostilities and turmoil, increasing economic insecurity and decreasing social cohesion.

During the late eighties Rwanda suffered from a severe economic crisis that deteriorated the living conditions of its population. That profound economic crisis has been linked with the decline of fertility between 1983 and 1992 when the total fertility rate fell from 8.3 to 6.2 and the desired family size from 6.3 to 4.2 children per woman (Olson 1994, Uvin 1998). This drop in Rwandan fertility seems to fit in the framework of crisis led fertility decline as

identified in the eighties and early nineties as the result the African economic crises and structural adjustment programmes (Uvin 1998).

After the genocide and war the food production fell completely, the public service infrastructure of the country was severely disordered and large numbers of the population were on the move. Two million Rwandans had left their country and sought refuge in camps in neighbouring countries, while another million had become internally displaced. (Gribbin 2005, Verpoorten 2010). After mid-1994 when a new regime was established refugees started to return – particularly the so-called old case load that fled the country during former conflict periods. The 1.7 million refugees of the new case load stayed in camps till 1996 (Verpoorten 2010). In the remaining years of the decade the Rwandan society had to incorporate several waves of returnees[17], who often found their houses and land destroyed or occupied. The government launched the Imidugudu[18] programme in 1996/7 to rehouse both former refugees and internally displaced persons (Hilhorst and van Leeuwen 1999, van Leeuwen 2001).

5.3 Theories on conflict induced migration and fertility

The existing literature linking migration and fertility discusses four possible hypotheses: socialisation, adaptation, selection and disruption (Hervitz 1985, Andersson 2004, Kulu 2005, Généreux 2007; Majelantle and Navaneetham 2013). The underlying assumption for the first two is the existence of regional or social differentiation in fertility norms and attitudes. The socialisation hypothesis suggests that migrating adults will, after migration, display the same fertility behaviour as common in their place of origin as a result of the social norms and values they have been exposed to during their childhood. This means that fertility norms and attitudes of migrants will not differ from that of stayers at their place of origin, but could differ from the one found in the place of destination. The adaptation hypothesis stipulates that over time, the fertility behaviour of immigrants will adjust to the fertility patterns common at the new place of residence, mainly due to prevailing socioeconomic conditions, societal norms and values related to childbearing behaviour which are different from those at their place of origin. The selection hypothesis theorises that migrants are a particular group of

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[17] The last months of the year 1996 witnesses the first wave of more than one million returnees (New Case Load) as a consequence of the decreasing international support for refugee camps and the changed attitude (violence) in the host countries towards the refugees.

[18] A low cost housing program introduced in Rwanda soon after the Genocide with the aim to resettle the thousands of people who returned mostly from neighbouring countries as well as those who were internally displaced. Among them were also the "old" groups of refugees who spend up to 35 years in exile.

people with individual characteristics associated with low fertility outcomes. Their characteristics are different from those of women who choose to stay. Migrants are more often younger, better educated and wealthier than stayers, characteristics that are associated with lower fertility.

Finally, the fourth hypothesis refers to the disruption of people's life as a result of migration which creates conditions that could contribute to downward revising their fertility decision making just after the migration. Living conditions are new and more insecure in that period. However, assessing the fertility behaviour of migrants over a longer period one could expect that their fertility behaviour could fit within more than one hypothesis depending the time elapsed since their move

A more specific interpretation of the disruption hypothesis could be to apply it on conflict-related migration which, by definition, causes a disruption of people's life. Conflict-related migration constitutes a broad category of migrants, who in one way or another have little choice but to leave their home at short notice and unplanned and move to safer place. The situation is completely different in terms of behaviour from the ones related to migration for economic or personal reasons. "Conflict reconfigures the social and political landscape as well as economic deprivation and subsequent social change will be associated with changing demographic behaviour in all spheres of demography" (Randall, 2005, p.292). Although voluntary migration and its consequences may also affect fertility in some way, it is endogenous because the decision-making process includes both relocation and fertility plans. Conflict-related migration has more specific characteristics that separates it from voluntary migration , like other contextual circumstances and longer lasting insecure living conditions. Not only is the cause exogenous, but it also has to be considered as a separate migration type that needs a specific conceptual framework.

To build this framework, we can refer to studies that link conflicts (or other severe crises) with changes in fertility behaviour. In these studies various possible hypotheses are brought to the fore concerning the association between fertility changes and disrupting situations such as war. A fertility decline could be a result from conflict-related changes in the classical intermediate determinants of fertility, like the dissolution of marriages through separation of the spouses or the death of one of the two or a delay of marriages (Blanc 2004, Woldemicael 2008). In the longer run however people might catch up in fertility behaviour, making their total fertility equal to the not affected population. The driving force in this particular case may

primarily result from reunification of spouses or resumption of reproductive plans and fertility replacement effect due to the death of children in the period of conflict.

A fertility increase could be driven by: the breakdown of reproductive health facilities hampering access to family planning methods to control fertility (Caldwell 2004, Kulu 2005, Heuveline and Poch 2007); increased mortality, in particular with the loss of children, the loss of a pregnancy or the death of family members; coerced intercourse, or marriages of young women in search of protection in hostile environments (Eloundou-Enyegue, Stokes and Cornwell 2000, De Walque and Verwimp 2009, Verpoorten 2010).

In addition, the wish to have more children could emerge in order to survive future hardship. Conflict has various negative impacts for those involved, including discontinued education of children, increased risks of disease and (psychological) health problems, decreased opportunities and resources, unemployment, factors that all contribute to a situation of ongoing subsistence insecurity and fear (Khatiwada, 2006).

Lindstrom and Berhanu (1999) pointed to the significance of a risk-insurance approach to fertility by revealing the importance of children under conditions of long-term economic insecurity and pointing to the incentive of having more children for couples who are dependent on their children for financial support. Nugent (1985, p.76) refers to this approach as the old-age security motive which is "likely to be an important motive for fertility when the relevant parent is both uncertain about his or her ability to be self-supporting at old age and dubious about other, more reliable or more effective means of such support than his or her own children". Although Lindstrom and Berhanu referred to several studies that did find evidence for the risk-insurance or old-age security motive for fertility (Cain 1985, Nugent 1985, Clay and Vander Haar 1993), they did not find evidence to support this view in their own study (Lindstrom and Berhanu, 1999).

Another theory which is summarized by McGinn (2000) displays how periods of uncertainty or crisis may lead to rising fertility when migration status is taken into account. McGinn claims in her paper that one of the possible impacts of forced migration on fertility is a rise in fertility because of the pressure to replace deceased children and adults (2000). Although McGinn fails to give evidence of any actual relation between the act of migration and rising fertility, this theory in line with the idea that people adapt their fertility to infant and child mortality. When infant and child mortality are high, fertility will be high in order to replace or to be secured for possible future losses. Where infant and child mortality is low, fertility is adjusted downward (Sanderson and Dubrow 2000).

Based on the conceptual framework suggested for the Malian Tuareg case study (Randall, 2005) this analysis is grounded on the following conceptual framework (Figure 5).

Figure 5: Conceptual framework
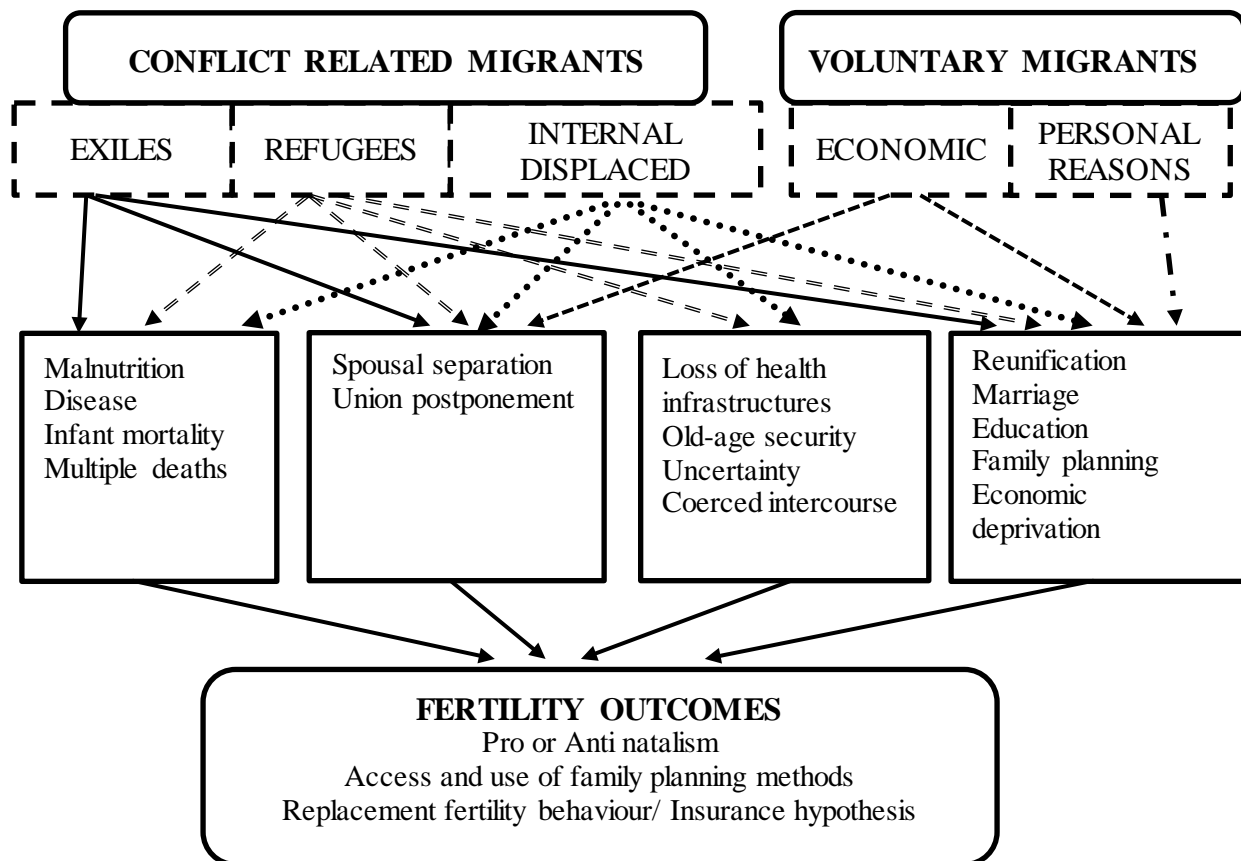
While theories linking fertility behaviour and crises (with or without taking into account migration) point to a rise in fertility during times of conflict, there are plausible arguments pointing to declining fertility in times of political upheaval, crisis or economic downturn too, at least in the short term. One such argument is that couples will delay births in response to sudden declines of income or increased insecurity about future income streams. The severity and duration of the economic decline or crisis determines whether couples can compensate for declines in fertility in future. "Reduced marital fertility in the presence of long-term income insecurity and declining real income represents acceptance of a higher level of long-term risk as part of an effort to avoid or reduce impoverishment in the short term" (Lindstrom and Berhanu, 1999). In other words, the longer the crisis, the shorter time there is to compensate for reduced fertility. This would mean that refugees and internally displaced persons who have lived in insecure conditions during part of their reproductive years have lower fertility

than other categories. These negative effects were brought to the table before as the disruptive effects of migration, which appear to be even more important in conflict-induced migration than they are for other types of migration (Verwimp and Van Bavel, 2005).

