An investigation into the progression of premarital fertility since the onset of Zimbabwe's fertility transition

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ABSTRACT

Premarital fertility, that is, childbearing before first marriage, is an important yet under researched demographic topic in sub-Saharan Africa. In Zimbabwe, the distinction by marital status in fertility research is hardly drawn. Hence, a gap exists in the knowledge of premarital fertility levels. This research aims to investigate levels of, and factors associated with, premarital fertility since the onset of Zimbabwe's fertility transition in the mid-1980s. The research employed direct fertility estimation techniques to effectively compare premarital, marital, and overall fertility trends between 1988 and 2015. Cox proportional-hazards regression and forest plot analyses were then used to explain changes in factors associated with the timing of premarital first births over the same period. Data quality assessments were carried out using the method of cohort-period fertility rates to provide explanations for any erratic results. The results showed that premarital fertility was constant and moderate, with an average of 0.7 children per woman, between 1988 and 2015. While most premarital first births consistently occurred to younger women, from 2005 onwards, they increased among women aged above 24 years and decreased among adolescents. An increase in age, commencing sexual activity after adolescence, and improved socio-economic status including level of education decreased the relative risk of having a premarital first birth. However, delaying marriage past young womanhood, history of contraceptive use, Ndebele ethnicity, and residence in regions other than Manicaland and Masvingo, especially Ndebele dominated regions, increased the same risk by 465.0%, 45.5%, 136.0% and up to 135.0% respectively. The stagnation of premarital fertility between 1988 and 2015 while both marital and overall fertility first declined and then stalled indicates that there is insufficient evidence to suggest that premarital fertility had contributed to the stall of fertility decline in Zimbabwe from the mid-1990s. The timing of premarital first births since the start of the fertility transition in the 1980s has had a strong ethnic and cultural bias. Due to evidence of the effect of migrancy and tourism on premarital fertility in border and tourism towns, an extension into the theory of migrant premarital sexual behaviour to detail the risk of premarital fertility among border town residents who interact with but are neither migrants nor tourists is recommended.

Keywords: fertility transition, premarital fertility, adolescents, young women, Zimbabwe, Ndebele, Shona, Cox proportional hazards regression

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1 INTRODUCTION

1.1 INTRODUCTION

This quantitative research seeks to explore premarital childbearing by examining changes in levels and factors associated with timing of premarital first births since the onset of Zimbabwe's fertility transition. This research acknowledges the vast work done on overall, teenage, and adolescent fertility, but seeks to further decompose fertility dynamics by marital status. It seeks to contribute on knowledge on premarital fertility, most of which is not answered by teenage and adolescent fertility studies, by employing an explanatory approach that examines factors associated with the timing of premarital births as opposed to just determinants of premarital fertility as seen in other studies. This chapter gives a background of premarital fertility and outlines the aim, objectives, and research questions to be answered in the research.

1.2 BACKGROUND TO THE STUDY

Premarital fertility, that is, childbearing occurring before a woman's first marriage or union, whether traditional, civil, or religious is an important multifaceted demographic topic. Although interest in premarital fertility has grown, it remains under-researched and poorly analysed in sub-Saharan Africa (Garenne, Tollman, Kahn, Collins, & Ngwenya, 2001; Garenne & Zwang, 2006; Bhatasara, Chevo & Changadeya, 2013; Palamuleni & Adebowale, 2014).

Clark, Koski and Smith-Greenaway (2017) highlight that what limits premarital fertility research is that defining and measuring premarital fertility in sub-Saharan Africa is complicated because marriage is traditionally a series of family visits, ceremonies, and payments for the bride which although sometimes supplemented with church or civil weddings are not entirely replaced. Thus, the exact date of marriage is rarely known. Additionally, first births and first marriages are usually entwined such that a first birth symbolises entry into marriage. In some settings but not others, cohabitation is regarded as marriage. Therefore, the complexity of union formation makes it difficult to differentiate between premarital births and births that form part of a union. Zwang and Garenne (2008) further allude to the fact that the focus on adolescent fertility without making the distinction by marital status has contributed to the limited research on premarital fertility among young mothers.

In sub-Saharan Africa, premarital fertility is concentrated among young women aged 15 to 24 years (Chimere-Dan, 1997; Garenne, Tollman, Kahn *et al.*, 2001). Its analysis is often intertwined with teenage and/or adolescent fertility (Rossier, Sawadogo & Soubeiga, 2013; Clark, Koski & Smith-Greenaway, 2017). However, Bledsoe and Cohen (1993) and Garenne, Tollman, Kahn *et al.* (2001) argue that it is the premarital aspect of adolescent fertility that has increased causing the overall adolescent fertility rates to increase as a result. Demographers also argue that it is a misguided approach to ignore premarital fertility occurring past 24 years of age as most studies have done (Seltzer, 2000; Garenne, Tollman, Kahn *et al.*, 2001) because premarital fertility can occur in later ages as long as a woman remains unmarried, sexually active, and fecund. Hence, this research investigates premarital fertility at all reproductive ages.

Studies have shown that premarital fertility levels differ by country, ethnicity, and culture (Garenne & Zwang, 2006; Clark, Koski & Smith-Greenaway, 2017). In Liberia and Botswana, premarital fertility is reportedly high while Ghana and Burundi have low premarital fertility levels (Meekers, 1993; Parr, 1995; Zwang & Garenne, 2008). Premarital fertility is largely condemned in Zimbabwe and Lesotho but is accepted in Namibia (Makatjane, 2002; Pitso & Carmichael, 2003). Premarital fertility has undergone changing levels of acceptance (Rossier, Sawadogo & Soubeiga, 2013; Palamuleni & Adebowale, 2014) as adolescents are turning away from traditions condemning premarital sex (Rossier, Sawadogo & Soubeiga, 2013; Ajiboye, Aina, Oyebanji, & Awoniyi, 2014). Interestingly, in Botswana, premarital fertility is more acceptable after 25 years as women are deemed to have waited long enough for marriage (Pitso & Carmichael, 2003).

Researchers describe premarital fertility as a product of competing forces of early puberty and the timing of first sexual activity, first births, and first marriages (CSO/Zimbabwe & Macro-Inc, 1989; Bledsoe & Cohen, 1993; Seltzer, 2000; Garenne, Tollman, Kahn *et al.*, 2001; Garenne & Zwang, 2006; Presler-Marshall & Jones, 2012; Rossier, Sawadogo & Soubeiga, 2013; ZIMSTAT & ICF-International, 2016; Clark, Koski & Smith-Greenaway, 2017; Maluleke, 2017). This is because women, after menarche, spend a considerable amount of their reproductive years having never yet married, others also never marry (Mensch, Grant & Blanc, 2006; Mashamba, 2009). This creates a conceptual difficulty in measuring the exposure to premarital fertility (Gupta & Mahy, 2003; England, Wu & Shafer, 2013).

Unmarried young women have been found to have high unmet need for family planning and inconsistent use of contraception (Boohene, Tsodzai, Hardee-Cleaveland, Weir, & Janowitz, 1991; Garenne, Tollman, Kahn *et al.*, 2001; Garenne & Joseph, 2002; Chemhaka, 2009; Rossier, Sawadogo & Soubeiga, 2013) even though the services are relatively inexpensive (Seltzer, 2000). Adolescents also face challenges of sexual coercion, sexual violence, and failure to negotiate the timing and safety of sex (Presler-Marshall & Jones, 2012).

Premarital fertility is more a social problem than it is a sign of women's emancipation on decisions on reproduction as it mostly affects younger women (Nzimande, 2005; Makiwane, 2010; Clark, Koski & Smith-Greenaway, 2017) who are often financially ill-prepared for motherhood especially where the child's father is absent (Bledsoe & Cohen, 1993; Calves, 2000; Gupta & Mahy, 2003; Fagbamigbe & Idemudia, 2016; Soura, Lankoande, Sanogo, Compaore, & Senderowicz, 2018; Odimegwu, Olamijuwon, Chisumpa *et al.*, 2020).

Although new attitudes and preferences of young women for later marriages and for remaining unmarried have become common (Garenne, Tollman, Kahn *et al.*, 2001), they prove costly in the event of an unplanned premarital pregnancy. School drop-out, stigma on mother and child, maternal and child mortality, and prolonged periods of poverty are some consequences of premarital fertility (Mturi & Moerane, 2001; Makatjane, 2002; Gupta & Mahy, 2003; Smith-Greenaway, 2016). Premarital fertility also affects a woman's marriageability (Fagbamigbe & Idemudia, 2016; Sennott, Reniers, Gómez-Olivé, & Menken, 2016; Clark, Koski & Smith-Greenaway, 2017), delaying her first marriage between 2 and 13 years (Smith-Greenaway, 2016).

1.3 GEOGRAPHY

Zimbabwe is a landlocked South-Eastern African country bordering South Africa, Botswana, Mozambique, Namibia, and Zambia. It is made up of various ethnic groups. The Shona make up 80% of the population while the Ndebele (often grouped with similar tribes including the Kalanga, Venda, Xhosa, Sotho, and Tonga), make up about 14% (Evason, 2017).

The Zimbabwean population is young with 60% of the population being under 25 years and 37.8% under 14 years (Muzadzi, 2013; Evason, 2017). Adolescents aged 10-19 years constitute 24% of the total population in Zimbabwe (Wekwete, Rusakaniko & Zimbizi, 2016). The majority of Zimbabweans are Christian, most of whom identify as Apostolic, Roman Catholic, and Pentecostal (Marindo, Pearson & Casterline, 2003;

ZIMSTAT & ICF-International, 2012; Chamisa, Makururu, Nyoni, Hapanyengwi, & Mutongi, 2019). The effects of British colonialism, technology, and social pressures have significantly changed the culture, more so in urban than in rural areas (Maunze, 2009; Evason, 2017).

1.4 STATEMENT OF PROBLEM

Much research has gone into teenage and adolescent fertility occurring because of child marriages, leaving premarital fertility under-researched in Zimbabwe. Where adolescent and teenage fertility have been investigated, early ages at first marriage/union meant that the entanglement between premarital and post marital fertility occurring to adolescents may have been misinterpreted. Premarital fertility has also not been investigated among women of all reproductive ages yet proportions of never married women at all ages have increased. Ignoring premarital fertility among women past adolescence and young womanhood is a misguided approach.

An explanatory approach in determining factors associated with timing of premarital fertility has hardly been employed although research on determinants associated with the fertility transition and fertility stall using the framework of proximate determinants has been done. Therefore, there exists a gap in knowledge of premarital age-specific fertility levels and factors associated with premarital fertility over time. This research seeks to add to existing literature on fertility, particularly on how premarital fertility has evolved since the beginning of Zimbabwe's fertility decline.

1.5 SIGNIFICANCE OF STUDY

This research is important to government and policy makers concerned with lowering fertility to achieve economic and social development in the country. Zimbabwe has a young population thus early pregnancy steals from girls the opportunities to attain their educational and career goals (Bledsoe & Cohen, 1993). Lower levels of education lead to continuing cycles of poverty. School drop-out also means that a subpopulation important to the country's labour force is negatively affected (World-Health-Assembly, 2012). ACHEST (2017) highlight that progress on achieving Millennium Development Goals, now Sustainable Development Goals (SDGs) set to be achieved by 2030 [1] pertaining to eradication of poverty and hunger (SDG1), universal primary education,

[1] https://sdgs.un.org/goals

and women empowerment (SDG5) will remain unrealisable if premarital fertility continues to rise.

The subject of premarital fertility is also important because adolescent mothers are at high risk of maternal morbidity and death and their children are at risk of child mortality, premature births, and delivery complications (Bledsoe & Cohen, 1993; Wekwete, Rusakaniko & Zimbizi, 2016; ACHEST, 2017; Amnesty-International, 2018). In Zimbabwe, the maternal mortality ratio (MMR) is very high, 581 deaths per 100 000 live births (World-Health-Assembly, 2012) and about 20% of these deaths reportedly occur to 15-19 year old adolescents (Amnesty-International, 2018). Sustainable Development Goal 3 (SDG3) was set to ensure healthy live and promote wellbeing for all at all ages by reducing the global MMR to less than 70 deaths per 100 000 live births, preventable deaths of new borns to as less than 12 deaths per 1000 live births, and deaths of children under 5 to 25 deaths per 1000 live births. The Zimbabwean government has made a commitment to achieve SDG3 through community involvement in SDG prioritization and delivery and through equipping more village health workers to assist with maternal and child health care (Machingura & Nicolai, 2018).

According to Palamuleni and Adebowale (2014), maternal deaths and lifetime illnesses common among adolescent mothers exert pressure on government to divert more funds to these areas while placing on hold other key development areas such as industry and trade to improve the gross domestic product per capita. Hence, this research seeks to shed light on how premarital fertility can be tackled as a socio-economic problem with long-term impacts on the economic development of a country.

1.6 AIM AND OBJECTIVES

The aim of this research is to examine changes in levels and factors associated with premarital fertility in Zimbabwe since the onset of fertility transition.

To achieve this aim, the following objectives will be tackled:

- To evaluate trends in total, post marital, and premarital fertility levels in Zimbabwe between 1986 and 2015.
- To investigate changes in factors associated with timing of premarital first births in Zimbabwe between 1988 and 2015

- To infer the extent of the contribution of premarital fertility to the stalling of fertility decline in Zimbabwe

1.7 RESEARCH QUESTIONS, ASSUMPTIONS, AND HYPOTHESES

This research seeks to investigate the progression of premarital fertility in Zimbabwe. The following questions will be answered in the research:

1. Since the onset of the fertility transition in mid-1980's, what has been the trend of fertility rates (total, post marital, and premarital) in Zimbabwe? Could premarital fertility have contributed significantly to the stall in overall fertility decline in Zimbabwe?

2. What changes, if any, can be noted in factors associated with timing of premarital first births between 1988 and 2015?