5.4 Hypotheses on fertility of migrant categories

The hypotheses tested in this article are linked to the following categories of forced as well as voluntary migrants The first group is composed of women that fled the country in the wake of or shortly after the genocide and stayed abroad before returning after 1995. This group of returnees will be labelled as *refugees*. The second group includes women that were forced to migrate but did not cross the national boundaries, defined here as *internally displaced persons*. The third category is defined as *exiles*, and pertains to those who left the country (long) before the genocide. They are also referred to as old case-load returnees.

Having lived in very difficult conditions in the refugee camps in neighbouring countries, the category of returnees that lived abroad in the post-genocide period are expected to display higher fertility due to very high exposure to infant and child mortality, a lack of access to reproductive health facilities and higher risks of coerced sexual intercourse or early marriages to reduce that risk.

A similar hypothesis can be formulated for the internally displaced persons (IDPs) who had to leave their community but stayed within Rwanda. They too were in a vulnerable state when it comes to personal protection, may have lost pregnancies or infants and had no or limited access to modern forms of contraception.

The ones that were born abroad or left (long) before 1994, may exhibit lower levels of fertility than refugees and IDPs as they had more time to adapt to their new status as exiles and were probably better able to control their fertility behaviour at their place of destination.

Next to conflict-induced or forced migrants three other migrant categories are distinguished in this study. The group of people that moved to other communities either for their education or for employment purposes are called economic migrants. Their fertility is expected to be lower as they have to postpone their reproductive plans in order to better prepare their migration and adjust themselves to new living conditions afterwards. Based on the selection hypotheses we expect them to be better educated, which would also lead to lower fertility. As many of the moves are into urban areas, the adaptation hypothesis would again lead to having lower fertility than those that stayed in their community.

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Women who moved for personal reasons are a mixed group as these include marriage migrants but also women who were separated from their husband for a certain period or who went to live with relatives for various reasons. It is therefore hard to specify a common hypothesis on the fertility-migration relation that applies for this category.

In this study the non-migrants are the reference category which consists of rural and urban women that have always lived in the same community or left this community only for a very short period.

5.5 Data and methodology

The data used in this paper are taken from the 2000-2001 Integrated Household Living Conditions Survey (EICV 1) in Rwanda. The principal motivations for conducting this survey as stated in its final report are first, to investigate in detail the different facets of poverty and second, to evaluate the impact of the policies and programs that were intended to improve the living conditions of the populations. For this analysis, women in the age group 20-49 years (at the time of the interview) who had at least one pregnancy are selected from the data base: 2622 non-migrants and 1977 migrants making a total of 4599 cases. The relationship between migration and fertility behaviour is explored using a Poisson regression analysis. The dependent variable is the number of pregnancies a woman ever had, the sum of the number of children ever born and pregnancies not ending in a life-birth.

The main independent variable considered is the migration experience classified into categories of former refugees (or new case load), former exiles (or old case-load), former internally displaced women, and women that left the communities for either economic or personal reasons. We used the variables place of destination and moment of migration (in century month codes CMCs) of the last and the previous migration to define the migration status. Those that moved abroad before the genocide were defined as exiles, those during or after the genocide as refugees. Checking the motives of the last migration it is found that more than 90% of the exile and refugee categories mention either return or conflict as the reason of their last migration. This definition might have some selection bias as not everyone that left the country has returned at the moment of the interview. This bias will be small as neighbouring countries did not allow exiles and refugees to stay after the start of the implementation of repatriation programmes in 1996. For the internal migrants we used the motives of the (initial) migration to make a clear distinction between internally displaced

women (conflict or return to the community), economic migrants (education and work) and personal migrants (marriage, separation, and other reasons).

Another independent variable used in this analysis is the mortality experience. The number of own children that died and the number of lost pregnancies due to foetal death or abortion may have had an impact on fertility outcomes due to the replacement effect. Age was used as a control variable. Because the total number of pregnancies accumulates over the life course in a non-linear way, 6 five-year age categories have been used in the analyses. Other control variables that may contribute in discriminating fertility behaviour are educational level, poverty and marital status, all of which were measured at the time of the interview.

All the explanatory variables are included stepwise in Poisson regressions. The Poisson distribution is appropriate in this case as this is a count variable with all positive integers with a Poisson mean greater than zero. The logarithm of the outcome variable is then linked to a linear function of a set of explanatory variables:

$$\log(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \; etc \text{ and } \; Y = (e^{\beta_0})(e^{\beta_1 X_1})(e^{\beta_2 X_2}) \ldots \; etc$$

where Y is the outcome variable and the coefficient e^{β_0}, $e^{\beta_1 X_1}$, $e^{\beta_2 X_2}$, $e^{\beta_3 X_3}$, ... are a set of predictors.

5.6 Results

Table 13 shows the descriptive statistics for the six categories of migrants. Compared to the non-migrants, the reference category, a number of relevant differences show up. The economic migrants have had fewer pregnancies, are slightly younger, and lost fewer infants. The share that lost their partner is also lower. Their socio-economic status is much higher; almost 80% is non-poor and 23.6 % is educated at secondary or higher level, This profile indicates that they have had less to suffer from the conflict than the ones that stayed put and are clearly better off.

The internally displaced persons had more pregnancies than the non-migrants, are roughly of the same age, and lost more children and pregnancies. The socio-economic status is comparable. Overall both categories are very much alike, but the internally displaced seem to have suffered more from the conflict, as expected. The refugees are younger than the non-migrants and more often single, but have the same number of pregnancies (only the group

with more than 9 pregnancies is higher). The death toll is higher among this group; at least 10% lost four of more children.

Table 14: Descriptive statistics for the migration categories (N=4599)

		Non-Migrants	Personal reasons migrants	Economic migrants	Displaced	Refugees	Exiles
N		*2622*	*713*	*165*	*240*	*558*	*301*
Number of pregnancies ++	25% percentile	2	2	2	3	2	2
	50% percentile	4	4	3	5	4	4
	75% percentile	7	6	5	7	7	7
	90% percentile	9	9	8	10	10	9
Age of women *	20 – 29	34	36	36	32	40	37
	30 – 39	36	36	39	34	33	34
	40 – 49	30	28	25	34	27	30
Children who died ++	50% percentile	0	0	0	1	1	0
	75% percentile	2	1	1	2	2	1
	90% percentile	3	3	2	3	4	2
Non-live birth pregnancies ++	75% percentile	0	1	0	1	0	0
	90% percentile	1	1	1	2	1	1
Education level *	No education	38.1	29.3	16.4	42.9	35.3	29.6
	Primary and post-primary	57.4	59.7	60	52.9	58.4	48.2
	Secondary and higher	4.5	11	23.6	4.2	6.3	22.2
Marital status *	Single	4.1	2.2	9.7	5.4	3.9	6
	Married/union	68.3	72.5	66.1	69.6	70.8	71.1
	Divorced/separated	7.7	4.9	9.1	6.2	5.4	6.3
	Widowed	19.9	20.3	15.2	18.8	19.9	16.6
Poverty level *	Extreme poverty	41.7	33.2	13.9	47.9	37.8	15.6
	Poor	20.0	15.6	7.9	17.9	21.3	10.6
	Non-poor	38.3	51.2	78.2	34.2	40.9	73.8

Education and poverty levels are comparable. Refugees seem to have suffered most from the conflict. People that went into exile lost fewer children than the non-migrants. Their stay abroad during the conflict will have meant a safer place. Yet, the numbers of pregnancies is equal to those of the non-migrants, while the age distribution is nearly the same and the socio-economic status is much higher..

The stepwise Poisson regression starts with migration history and age, and adds a variable in each next model: loss of pregnancy or offspring, marital status, education, and wealth, in order to assess the contribution of each predictor in determining the number of pregnancies women have ever had as a measure of fertility (Table 14).

Non-migrants are the reference category and model 1 shows the effect of the migration history after controlling for the age distribution. The parameters show the expected signs. Economic (and personal) migrants have had significantly fewer pregnancies, the internally displaced and refugees have had more. The women that went into exile before the conflict have the same number as the non-migrants.

Table 15: Regression coefficients predicting the number of pregnancies (N=4599)

Parameter	Model 1		Model 2		Model 3		Model 4	
Migration history	β	Sig.	β	Sig.	β	Sig.	β	Sig.
Non-migrants								
Internally displaced women	0.047		-0.000		0.001		-0.002	
Refugees	0.054	**	0.017		0.010		0.013	
Exiles	-0.015		0.040		0.039		0.102	***
Economic migrants	-0.195	***	-0.128	***	-0.112	***	-0.036	
Personal reasons migrants	-0.053	***	-0.041	**	-0.048	**	-0.029	
Age category								
20-24								
25-29	0.444	***	0.402	***	0.386	***	0.384	***
30-34	0.802	***	0.713	***	0.701	***	0.691	***
35-39	1.135	***	0.978	***	0.970	***	0.943	***
40-44	1.365	***	1.131	***	1.133	***	1.097	***
45-49	1.466	***	1.155	***	1.162	***	1.129	***
Mortality experience								
Number of children who died			0.102	***	0.101	***	0.097	***
Non-live birth pregnancies			0.150	***	0.142	***	0.140	***
Marital status								
Married/Union								
Single					-0.447	***	-0.428	***
Divorced/Separated					-0.255	***	-0.267	***
Widowed					-0.151	***	-0.156	***
Education								
Non educated								
Primary and post-primary							-0.019	
Secondary and higher							-0.228	***
Level of poverty								
Extreme poverty								
Poor							-0.042	**
Non-poor							-0.119	***
Intercept	*0.616*		*0.564*		*0.635*		*0.732*	

*p<0.1, ** p < .05, *** p<.001

Replacement is stronger with pregnancies lost, than with child mortality. The parameter of 0.150 actually indicates that for every pregnancy lost an extra pregnancy occurs. The effect of

the loss of a child is less strong, but as substantial numbers of women lost three of more children, the upward effect on the total numbers of pregnancies is larger than the loss of pregnancies, as few women had more than one non-life birth.

When child mortality and pregnancy losses are added to the equation, the parameters shift considerably (model 2). After controlling for these losses, refugees and internally displaced have the same level of fertility as the non-migrants. This means that the higher fertility of the conflict related migrants is completely explained by the replacement of the loss of children and pregnancies.

Including marital/union status shows that widowhood and separation do have the expected negative effect on the number of pregnancies (model 3). However, this does not change the parameters for the conflict related migrants, because the levels of widowhood and separation are the same as among non-migrants (Table 13). The parameter for the economic migrants becomes less negative as we now control for the larger number of singles and the lower numbers of widows among this category.

The inclusion of socio-economic status has a strong effect for both the economic migrants and the exiles (model 4). Women with secondary or higher education have fewer pregnancies as have the non-poor. As both the economic migrants and the exiles have much higher levels of education (more than 20% have at least secondary) and much lower levels of poverty (less than 25%) the parameters change after controlling for these composition effects. Economic migrants now have the same level of fertility as non-migrants and exiles now have a significantly higher level of fertility.

5.7 Conclusion and discussion

The relation between conflict and fertility is not straightforward. The most common idea is that civil war and other crises will disrupt people lives and will there for lead to the postponement of having children in the short run, among others because of spousal separation, the loss of the partner and postponed union formation as a result of the insecurity. Migration itself is a disruptive event in de life course of individuals as it is hard to combine place making with family formation. Even if the migration is voluntary, lower fertility is expected. If the migration is forced by the conflict the disruptive effects are exacerbated. Loss of or

separation from the spouse is bound to coincide with the migration and levels of insecurity are higher is one is forced to leave one's home. On the basis of these theoretical arguments it is plausible to assume that migrant have lower fertility and that this would hold for conflict related migrants in particular. However, this assumes some degree of fertility control which might be absent in violent conflict situations when rape is part of the warfare, when coerced intercourse is a way to survive in refugee camps, and when access to reliable contraceptives is blocked. It the slightly longer run fertility might increase as people may have lost children during or in the wake of the hostilities and as (reunified) couples might change their minds on the ideal number of children to have to provide for them in old age. In a bid to disentangle at least part of these mechanisms, this research provides some new evidence on this matter.

The Integrated Household Living Conditions Survey of 2000/2001 enabled the reconstruction of the migration history in the ten year preceding the interview, including the genocide of six years before (1994), the return of people that had gone into exile before in that same year and the return in 1996 and 1997 of people that fled the country during or directly after the civil war. As the motive for each migration was recorded these groups of exiles and refugees could be distinguished from the ones that got displaced within the country as a result of the conflict, from voluntary migrants and from people that never left their community.

We expected that the ones that were displaced or had to leave the country would show higher levels of separation and widowhood in 2000 than the non-migrants and the voluntary migrants or the exiles which were outside the country during the war. Of the woman aged 20-49 in 2000 that were displaced or refugee before, almost a quarter was either separated of widowed and we could show that this led to lower fertility. Yet, non-migrants showed the same levels of widowhood and separation as the displaced person and refugees. As the conflict spread over the whole country, many of the non-migrants may have lost their husband in the killings or got separated due to his flight abroad. However displaced and refugee women did suffer more from the conflict as they lost more children and more pregnancies. The replacement of these losses accounted for their higher level of fertility compared to non-migrants, to voluntary migrants and women from exile, at least after we controlled for the better socio-economic position of the latter two groups..

The contribution to the existing body of knowledge is that we found three mechanisms with contrary effects on fertility. Voluntary migrants are a selective group with better education and higher wealth which leads to lower fertility. Poor people are more affected by conflicts, reflected in the loss of the spouse trough death or separation which reduces their higher fertility. Conflict related migrants lost more pregnancies and children and the replacement

accounted for the higher fertility of these women. After controlling for these three mechanism (wealth, partner loss and replacement), we found no remaining significant differences between the various groups. The reason why existing evidence on the relation of conflict and conflict related migration with fertility is so inconclusive might be that the relative weight of the diverse mechanisms is different between contexts.

One should keep in mind however that we analysed the fertility and migration history retrospectively, looking back 5 years after the conflict. We could not identify the proximate determinants that could account for spells of lower and higher fertility during the conflict and its aftermath. The availability of information on the proximate determinants and time varying variables would have helped in deepening the analysis and have improved the research on conflict related migration and fertility.

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6 CONFLICT RELATED MIGRATION AND FERTILITY IN RURAL RWANDA

Research article co-authored by Annelet Broekhuis, Pieter Hooimeijer and Ariella Verheul, submitted

Abstract

The literature on the effects of conflict related migration on fertility is inconclusive. The effects range from lower fertility due to spousal separation and widowhood, neutral as postponed pregnancies will occur after reunification, to higher fertility due economic insecurity, replacement of children lost during hostilities and a lack of fertility to control due to the breakdown of reproductive health services. This paper analysis the contraceptive behaviour in the two years following a migration event distinguishing between not having a need to avoid pregnancy, unmet need to do so, use of traditional methods and using modern contraceptives as proximate determinants of pregnancy risks and identifies the role of the more distant determinants in these behavioural choices.

Using a sample of 707 women aged 20-49 in 2008 in Rwanda; we collected data on 7656 person-years for which migrations including the motive of the move, the loss of children, and the contraceptive behaviour were recorded. We recorded 727 migrations: 373 forced moves, 110 repatriation moves and 244 voluntary moves. Using an ordinal logistic regression we analysed the readiness, willingness and ability to control fertility after disruptive events: voluntary migration, forced migration due to conflict, repatriation and the loss of one or more children.

The results confirm existing evidence of the replacement effect in the reduced need and effort to avoid a next pregnancy after the loss of one or more children. After repatriation women are also less inclined to prevent becoming pregnant. If women did not move in the two years before, the willingness and ability to actively use contraceptive is much higher, than after a voluntary of conflict induced migration. We found no evidence for a higher need to postpone births after a forced migration, but that might be due to higher incidence of spousal separation which we could not measure. Yet we did find that in the years after the forced move both the ability and choice to use contraceptives are lower than in more stable years.

The result indicate that replacement of lost children and repatriation after the conflict ended, will have added to the stall in the decline of fertility in Rwanda in the wake of the 1994 genocide as women deliberately choose to become pregnant (again) after these two events.

6.1 Introduction

The fertility decline, which was on its way in Rwanda in the eighties and early nineties of the previous century, stalled in the post-conflict period, and it only resumed its course after 2005 (Rutayisire, P.C. et al. 2013). The civil wars, which Rwanda experienced over decades since 1959, culminated in the genocide that raged the country from April to July 1994. The

aftermath showed massive population displacement. Two million Rwandans left the country and sought refuge in camps in neighbouring countries, and another million were internally displaced in 1994. Around 1.1 million that lived in exile as a result of previous hostilities returned to the country after the regime change (Linde T. 2000, Griffin R.E. 2005). In 1996 repatriation from the refugee camps began for those that fled the country in 1994.

The challenge for this paper is to uncover the role of conflict related migration in the stall of the fertility decline. Voluntary migration is generally associated with lower levels of fertility due to various reasons. The literature on conflict related migration is less conclusive. The proposed effects of this migration on fertility ranges from: lower fertility due to disruption in the fertility plans as a result of separation and widowhood, neutral in the longer run as this disruption is compensated by a rebound of fertility after the conflict and higher fertility as a response to economic insecurity, replacement of children lost during hostilities and a lack of fertility control due to the break-down of reproductive health services.

Using a sample of women aged 20-49 in 2008 we analyse the effects of various migration events on the readiness willingness and ability to control fertility. Using life history data we are able to distinguish several migration waves: forced migration due to war, politic and land disputes, both before, during and after the period of the genocide, repatriation of people that lived in exile until the regime change in 1994 and repatriation of the ones who were living in refugee camps and returned to the country in the years after the genocide. Economic and marriage migration were combined with other causes of migration into one category in order to consider the effect of voluntary migration on fertility. Overall less fertility control is expected, but also quite some heterogeneity depending on the type of conflict related migration. The next section provides an elaboration of the hypotheses, followed by a description of the data and the methodology and the results of the models. The final section lists the conclusions and gives a discussion.

6.2 Migration and Fertility Linkages:

Despite the large amount of research related to migration and fertility separately, the interaction between the two fields has been under-explored and remains under-theorised (Kulu H. 2005). However, scholars working on the impact of migration on fertility came up with four major hypotheses about the impact of migrants' behaviour on their fertility. The

hypothesis known as the *socialisation hypothesis,* which appears to be the most important in understanding the impact of South-North migration on fertility, relies on the idea that fertility of migrants reflects the fertility preferences dominant in their childhood environment causing migrants to exhibit similar fertility levels as non-migrants at the origin. In contrast, the *adaptation hypothesis* builds on the idea that fertility of migrants comes to resemble fertility preferences that are dominant at the destination. A study in the African context found that upon migration, a decline in fertility of migrants could largely be attributed to improved living conditions and the increased use of effective contraceptives (Kulu, H. 2005). The adaptation hypothesis may be particularly valid for rural-urban and South/North moves. The *selection hypothesis* claims that migrants are a specific group of people whose characteristics such as higher educational attainment or desire for upward social mobility distinguish them from those who remain at the origin and predetermine them to have low fertility, irrespective of a move (Brockerhoff, 1998). Last, the *disruption hypothesis* suggests that immediately upon migration, migrants show particularly low levels of fertility due to the disruptive factors associated with the migration process.

Although these four major theories have contributed greatly to the debate on the link between migration and fertility, John Bongaarts[19] (1978) correctly pointed out that migration can only affect fertility indirectly by altering the so-called proximate determinants of fertility. Socioeconomic and cultural variables that are altered by or coincide with migration have an important role in rational decision making but only affect fertility by modifying the proximate determinants, which impact fertility directly (Bongaarts, Frank and Lesthaeghe, 1984). Bongaarts found that marriage or union formation, contraceptive use, induced abortion and duration of the breastfeeding (or lactation) period are the primary proximate causes of fertility differences among populations (Bongaarts, 1978). In a later study, carried out specifically for the sub-Saharan region, Bongaarts, Frank and Lesthaeghe (1984) found that the shortening of breastfeeding and postpartum abstinence[20] and the decline in pathological sterility[21] exert upward pressure on fertility in sub-Saharan Africa, while the rise in the age of first marriage and the higher prevalence and effectiveness of contraception tend to reduce fertility in the region.

Limited research has been carried out on the relation between migration and the proximate determinants of fertility. Brockerhoff (1998) is one of the very few who examined this

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[19] The intermediate determinants of fertility had already been established by pioneering work of Davies and Blake (1956).
[20] Postpartum abstinence is a custom of prolonged sexual abstinence in the period immediately following a woman's delivery.
[21] Pathological sterility is infertility caused by infections, especially sexually transmitted infections such as gonorrhoea.

relation more closely, particularly for rural-urban contexts. He identified a number of the proximate determinants of fertility to be important in understanding fertility patterns of migrant women in African cities up to the time of conception, of which three appear to be relevant for conflict-induced migration as well. These include prevalence of marriage, duration of breastfeeding period, and modern contraceptive use.

Prevalence of marriage is likely to be affected not only by rural-urban migration but also by conflict-induced migration. Early marriage can be associated with early child bearing while delayed marriage reduces the number of years available for childbearing (Chandrasekhar, Gebreselassie and Jayaraman, 2007). Foster (1993) found that crisis can lead to delays in marriage and in the onset of childbearing. The uncertainties and the separation of partners that result from a forced migration in particular will have the same effect. When conflict-induced migration leads to spousal separation, frequency of intercourse will be reduced (Wardwell and Cornelius, 1987). In contrast, the return of refugees and displaced persons in more stable times may lead to spousal reunification, and therefore more births.

With regard to breastfeeding, a study by Zakanj, Armano, Grguriæ and Herceg-Èavrak (2000) concluded that war decreased the prevalence and duration of breast-feeding. The scholars concluded that this might be related to regular humanitarian donations of infant food and mother's milk substitutes, especially in the war-affected areas. Another reason could be that a mother's food situation is insecure in times of crisis, which seriously limits her ability to breastfeed her children (Infact Canada, 2007). However, it is also possible that conflict-induced migration results in pro-longed duration of breastfeeding as it is an economic way of feeding a child, presuming the mother's nutritional status enables her to breastfeed her infants. Additionally, many refugee camps have implemented projects that stimulate mothers to breastfeed their children to improve both child and mother's health (Infact Canada, 2007), which could result in prolonged breastfeeding among those in camps.