This research presents a hypothesis that there have been significant changes in levels and factors associated with premarital fertility since the onset of the fertility transition. It is assumed that dates of birth of children and women and dates of first sex and marriage were accurately reported and recorded. The research also classifies women who were currently in a civil or customary marriage or cohabitation, divorced or widowed as ever married. The research further assumes no difference in fertility between women included in each survey and those who died or emigrated and for each time-varying variable including marital status, there was no significant change in respondent's reported status in the five years prior to each survey.

1.8 OVERVIEW OF THE STUDY

The research is laid out in five chapters. A theoretical framework of premarital fertility in sub-Saharan Africa is detailed in Chapter Two. Time-to-event analysis, described in Chapter Three, is the main methodology employed to determine factors associated with timing of premarital births. A forest plot analysis is then used to track changes in factors associated with premarital fertility across the six surveys. Results from the analysis will be presented in Chapter Four. The concluding chapter, Chapter Five, will discuss key findings and recommendations for further research.

1.9 LIMITATIONS TO STUDY CONDUCT

The research will focus on women aged between 15 and 49 years at the time of each demographic and health survey (DHS) who have ever had sexual intercourse regardless of whether they experienced a premarital first birth. Six cycles of DHS data, 1988, 1994, 1999, 2005, 2010, and 2015 will be used in the analysis. The analysis will go as far as timing of premarital first births only and will not dwell on higher order premarital births. Additionally, the research will not include premarital abortions and miscarriages as these did not end in live premarital births.

1.10 DEFINITION OF TERMS

The following terms are defined as used in this research only. The definitions may not be exhaustive in other fields of study.

Adolescent fertility - fertility occurring from puberty to early adulthood, 10-19 years, sometimes extended to 21 years

Border town - a town or city close to the boundary between two countries

Child marriage - marriage or union of a woman (or man) before the age of 18 years

Consensual union/Cohabitation - establishment of a marital-like union without any certification

Marriage - formal union of persons of opposite sex established by civil, religious, or other means as recognised by the laws of a country

Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) - United Nations goals set with measurable targets and deadlines for improving the lives of the world's poorest people

Post marital fertility - childbearing that occurs after a first marriage

Premarital fertility - childbearing that occurs before entry into a first marriage

Premarital sexual activity - sexual activity that occurs before entry into first marriage

Teenage fertility - fertility occurring to women aged between 13 and 19 years

Young women - women aged between 15 and 24 years

1.11 CONCLUSION

This introductory chapter gave a detailed background on premarital fertility in sub-Saharan Africa and described the gap in knowledge on the explanatory aspect of premarital childbearing in Zimbabwe. The following chapter will review literature on premarital fertility and discuss the theoretical framework that will guide the formulation of the methodology in Chapter Three and the analysis of data in Chapter Four.

2 LITERATURE REVIEW

2.1 INTRODUCTION

In past centuries, premarital fertility was considered negligible according to demographic standards (Garenne, Tollman, Kahn *et al.*, 2001) largely because of widespread early marriage. Hence, the bulk of studies did not differentiate fertility indicators by marital status. Recent evidence from sub-Saharan Africa have hinted at rising premarital fertility levels. This chapter presents discussions and debates on theories associated with premarital sexual activity and childbearing in Sub-Saharan Africa. The concept of marriage in Zimbabwe is also discussed.

2.2 FERTILITY IN ZIMBABWE

2.2.1 The fertility transition

Fertility transition refers to the path from high to low fertility (Garenne, 2008; Shapiro & Gebreselassie, 2008; Garenne, 2009; Johnson-Hanks, 2015). Fertility transition in sub-Saharan Africa began later and progressed much slower compared to other regions in the world (Shapiro & Gebreselassie, 2008; Garenne, 2011; Sayi, 2015b; Shapiro & Hinde, 2017; Schoumaker, 2019). Moreover, it was delayed in rural areas compared to urban areas and is expected to continue this way in the future (Garenne, 2008) due to limitations in economic and educational development (Agadjanian, 2005; Choto, 2008; Shapiro & Hinde, 2017).

Several sub-Saharan African countries' fertility transitions including Zimbabwe have been characterised by stalls (Bongaarts, 2006; Westoff & Cross, 2006; Machiyama, 2010; Schoumaker, 2015; Muza, 2019). A comprehensive definition of a stall is the slowing down, halting or reversal of a once-declining fertility provided it is nowhere close to replacement level (Bongaarts, 2006; Moultrie, Hosegood, McGrath *et al.*, 2008; Ezeh, Mberu & Emina, 2009; Garenne, 2009; Machiyama, 2010; Garenne, 2011; Howse, 2015; Kabagenyi, Reid, Rutaremwa, Atuyambe, & Ntozi, 2015; Sayi, 2015b; Schoumaker, 2015; Shapiro & Hinde, 2017; Schoumaker, 2019). Stalls in fertility decline in sub-Saharan countries have been associated with changes in mean age at birth or first marriage and contraceptive use (Garenne, 2009; Schoumaker, 2015).

2.2.2 Trends in fertility decline in Zimbabwe – a case of stalled fertility

In Zimbabwe, fertility transition began in the mid-1980s (Choto, 2008) having declined from 6.4 children per woman in 1969 to 5.3 in 1985-88 (CSO/Zimbabwe & Macro-Inc, 1989; Hill & Marindo, 1997; ZIMSTAT & ICF-International, 2016). From the mid-1990s onwards, total fertility oscillated around an average 4 children per woman (CSO/Zimbabwe & Macro-Inc, 2000, 2007; ZIMSTAT & ICF-International, 2016) signifying a fertility stall. The peak age of childbearing overtime remained between 20 and 29 years (CSO/Zimbabwe & Macro-Inc, 1995, 2007). Different approaches have led authors to locate the stall of Zimbabwe's fertility at different time points between mid-1990s and 2015 (Bongaarts, 2008; Chemhaka, 2009; Garenne, 2011; Johnson, Abderrahim & Rutstein, 2011; Sayi, 2015b; Schoumaker, 2015).

Trends in fertility levels in Zimbabwe have varied by education level of women, type of residence, economic status, and contraception use. Between 1989 and 1999, the total fertility rate (TFR) for women with at least secondary education decreased from 3.8 to less than 2.0 children per woman while that of women with no education decreased from 7.0 to about 5.0 children per woman (CSO/Zimbabwe & Macro-Inc, 1989, 1995, 2000). By 2015, the TFR for women with at least secondary education had reportedly risen to 2.2 children per woman (ZIMSTAT & ICF-International, 2016), validating the claim by Kebede, Goujon and Lutz (2019) that stalls in education advancement of women had led to stalls in fertility decline.

Urban fertility decline began a decade ahead of rural fertility in Zimbabwe (Sayi, 2015b) and has remained consistently lower by about two children (CSO/Zimbabwe & Macro-Inc, 1989, 1995; Hill & Marindo, 1997; CSO/Zimbabwe & Macro-Inc, 2000, 2007). Zimbabwe's largest cities: Bulawayo and Harare have always had the lowest fertility rates, 3.0 in 1999 and 2012 (CSO/Zimbabwe & Macro-Inc, 2000, 2007; ZIMSTAT & ICF-International, 2012). Fertility levels remain highest in Manicaland increasing from 4.8 to 5.0 children per woman between 2012 and 2015 (ZIMSTAT & ICF-International, 2012, 2016).

Chemhaka (2009) highlighted that fertility decline in Zimbabwe between the 1980s and 1990s had been propelled by increased contraception uptake. Ezeh, Mberu and Emina (2009) then suggest that from the 1990s it was the decline in contraceptive use that stalled fertility decline in Zimbabwe. Lastly, ZIMSTAT and ICF-International (2016) also reported very high fertility among poor women compared to rich women.

2.3 THE CONCEPT OF MARRIAGE IN ZIMBABWE

While investigating premarital fertility, it is important to understand marriage formation in Zimbabwe where diverse cultures, religions, and introduction of civil marriages through colonialism are key players. Marriage is almost universal such that by age 30 only 7.5% of women have never married (ZIMSTAT & ICF-International, 2016). However, the proportion of unmarried 15-19 year old women was 26% at the 1992 census and 31% at the 2002 census varying by province (ZIMSTAT & ICF-International, 2014, 2015) an indication of delayed marriages among adolescents.

The types of marriage unions in sub-Saharan Africa include cohabitations, union at the birth of a child, religious, traditional/customary, and civil marriages (Parr, 1995; Seltzer, 2000; Cremin, Mushati, Hallett *et al.*, 2009; Mawere & Mbindi-Mawere, 2010; Evason, 2017; Koski, Clark & Nandi, 2017; Soura, Lankoande, Sanogo *et al.*, 2018). Civil marriages brought by colonialism have not eliminated the lengthy process of indigenous marriage rituals making it unclear when a union becomes formalised. This leads to biased reporting of marriage dates in social surveys (Cremin, Mushati, Hallett *et al.*, 2009; Mawere & Mbindi-Mawere, 2010).

Child marriages, legal or customary union of a woman (or man) below the age of 18 years, are highly prevalent in Zimbabwe (Sibanda, 2011; Wekwete, Rusakaniko & Zimbizi, 2016; Amoo, 2017; Dzimiri, Chikunda & Ingwani, 2017; Koski, Clark & Nandi, 2017; Kurebwa & Kurebwa, 2018; UNFPA-UNICEF, 2018). By 2011, 21% of children just below the age of 18 were already married (Sibanda, 2011; ZIMSTAT & ICF-International, 2012), 31% were married by 2014 (Kurebwa & Kurebwa, 2018) and 34% by 2018 (UNFPA-UNICEF, 2018). Some child marriages are a form of social control exerted by elders to ensure that unmarried adolescents do not engage in premarital sex (Palamuleni & Adebowale, 2014).

Child marriages are often endorsed culturally, religiously, and politically (Cremin, Mushati, Hallett *et al.*, 2009; Sibanda, 2011; Kurebwa & Kurebwa, 2018; Chamisa, Makururu, Nyoni *et al.*, 2019). They are more prevalent in rural areas than urban areas and less prevalent among educated and wealthy women (Sibanda, 2011). The prevalence of child marriages in Zimbabwe is distributed as follows: Mashonaland Central, West and East 50%, 42% and 36% respectively, Midlands 31%, Manicaland 30%, Masvingo 39%, and Bulawayo 10% (UNFPA-UNICEF, 2018). This suggests that child marriages are common among the Shona tribe because they live largely in Mashonaland regions.

2.4 PREMARITAL FERTILITY IN SUB-SAHARAN AFRICA

Premarital fertility varies widely across sub-Saharan Africa. In Southern Africa, premarital fertility levels in Zimbabwe, Lesotho, and Madagascar are described as moderate but rising (Mturi & Moerane, 2001; Garenne & Zwang, 2004, 2006; Garenne, 2008; Sennott, Reniers, Gómez-Olivé *et al.*, 2016; Clark, Koski & Smith-Greenaway,

2017) while Botswana, Namibia, and South Africa have the highest prevalence of premarital fertility.

The concentration of premarital fertility particularly among adolescents; is a key finding in most studies on premarital childbearing. Recently, ACHEST (2017) reported that most of the premarital fertility in Zimbabwe was a result of adolescent fertility. Studies on premarital fertility in Liberia, South Africa, Lesotho, Botswana, and Namibia also concluded the same (Parr, 1995; Garenne, Tollman, Kahn *et al.*, 2001; Mturi & Moerane, 2001; Garenne & Zwang, 2006; Clark, Koski & Smith-Greenaway, 2017). However, premarital fertility and adolescent fertility are two distinct topics. Mturi and Moerane (2001) found that Lesotho and Zimbabwe had lower levels of premarital fertility for adolescents and 20-24-year-olds, 3% and 26% respectively compared to South Africa and Namibia, 13% and 53% respectively. Botswana had remarkably higher premarital fertility, 21% for adolescents and 71% for 20-24-year-olds.

Premarital fertility, although concentrated among adolescents and young women, can just as well occur to older women. Adolescent fertility, on the other hand, occurs only to women aged 10-19 years. Its interesting feature is the fact that it can either be premarital or post marital, where in both cases it presents as a socio-economic problem. Still, other authors have presented opposing views on the age concentration of premarital fertility. In some countries where premarital fertility has been rising, the largest increases were found to be among women aged between 20 and 24 years (Clark, Koski & Smith-Greenaway, 2017). In Uganda, Cameroon, Cote d'Ivoire, Ghana, Liberia, and Namibia, increases in premarital fertility between 20 and 24 years of age were more than double the increases among adolescent girls (Parr, 1995; Clark, Koski & Smith-Greenaway, 2017). Hence, they concluded that in countries where most women marry in their teens, most premarital fertility is found to be concentrated among adolescents whereas where age of marriage is late, premarital fertility also occurs to older women (Clark, Koski & Smith-Greenaway, 2017).

2.5 THEORETICAL FRAMEWORK - PREMARITAL SEXUAL BEHAVIOUR AND FERTILITY IN SUB-SAHARAN AFRICA

Several theories have proposed the use of biological and behavioural, socio-economic, and cultural factors to explain premarital childbearing. This research integrates and modifies two main theories discussed in this section. These are the rational adaptation and social disorganisation theory, and the demographic, cultural inheritance, and social capital theory. The following modifications are made: the rational adaptation and social disorganisation theory is combined with the social capital model, while the cultural inheritance theory is extended to capture the effect of the social disruption resulting from long-standing economic crises and high migration rates in Zimbabwe.

Pioneers in African adolescent premarital childbearing, Cherlin and Riley (1986) proposed the rational adaptation and social disorganisation theory as suitable models for explaining this phenomenon. The rational adaptation theory states that a woman's decision to engage in sexual activities is a carefully considered one based on the expectation of benefitting financially or securing marriage (Cherlin & Riley, 1986; Meekers, 1993). Pitso and Carmichael (2003) noted that older women in Botswana used premarital fertility as a strategic goal to attain a sense of self-worth and old age security.

Mberu and White (2011) suggests that it is also an individual's characteristics, prior experiences, and current surroundings that shape their perceptions on risk and severity of sexual behaviour outcomes. Farahani, Cleland and Mehryar (2011) agreed that family structure and socio-economic status of the head of household also influence an adolescent's sexual choices. Therefore, premarital sex is a rational decision influenced by prior and current circumstances.

In contrast, the social disorganisation model states that premarital sexual activities and premarital fertility are somewhat accidental or spontaneous (Cherlin & Riley, 1986; Pitso & Carmichael, 2003). It suggests that premarital childbearing is a result of the weakening of social control by elders on young women leading to the adoption of more liberal attitudes that come with modernisation media and schooling (Cherlin & Riley, 1986; Meekers, 1993; Farahani, Cleland & Mehryar, 2011; Soura, Lankoande, Sanogo *et al.*, 2018). Hence, the social disorganization theory is referred to by other authors as the loss of social (or) parental control theory.

Emina (2010) then suggests that a breakdown of the rational and social disorganization theory into the demographic, cultural inheritance and social capital models would better explain premarital fertility. The demographic model points premarital fertility to low contraceptive prevalence and a growing gap between puberty and first union that prolong a woman's period of exposure to childbearing. The cultural inheritance model states that differences in cultural or normative values, whether as a result of religion or ethnicity can either translate to high or low prevalence of premarital fertility. Soura, Lankoande, Sanogo *et al.* (2018) found this theory to have strong explanatory power in the Congo.

The social capital model proposed by Coleman (1988) suggests that one's sexual behaviour is influenced by living in a particular social setting and that can translate to premarital fertility. There are three forms of capital namely, financial, human, and social capital. Financial capital provides the physical resources needed for socialisation and meeting family needs while human capital is the stocking of educational resources that aid children to act in new ways due to new skills and ideas obtained. Social capital refers to resources available in a family and community. Soura, Lankoande, Sanogo *et al.* (2018) related the social capital model to the rational adaptation model in that household size, composition and standard of living are all associated with premarital childbearing. Also, Garenne, Tollman and Kahn (2000) found that in the presence of social and psychological hardship and disruption and high influx of migrant labour, adolescents are likely to remain unaware or ambivalent of fertility control methods for prolonged periods.

On migration, Stack (1994) sought to extend the social control theory to explain the influence of migration on premarital sexual behaviours. The theory states that migration increases the probability of deviance by weakening existing ties to conventional institutions such as schools and family. Stack (1994) highlighted some mechanisms through which migration might increase the likelihood of premarital sex.

First, repeated moving decreases ties to familiar community institutions making it easier for individuals to engage in casual sex. High neighbourhood turnover also leads to crumbling conventional traditions and public opinion. Moreover, parents of migrants may seek to further control children who have migrated while children's perceptions of parental legitimacy may be diminishing. This estrangement between parents and children has been linked to a relatively high probability of premarital sex.

Second, erosion of the supply of parental control may cause distress, depression, and anxiety especially among female migrants. Mberu and White (2011) also stated that disruption of life in the early days of the move, that is, separation from a spouse or family causes psychological stress. Furthermore, adaptation to new social norms including sexual norms and a new economic and cultural environment also places migrants at higher risk of engaging in premarital sexual activity.

Other mechanisms that increase the likelihood of premarital sex are increased loneliness and arousal. Migrants may use sexual activity to form friendships or combat loneliness (Stack, 1994). Lastly, the excitement of a new neighbourhood or school can increase sexual stimulation among young migrants. Hence, arousal has been identified as a mechanism linking migration to premarital sex. However, this theory is weak in that it does not consider recent and past moves separately.

Therefore, to test the explanatory power of the rational adaptation, social disorganisation and social capital theory, age of respondent, age at first marriage, age at first sexual activity and the socio-economic variables education level of women, media exposure, wealth status and type of residence are incorporated in the model. The hypothesis that an improvement in education to secondary or higher levels reduces the relative rise of a premarital first birth is presented in this research. Likewise, improved wealth status from poor to average or rich, exposure to media compared to no media and living in an urban area compared to a rural area reduce the relative risk of a premarital birth. Due to lack of data, effect of parental presence and education level of parents on timing of premarital first births cannot be investigated.

Age of respondent, age at first marriage, age at first sexual activity and history of contraceptive use are used to test the demographic sub-theory while religion, region and ethnicity are used to test the cultural inheritance model. Lastly, I test the hypothesis that women with a history of contraceptive use have a lower risk of experiencing a premarital first birth. The relevance of these variables in explaining premarital fertility is discussed in the section below.

2.6 FACTORS ASSOCIATED WITH PREMARITAL FERTILITY

Studies have shown that in most cases than not, biological, cultural, and socio-economic factors are linked to the occurrence of premarital births. These factors are used to investigate premarital fertility to validate existing and new theories of premarital fertility.

2.6.1 Age at first marriage

Researchers have reported increases in ages at first marriage in sub-Saharan Africa and Southern Africa over time (Garenne, Tollman, Kahn *et al.*, 2001; Garenne & Zwang, 2004; Amoo, 2017; Clark, Koski & Smith-Greenaway, 2017; Koski, Clark & Nandi, 2017; Odimegwu, Olamijuwon, Chisumpa *et al.*, 2020). The median age at marriage in Zimbabwe has increased slowly over time from 18.9 years in 1994 to 19.8 years in 2015 (CSO/Zimbabwe & Macro-Inc, 2000, 2007; ZIMSTAT & ICF-International, 2012, 2016). It is reportedly higher among women with at least secondary education, 23.6 years, and lower among women with no formal education, 17.2 years and higher in urban areas 21.2 years than rural areas 19.1 years (ZIMSTAT & ICF-International, 2016; UNFPA-UNICEF, 2018).

Compared to neighbouring countries, age at first marriage in Zimbabwe is rather early. South Africa, Namibia and Botswana are reported to have the most delayed ages at entry into marriage in Southern Africa, above 25 years (Garenne, Tollman, Kahn *et al.*, 2001; Garenne & Zwang, 2006; Sennott, Reniers, Gómez-Olivé *et al.*, 2016; Clark, Koski & Smith-Greenaway, 2017).

2.6.2 Age at sexual activity debut

Where premarital sex is common, age at first sex is a better proxy measure for the onset of a woman's exposure to childbearing than first marriage (Zaba, Ties, Pisani, & Baptiste, 2002; Mashamba, 2009). Knowing age at first sexual experience is important because early sex initiation and declining age at menarche leave more exposure to conception over the reproductive span especially outside formal unions (Calves, 2000; Gupta & Mahy, 2003; Mensch, Grant & Blanc, 2006; Mashamba, 2009). Age at first marriage in sub-Saharan Africa has risen faster than age at first sex making premarital fertility more common in some countries (Mensch, Grant & Blanc, 2006; Clark, Koski & Smith-Greenaway, 2017).

ZIMSTAT and ICF-International (2012) and ZIMSTAT and ICF-International (2016) reported the median age at first sex in Zimbabwe to be 18.9 and 18.7 years respectively while Mashamba (2009) reported 15 years for rural South Africa and Okigbo and Speizer (2015) reported 17.7 years for Kenya. Zaba, Ties, Pisani *et al.* (2002) and Mensch, Grant and Blanc (2006) found that Zimbabwean females reported the latest starting ages and the slowest progression to sexual activities compared to other countries. However, although the median age at first sexual activity in Zimbabwe is reportedly up to four years later than most countries in the region, it remains rather early as sexual activity appears to commence at adolescence.

Trends in premarital sex in sub-Saharan African countries have been explained by background characteristics such as age, economic status, exposure to mass media, higher education, urbanisation, urban residence, patrilineality, access to contraception and abortion services, and AIDS awareness (Djamba, 2003; Gupta & Mahy, 2003; Mashamba, 2009; Sibanda, 2011; Rossier, Sawadogo & Soubeiga, 2013; Okigbo & Speizer, 2015; Clark, Koski & Smith-Greenaway, 2017).

2.6.3 Age at first birth

Aside from examining correlates of premarital fertility over time, part of understanding premarital childbearing in Zimbabwe will be to investigate trends in timing of first premarital births. This is because often premarital births are concentrated among adolescents and young women (Garenne & Joseph, 2002). The median age at first birth in Zimbabwe is 20.3 years (ZIMSTAT & ICF-International, 2016), about a year later than sexual activity debut, two years later than the median age at first birth in Kenya (Okigbo & Speizer, 2015). Women with at least secondary education have their first birth almost 6 years later than women with no education (24.0 years vs. 18.1 years) while women in urban areas have their first birth two years later than women in rural areas (21.6 years vs. 19.6 years) (ZIMSTAT & ICF-International, 2016).

According to ZIMSTAT and ICF-International (2016), 1 in 5 15-19-year old Zimbabwean adolescents were already mothers. 30% of young women in Mashonaland Central and Matebeleland South had begun childbearing while Harare recorded 10% irrespective of marital status. Also, rural adolescent girls were reportedly twice as likely to become pregnant than their urban peers (ZIMSTAT & ICF-International, 2012, 2014).

2.6.4 Education

Improved education level is often negatively associated with fertility as a result of delayed entry into marriage and the bargaining power in controlling family size (Chemhaka, 2009). In like manner, teenage and adolescent fertility in Zimbabwe have been found to decrease with increased education (Mashamba, 2009; ZIMSTAT & ICF-International, 2016). Soura, Lankoande, Sanogo *et al.* (2018) also found that in Burkina Faso premarital was negatively associated with education level of the head of household.

However, these results have not been similar across countries. In Lesotho, Makatjane (2002) found no relationship between education level, premarital sex, and fertility. On the other hand, studies in Burkina Faso and Madagascar suggest that premarital fertility increased with advancement in education (Makatjane, 2002; Garenne & Zwang, 2004). Thus, the effect of increased education on premarital fertility differs by country. Thus, changes in the effect of increased education levels on premarital fertility over time will be examined in this research.

2.6.5 Access to contraception and abortion services

Premarital fertility reflects a lack of contraception before first births among adolescents, low abortion prevalence, and high prevalence of contraception after the first birth (Garenne, Tollman, Kahn *et al.*, 2001; Mturi & Moerane, 2001; ZIMSTAT & ICF-International, 2016). Contraceptive use is high among married women and irregular among young unmarried women (Ezeh, Mberu & Emina, 2009; ZIMSTAT & ICF-

International, 2016). As at 2015, only 66% of unmarried sexually active women reported use of a modern contraceptive method (ZIMSTAT & ICF-International, 2016).

Unfriendliness of health workers, lack of education on effectiveness and myths about contraception, failed health systems, limited communication and negotiation between sexual partners, and accessibility of health centres have implications on young people's access and regular uptake of contraception (Vos, 1994; Marindo, Pearson & Casterline, 2003; Agadjanian, 2005; Muzadzi, 2013; Rossier, Sawadogo & Soubeiga, 2013; Fagbamigbe & Idemudia, 2016; Clark, Koski & Smith-Greenaway, 2017; UNFPA-UNICEF, 2018). However, it is worth noting that unmarried sexually active women may deliberately avoid contraception in an effort to conceive (Parr, 1995).

2.6.6 Religion and culture

Hammel (1990) states that culture is learned and shared but should not be viewed as static as it is not. Culture may explain why communities living under similar economic conditions but speaking different languages, following different traditions, or living in different geographic areas often behave differently. He also highlights that the effect of culture is intense in that even with changing economic conditions, certain groups may not change their behaviour.

Culture and religion are associated with premarital fertility through their interplay with contraceptive uptake and age at entry into first marriage. For fear of criticism from the community, young women are often caught unprepared and fail to negotiate safe sex (Marindo, Pearson & Casterline, 2003). Zimbabwean media also promotes reproduction, marriage and/or motherhood (Maunze, 2009) and where contraception is advertised it is coupled with emphasis on sexual morality (Marindo, Pearson & Casterline, 2003). However, culture forbidding premarital sex has eroded in urban areas compared to rural areas (Makatjane, 2002).

According to Marindo, Pearson and Casterline (2003) and Mboho, Furber and Waterman (2013), the Christian religion in Africa, by promoting chastity, impedes sexual activity and contraception education between parents and their children. Studies in various African countries have shown that other Christian groups had increased odds of having a premarital birth compared to Catholics (Makatjane, 2002) while others have found that Christians had higher premarital fertility compared to animists (Garenne & Zwang, 2004) and Muslims (Soura, Lankoande, Sanogo *et al.*, 2018).

In this research ethnicity and region are used to model the effect of culture on ethnicity. The two main ethnic groups are the Shona and Ndebele. The Shona are mostly found on the North-Eastern part of Zimbabwe, occupying about two thirds of Zimbabwean land, that is Mashonaland Central, East, and West, Manicaland, Masvingo, Harare and parts of Midlands. While the Shona are made of subgroups namely Manyika, Zezuru, Karanga, Ndau and Korekore, they identify as Shona and are recorded as such in the DHS. The Ndebele are mostly found on the South-West part of Zimbabwe in Matebeleland, Bulawayo and some parts Midlands. Other tribes such as the Venda, Tonga and Xhosa are also classified as Ndebele and are recorded as such in the DHS. Hence, the analysis will focus on comparing Shona women to Ndebele women and will exclude all non-Africans[2,3]. While migration is common in Zimbabwe, this will not have a significant effect on the results as I assume that those in Shona dominated rural regions migrate to Harare while those in Ndebele dominated rural regions migrate to Bulawayo. I further assume that the proportions of Shona people that migrate to Bulawayo and the proportions of Ndebele people that migrate to Harare are small such that they have not much effect on the results. Also, those who migrate to a different cultural setting assimilate the culture of that area.

2.6.7 Economic factors

Poor wealth status is reportedly associated with high premarital fertility (Garenne, Tollman, Kahn *et al.*, 2001; Garenne & Zwang, 2006; ZIMSTAT & ICF-International, 2016; Soura, Lankoande, Sanogo *et al.*, 2018). One reason is the exchange of sex for money while failing to negotiate safe sex. Vos (1994) found that in rural Matebeleland in Zimbabwe there was a high expectation from single women to get rewarded for sex outside marriage. However, it is argued that dire economic conditions in developing countries, including Zimbabwe, have increased premarital childbearing because of failure to pay lobola (money paid by the groom to the bride's family) (Calves, 2000; Mensch, Grant & Blanc, 2006; Mawere & Mbindi-Mawere, 2010; Posel & Rudwick, 2013). Thus, where economic hardships have delayed entry into first marriage, the risk of premarital fertility increased.