The non-use of modern contraception might be more pertinent to conflict related migration. Brockerhoff argues that "non-use is reinforced among migrant women unsure about their long-term residential intentions. Women who plan to return soon to their villages and towns are likely to devote less effort and fewer resources to obtaining methods and are less likely to adopt longer-term methods for which follow up counselling and monitoring are desirable" (Brockerhoff 1998, p.363). For women who have fled as a result of conflict, uncertainty about time of return is high, that makes this an eligible assumption not only for rural-urban migration but also for conflict-induced migration. McGinn (2000) suggests that accessibility and availability of contraceptives is problematic even in refugee camps where emergency

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reproductive health projects have been installed. Yet both seem to imply that women are in need of using contraceptives method. Lesthaeghe and Vanderhoeft (2001) elaborated the Coale framework of three preconditions for contraceptive behaviour: readiness, willingness and ability. The readiness refers to the question whether women want or need to avoid getting pregnant, many want to have another child and some abstain from intercourse by lack of a partner (e.g. due to spousal separation). Even if women acknowledge the need to avoid getting pregnant, it is not automatically so that she will apply (modern) methods to do so as private attitude and social norms might prevent the actual use. If she is ready and willing, the last precondition is that she needs to have access to reliable methods. The decision making is hierarchical. If there is no need for birth control, women will not use any means regardless of their availability. If she does have the need but is restricted in practicing birth control, again availability will not matter. Only if she is ready and willing to practice birth control the ability to do so becomes pertinent. Rather than just concentrating on the non-use of contraceptives in the context of (conflict related) migration it is required to include the reasons for non-use in theorising this relation, as these might differ depending on the trigger of the migration.

6.3 Hypotheses

We expect that voluntary migrants will have lower fertility than non-migrants, based on the selection hypothesis of social mobility leading to both geographical mobility and lower fertility, even after controlling for educational level. Yet it should be noted that voluntary migrants are a heterogeneous category. Job change or educational enrolment that trigger a move will probably result in the need to at least postpone a pregnancy in the period following the migration and they might be able to do that given their higher socioeconomic status. If marriage triggers the move the reverse might be true, as women may want to become pregnant of their first or will be under social pressure to do so.

Conflict-induced migrants may be expected to also need to postpone a pregnancy, given the high level of insecurity. Their level of unmet need will be high among the ones that are coerced to have intercourse. For people on the move access to modern methods of contraception is problematic, even in refugee camps were health services are often very basic. However this group is more than others exposed to the risk of losing one of more children, because they are touched by the conflict by definition and their children much suffer from that as well.

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Repatriation might have the opposite effect as this means that people resettle and if they postponed giving birth or lost children before might want to catch up in their reproductive career. The period after repatriation can therefore be expected to show low levels of need for contraceptives.

More generally speaking, we expect that fertility control is highest in episodes without disruptive events like a (return) migration or the loss of a child. These are the times when people can actually plan their pregnancies and have access to means to put these into practice.

6.4 Data, methods and descriptive statistics.

The survey sample consists of 707 women from three *districts* of Rwanda: Kayonza (East province), Gicumbi (North province) and Huye (South province). In each district four *sectors* have been randomly selected. All *sectors* are rural; urban areas have been left out of the comparison eliminating the need to control for differences caused by rural or urban living conditions. All women in the survey were in their reproductive span at the moment of interview.

The questionnaire includes among others questions on women's birth histories, migration, contraceptive use, and other socio-demographic characteristics. We have converted the individual records into a person-period database with the life events (migration, birth and death) as time-varying variables to be able to link behavioural fertility responses to historic events. As the motive of each change in place of residence was recorded we can identify both forced and voluntary migrations. Unfortunately marital/union status was not recorded for each year, but only at the time of the interview.

In order to estimate the factors that played a role in the use of family planning, a generalised logistic regression model for ordinal dependent variables has been used in this study. The dependent variable being contraceptive methods used with four categories which are unwilling or no need to use, unmet need, use of traditional methods and use of modern methods. These ordered categories reflect the hierarchy in decision making from the readiness, willingness and ability framework.

Three parallels models have been created. The first contrasts women that specify a need or are actually using methods to those that have no need for contraceptives. The second model contrasts women who use any method, to those without need or with unmet need. The third

model contrasts women that use modern contraceptive methods to all others. The unit of analyses is the person-year of no need, unmet need, use of traditional or use of modern methods..

The main independent variables are the migration events two years before, categorised by the trigger of the migration: the first is no migration in that year, the second is a migration due to war and politics, the third is repatriation and the fourth all other triggers.

In assessing the relationship between the contraceptive use and the migration event two years before, control variables are included in the model. The time varying control variables are woman's age, cumulative number of children and mortality experience. Time invariant control variables are level of education and religion.

6.4.1 Descriptive statistics

The geographic distribution of the respondents is: Kayonza 28.3%, Gicumbi 28.3%, and Huye 43.4%. Around four out of five of the respondents were born in Rwanda. Most of the foreign born come from: Uganda (6.1%), Democratic Republic of Congo (3.8%), Burundi (3.3%) and Tanzania (2.3%). Only 7% of all women has not given birth, 31% had one or two, 33% had three or four, and 29% had five or more children ever born. The majority of the women (74%) is less than 40 years of age, 31% is younger than thirty. The level of education of the majority of the respondents (62%) is primary school, 24.4% percent have been enrolled in a higher level of education (professional, secondary and higher education) and 14% have never been at school.   At the time of the interview four out of five women (78%) are either officially married or living in union, 9% is a widow, 8% is divorced or separated and 5% is single.

6.4.2 Migration events

The data recorded up to six moves by women interviewed (Table 15). The person-period data records each move as an event. Of these events 41.3% are attributed to women born in Rwanda that migrate only internally, 15.4% are made by women born outside Rwanda – some have been outside the country more than once – and the rest is attributed to women born in Rwanda who went out at least once.

Table 16: Cause of migration by period

Cause of migration			Migration for each period				
		Migration before 1990	Migration between jan1990 - jun1994	Migration between jul1994 - dec1994	Migration between jan1995 - dec2000	Migration between jan2001 - Feb2008	Total
War/Politics/Land	Count	55	114	17	87	100	373
	%	14.7%	30.6%	4.6%	23.3%	26.8%	100%
Repatriation	Count	0	7	25	75	3	110
	%	0.0%	6.4%	22.7%	68.2%	2.7%	100%
Other causes	Count	18	21	26	103	76	244
	%	7.4%	8.6%	10.7%	42.2%	31.1%	100%
Total	Count	73	142	68	265	179	727
	%	10.0%	19.5%	9.4%	36.5%	24.6%	100%

Breaking down the migrations by the period in which the event happened, as illustrated in the table 1, we found that 19.5% of all the moves happed between January 1990 and June 1994. This is the period of the civil war that culminated in the genocide in Rwanda in April 1994.

Migrations because of war and politics clearly dominate in this period (114 out of 142). During the following period, July to December 1994, the regime changed and many people that had left the country before the conflict took the opportunity to return back to Rwanda, where they are referred to as *old case load*. A substantial part of these migrants is born outside Rwanda, as their parents left the country during earlier conflicts.

Repatriation after January 1995 includes some of these as well, but the majority consists of people that fled the country during and after the conflict and stayed in refugee camps across the border. Repatriation of this *new case load* started around 1996 and was nearly completed by 2000 when conditions in the country became more stable. Yet, conflict related migration continues after 1995 and even after 2000 as many internally displaced persons had to find a new place to live and conflict over land became predominant when property rights of people returning from exile were reinstated.

More than 50% of all migration observed over the total period are therefore conflict related in one way or another, either as a direct result of hostilities or as a result of conflict over land that forced people to relocate. Repatriation accounts for 15% of all migration, but refers to different groups before and after 1995. Other causes such as marriage, employment, education account for the remaining 35%.

6.5 Multivariate analysis

In estimating the generalized logistic regression models for ordinal dependent variables we used Stata12 (Table 16). A test shows that the final model does not violate the proportional lines assumption (p=0.251). The first model analyses the (logged) odds that women express the need or use of contraception (categories 2,3 and 4) over not having a need (category 1) in any given year. The intercept in the first model is -0.467 which corresponds to an odd of 6 over 10, of being ready to at least postpone a pregnancy in a given year. The second model analyses the odds that a women will use some method versus not using any. The third model analyses the odds that women use modern contraceptive rather than not using any or rely on traditional methods.

The parameters show that all the control variables have expected signs. Age as a time varying variable does not seem to be related with increasing need to reduce offspring, but model two shows that the use of methods increases with age, indicating lower levels of unmet need when women grow older. The fact that the use of modern methods does not grow proportionally (model three) could mean that older cohorts rely more on traditional methods and younger cohort favour modern methods.

Once a woman has 4 children or more, the need and use of contraception increase in the years after (+0.723). The positive parameter in model two shows that not just the need but also the use increases with the number of children and model 3 shows that these do have access to modern methods.

Women with primary education do not differ significantly from those without a diploma in their need and use of contraception, but they do have better access to modern methods (model 3). A higher education radically changes everything. Not only do these women express the desire to control their pregnancy more often, they are also more willing to actually use contraception and are able to get modern methods.

The role of religion should not be overstated. We expected Catholics to prefer larger families, which is confirmed by their lower need for birth control, and Protestants to object more to the use of modern methods, which is not corroborated by model 3 (-0,045).

The effect of replacement is very strong, which becomes clear when the variable number of children lost two year before is included in the model (-0,573). In the years after the loss the need for or practice of contraception is significantly lower. The desire to have another child to

replace the children lost two years before causes people not to use method either traditional or modern.

Adding the variable does not change the parameters, showing that the need for replacement (the loss itself) is not specific to the other variables in the model. This in in contrast to our expectation as we assumed that the ones that have to move due to conflict might have lost more children and that part or their contraceptive behaviour would be caused by this higher loss. Also people that did not move may have experienced family loss during the conflict and the poor living conditions afterwards.

In fact, our hypothesis that people who had to move due to conflict would have a greater need to postpone births in the two years after, is not confirmed by model 1.

Table 17: Partial proportional odds of using contraceptive methods by characteristics of migrant women

Contraceptive use categories*	2+versus 1		3+ versus <=2		4 versus <4		2+versus 1		3+ versus <=2		4 versus <4	
Time varying variables	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.	β	Sig.
Age												
Age of the mother	0,055		0,241	***	0,142	***	0,060		0,245	***	0,145	***
Age of the mother squared	0,000		-0,004	***	-0,002	***	0,000		-0,004	***	-0,002	***
Parity groups cumulative												
children <=3												
children >=4	0,723	***	0,199	***	0,413	***	0,754	***	0,219	***	0,431	***
Migration (2 years ago)												
# Non-migrants	0,101		0,415	***	0,278	***	0,100		0,414	***	0,277	***
# War/Politics	0,060		0,060		0,060		0,093		0,093		0,093	
# Repatriation	-0,471	**	-0,471	**	-0,471	**	-0,462	**	-0,462	**	-0,462	**
# Other reasons	0,087		0,087		0,087		0,084		0,084		0,084	
Mortality experience												
# children died 2 years ago							-0,573	***	-0,573	***	-0,573	***
Time invariant variables												
Education												
No education												
Primary and professional	-0,132		0,014		0,193	**	-0,137		0,012		0,191	**
Secondary and high	0,629	***	1,157	***	1,428	***	0,614	***	1,150	***	1,421	***
Religion												
Other religions												
Catholic	-0,211	***	0,341	***	0,058		-0,198	**	0,352	***	0,067	
Protestant	0,167		0,302	***	-0,045		0,172	**	0,307	***	-0,042	
Intercept	-0,467		-5,018	***	-4,049	***	-0,518		-5,059	***	-4,081	***
Number of Observations	7656		7656		7656		7656		7656		7656	

*1= Unwillingness   2= Unmet need   3=Traditional methods   4= Modern methods

***: p<0.001   **: p<0.05

The parameter in model 1 is close to zero and this is not radically different from periods without a migration. Yet clear differences show up if we compare episode with and without a migration with the actual practice of contraception and the access to modern methods which are both more common in episode without migration. It looks as if the years after a conflict induced migration are characterised by higher levels of unmet need and limited access to reproductive health services. Yet we find the same pattern among the voluntary migrants. This category is too heterogeneous to allow a clear interpretation, but we did expect to find significantly different behaviour.