2.6.8 Residence

Type of residence of women has been found to significantly affect premarital fertility. Urban residence, unlike rural residence, is characterised by a monetary economy hence economic hardships in urban areas negatively affect fertility (Chemhaka, 2009). Participation in the workforce and higher education levels attained by urban women also

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[2] https://minorityrights.org/country/Zimbabwe/
[3] https://Issafrica.org/country-file-zimbabwe/society/

lower the risk of premarital fertility. However, women in urban Madagascar (excluding the capital city) were found to have higher premarital fertility than rural dwellers (Garenne & Zwang, 2004).

2.7 GAPS IN LITERATURE

Researchers have used existing theories of premarital fertility to the best of their ability to explain premarital fertility in sub-Saharan Africa. Where these have fallen short, researchers have combined theories to complement each other or proposed new ones altogether to fully answer a research question. Therefore, there is a rich literature on models of premarital sexual activity and fertility.

In Zimbabwe, some studies on the fertility transition and fertility stall have also explored some aspects of premarital fertility such as proximate determinants of premarital childbearing and/or teenage childbearing. Sayi (2015a) investigated the changes in fertility due to marital and non-marital fertility by examining how the determinants had shifted over time. The conclusion drawn was that non-marital fertility was concentrated among young women and was more common among Ndebele women. However, the timing of premarital fertility was not explored especially by ethnicity. Johnson, Abderrahim and Rutstein (2011) also explored changes in direct and indirect determinants of premarital (and marital) fertility using the Bongaarts framework. Other similar studies done by Choto (2008) and Guilkey and Jayne (1997) on explaining the fertility transition and stall also analysed determinants of fertility by marital status.

Still, factors affecting changes in the timing of premarital fertility are not well documented in Zimbabwe as most studies have only focused on teenage and adolescent fertility without making the distinction by marital status. Garenne and Zwang (2006) argue that before them, no study considered premarital fertility at all reproductive ages but rather studies limited samples to adolescents or women aged below 25 years. It is therefore one of the aims of this research to focus on all age groups.

Since child marriages are widespread in Zimbabwe, premarital fertility is a complicated indicator to measure. The distribution of the prevalence of child marriages in Zimbabwe has not been fully explored when analysing premarital childbearing. Lastly, when discussing fertility by ethnicity and culture, Zimbabwean literature is rather silent on other cultures such as the Kalanga, another large population group after the Ndebele.

2.8 CONCLUSION

This chapter discussed the literature on trends in premarital fertility in sub-Saharan Africa. While much has been documented on median ages at first sexual activity, birth and marriage in Zimbabwe, not much has been documented on premarital fertility in Zimbabwe. The issue of early marriages and teenage and adolescent fertility has been widely documented and generalised across the population. This weakness in reporting calls for a contribution into research on premarital fertility in Zimbabwe, paying attention to regional, cultural, and ethnic differences. This research seeks to accomplish this in the chapters that follow.

3 DATA AND METHODS

3.1 INTRODUCTION

The preceding chapter discussed theories on premarital fertility in sub-Saharan Africa which, in the analysis and as far as data are available, will be integrated and extended. This chapter details the quantitative analysis techniques employed in examining changes in premarital fertility levels and associated determinants between 1988 and 2015.

3.2 DATA AND SAMPLE DESIGN

Cross-sectional secondary data in the form of six cycles of Zimbabwe Demographic and Health Surveys (ZDHS) collected in 1988, 1994, 1999, 2005, 2010, and 2015 on women aged 15-49 years were used in the analysis[4]. The Central Statistics Office (CSO) of Zimbabwe administers these surveys through face-to-face interviews using a stratified 2-stage cluster sample design representative at national, residence (urban/rural), and regional level. The first stage includes enumeration areas drawn from census files and the second includes sampled households from a list of households in each enumeration area (Vaessen, Thiam & Le, 2005).

Each survey was analysed separately to avoid generalising that factors associated with premarital fertility at the beginning of the fertility transition in the mid-1980's (Muhwava & Timæus, 1996; Guilkey & Jayne, 1997; Choto, 2008) had remained constant almost a generation later. Microsoft Excel 16, Comprehensive Meta-Analysis and Stata 15.0 set to survey mode were used in the analysis. Sampling weights and strata were also specified accordingly to ensure that the results obtained were reflective of the composition of the population.

3.3 CONSTRUCTION AND DESCRIPTION OF VARIABLES

A brief description of distributions of women aged 15-49 years by selected background characteristics between 1988 and 2015 using frequencies and measures of central tendency is shown in Table 3.1. The variables and their categories are presented as used in the time-to-event regression analysis.

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[4] https://www.dhsprogram.com

Table 3.1: Background characteristics of sampled women 1988-2015

	1988		1994		1999		2005		2010		2015	
	%	N	%	N	%	N	%	N	%	N	%	N
Age												
15-19	24.3	1021	24.0	1486	24.5	1468	24.2	2130	21.2	1980	22.1	2156
20-24	20.0	840	20.7	1231	21.9	1232	21.9	1945	20.1	1815	17.0	1782
25+	55.7	2340	55.3	3411	53.6	3207	53.9	4832	58.7	5376	60.9	6017
Marital Status												
Never married	27.0	1133	27.1	1663	28.5	1683	27.5	2452	25.4	2332	26.8	2666
Ever Married	73.0	3068	72.9	4465	71.5	4224	72.5	6455	74.6	6839	73.2	7289
History of contraception use												
Never used	51.6	2167	43.9	2689	39.2	2317	34.4	3067	41.3	3783	36.4	3621
Ever used	48.4	2034	56.1	3440	60.8	3590	65.6	5840	58.8	5388	63.6	6334
Level of Education												
No education	13.5	566	11.1	712	6.7	437	4.3	380	2.3	224	1.3	106
Primary	55.9	2349	47.3	2961	40.2	2518	32.6	2971	28.0	2650	25.8	2385
Secondary or higher	30.6	1286	41.6	2455	53.1	2952	63.2	5556	69.7	6297	72.9	7464
Wealth Status												
Poor	41.1	1747	37.3	2436	34.4	2280	34.3	3237	34.2	3292	34.1	2951
Average or better	58.8	2459	62.7	3645	65.6	3334	65.75	5670	65.77	5879	65.87	7004
Type of Residence												
Rural	33.5	1407	32.2	1745	38.6	1809	39.3	3203	38.7	3437	38.5	4521
Urban	66.5	2794	67.8	4383	61.4	4098	60.7	5704	61.3	5734	61.5	5434
Exposure to Media												
No	45.3	1902	34.0	2084	59.6	3520	43.7	3896	49.1	4504	57.4	5715
Yes	54.7	2299	66.0	4044	40.4	2387	56.3	5011	50.9	4667	42.6	4240
Religion												
Apostolic	20.2	848	33.0	2018	25.7	1516	29.9	2659	38.0	3488	41.8	4165
Christian	67.1	2818	56.7	3471	58.3	3441	59.2	5271	54.7	5019	52.2	5193
Other	12.7	535	10.4	636	16.1	951	11.0	977	7.2	663	6.0	598
Ethnicity												
Shona	81.4	3283	83.9	4976	83.4	4750	83.9	7351	86	6991	89.5	8408
Ndebele	18.6	752	16.2	959	16.6	946	16.1	1409	14.0	1135	10.5	990
Median age at first sexual intercourse												
	17.4		19.0		19.5		18.8		18.9		18.7	
Median age at first marriage												
	18.6		18.9		19.3		19.3		19.7		19.8	
Median age at first birth												
	19.5		19.6		19.9		20.0		20.2		20.3	
Median age at first premarital birth												
	19.0		18.0		18.0		18.0		19.0		19.0	

The age-specific risk of premarital fertility will be compared between adolescents (15-19), young women (20-24), and older women (25+ years). The population distribution of women remained young despite the decrease in proportions at age 15 to 24 years and the increase at age 25+ years over time. This shows that fertility decline has been underway. Proportions of never married and ever married women remained constant while the median age at first marriage increased from 18.6 years in 1988 to 19.8 years in 2015. Although age at first sex increased, it remained as of 2015, a year earlier than age at marriage, almost equal to age at first premarital birth, and two years earlier than age at first birth irrespective of marital status.

Wealth indices were constructed using the principal component analysis technique for surveys 1988, 1994, and 1999 using household assert ownership variables (Vyas & Kumaranayake, 2006; Howe, Hargreaves & Huttly, 2008; Okigbo & Speizer, 2015; ZIMSTAT & ICF-International, 2016). To avoid bias rural and urban indices were created separately and then merged to form a composite wealth index taking values 1(poorest) to 5(richest) as was done in surveys 2005, 2010, and 2015. There was a significant improvement in wealth status, contraception use, and education attainment whereas proportions of urban women decreased, suggesting that emigration is fast outweighing rural-urban migration.

While the Apostolic following doubled by 2015 from 20.2% in 1988, the Christian following slightly decreased, and that of other religions halved. Thus, premarital fertility was compared between the Apostolic sect, Christians, and other religions including Muslims and Traditionalists to avoid lowering model statistical power by analysing small numbers.

3.4 QUALITY OF BIRTHS REPORTING

Data errors such as omission and displacement of births, prevalent in birth history data (Schoumaker, 2014; Al Zalak & Goujon, 2017) have potential to impact premarital fertility indicators since premarital fertility affects a small proportion of women. Omissions and displacements are common in low income countries and are a result of poorly trained interviewers, forgetfulness or limited knowledge of interviewees and lengthy questionnaires (Schoumaker, 2014; Al Zalak & Goujon, 2017).

Quality of overall births reporting was assessed using an Excel-built program of the method of cohort-period fertility rates by Moultrie (2013b). It was assumed that where overall births were poorly reported, premarital births were reported just as poorly or worse. This assumption is valid since premarital fertility is largely frowned upon in Zimbabwe and may not be honestly reported during an interview.

Generally, this method derives cohort-period fertility rates as far back as 35 years, classified by age of woman at survey

$$f_{ij} = \frac{1}{5}\left(\frac{B_{ij}}{N_i}\right) \qquad [3.1]$$

and age of woman at the end of each 5-year period

$$f^*_{k,j} = f_{k+1,j} \qquad [3.2]$$

where B_{ij} are the number of births to cohort *i* at each 5-year period *j* and *k* refers to age group of cohorts at the end of each period and N_i are the number of women in each cohort *i*. It also computes cumulated cohort fertility, that is, children ever born and cumulated period fertility respectively as

$$P_{k,j} = 5.\sum_{z=0}^{k-1} f^*_{k-z,z+j} \text{ and } F_{k,j} = 5.\sum_{z=1}^{k} f^*_{z,j} \qquad [3.3]$$

Lastly, *P/F* ratios obtained using the period and cohort estimates are derived for each age group *k* in period *j* as

$$\frac{P}{F}(k,j) = \frac{P_{k,j}}{F_{k,j}} \qquad [3.4]$$

The cohort-period fertility rates enable the identification of Brass and Potter effects. Brass effects result when women push births of oldest children further back in time hence overestimating distant fertility and underestimating recent fertility. Potter effects result when women report births to have occurred later than they actually did thereby underestimating distant fertility (Potter, 1977; Schoumaker, 2014). If fertility is falling, an orderly incremental change of P/F ratios greater than 1 from age 25 is expected, and a deviation from this sequence indicates that births have been omitted or displaced and age of respondent has been misreported.

From Table 3.2 overleaf, it is evident that in earlier surveys up to 2005, births were displaced, that is, women aged 25-39 years reported their births much closer to the survey dates. These women may have been attempting to conceal that they had given birth at younger ages. Moreover, in the case of premarital births, women may have

Table 3.2: Age-specific Fertility Rates 1988-2015

	Years prior to survey						
year of survey	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**
1988	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**	**1959-1964**	**1954-1959**
15-19	0.100	0.130	*0.155* *	0.126	0.121	0.154	0.044
20-24	0.230	*0.258* *	0.231	0.216	0.228	0.075	
25-29	*0.233* *	0.204	0.175	0.147	*0.398* ~		
30-34	0.145	0.148	0.048	*0.566* ~			
35-39	0.090	0.136	*0.413* ~				
40-44	0.160	*0.206* ~					
45-49	0.051						
1994	**1989-1994**	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**	**1959-1964**
15-19	0.097	0.100	0.165 *	0.122	0.137 *	0.125	0.037
20-24	0.176	0.251	0.252	0.279 *	0.236	0.101	
25-29	0.199	0.220	0.274 *	0.237	0.092		
30-34	0.148	0.217	0.223	0.087			
35-39	0.127	0.149	0.066				
40-44	0.058	0.039					
45-49	0.008						
1999	**1994-1999**	**1989-1994**	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**
15-19	0.100	0.094	0.089	0.158 *	0.111	0.119	0.019
20-24	0.175	0.174	0.248 *	0.251	0.264 ~	0.077	
25-29	0.143	0.206 *	0.215	0.256 ~	0.073		
30-34	0.145	0.163	0.217 ~	0.083			
35-39	0.096	0.142 ~	0.065				
40-44	0.052	0.036					
45-49	0.005						
2005	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**	**1975-1980**	**1970-1975**
15-19	0.097	0.097	0.100	0.094	0.129 *	0.121	0.032
20-24	0.172	0.191	0.177	0.222 *	0.280 ~	0.091	
25-29	0.160	0.161	0.190 *	0.233 ~	0.092		
30-34	0.115	0.146	0.175 ~	0.071			
35-39	0.078	0.110 ~	0.042				
40-44	0.048	0.020					
45-49	0.004						
2010	**2005-2010**	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**	**1975-1980**
15-19	0.105	0.099	0.091	0.098	0.090	0.133 ~	0.023
20-24	0.178	0.176	0.181	0.163	0.217 ~	0.089	
25-29	0.136	0.174 *	0.150	0.176 ~	0.080		
30-34	0.115	0.111	0.148 ~	0.064			
35-39	0.064	0.091 ~	0.038				
40-44	0.028	0.018					
45-49	0.005						

Table 3.2 (continued)

year of survey	Years prior to survey						
	0-4	5-9	10-14	15-19	20-24	25-29	30-34
2015	**2010-2015**	**2005-2010**	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**
15-19	0.094	0.118	0.111	0.094	0.097	0.075	0.029
20-24	0.206	0.208	0.179	0.193	0.164	0.071	
25-29	0.210	0.153	0.163	0.144	0.062		
30-34	0.140	0.128	0.117	0.053			
35-39	0.102	0.073	0.034				
40-44	0.026	0.017					
45-49	0.003						
	Brass Effects (~) Potter Effects (*)						

reported these to have occurred after their first marriage, leading to underestimated premarital fertility rates. Births reporting improved notably between 2010 and 2015.