The last category of migrations, repatriation does have the expected behaviour. In the two years after the repatriation the need to control birth is drastically lower as is the practice of (modern) contraception. It certainly looks as if people after resettlement catch up on the pregnancies they might not have had during the stay away from their homesteads.

6.6 Conclusion and discussion

The challenge of this paper is to contribute to the debate of the effect of conflict related migration on fertility. This debate is sincerely hampered by a lack in insight in the timing of the various events and their consequences and a neglect of the proximate determinants that may account for higher or lower fertility in the wake of the migration events.

This study produced relatively unique data in which the exact timing of the disrupting events (both migrations and the loss of children) and a detailed measurement of contraceptive behaviour in the years after the event were recorded. A number of hypotheses could be tested more strictly with these data.

The first is that in the period following a conflict induced migration the fertility will be lower due to spousal separation and the desire to postpone births until live has resettled again, which might be counteracted by a higher risk of becoming pregnant due to a lack of access to contraceptives. We could show that a conflict induced migration does not lead to a higher need to postpone births in the two years after. Unfortunately we could not distinguish whether this lower than expected need arose from a lack of intercourse due to spousal separation (not in our data), but this is a plausible cause. What we could see was that in period after the migration the practice of using modern contraception is lower than in spells that were not preceded by a migration.

The second is that conflict leads to the loss of children and that fertility in the years after this loss will be higher to replace them. We did indeed find that women that lost children, more

often chose to become pregnant in the two years after these events by rejecting the idea of birth control in this episode.

The third is that people will catch up and realise the ideal family size after the conflict has settled and life returns back to normal. We did find this type of contraceptive behaviour among the women that were repatriated. In the years after repatriation significantly more women do not want to use contraception as they desire to become pregnant.

The use of contraceptive desires and behaviour rather than actual fertility is that this provides us with an idea whether high (or low) fertility is driven by choice of forced by the circumstances. Our result support the idea that in the heydays of the conflict fertility might be higher than desired due to a lack of fertility control, and also that after the conflict people are deliberately catching up, replacing the children they have lost or getting the pregnancies they postponed earlier once repatriated. These mechanism may well account for (part of) the stall in fertility decline in Rwanda in the years after the genocide.

The study has some very clear limitations. The higher level of fertility in the period 1990-2005 reflects not only the effect of the massive migration but also overall period effects. The total population will have suffered from economic insecurity and a lack of fertility control, not just the migrants, making non-migrants less apt as a control group. The lack of data on spousal separation was another drawback that hampered the interpretation of our results.

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7 SYNTHESIS AND FINAL CONCLUSION

7.1 Introduction

The stall in fertility decline in Sub-Sahara Africa is subject of scientific debates. Most researchers that contributed to this debate mentioned Rwanda as one of the examples (Schoumaker 2009, Shapiro and Gebreselassie 2008, Garenne 2008). From 1983 to 1992 the total fertility rate (TFR) in Rwanda decreased from 8.5 to 6.2, came to a standstill at around 6 children from 1993 up to 2005, and fell to a level of 4.6 between 2005 and 2010, a drop of 25 percent in only five years.

This thesis focussed on explaining the shifts in fertility during the period 1992-2010. One of the main objectives was to assess to what extent the war and genocide in Rwanda have affected the demographic behaviour in the aftermath of those shocking events that disrupted the lives of the Rwandan population. This study wants to contribute to the existing literature on fertility in which the impact of major disruptive events such as (civil) wars is rarely considered as a possible cause for stalling fertility decline. This thesis also explores the drivers of the second shift when fertility decline resumed its course. Has the demographic transition just resumed its course or are other mechanisms causing this decline? Finally, this thesis presents additional empirical evidence to the literature on the impact of forced migration on fertility, since the disrupting events in Rwanda were coupled with massive internal and external migration. To what extent does conflict-induced migration play a role in the stall of fertility decline? The questions addressed in this thesis are elaborated in three chapters on crises led fertility and two chapters on the association between forced migration and fertility.

7.2 Discussion of the findings

The first main chapter ("*Stalling fertility decline in Rwanda: the role of the 1994 genocide"*) discussed the relation between major disruptive events and some intermediate variables that shape fertility, in particular during the early phase of the demographic transition. With a high fertility level of over 6 children per woman (TFR) and a life expectancy at birth of less than 50 years during the 1980s[22], Rwanda was still at the beginning of the transition at the moment

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[22] In the 1990s the life expectancy dropped substantially till levels below 40 years. See for details: http://hdr.undp.org/sites/default/files/Country-Profiles/RWA.pdf; UNDP, Human Development Report 2013 The Rise of the South. Explanatory Note on 2013 HDR composite indices, The example of Rwanda.

the turmoil started in the 1990s. In the early transition phase, fertility regulation by couples is still limited and changes in fertility level will be mostly unintentional because fertility levels will depend more on mating patterns, marriage formation and risk of conception than on deliberate pregnancy management. Yet, it was expected that the war and genocide and its concomitant very high mortality would influence the intentional reproductive behaviour. This resulted in the research question "to what extent did changes in mortality experience, marriage formation, migration status, and risk of conception have an impact on fertility levels between 1995 and 2000".

After the introduction of the data in the Rwandan Demographic Health Surveys (RDHS) from 1992, 2001, and 2005, the demographic trends for the period 1990 – 2000 were shown in figures and tables, and analysed using a general ordered logistic regression analysis (showing the partial proportional odds of giving birth(s) in the five years following the genocide). The analysis showed that the course of the Rwandan fertility fits in with the statement of Caldwell (2004) that "great social upheavals tend to depress fertility decline for a while at the early transition stage".

The most prominent conclusion of this chapter is that the crises-induced fertility decline which started in the 1980s in Rwanda did not continue its course during the turbulent 1990s despite the downward effects of: changes in the population composition according to marital status (decrease of married or cohabiting women of 30 years and older); instability due to the large number of uprooted people; and hard living conditions combined with insecurity. Instead, part of the Rwandan people developed a pro-natalist attitude with a preference for large families, and a more negative attitude about family planning, which led to a high number of births in 1995-2000. This change in fertility attitude is linked to a wish to replace the death of own children but also occurs among those that did not lose offspring. A second cause is probably the lack of family planning facilities for women who were in need of limiting their offspring. The shift in fertility preferences brought this thesis to another research question about the drivers of the desired family size after the genocide which was addressed in the next chapter.

The chapter entitled *"Role of conflict in shaping fertility preferences in Rwanda"* explored to what extent the increase in desired family size in Rwanda in the aftermath of the 1994 genocide can be attributed at least partly to a rise in mortality experience, both of children and siblings through the so-called replacement and insurance (or holding) mechanisms. The theoretical framework for this chapter further postulated that a rise in desired fertility could

also be associated with the slowing down of the urbanization process and the fact that the expansion of the group of more educated couples – both as proxies of the modernisation process - came to a halt. The impact of the socio-cultural environment of women on her desired fertility, the attitudes to birth regulation of others, was added as a cultural determinant. According to the theory, replacement, insurance, lack of modernisation and disapproval of birth control by husband play a decisive role in developing attitudes about desired family size, and may therefore explain part of stall in fertility decline between 1992 and 2005.

Data from RDHSs of 1992, 2000, 2005 and the interim RDHS of 2008 were used in a ordinal logistic regression to model the woman's ideal number of children. The analysis of the development of the level of desired fertility in this chapter was not restricted to the period of the direct aftermath of the disruptive events, but also covered the period with the second shift in fertility, the resumption of the fertility decline after 2005.

The most striking result of the analysis was the fact that the desired fertility size was indeed highest in the 2000 DHS data set, the measurement in the most disruptive period in Rwanda's history. We did find strong effects of children's mortality on desired family size, similar to the conclusion of the previous chapter on the role of replacement of lost children in actual fertility. This provides support that violent deaths change the mind-set of the population to more pro-natalist attitudes. However, we found no support that the loss of siblings (insurance mechanism) also contributes to the explanation of wanting more children. Yet, we did find that the approval of family planning by the husband/partner was a stronger predictor of the desired family size stated by the woman, than the mortality experience. This disapproval was much higher in 2000 than in 2005 accounting for part of the change in desired fertility. The effects of migration status as indicator for a modernization (urbanisation) process indicated that living or having lived in Kigali contributed a lot to desire smaller families and furthermore, also the level of education has a strong effect on the desired family size. Young generations were less likely to prefer large families compared to older ones. The multivariate models were unable to account for all the differences in desired family size over the years. The final models still show the year 2000 as the year with the highest preference after controlling for the various determinants. We did not succeed in fully capturing the change in mind-set of the population.

The third chapter on the shifts in fertility decline; *"Changes in Fertility Decline in Rwanda: A Decomposition Analysis"* dealt specifically with the question to what extent compositional or behavioural change accounted for the changes infertility, systematically comparing the

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changes in the period 1992-2000 to those in 2000-2010. We looked at the changes in composition in terms of age, number of living children, marital status, mortality experience, and contraceptive use, and at the shifts in behaviour within these categories using decomposition analysis with the number of pregnancies in the two years before the interview as a dependent variable.

For the period 1992-2000 the analysis showed that fertility hardly differed between the years as a result of an overall negative composition and an overall positive behavioural effect. The larger share of women that had lost at least one child and the lower share practicing contraception were compensated by the larger share of separated and widowed women in the effect on fertility. With only compositional change, fertility in 2000 would have been lower than in 1992, in particular because of spousal separation and the loss of partners. Yet behaviour did change as well. In particular women in a union had higher fertility in 2000 than in 1992, which could be due to catching up after reunification. Women in 2000 that used contraceptive had higher fertility than those in 1992. The stall in fertility between 1992 and 2000 is the result of the averaging out of both positive and negative trends and determinants.

All things changed after 2000 when the government decided to involve all the legislative and administrative authorities from the Senate to the level of the village in their sensitizing campaign family planning and reproductive health policies. This shift is reflected in both the composition and the behaviour of the people. Child mortality decreased (in 2010 only 8% had lost one or more children as opposed 23% in 2000). Age at marriage increased, accounting for a larger share of singles. The most pervasive compositional change is the increased share of women using modern contraceptive (which moved up from 4.4% to 31.7%). On top of those compositional changes that led to lower fertility, behaviour also changed. Women in a union got far less children and in particular those having three or more had fewer pregnancies in 2010 than in 2000. Compositional and behavioural change point in the same direction of lower fertility and contribute in equal measure to the tremendous drop in fertility between 2000 and 2010.

The two last chapters deal with the relation between fertility and conflict-induced or forced migration and analysed the research question "To what extent does conflict-induced migration play a role in the shifts in fertility decline in Rwanda?".

In the theoretical part of the chapter entitled *"Conflict related migration and fertility in Rwanda: exiles, refugees and displaced women"*, added two hypotheses to the relation between conflict and fertility. The first is that the migration itself is a disruptive event in the

life-course which may lead to postponement of union formation and childbearing. The second is that conflict-induced migrants will have been exposed to severe distress that forced them to leave behind their homes, and might have more often lost children or spouses or got separated from their families. .