Generally, older women aged 45-49 years had displaced births to periods between 0 and 14 years before each survey and wrongly reported their own dates of births as evidenced by disrupted sequences of P/F ratios in Table 3.3. Older women also omitted births so that their fertility rates shown in Figure 3.1 were much lower than those of younger cohorts. Older women usually omit births of children who died or moved to a new house. It is unlikely that these omissions will impact the true trend of premarital fertility over time since premarital births occurring to older women are rare.

3.5 DIRECT ESTIMATION OF FERTILITY

The direct estimation technique was used to capture trends of overall, premarital, and post marital age-specific and total fertility rates by producing estimates for 3 years leading up to each survey, assuming that marital status was constant in that period. The method of period fertility has been employed widely in measuring fertility rates (Garenne & Zwang, 2006; Chemhaka, 2009).

The method requires births to women (numerator) and exposure of women to childbearing (denominator) for a specified period. To avoid having to make additional assumptions about the exposure to the risk in the month of each interview, both exposure and births occurring in the month of the interview were ignored (Moultrie, 2013a).

Table 3.3: P/F Ratios 1988-2015

	Years prior to survey						
year of survey	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**
1988	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**	**1959-1964**	**1954-1959**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	1.094	1.062	0.926	0.984	1.096	0.520	
25-29	1.151	***0.946***	***0.913***	1.082	***0.692***		
30-34	1.012	***0.891***	***0.948***	***1.025***			
35-39	***0.952***	***0.813***	1.463				
40-44	***0.921***	1.570					
45-49	1.754						
1994	**1989-1994**	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**	**1959-1964**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	1.011	1.185	0.895	1.040	0.968	0.610	
25-29	1.302	***1.040***	0.998	***0.939***	***0.495***		
30-34	***1.195***	1.151	***0.898***	***0.438***			
35-39	1.383	***1.036***	***0.391***				
40-44	***1.276***	***0.433***					
45-49	***0.528***						
1999	**1994-1999**	**1989-1994**	**1984-1989**	**1979-1984**	**1974-1979**	**1969-1974**	**1964-1969**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	0.980	0.981	1.203	0.886	1.021	0.488	
25-29	***0.972***	1.289	***1.046***	0.962	***0.375***		
30-34	1.343	***1.162***	1.114	***0.336***			
35-39	***1.269***	1.281	***0.379***				
40-44	1.478	***0.431***					
45-49	***0.498***						
2005	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**	**1975-1980**	**1970-1975**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	1.000	1.008	0.979	1.111	0.979	0.581	
25-29	1.050	***0.960***	1.161	1.153	***0.429***		
30-34	***1.005***	1.154	1.260	***0.461***			
35-39	1.230	1.301	***0.480***				
40-44	1.441	***0.479***					
45-49	***0.521***						
2010	**2005-2010**	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**	**1975-1980**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	0.977	0.973	1.025	0.968	1.140	0.505	
25-29	0.962	1.008	***0.956***	1.202	***0.496***		
30-34	1.062	***0.918***	1.183	***0.510***			
35-39	***0.965***	1.174	***0.483***				
40-44	1.262	***0.465***					
45-49	***0.500***						

Table 3.3 (continued)

year of survey	Years prior to survey 0-4	5-9	10-14	15-19	20-24	25-29	30-34
2015	**2010-2015**	**2005-2010**	**2000-2005**	**1995-2000**	**1990-1995**	**1985-1990**	**1980-1985**
15-19	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20-24	1.080	0.980	0.940	1.012	0.917	0.681	
25-29	1.038	***0.889***	1.000	***0.890***	***0.501***		
30-34	***0.871***	***0.957***	***0.878***	***0.443***			
35-39	***0.909***	***0.843***	***0.411***				
40-44	***0.770***	***0.381***					
45-49	***0.344***						

Following Moultrie (2013a), exposure to risk of childbearing for each woman at the beginning of the year of the interview was computed at age *x* and age *x+1* as

$$E(x_I, y_I) = \frac{M^m{}_B - 0.5}{12} \, and \, E(x_{I+1}, y_I) = \frac{M_I - M^m{}_B - 0.5}{12} \qquad [3.5]$$

Where $M^m{}_B$ is the mother's birth month and M_I is the interview month.

If the birth month of the woman was the same as the month of the interview, then the exposure calculation was modified for age *x* and age *x+1* to be

$$E(x_I, y_I) = \frac{M_I - 1}{12} \, and \, E(x_{I+1}, y_I) = 0 \qquad [3.6]$$

Exposure in the last complete calendar year before the survey was calculated as

$$E(x_{I-1}, y_{I-1}) = \frac{M^m{}_B - 0.5}{12} \, and \, E(x_I, y_{I-1}) = 1 - E(x_{I-1}, y_{I-1}) \qquad [3.7]$$

It then followed that exposure for earlier complete calendar years was calculated as

$$E(x, v-1) = E(x-1, v-2) = \ldots = E(x-k, v-k-1) \qquad [3.8]$$

For surveys carried out over two years (1988/9, 2005/6, and 2010/11), total exposure in the final calendar year was based on the partial exposure of women interviewed in the final year of fieldwork, whereas total exposure in the immediately preceding year comprised of the partial exposure of women interviewed in the first year of fieldwork and the full exposure in that year of women interviewed in the final year of fieldwork. Exposure for preceding years was shifted upwards by 1 year at each *y-1* year and summed in order to get exposure up to 3 years before the survey which also enabled calculation of rates for women aged 10-14 years who are not eligible for the DHS.

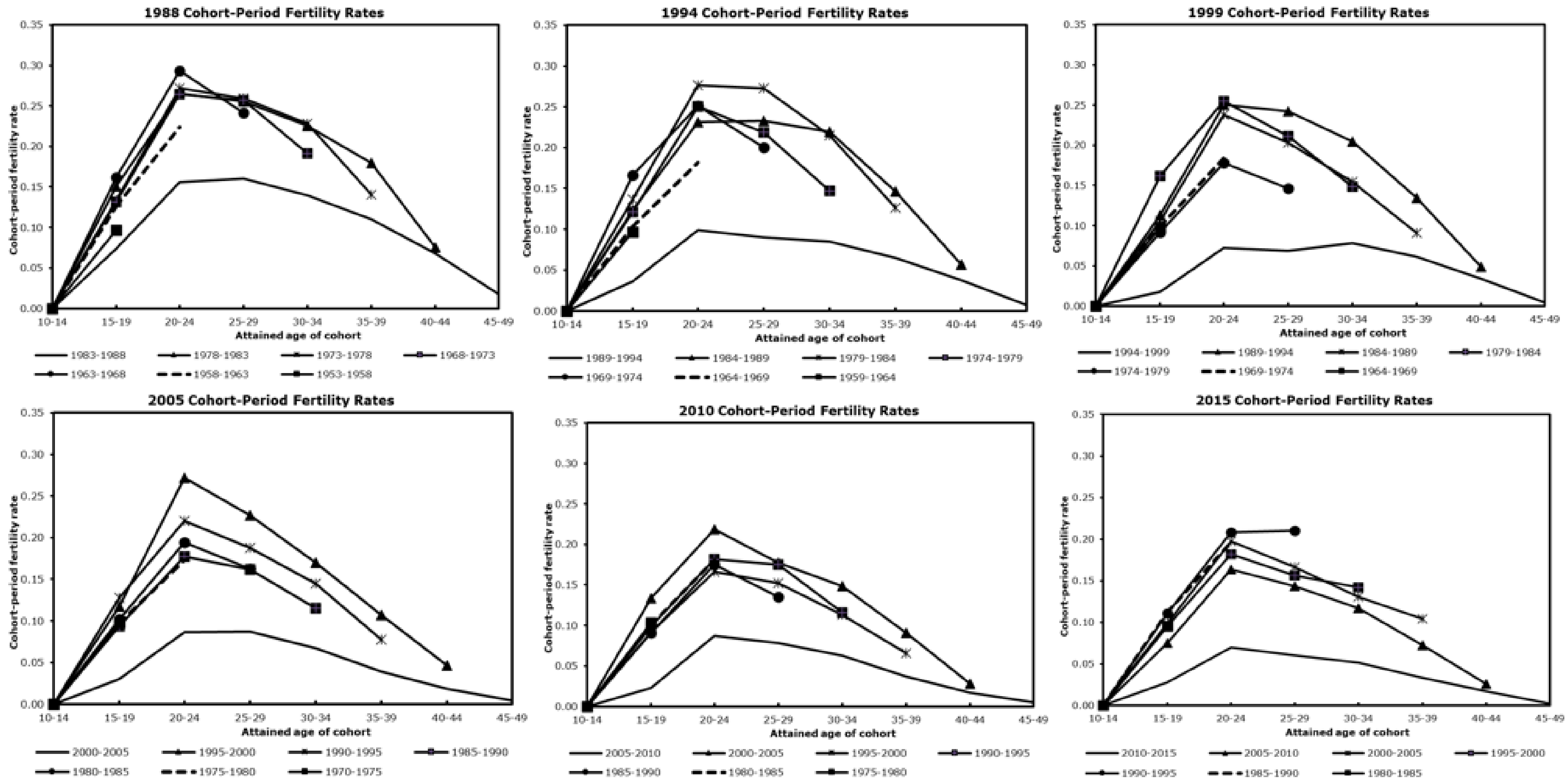

Figure 3.1: Cohort-period age-specific fertility rates 1988-2015

Age-specific fertility rates (ASFRs) corresponding to each survey year and three single years prior to each survey were computed as

$$f(x,t) = \frac{B_x(t)}{E_x(t)} \qquad [3.9]$$

Since single year ASFRs are often inflated by recall errors found in birth history data, these were aggregated into 5-year groups and averaged over 3 years to get more reliable estimates and avoid flattening the trend (Moultrie et al 2013). ASFRs show the age pattern of fertility in a population (Elkasabi, 2019). Total Fertility (TF) is the mean number of children a woman would have by age 50 if she survived to age 50 and were subject to the age-specific fertility rates observed each year throughout her life. The total fertility rates (TFRs) were computed as $TFR = 5.\sum_{i}^{j} ASFR$ [3.10]

In a similar approach, age specific and total fertility rates for never married and ever married women were derived by limiting births and exposure to each respective subgroup. In this research, women were classified into two categories which were never married if the woman reported being never married at the time of the survey and ever married if she reported otherwise. It is expected that premarital fertility levels will be low and concentrated at younger ages. As a result, for never married women, questionable TFRs obtained will be dismissed as an artifact of statistically unreliable components especially for 40-44 and 45-49-year old women (Parr, 1995). According to DHS guidelines, indicators drawn from less than 125 person years exposure must be ignored whilst those drawn from less than 245 person years exposure must be interpreted with caution.

3.6 TIME-TO-EVENT ANALYSIS

3.6.1 Cox Proportional-Hazards Regression modelling of factors associated with timing of premarital first births

Survival analysis, referred to herein as time-to-event analysis due to the nature of research, is a technique that analyses time duration until an event of interest happens. Time-to-event analysis is robust in that the outcome of interest is not only whether an event occurred, but also when it occurred. This is crucial in investigating the occurrence of premarital first births and the ages at which they occur. The time to premarital first births analysis employed the Cox Proportional-Hazards regression model, where each date at premarital first birth coded in century month code (CMC) format was scaled by 12 months to obtain time values in years. The Cox Proportional Hazards model is a semiparametric model that does not assume any distribution for the baseline hazard. The model is defined as

$$h_{t,x} = B_0(t)e^{(\sum_{i=1}^{k} BiXi)} \quad [3.11]$$

where $B_0(t)$ is the baseline hazard at time t and X_1 to X_j are independent covariates. Unlike the logistic regression model, the Cox Proportional-Hazard regression model has the advantage of rigorous time-to-event analysis.

The first step in the analysis was the derivation of life tables to compare median ages at which women have premarital first births between 1988 and 2015. Thereafter, the Kaplan-Meier survivor function was used to compute median ages at premarital births and incidence rates with respect to each covariate. The Kaplan-Meier technique is a non-parametric approach that breaks down estimates of the survival function into a series of intervals based on observed event times. The survival function $S(t)$ is the probability that a woman does not experience a premarital first birth past age t years. The median is the value of t where $S(t)=0.5$ (that is 50% of the cohort has not experienced a premarital first birth). The median age at premarital birth is estimable only if the Kaplan-Meier curve drops to or below 0.5.

Lastly, a stepwise Cox Proportional-Hazards regression of three nested models was used to examine factors associated with timing of premarital first births. The dependent variable (event of interest) was the time from woman's birth to her premarital first birth. It measured the significance of other covariates on the occurrence of a premarital first birth (Otieno & Bocquier, 2004). The terminal event was a premarital first birth and the censoring event was first marriage before first birth or end of survey. Non-informative censoring was used so that censoring time was independent of event time. An assumption that censored individuals have the same probability of experiencing an event as individuals that remain in the study was made. Women who never gave birth throughout the analysis were right censored.

The first model included proximate (biological and behavioural) factors, age of respondent, age at first sexual activity, age at first marriage, and history of contraceptive use. The second model tested whether the socio-economic variables, education level, media exposure, type of residence, and wealth status were significant indirect factors of premarital fertility with the proximate determinants set as control variables. The third model tested the association of ethnicity, religion, and region with premarital fertility through proximate determinants. An assumption on satisfactory number of events for adequate statistical power was made.

Model diagnostics were done using log-rank tests for equality, tests for proportionality and goodness of fit tests. Log-rank tests test the hypothesis of no statistical difference in survival between groups. The Schoenfeld and Schoenfeld scaled residuals test was used to test for proportionality. The assumption of proportionality is such that the effect of any covariate is the same at any time during follow up. This assumption weakens if several covariates vary over time (Soura, Lankoande, Sanogo *et al.*, 2018). To overcome this, the sample was limited to first births that occurred five years before each survey.

3.6.2 Forest plot analysis

To summarise the changes in factors associated with timing of premarital first births, the results were fitted onto a forest plot. Where little variation was seen in each result per survey year, the fixed effect model was used to draw a conclusion on the overall effect. A fixed effect model shows the combined effect for the six studies by assuming that all studies considered in the analysis were conducted under similar conditions with similar subjects (Hunter & Schmidt, 2002; Borenstein, Hedges & Rothstein, 2010; Berhan & Berhan, 2014). That is to say that the only difference between the studies is their power to detect outcomes.

In the case of clear heterogeneity, a conclusion was drawn using the random effect model estimate. Heterogeneity refers to the variation in outcomes between studies. A random effects model states that there is a distribution of the true effect sizes and the analyst's goal is to establish the mean of this distribution. It allows a normally distributed variation of the outcomes between studies. A random effects model is usually the best bet in medial decision-making context. Random effects model assumes that differences in effect size could be attributed not only to random error, but also to variation in true exposure effects, that is, heterogeneity (Hunter & Schmidt, 2002; Borenstein, Hedges & Rothstein, 2010; Berhan & Berhan, 2014).

3.7 CONCLUSION

This chapter discussed the source, characteristics, and quality of the data used in this research. This chapter also detailed the main methodologies used to examine premarital fertility levels and factors associated and with premarital first births. These methods are the direct estimation method and the Cox-proportional hazards model. The following chapter will present findings obtained from running these analyses.

4 DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

This research seeks to examine changes in levels and factors of premarital fertility among Zimbabwean women. The focus of this chapter is to present findings from analysing ZDHS datasets for the years 1988, 1994, 1999, 2005, 2010, and 2015 using direct fertility estimation techniques and time-to-event analyses. The first section presents findings on trends of overall, premarital, and post marital fertility levels between 1988 and 2015. The second section discusses changes in factors associated with timing of premarital first births.

4.2 OVERALL, PREMARITAL, AND POST MARITAL FERTILITY TRENDS

Figure 4.1 shows average 3-year TFRs for overall, premarital, and post marital fertility. Fertility declined and stalled differently at overall and post marital levels than it did at premarital level. On average, between 1992 and 2015, overall and post marital TFR oscillated around 4 and 6 children per woman, respectively. Despite slight disruptions, the premarital TFR trend was mainly constant, showing an average of 0.7 children per woman. It was worth noting that all three trends slightly reversed upwards in 2010.

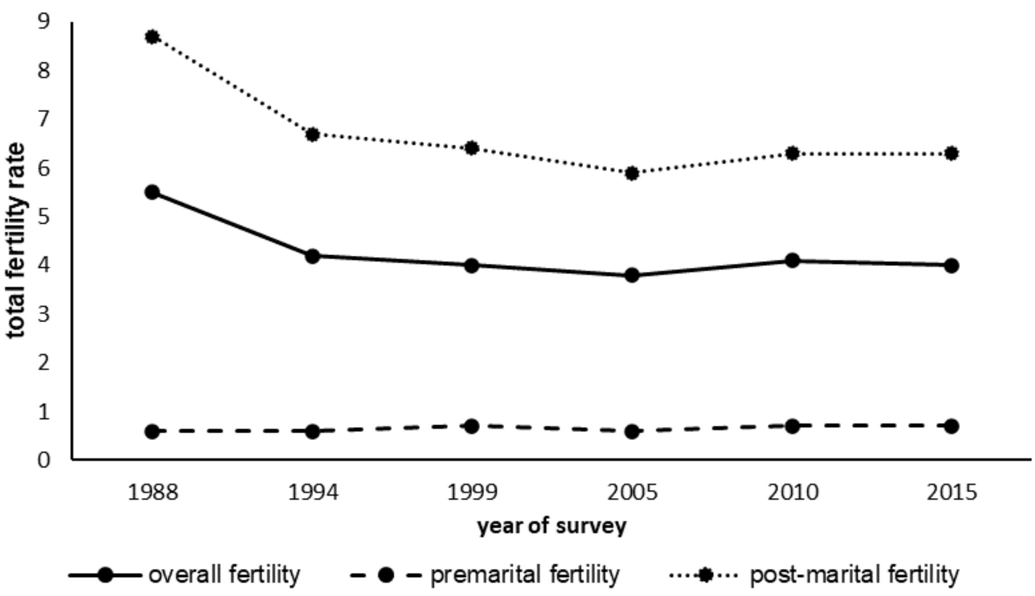

Figure 4.1: Trends in total fertility rates 1988-2015

Figure 4.2 shows patterns of overall ASFRs derived for 3 years leading up to each survey. Levels of fertility declined markedly between 1988 to 2015 with significant declines between 1988 and 1994. The bulk of fertility occurred between 20 and 29 years in all survey years but the peak was flatter and more concentrated at ages 25-29 years in 2015. While this indicated later ages at fertility over time, the fertility schedule remained wide, with childbearing continuing until 49 years, a reason to investigate the possibility of premarital fertility occurring in older ages.

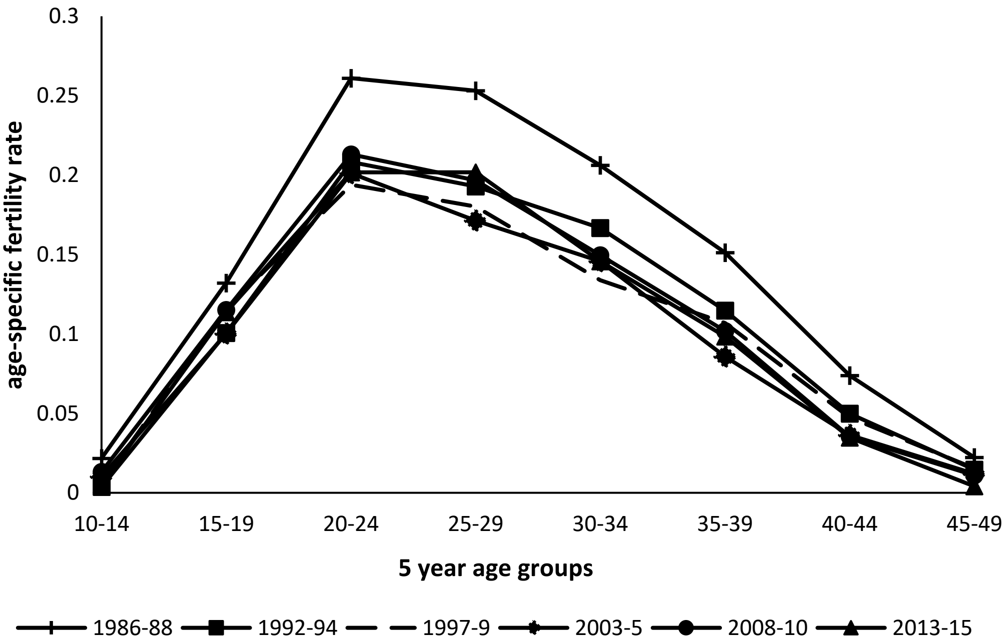

Figure 4.2: Overall age-specific fertility rates per survey 1988-2015

Figure 4.3 shows average premarital ASFRs for 3 years leading up to each survey. Premarital childbearing was concentrated between ages 15-24 years in each survey. Premarital fertility declined significantly among women aged 10-24 years from 1992 to 2015 and increased among women aged 25+ years from 2003 to 2015. Hence, women delayed premarital childbearing past young womanhood over time.

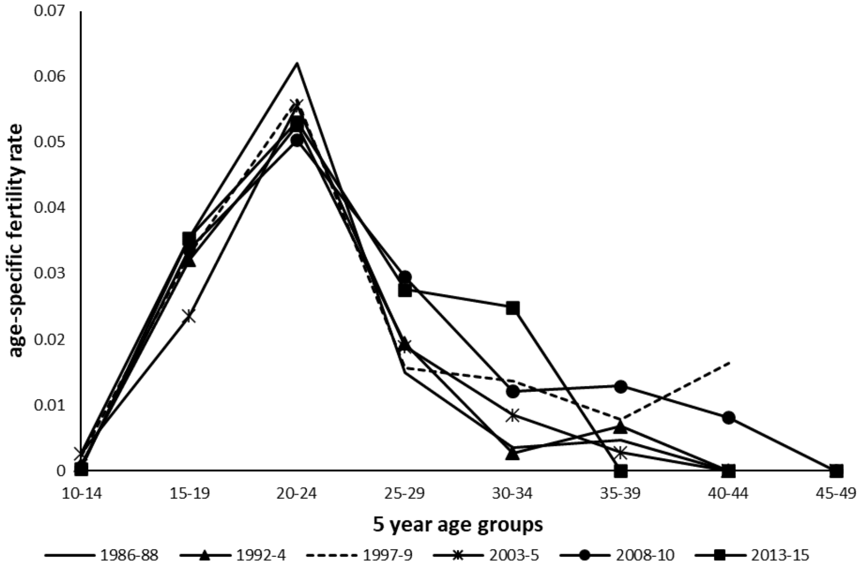

Figure 4.3: Premarital age-specific fertility rates per survey 1988-2015

Figure 4.4 shows average post marital ASFRs for 3 years leading up to each survey. In all survey years, person years of exposure at ages 10-14 years were less than 125 and were excluded as per the reasons given in Chapter Three. Overall, the trend for post marital fertility was like that of overall fertility. Post marital fertility was highest in 1988 at all ages compared to other survey years but declined rapidly thereafter among older women compared to adolescents. This indicates that marital fertility levels have declined but childbearing still occurs immediately after marriage.

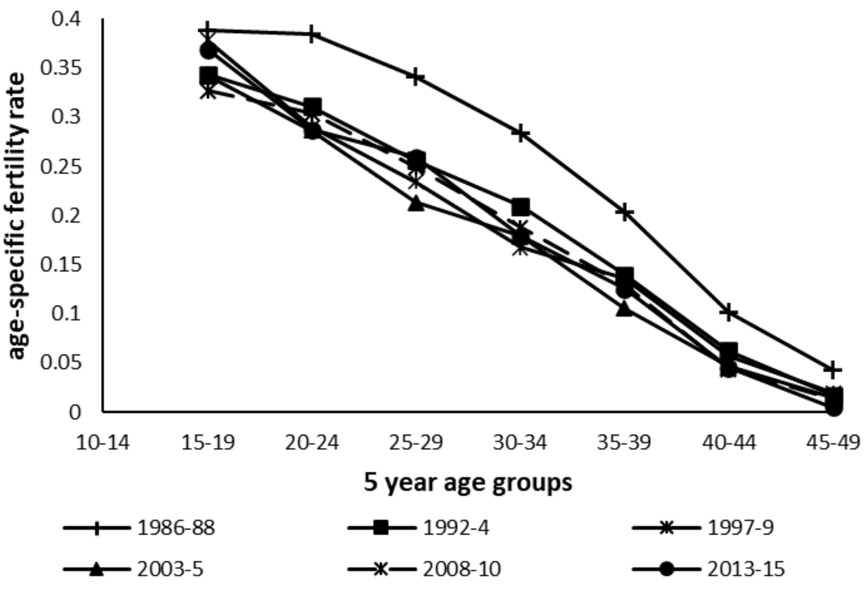

Figure 4.4: Post-marital age-specific fertility rates 1988-2015

4.3 TIME TO EVENT ANALYSIS - timing of premarital first births

The analysis of timing of premarital first births was done using life tables and Kaplan-Meier survival estimates producing median ages at premarital first births and incidence rates of premarital first births by covariate. This to establish how the distribution of occurrence of premarital first births differed from one subgroup of women to another by covariate.

4.3.1 Overall median age at premarital first birth by survey

Figure 4.5 shows life tables modelling the proportions of women who, at a specific age (in years), had never had a premarital first birth by survey. The decline in proportions of adolescent and young women who had never yet had a premarital first birth was more pronounced between 1988 and 1999 compared to later years. This confirms the findings in the preceding section that from 2005 onwards, women began to delay premarital childbearing. The haphazard trend observed after 35 years in each survey is attributed to fewer premarital births occurring to women aged 35 years and above.

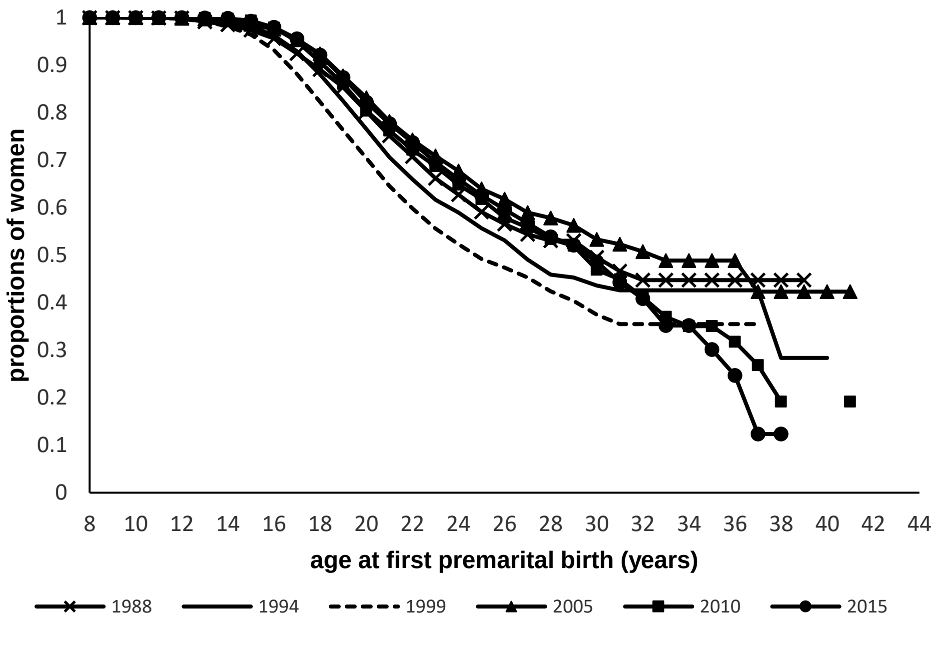

Figure 4.5: Proportions of women who had never experienced premarital first births by age t (in years) from 1988-2015

Median ages of experiencing premarital first births were further decomposed by covariate (Table 4.1). Additionally, incidence rates of premarital first births were computed by covariate and are shown in Figures 4.6, 4.7, and 4.8 in the order of biological and behavioural, socio-economic, and cultural factors.