Data from the Integrated Household Living Conditions Survey of 2000/2001 enabled the reconstruction of the migration history in the ten year preceding the interview, including the genocide of six years before (1994), and the calculation of the total number of pregnancies of six categories of women aged 20-49 in 2000: internally displaced persons, refugees, people that went into exile before the 1994 genocide broke out, those that moved for economic reasons, for personal reasons and those who have never left their community as the reference category. After controlling for age effects, the research shows that, as expected, voluntary migrants have lower fertility than the ones that never left their community. In contrast, displaced persons and refugees have a higher number of pregnancies and this higher number can be attributed completely to the replacement of the loss of pregnancies and new-born children. Women that went into exile before the conflict became violent have lower fertility, yet after controlling for educational status and wealth they display more pregnancies than any other group.   Conflict-related migration is related to higher fertility, but only because of the higher loss of pregnancies and infant mortality in the wake of the hostilities. Unfortunately the data did not allow isolating the effect of spousal separation which showed up in the previous chapter as a probable cause of lower fertility, not could the disruption in the use of contraceptives be included in the analyses.

The use of contraceptives is the focus of the last empirical chapter, "Conflict Related Migration and Fertility in Rural Rwanda". The major hypothesis is that forced migration lead to higher fertility because of lack of fertility control, of a response to insecure economic conditions and of replacement of lost children during the turmoil. Using life history data the contraceptive behaviour in the years following a migration event, distinguishing between not having a need to avoid pregnancy, unmet need to do so, use of traditional methods and using modern contraceptives, could be identified as proximate determinants of pregnancy risks and the role of the more distant determinants in these behavioural choices could be analysed.

Using a sample of 707 women aged 20-49 in 2008 in Rwanda; we collected data on 7656 person-years for which migrations, including the motive of the move, the loss of children, and the contraceptive behaviour were recorded. We recorded 727 migrations: 373 forced moves, 110 repatriation moves and 244 voluntary moves. Using an ordinal logistic regression we

analysed the readiness, willingness and ability to control fertility after disruptive events: voluntary migration, forced migration due to conflict, repatriation and the loss of one or more children.

The results confirm evidence from the previous chapter about the replacement effect, which now shows up in the reduced need to avoid a next pregnancy after the loss of one or more children. After repatriation women are also less inclined to prevent becoming pregnant. If women did not move in the two years before, the willingness and ability to actively use contraceptive is much higher, than after a voluntary of conflict induced migration. We found no evidence for a higher need to postpone births after a forced migration, but that might be due to higher incidence of spousal separation which we could not measure. Yet we did find that in the years after the forced move both the ability and choice to use contraceptives are lower than in more stable periods.

The result indicate that replacement of lost children and repatriation after the conflict ended, will have added to the stall in the decline of fertility in Rwanda in the wake of the 1994 genocide because women deliberately choose to become pregnant (again) after these two events.

7.3 Contribution of the scientific debate

This thesis contributes to the theoretical debate on the impact of severe disruptive events and concomitant types of forced migration on the stall in fertility decline especially in the early phase of the fertility transition.

What did the findings in this thesis contributed to the understanding of the stall in the Rwandan fertility decline between 1992 and 2005? And how do these findings fit in results from related studies?

According to Hill (2004) the genocide and massive displacements and returns seemed not to have affected the number of births. We disagree with this conclusion that there was no response. Looking at the trend of a standardised measure for fertility (TFR) over a longer period a clear response shows up: the ongoing fertility decline stopped, while a drop was expected. Understanding this response requires carefully theorising and in-depth analyses of the determinants of fertility.

Only few studies are available on the impact of conflicts on fertility in Africa (on Angola, Ethiopia, and Eritrea) or on a equable severe external shock in terms of massive killings on fertility outside the region (Cambodia). The studies on Africa show a modest fertility response existing of short term fluctuations in Angola and in Ethiopia (Agadjanian and Prata 2002, Lindstrom and Berhamu 1999), a slowing down and long term stop of further fertility change for Angola (Agadjanian and Prata 2002), and a rapid ongoing fertility decline in Eritrea (Blanc 2004). Woldemicael (2008) concluded that the war in Eritrea fuelled an already ongoing fertility decline among specific groups of women. All those researchers studied relations between changes in various direct intermediate variables (age at first marriage, marriage frequency, widowhood and separation, as well as access and use of family planning methods) and fertility in an attempt to explain the course of the fertility development. Heuveline and Puch (2007) looked from a different angle to the fertility of Cambodians during and after the Khmers Rouges period. During the horrible Khmers Rouges years a fertility decline took place, followed by a long lasting substantial increase of the fertility after the regime change. The researchers, reflecting on the difference with studies on Africa, point to the larger external shock in the form of massive killing. Rwanda might be closer to Cambodia when it comes to the severity on the conflict, but certainly shows a different course of fertility.

Our research contributes to the understanding of the relation between conflict, migration and fertility by taking the multi-dimensionality of this relation as a starting point.

The first contribution is that actual fertility is the outcome of both fertility preferences and fertility control. Ignoring preferences might lead to unobserved heterogeneity in carefully constructed multivariate models as it did in our first chapter. We found several strong indications that preferences do matter. From the analysis of the (shifts in) ideal family size it became clear that the loss of (several) children had a strong effect on the ideal number of children and that this effect was mediated by the negative attitudes of partners to use contraceptives. This could partially account for the fact that ideal family size was extremely high in the period just after the conflict. This was further corroborated by the analysis or the contraceptive behaviour in the last chapter. It was shown that women who lost one of more children in a given year deliberately chose not to use contraception in the two years after. Contrary to the importance of this so-called replacement effect, no evidence was found for an

significant impact of the loss of siblings[23]. This relation was chosen as a proxy for the impact of the community mortality on desired family size, the insurance mechanism. However, seen the enormous extent of the death toll during the genocide and hostilities, and the huge subsistence insecurity in the years just after the turmoil, it is also possible that the loss of siblings alone is not an adequate proxy to measure the insurance mechanism. Regardless the extent of loss of siblings, the disturbing events could have triggered the wish to have a larger family in order to compensate for the likelihood that some of their own children could die in the future seen the experiences of the recent past.

The second contribution is that in the wake of the conflict several mechanisms have opposing effects on fertility. Widowhood and spousal separation obviously have a downward effect due to less intercourse. The need for replacement and the non-use or limited access to contraception, clearly have an upward effect. In decomposing age-standardised fertility we could show that in Rwanda the negative separation effect outweighed the positive replacement and contraceptive effects, yet also showed that the ones in a union had higher fertility after the conflict than before. This might be the result of catching up after the reunification of the partners, which is also supported by the finding in the last chapter that after repatriation women more often choose not to use contraception.

The third contribution is that migration is part of the relation between conflict and fertility. It is hard to imagine violent conflict that is not accompanied by displacement, although it might not be as massive as in Rwanda. Migration itself is a disruptive event in de life course of individuals as it is hard to combine place making with family formation. Even if the migration is voluntary, lower fertility is expected. If the migration is forced by the conflict the disruptive effects are exacerbated. Loss of or separation from the spouse is bound to coincide with the migration and levels of insecurity are higher if one is forced to leave one's home. Yet, the analysis in the fourth empirical chapter did not fully corroborate this theory. Non-migrants showed the same levels of widowhood and separation as the displaced person and refugees. As the conflict spread over the whole country, many of the non-migrants may have lost their husband in the killings or got separated due to his flight abroad. However displaced and refugee women did suffer more from the conflict as they lost more children and more pregnancies. The replacement of these losses accounted for their higher level of fertility compared to non-migrants, to voluntary migrants and women returned from exile, at least after controlling for the better socio-economic position of the latter two groups. Again, three

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[23] Schindler and Brück (2011) found in their analysis only a short term replacement effect of the death of a sister during the genocide. But this effect had no significant effect on fertility in the longer run.

mechanisms were found with contrary effects on fertility. Voluntary migrants are a selective group with better education and higher wealth which leads to lower fertility. Poor people are more affected by conflicts, reflected in the loss of the spouse through death or separation which reduces their higher fertility. Conflict related migrants lost more pregnancies and children and the replacement accounted for the higher fertility of these women. After controlling for these three mechanism (wealth, partner loss and replacement), no remaining significant differences between the various groups was found.

The fourth contribution is the issue of 'breaking into time', as many studies rely on one specific moment to (retrospectively) analyse the outcome of preceding events. Looking back over a longer period (20 years) and using consistent data sets from 1992 to 2010 we could not only go back to the onset of the stall in fertility decline, but also capture the mechanism in the resumption of this decline. We could show that spousal separation and child mortality have decreased considerably and that access to contraceptives has improved. Some of the structural causes for the stall in the fertility decline have certainly diminished. Yet that does not mean that the system returned to its state before the conflict and that the demographic transition resumes its course. Again the decomposition analyses showed the strong effect of behavioural changes linked to explicit policy of the Rwandan government, from the national to the smallest local level, to advocate having fewer children and enabling women to have the children they want.

The reason why existing evidence on the relation of conflict and conflict related migration with fertility is so inconclusive might therefor have several reasons. The first is that the relative weight of the diverse opposing mechanisms is different between contexts. The second is that it is often assumed that women want access to contraceptives. Yet preferences can be in the way and people might actually want to become pregnant. The third is that the relation is not stationary over time and relevant shifts in the context should be part of the analyses. The fourth might be that Rwanda is an exceptional case and that findings cannot be transported to other countries. The following section will further elaborate this issue.

7.4 Limitation of the study

Rwanda is not an average Sub-Saharan country. Of course it shares with other countries in the region several historical and contemporary development characteristics plus periods of

political instability after attaining Independence, but it stands out for its very high population density, high pressure on natural resources in particular on land and currently for a rather determined, committed and dedicated national government with a clear development vision.

To understand the course of the fertility development and the shifts between three constructed periods (before 1992, 1992-2005, after 2005), one have to realise that these periods can be characterized as very different, in political stability, socio-economic conditions and institutional environment, as described in the regional context of several chapters of this study. The start of the fertility decline in the 1980s coincided with deteriorating economic conditions, various environmental crises, and with the start of a population policy that enforced family planning. The increase of the number of fecund women practicing a form of traditional or modern family planning method rose from 11 in 1983 to 21% in 1992 (Ndaruhuye et al, 2009). Seen the economic conditions of that time the fertility decline measured in the same period could be crisis- or poverty induced and facilitated by the extension of family planning services. After 2005 the contraceptive prevalence rate increased three fold from 17 to 52% in 2010. This period can be characterised as one of more economic progress, political stability and a strong promotion of family planning. In a study using a multivariate decomposition analysis to measure the success of family planning in Rwanda (Muhoza, Rutayisire and Umubyeyi, 2013) it was shown that rural women with lower educational level who not lost a child, contributed significantly to the fertility decline. This fact supports the conclusion that also the resuming of the fertility decline is poverty driven and only facilitated by improved access to reproductive health services and a strong government campaign to promote small families. The disturbing events of the 1990s also led to changing social relations and empowerment of women who had to take the lead during the post-conflict reconstruction of the society.

7.5 Recommendation for future research

Evidence from several studies and the empirical findings stated in this thesis are pointing to the fact that the impact of disrupting events on fertility is factual and to multifaceted to be fully covered in one contextual analysis. There is a need for more case studies with regards to association between conflict induced fertility and individual as well as aggregate characteristics. The following future research may be of help in assessing the conflict induced fertility change:

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- More detailed and complete analysis of proximate determinants of conflict induced fertility using retrospective data and time varying variables.

- Further isolating the effect of forced migration in the short and long run and including the context of the place were peoples stayed.