Table 4.1: Median age at premarital first birth 1988-2015

	Median age at premarital first birth (years)					
	1988	1994	1999	2005	2010	2015
Age at survey (ref. 15-19)	18.8	19.1	19.5	19.4	19.4	19.4
20-24	22.5	24.3	22.8	23.5	23.9	23.0
25+	30.7	37.8	30.9	36.1	32.1	31.1
Age at first sexual activity (ref.<15)	23.8	24.6	23.2	22.1	19.7	19.6
15-19	26.3	24.8	25.4	27.3	24.9	24.0
20+	37.0	37.8	36.4	36.1	35.1	32.2
Age at first marriage (ref.<20)	.	.	.	.	.	.
20-24	.	.	.	.	.	.
25+	26.8	29.6	29.4	22.4	20.5	29.1
Contraception use (ref. never)	31	27.6	23.5	25.8	30.3	25.7
Ever	26.8	28.0	30.9	32.5	31.0	31.9
Level of education (ref.<=primary)	28.7	37.8	28.7	29.4	26.6	26.5
Secondary+	30.3	28.5	31.8	32.5	31.4	31.9
Wealth status (ref. poorest)	27.8	27.9	28.7	29.4	31	27
poorer	.	30.4	25.4	30.0	30.3	24.5
middle	.	.	28.8	36.1	29.8	30.2
richer	25.5	27.0	29.5	29.4	29.3	30.2
richest	26.8	27.8	31.8	31.8	35.1	32.2
Type of residence (ref. rural)	31	30.4	28.8	36.1	29.8	29.8
urban	25.5	27.0	29.5	32.5	35.1	32.2
Media exposure (ref.no)	30.7	37.8	27.8	36.1	30.3	30.2
Yes	26.8	30.4	31.8	32.5	31.4	32.2
Religion (ref. Apostle)	.	.	29.5	30.3	30.3	30.0
Christian	26.3	29.6	28.8	32.5	31.0	30.9
Other	.	.	.	23.9	27.2	28.1
Ethnicity (ref. Shona)	.	37.8	.	36.1	32.1	31.1
Ndebele	20.8	20.5	20.9	22.0	20.9	20.7
Region (ref. Manicaland)	.	.	.	31.8	.	30.2
Mashonaland Central	24.8	30.4	.	26.8	29.3	30.9
Mashonaland East	.	27.9	.	.	29.8	.
Mashonaland West	.	.	26	26.8	30.4	30.2
Matebeleland North	23.6	20.3	21.3	21.3	22.0	21.5
Matebeleland South	20.8	20.4	20.1	20.8	20.5	19.9
Midlands	27.8	37.8	28.8	.	30.3	.
Masvingo	.	.	.	.	32.1	30.3
Harare /Chitungwiza	29.5	.	.	.	.	32.2
Bulawayo	22.0	23.4	22.5	25.2	25.8	24.9

4.3.2 Proximate (biological and behavioural) factors

Incidence rates of premarital first births among adolescent and young women decreased markedly between 1988 and 2015 but remained low and constant among older women. Where sexual activity had begun before the age of 15 years and where contraception use was low, incidence rates remained significantly higher and rose continuously compared to where sexual activity had begun at a later age and where contraception use was high. Also, the median age at premarital first birth decreased from 24 years to 20 years where sexual activity had begun before the age of age 15. However, marriage after the of age 20 years resulted in increased incidences of premarital first births over the same period.

4.3.3 Socio-economic factors

Incidences of premarital first births among women with at least secondary education went from being higher between 1988-99 to being lower from 2005 onwards compared to women with primary or no formal education. Similar trends were observed among urban women, women of average or higher economic status, and women with media exposure. This shows that while improved socio-economic status translated to higher incidences of premarital births in the earlier years of the fertility transition, this trend was reversed from 2005 onwards.

4.3.4 Cultural and religious factors

Between 1988 and 2015, incidence rates among Ndebele women were up to four times higher compared to Shona women. Incidence rates were also highest in Matebeleland and Bulawayo, largely occupied by the Ndebele, moderate in Midlands were both ethnicities almost equally dominate, and lowest in remaining regions largely occupied by the Shona. Median ages at premarital first birth for Ndebele women were as early as 22 years whereas Shona women likely experienced premarital first births after the age of 25 years. While there were small differences in median ages at premarital first births by religion, incidence rates among Apostles (whose largest following are Shona) and Christians declined whereas incidence rates among women of other religions increased.

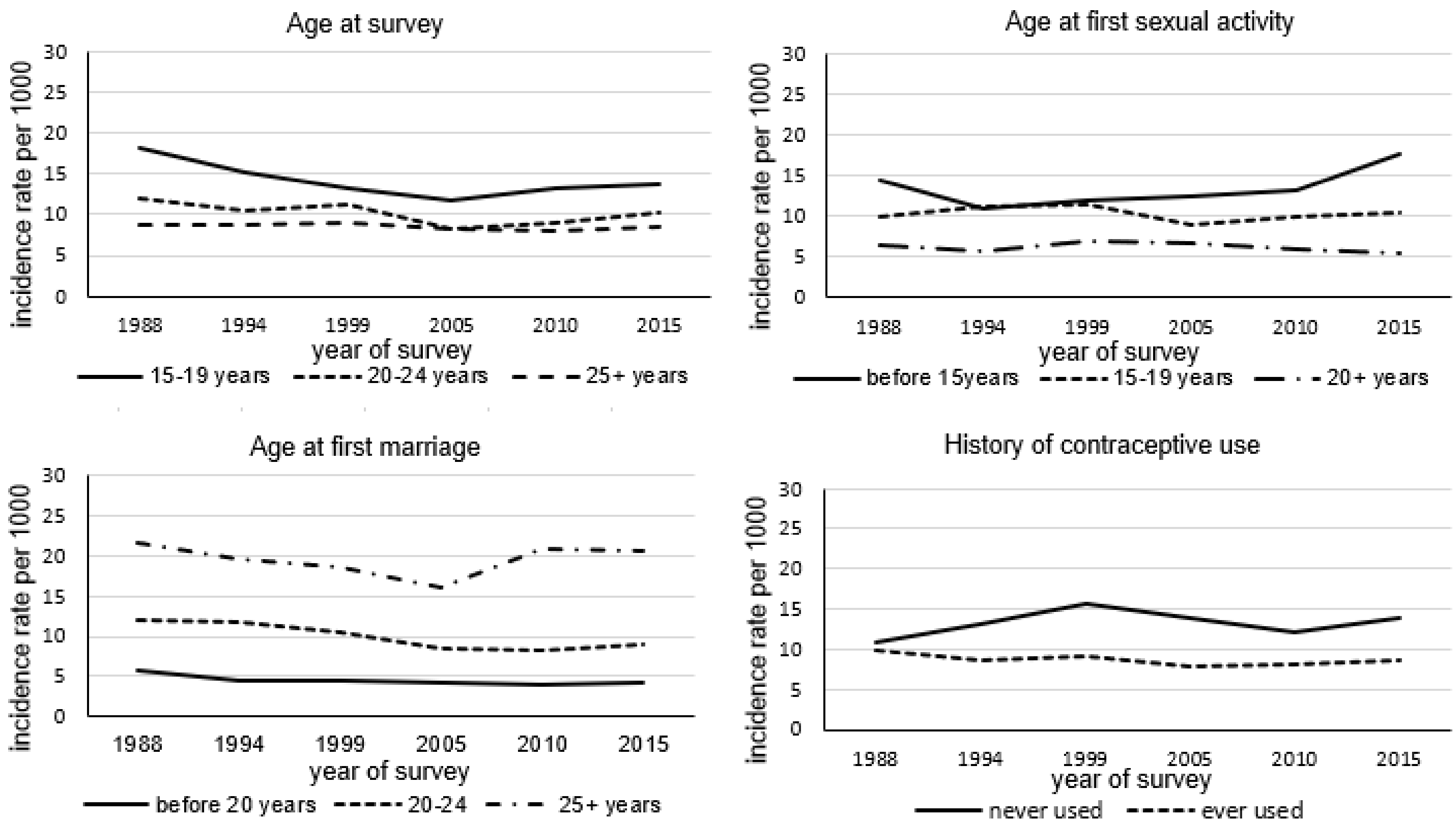

Figure 4.6: Incidence rates of premarital first births by proximate (biological and behavioural) factors per 1000 women 1988-2015

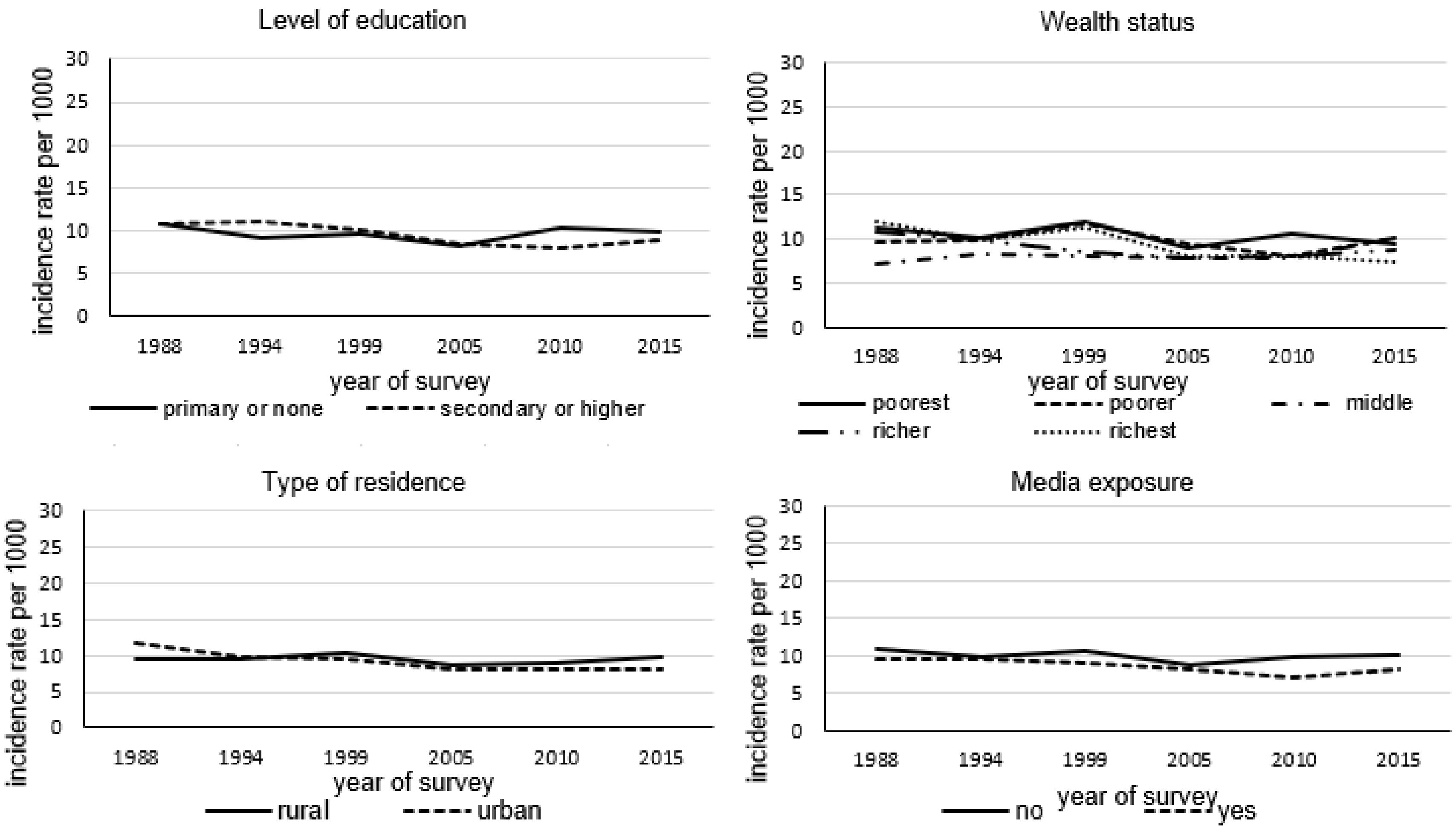

Figure 4.7: Incidence rates of premarital first births by socio-economic factors per 1000 women