- Isolating the role of rebuilding health infrastructures, poverty reduction strategies and "sensitizing" campaigns in fertility decline in the aftermath of a conflict.

7.6 Conclusion

Despite its shortcomings, this thesis embarked in analysing the multi-dimensionality of this relation between conflict and fertility in Rwanda in the aftermath of the civil war and the genocide. It is bringing evidence not only on the mechanisms by which the conflict in Rwanda affected fertility but also contribute to the debate on the topic in distinctive ways. In the first place it contributes to the debate about the stalling fertility decline in sub-Saharan Africa in the nineties. Second, it adds to the debate on the impact of social upheavals on fertility especially in the early phase of fertility decline. Third, it enriches the debate on the effect of conflict related migration on fertility in the short as well as the long-run in Rwanda.

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Nederlandse samenvatting

Maatschappelijke ontwrichting en demografisch gedrag
Een verklaring van de veranderingen in de vruchtbaarheid in Rwanda

Inleiding

De jaren negentig vormden een zwarte bladzij in de geschiedenis van Rwanda. De bloedige burgeroorlog die culmineerde in een volkenmoord in 1994, trof miljoenen Rwandezen. Rond 0,8 miljoen mensen op een bevolking van 7,8 miljoen verloren het leven en meer dan drie maal zoveel waren op de vlucht. De gebeurtenissen leidden tot totale ontwrichting van de samenleving en vernietiging van de infrastructuur.

Terugkijkend valt deze trieste periode en de naweeën ervan samen met een stagnatie van de vruchtbaarheidsdaling die in de jaren tachtig was ingezet als gevolg van verslechterde economische omstandigheden. Tussen 1992 en 2005 bewoog het vruchtbaarheidscijfer (TVC) in Rwanda zich rond de zes kinderen per vrouw. Rwanda is niet het enige land in sub-Sahara Afrika dat een dergelijke stagnatie in de vruchtbaarheidsontwikkeling doormaakte in het laatste decennium van de vorige eeuw. Onderzoekers brachten deze stagnatie in verband met de haperende economische ontwikkeling, structurele hervormingsprogramma's, hoog blijvende zuigelingen- en kindersterfte of stijgende sterfte door de verspreiding van HIV-AIDS. De mogelijke korte termijn invloed van oorlog en conflict op het stokken van de vruchtbaarheidsdaling is echter weinig bestudeerd.

Dit proefschrift richt zich op het verklaren van de ontwikkeling van het vruchtbaarheids-niveau van Rwandese vrouwen in de periode 1992-2010. Eén van de doelen is te analyseren in welke mate oorlog en genocide het demografisch gedrag hebben beïnvloed in de jaren na het conflict, met andere woorden hebben deze (mede) geleid tot stagnatie van de vruchtbaarheidsdaling? De studie geeft ook aandacht aan de tweede verandering in de vruchtbaarheidstransitie: de zeer snelle geboortedaling na 2005 van een TVC van 6,1 naar 4,6 kinderen per vrouw in 2010. Welke verklaringen kunnen daarvoor worden aangedragen? De derde focus tenslotte is het verkrijgen van meer inzicht in het effect van conflict-gedreven migratie op vruchtbaarheid. Studies op dit terrein geven uiteenlopende uitkomsten en wijzen zowel naar een verhogend, verlagend of geen enkel effect.

Het proefschrift presenteert vijf analyse hoofdstukken. De gebruikte gegevens zijn afkomstig van de *Demographic and Health Surveys* uit 1992, 2000, 2005, 2008 en 2010 en het *Integrated Household Living Conditions Survey* uit 2000/2001. Het laatste analyse hoofdstuk is gebaseerd op gegevens die verzameld zijn in 2008 onder 707 vrouwen in de leeftijd van 20 tot 49 jaar wonend op het platteland van Rwanda.

Resultaten

In het hoofdstuk *Impact of disruptive events on fertility decline* worden de veranderingen in belangrijke determinanten van het geboorteniveau bekeken die naar verwachting een rol spelen tijdens de eerste fase van de vruchtbaarheidstransitie. Tijdens die fase is nog geen sprake van een wijdverbreide geboorteplanning en zijn veranderingen in het geboorteniveau

in de regel een gevolg van veranderingen in patronen van partnervorming en in kansen op conceptie. De resultaten van de beschrijvende en verklarende analyse laten zien dat de samenstelling van de bevolking zich wijzigde tussen 1994-2000. Het percentage vrouwen met een partner nam af door sterfte en scheiding door migratie. Dit leidde echter niet tot een daling van het geboorteniveau. De overgebleven echtparen ontwikkelden een meer pro-natalistische houding met een voorkeur voor een hoog kindertal en een meer negatieve houding ten aanzien van geboorteregeling. Deze verandering in attitude hing samen met de wens om gestorven kinderen, met name de in 1994 omgekomen kinderen, te vervangen. Deze houding werd echter ook gevonden onder ouders die geen kinderen hadden verloren. Een deel van de toegenomen vruchtbaarheid was ongetwijfeld ook een gevolg van het wegvallen van family planning faciliteiten. Geboorteregeling werd in 1992 nog beperkt toegepast, maar was in 2000 gehalveerd tot 10% van de vrouwen.

In het volgende hoofdstuk *The role of conflict in shaping fertility preferences in Rwanda,* word dieper ingegaan op het hoge gewenste kindertal als één van de verklarende determinanten van vruchtbaarheidsgedrag in de periode 1992-2008. Daarbij is uitgegaan van drie achterliggende mechanismen die de houding van vrouwen ten aanzien van gewenst kindertal kunnen beïnvloeden. De eerste is hun ervaring met verlies door sterfte van kinderen (vervangingseffect) en familieleden en derden (verzekeringseffect). Het tweede is modernisering van de samenleving (via urbanisatie, scholing) die nieuwe kansen biedt maar ook andere eisen stelt aan bijvoorbeeld opleiding. Het derde mechanisme is de houding van derden ten aanzien van geboorteregeling in de sociale omgeving van de vrouw. Het is voorstelbaar dat veranderingen hebben plaatsgevonden in deze achterliggende mechanismen tijdens de conflictperiode.
Na controle voor andere factoren die het gewenst kindertal beïnvloeden, bleek het gewenst kindertal in het jaar 2000 en in mindere mate ook in het jaar 2005 buitengewoon hoog in vergelijking met de situatie in 1992 en 2008. Dit onderbouwt opnieuw de hypothese dat door de zeer gewelddadige sterfte tijdens het conflict de Rwandese bevolking een meer pro-natalistische houding ontwikkelde. De diepte analyse liet inderdaad het zogenaamde vervangingseffect zien: verlies van één of meer kinderen leidde tot een hoger gewenst kindertal. Het verwachte verzekeringseffect (geoperationaliseerd via verlies van broers en zusters) was veel minder belangrijk dan het moderniseringsproces dat andere wendingen nam tijdens het conflict. De uitkomst voor migratiestatus toonde dat (zelfs tijdelijk) wonen in de hoofdstad bijdroeg aan een lager gewenst kindertal, hoewel het effect minder sterk was dan dat van opleiding. Ook de discussie over family planning en goedkeuring van de partner droeg significant bij aan een lager gewenst kindertal. Deze laatst genoemde bevindingen bevestigden dat de sociaaleconomische en –culturele determinanten van de houding ten aanzien van voortplanting niet snel veranderen in de tijd. Jongere generaties wensten overigens wel een lager kindertal dan oudere.
Het verklarend model laat zien dat vooral onder oudere vrouwen de heterogeniteit in voorkeuren voor gewenst kindertal groot was in 2000. Dit leidt tot de veronderstelling dat er een samenhang zou kunnen zijn met hun woonplaats tijdens de genocide. Na het herstel van de vrede kwamen oudere generaties vluchtelingen terug uit ballingschap. Deze retourmigranten die jaren in het buitenland verkeerden, hadden wellicht een andere houding

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ontwikkeld ten aanzien van vruchtbaarheid dan generatiegenoten die hun hele leven in Rwanda bleven. In de laatste analyse hoofdstukken wordt de relatie tussen ruimtelijke mobiliteit en vruchtbaarheidsgedrag verder geanalyseerd.

Eerst werden in het hoofdstuk *Changces in fertility decline in Rwanda, a decomposition analysis* nog de veranderingen in de achterliggende determinanten van de vruchtbaarheid voor een langere periode bestudeerd. Dit met het doel te achterhalen welke veranderingen leiden tot de relatief spectaculaire daling van de vruchtbaarheid na 2005. De decompositie-analyse vergeleek de veranderingen in twee perioden: 1992-2000 en 2000-2010. Daarbij wordt onderscheid gemaakt tussen veranderingen in de samenstelling van de bevolking en veranderingen in determinanten van vruchtbaarheidsgedrag.

De uitkomsten voor de periode tussen 1992 en 2000 bevestigden de uitkomsten uit de twee eerdere hoofdstukken. Na 2000 veranderde gaandeweg de situatie in Rwanda. Er was flinke voortgang geboekt met het proces van verzoening, herstel van vertrouwen en opbouw van de samenleving. De economie groeide en de overheid implementeerde met succes beleid om in rap tempo de millennium-ontwikkelingsdoelen te bereiken. Er werd ook een beleid gevoerd om de bevolkingsgroei in te dammen door bewustmakingscampagnes onder alle lagen van het overheidsapparaat. Tegelijkertijd werd de toegang tot onderwijs en gezondheidzorg sterk verbeterd, waaronder de toegang tot family planningsfaciliteiten. Dit beleid vertaalde zich in een enorme groei van het gebruik van methoden voor geboorteregeling, wat samen met een daling van de zuigelingensterfte leidde tot een opmerkelijke daling van de vruchtbaarheid na 2005.

De analyses in de eerste drie hoofdstukkenlaten illustreerden dat er sprake is van een meerdimensionale relatie tussen conflict en vruchtbaarheidsdaling. Aan de ene kant leiden sterfte en vluchtelingenstromen tot ontbinding van huwelijken en scheiding van partners met als gevolg lagere kansen op conceptie en geboorten. Aan de andere kant dragen hogere niveaus van kindersterfte en verminderde toegang tot moderne anticonceptiemiddelen bij tot hogere vruchtbaarheid tijdens en na de conflictperiode. Het gecombineerde effect van beide tendensen was ontoereikend om de stagnatie van de vruchtbaarheidsdaling in die periode geheel te verklaren. Veranderingen in attitude en gedrag ten aanzien van voortplanting blijken belangrijker voor de verklaring van de stagnatie en de latere daling van de fertiliteit dan veranderingen in bevolkingsstructuur.

Het hoofdstuk *Conflict related mobility and fertility in Rwanda: exiles, refugees and displaced women* analyseert het totaal aantal zwangerschappen in relatie tot het migratieverleden van zes groepen vrouwen in de vruchtbare leeftijd (20-49 jaar) in 2000. De referentiegroep in de analyse bestaat uit vrouwen die niet migreerden. Ze worden vergeleken met drie groepen vrouwen die een gedwongen migratiegeschiedenis kennen (bannelingen, vluchtelingen naar het buitenland en binnenlandse vluchtelingen) en drie groepen vrouwen die een vrije keus maken om naar elders te migreren. Deze laatst genoemden worden onderverdeeld naar reden van de vrijwillige migratie (economische reden, familiaire reden, overig).

De relatie tussen conflict en vruchtbaarheid is niet eenduidig. Het meest gangbare idee is dat burgeroorlog en andere crises het leven van mensen dusdanig verstoord dat dit op de korte termijn leidt tot uitstel van huwelijken en geboorten door onzekerheid, scheiding van partners of ontbinding van huwelijken door sterfte. Migratie is op zich al een breuk in de levensloop van individuen waarbij een nieuw bestaan opbouwen zich niet makkelijk laat combineren met gezinsvorming. Zelfs bij vrijwillige migratie, wordt een lagere vruchtbaarheid verwacht. Is er sprake van conflict-gestuurde migratie dan zullen de verstorende effecten sterker zijn. Gedwongen migratie kan samenvallen met verlies van de partner of scheiding waardoor de bestaansonzekerheid groter is dan bij niet-gedwongen migratie. Op grond van deze theoretische argumenten is het plausibel dat migranten op de korte termijn een lagere vruchtbaarheid zullen hebben en dat dit met name geldt voor vluchtelingen.

Deze zienswijze veronderstelt een zekere mate van geboorteregulatie die echter afwezig kan zijn in een periode van een gewelddadig conflict, waarbij verkrachting een onderdeel is van oorlogsvoering en gedwongen gemeenschap een manier kan zijn om te overleven in een vluchtelingenkamp, en waarbij toegang tot anticonceptie ontbreekt.

Op de wat langere termijn kan de vruchtbaarheid weer toenemen door hereniging van partners en de wens om de tijdens vlucht en de vijandigheden gestorven kinderen te vervangen. Ook zouden ouderparen hun idee over ideaal kindertal in relatie tot hun oudedagsvoorziening kunnen bijstellen door een situatie van langdurige onzekerheid.

Verwacht werd dat degenen die op de vlucht waren geweest binnen Rwanda of naar het buitenland waren uitgeweken frequenter getroffen zouden zijn door scheiding of verlies van de partner in 2000 in vergelijking met niet-migranten, vrijwillig migranten en teruggekeerde bannelingen. Bijna een kwart van de vrouwelijke vluchtelingen van 20 tot 49 jaar bleek inderdaad of gescheiden of weduwe geworden. De analyse illustreerde dat dit leidde tot lagere vruchtbaarheid. Niet-migranten lieten echter een zelfde frequente van huwelijksontbinding door sterfte of scheiding zien als de vluchtelingen. Het conflict trof ook de vrouwen die in hun woonplaats bleven. Hun mannen stierven door deelname aan oorlogshandelingen of waren op de vlucht geslagen. De verliezers verlieten namelijk aanvankelijk in groten getale het land. Toch was er een verschil tussen bovengenoemde groepen; de vluchtelingen leden meer door het conflict in de zin dat zij een groter verlies van kinderen en zwangerschappen te betreuren hadden dan de anderen. Vervanging van dit verlies was verantwoordelijk voor de hogere vruchtbaarheid van vluchtelingen in vergelijking tot die van niet-migranten, van die van vrijwillige migranten en van teruggekeerde bannelingen na controle in de analyse voor sociaaleconomische positie.

Dit hoofdstuk laat zien dat conflict en migratie via drie gevonden mechanismen met tegengestelde effecten, inwerken op vruchtbaarheid. De groep vrijwillige migranten zijn een selectieve groep van beter opgeleiden met een betere sociaaleconomische positie wat leidt tot lagere vruchtbaarheid. Arme mensen worden meer getroffen door conflicten, wat reflecteert in verlies van de echtgenoot door sterfte of scheiding waardoor hun vruchtbaarheid lager is. Vluchtelingen (conflict-gestuurde migranten) kampen meer met verlies van kinderen en zwangerschappen en het vervangingseffect zorgt nadien voor hogere vruchtbaarheid. Als in de analyse voor deze mechanismen (via de variabelen sociaaleconomische positie, verlies van

de partner en vervangingseffect) wordt gecontroleerd, worden er verder geen andere significante verschillen tussen de onderscheiden groepen vrouwen gevonden.

De reden dat bestaand onderzoek naar de relatie tussen conflict, conflict-gerelateerde migratie en vruchtbaarheid geen eenduidige uitkomsten opleveren kan verband houden met het verschil in het relatieve gewicht van de drie verklarende mechanismen tussen de contexten.

Om de zeer specifieke context van Rwanda met de enorme sterfte tijdens het hoogtepunt van het conflict en de enorme omvang van de door het conflict veroorzaakte ruimtelijke mobiliteit nader te bezien, zijn gegevens verzameld die een precieze datering mogelijk maken van de variabelen vruchtbaarheid, anticonceptie gedrag en migratie tijdens de levensloop. Hoofdstuk *Conflict related migration and fertility in Rural Rwanda* - gebaseerd op de die data - richt de aandacht op het anticonceptiegedrag van vrouwen op het platteland. Onderscheid wordt gemaakt tussen 1) het geen behoefte hebben aan geboorteregulering, 2) onvervulde behoefte aan anticonceptiemiddelen, 3) gebruik van traditionele methoden, en 4) gebruik van moderne anticonceptiemethoden als afhankelijke variabele. De analyse ging na in welke mate aan de precondities (*readiness, willingness and ability to control fertility*) voor het gebruik van contraceptiemiddelen is voldaan in de twee jaar na een ingrijpende gebeurtenis in de levensloop: vrijwillige migratie, gedwongen migratie door conflict, repatriëring of het verlies van één of meerdere kinderen.

Onder vrouwen die niet migreerden was de bereidheid voor en het gebruik van anticonceptie significant groter dan onder vrouwen die daarvoor vrijwillig of gedongen migreerden. Voor de gedwongen migranten kan dit lagere gebruik verband houden met de afwezigheid van de partner, maar hiervoor kon niet worden gecontroleerd in de analyse. De resultaten bevestigden het vervangingseffect op behoefte aan en gebruik van anticonceptie na het verlies van een of meerdere kinderen. Beiden waren significant lager. Na repatriëring waren vrouwen significant minder geneigd om geboorte beperkende middelen te gebruiken. Ook bleek dat in de jaren na een gedwongen vertrek de mogelijkheid om aan family planning te doen lager waren dan in meer stabiele jaren in de levensloop.

Conclusies

Rwanda behoort nog steeds tot de armste landen van de wereld. Het is zeer dichtbevolkt met een hoge bevolkingsdruk op de hulpbron land. Ondanks deze achterstand halveerde het geboorteniveau vanaf de jaren tachtig tot iets boven de vier kinderen per vrouw in 2012. Rwanda is een voorbeeld van een door armoede gedreven geboortedaling (Muhoza 2014). In de periode 1992 tot 2005 schommelde het totaal vruchtbaarheidscijfer echter rond de zes kinderen. Deze stagnatie is beïnvloed door de rampzalige gebeurtenissen in het midden van de jaren negentig, zoals in dit proefschrift is aangetoond. Het conflict en de daaraan gekoppelde enorme vluchtelingen stromen hadden een effect op zowel de directe als indirecte determinanten van de vruchtbaarheid. De veranderingen in de determinanten hadden afzonderlijk een verhogend of verlagend effect, maar gezamenlijk een dempende invloed op de vruchtbaarheidsdaling tijdens en in de periode volgend op het conflict.

Na een periode van herstel en opbouw hernam de daling zich in een versneld tempo. Een situatie die eerder werd opgemerkt na een conflict of sociale omwenteling in landen die in de latere fase van de transitie verkeerden (Caldwell 2004). In Rwanda heeft de overheid

condities gecreëerd die het ouders mogelijk maakte om niet meer kinderen te krijgen dan zij kunnen onderhouden. Er zijn ook aanwijzingen dat door de verschrikkelijke geschiedenis de sociale verhoudingen binnen de Rwandese samenleving zijn veranderd. Vrouwen hebben in de nadagen van het conflict het voortouw moeten nemen met het oppakken van het leven door verlies of scheiding van hun man. De overheid heeft nadien die rol erkend en vrouwen meer rechten gegeven en ook een stem en plaats in het publieke domein. Uit ander onderzoek is bekend dat naast opleiding van vrouwen ook hun emancipatie en empowerment daling van de vruchtbaarheid bevorderen.

De resultaten van de studie ondersteunden ook het nut van de theoretische benadering om vruchtbaarheid te zien als een resultante van zowel vruchtbaarheidscontrole als van gewenst kindertal. Er worden in de literatuur wel vraagtekens gezet bij de waarde van vragen naar ideaal aantal kinderen of naar de wens om nog een kind te krijgen. In deze studie is geïllustreerd dat in de periode na burgeroorlog en genocide er onder alle onderscheiden groepen vrouwen een voorkeur voor een aanzienlijk hoger kindertal bestond dan vóór de dramatische gebeurtenissen, ongeacht of vrouwen zelf een kind hadden verloren of niet. Dit zou kunnen worden uitgelegd als bewijs voor het 'insurance' effect: een hoger kindertal wordt gewenst als verzekering tegen het risico op sterfte in de toekomst op grond van het algemeen geldende sterfteniveau. Het illustreert echter ook een verandering in de *mind-set* van de bevolking over vruchtbaarheid. Die verandering in attitude vertaalde zich in een ander – hoger – vruchtbaarheidsniveau. Op individueel niveau hebben variabelen als gewenst kindertal misschien geen grote voorspellende waarde, maar op geaggregeerd niveau wel.
Vervolgens heeft deze studie laten zien dat gewelddadige conflicten verschillende vormen van ruimtelijke mobiliteit veroorzaken. Migratie is een eveneens een dimensie van de relatie tussen conflict en vruchtbaarheid, en heeft een versterkend effect op veranderingen die conflicten veroorzaken in directe maar ook indirecte determinanten van vruchtbaarheid.

Tenslotte draagt deze studie bij aan het inzicht dat belangrijke veranderingen in de vruchtbaarheid zich pas na verloop van tijd volledig laten interpreteren. Door de relatief lange periode die werd bekeken (1992-2010) en door het gebruik van in hoofdzaak op dezelfde manier verzamelde consistente datasets, werden de mechanismen duidelijk die de stagnatie verklaarden, maar ook die van de hervatting van de daling.

Worden de bevindingen geplaatst in de bredere context van studies over de demografische transitie, dan is duidelijk dat Rwanda een atypische case is.

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Curriculum

Born in Kigali (Rwanda) in August 8th 1967, Pierre Claver Rutayisire completed his primary, secondary and under-graduate education in Burundi in 1994. From 2000 up to now, he worked for the University of Rwanda. He embarked in a Master's Degree in Demography (DEA) in Université Catholique de Louvain (Belgium) which he successfully completed in 2003.

In addition to his regular teaching activities in the department of applied statistics (College of Business and Economics) he has been always involved in various research and consultancy activities related to demography ranging from survey design, sampling, data collection up to data analysis. His experience has been supported by the participation in many international internships, workshops as well as conferences where he was invited either as participant or as presenter of his published papers.

He enrolled in a PhD in Utrecht University in 2006 in the Netherlands on a sandwich mode arrangement combining research and teaching responsibilities in Rwanda. His doctoral research on "Disruptive Events and Demographic Behaviour in Rwanda" aimed at explaining the shifts in fertility in Rwanda since the 1990s. In addition to his doctoral research he extended his knowledge in quantitative research with an internship on event history analysis in Max Planck Institute for Demographic Research as well as various summer courses on quantitative methods in Utrecht University. He was selected as 2012 Demographic and Health Surveys Fellow and trained in 2014 on the analysis of those data in combination with data from Malaria Indicator Surveys. His current research interest is the complex relationship between fertility outcomes and household welfare.

He is married to Jocelyne Mutaganda and he is father of four wonderful children.