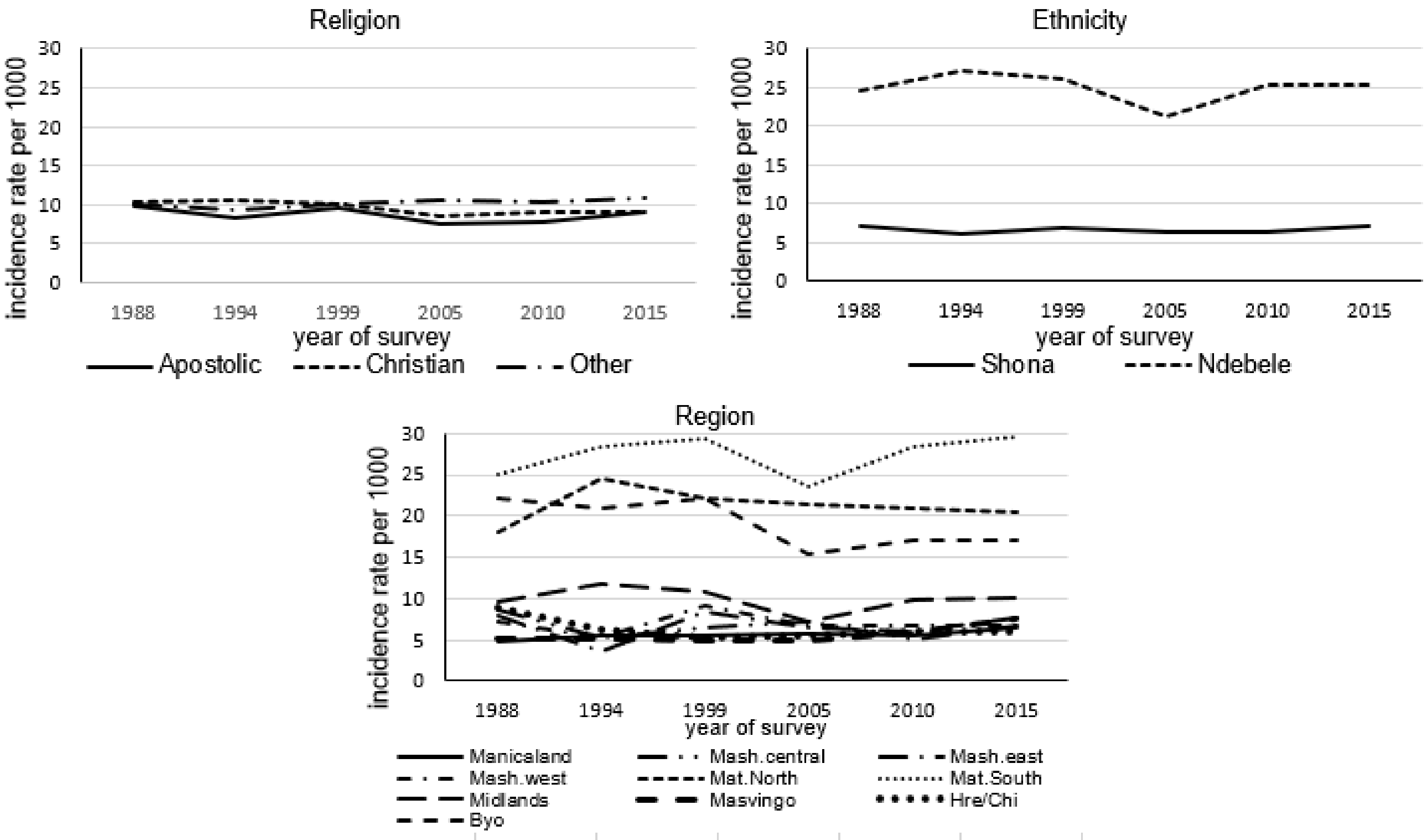

Figure 4.8: Incidence rates of premarital first births by cultural factors per 1000 women

4.3.5 Factors associated with timing of premarital first births

Cox proportional-hazards regression was used to examine the factors associated with timing of premarital first births between 1988 and 2015 using three stepwise models. Model I tested the significance of the proximate factors; age, sexual activity initiation, entry into first marriage, and contraception use in explaining the timing of premarital first births. Models II and III tested the importance of socio-economic and cultural factors in explaining the timing of premarital first births through the proximate factors in model I. The hazard ratios for each model and survey year from 1988 to 2015 are presented in Table 4.2. Additionally, forest plots (at 95% confidence intervals) are used to describe the extent of the changes in the significance of these factors over time and interpret their average effect on the timing of premarital first births.

Age of respondent at survey

The non-linear effect of age of respondent on the timing of premarital first births was tested by comparing the relative risks between women aged 15-19 years, 20-24 years, and 25+ years. Overall, an increase in age group from 15-19 years was negatively associated with premarital childbearing (Table 4.2).

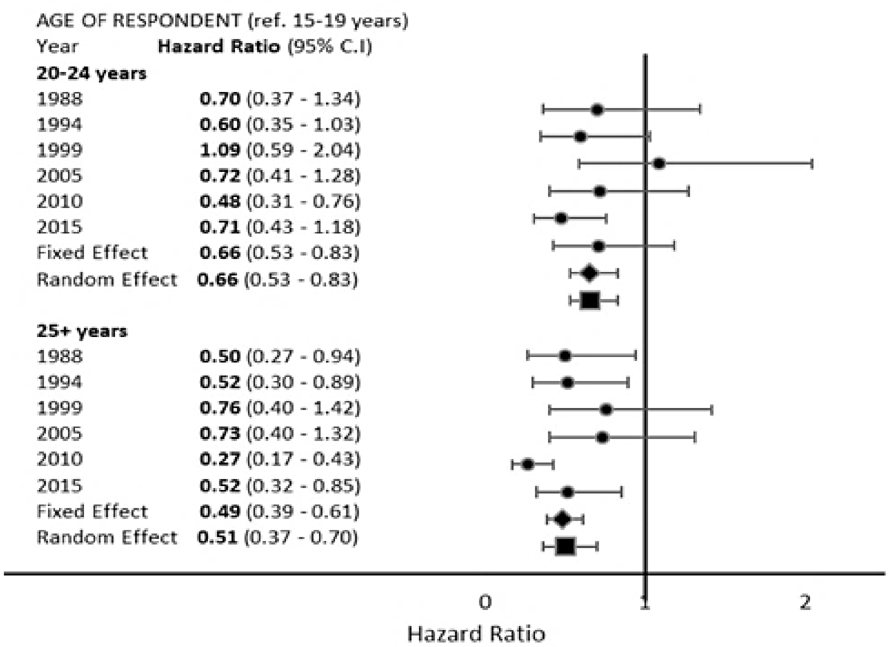

Figure 4.9: Hazard ratios (95% C.I) associated with age of respondent from 1988 to 2015

Table 4.2: Hazard Ratios Intervals for model I, II and III between 1988 and 2015

	1988			1994			1999			2005			2010			2015		
Model	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
	Hazard Ratio p<0.05 * p<0.01**																	
Age at survey (ref.15-19)																		
20-24	0.73	0.72	0.70	0.64	0.65	0.60	0.92	1.08	1.09	0.73	0.73	0.72	0.50**	0.50**	0.48**	0.70	0.72	0.71
25+	0.50*	0.50*	0.50*	0.58*	0.58	0.52*	0.70	0.78	0.76	0.79	0.76	0.73	0.30**	0.28**	0.27**	0.50**	0.50**	0.52**
Age at first sexual activity (ref. <15)																		
15-19	0.38 **	0.39**	0.35 **	0.49**	0.52**	0.54**	0.27**	0.30**	0.27**	0.21 **	0.22**	0.20**	0.30**	0.34**	0.34**	0.36**	0.37**	0.37**
20+	0.07 **	0.07**	0.07**	0.07**	0.08**	0.10 **	0.03**	0.04**	0.04**	0.04 **	0.04**	0.04**	0.04**	0.05**	0.06**	0.04 **	0.04**	0.05**
Age at first marriage (ref. <20)																		
20-24	2.01**	1.92**	1.79**	3.26**	3.32**	2.60**	3.74**	4.00**	3.00**	2.76**	2.84**	2.30**	3.19**	3.35**	2.85**	3.09**	3.20**	2.84**
25+	2.75**	2.44**	2.47**	4.64**	4.73**	3.48**	7.64**	9.10**	6.56**	4.72**	5.08**	4.52**	7.95**	8.17**	6.92**	6.24**	6.45**	5.65**
Contraception history (ref. never)																		
Ever	1.14	1.17	1.39	1.12	1.21	1.43**	1.09	1.27	1.38*	1.36	1.54	1.67*	1.50*	1.60**	1.60**	1.17	1.25	1.39
Level of education (ref. <=primary)																		
Secondary+		1.10	1.02		0.85	0.72*		0.82	0.79		0.91	0.91		0.63**	0.63**		0.76**	0.77**
Wealth status (ref. poorest)																		
poorer		0.84	1.05		0.91	0.88		1.07	1.04		1.21	1.29		0.92	1.02		1.13	1.14
middle		0.67	0.77		0.73	0.83		0.56**	0.60**		0.91	1.01		0.83	0.93		0.95	0.98
richer		0.75	0.81		0.98	1.05		0.85	0.81		0.70	0.77		0.90	0.91		0.99	0.98
richest		0.76	0.86		0.75	0.93		1.18	0.94		0.71	0.77		0.65	0.63*		0.85	0.80
Type of residence (ref. rural)																		
urban		1.62*	1.38		0.95	0.75		0.84	0.95		1.05	1.15		1.09	0.92		0.91	1.04
Media exposure (ref. no)																		
Yes		0.69**	0.68**		1.06	1.05		0.80	0.92		1.09	0.99		0.88	0.95		1.01	1.08

[5]**Table 4.2 Continued**

	1988			1994			1999			2005			2010			2015		
Model	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
	Hazard Ratios p<0.05 * p<0.01**																	
Religion (ref. Apostolic)																		
Christian			0.82			1.07			0.98			1.36*			1.06			0.96
Other			0.76			0.93			0.94			1.39			1.11			1.09
Ethnicity (ref. Shona)																		
Ndebele			4.39**			1.65*			1.66			3.18**			2.11**			2.36**
Region (ref. Manicaland)																		
Mashonaland Central			1.83*			0.93			1.19			1.73			0.95			1.03
Mashonaland East			1.72*			0.70			2.01*			1.46			0.89			1.33
Mashonaland West			1.51			0.85			1.70			1.22			1.09			1.22
Matebeleland North			1.45			2.35*			1.54			1.24			1.17			1.03
Matebeleland South			1.27			2.21*			2.23*			1.12			1.08			1.46
Midlands			1.31			1.98*			1.92*			1.26			1.45			1.45
Masvingo			1.08			0.88			0.70			0.98			0.83			1.15
Harare/Chitungwiza			1.64			1.30			0.94			1.09			1.32			0.90
Bulawayo			1.08			2.20			1.72			0.72			1.30			1.22

[5] All models run at 5% level of significance. Age of respondent, age at first sex, and age at first marriage given in years.
H.R refers to Hazard Ratio and C.I refers to Confidence Interval

Adding socio-economic covariates in model II (education, residence, wealth status, and media exposure) and cultural/religious covariates in model III (religion, ethnicity, and region) slightly modified the hazard ratios in each age category albeit leaving the direction of association unchanged. Due to data quality issues, age lost significance in explaining premarital fertility in 1999 and 2005 so that as data quality improved from 2010 onwards, age became strongly significant again.

The random effect estimates in Figure 4.9 showed that on average, compared to 15–19-year-old women, women aged 20-24 years and 25 years and above had a 34.0% and 49.3% lower risk of experiencing a premarital first birth, controlling for socio-economic and cultural/religious factors. While the risk of experiencing a premarital first birth decreases as age increases, there is no significant difference in the relative risk of premarital childbearing between 15-19 and 20-24-year-old women.

Age at sexual activity initiation

The effect of delaying sexual activity on premarital fertility was tested by comparing women who initiated sexual activity before the age of 15 years to those who begun sexual activities between 15-19 years and at 20 years or later. Generally, delaying initiation of sexual activity to 15 years or later was strongly significant and translated to a lower risk of having a premarital first birth. Adding socio-economic variables in model II slightly inflated the hazard ratios in all survey years while adding cultural values in model III almost always depressed them, all without altering the direction of association.

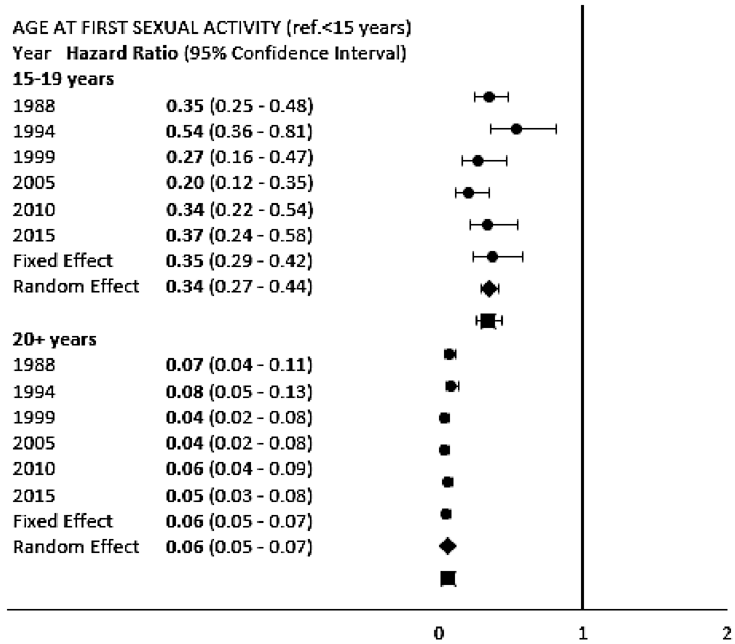

Figure 4.10: Hazard ratios (95% C.I) associated with age at first sexual activity from 1988 to 2015

There was minimal variation in the adjusted hazard ratios obtained within 1988 and 2015 as seen in the forest plot in Figure 4.10. Hence the fixed effect estimate showed that on average, compared to initiating sexual activity before 15 years, starting sexual activities at 15-19 years or at 20 years or later was associated with a 65.2% and 94.2% lower hazard of having a first birth before marriage respectively, holding other covariates constant. Therefore, starting sexual activity after adolescents almost nullifies the risk of having a premarital first birth.

Age at first marriage

Delaying marriage past adolescence and young motherhood was strongly significant and positively associated with timing of a premarital first birth in all survey years. Controlling for other covariates, getting married at 20-24 years compared to before 20 years bore double the risk in 1988 and triple the risk in 2015 whereas getting married at 25 years or later carried up to four times the same risk by 2015 as shown in Table 4.2. Hence, the risk of premarital fertility if marriage occurred past adolescence increased between 1988 and 2015. This indicates that it has become more likely with time that delaying marriage past adolescence will result in a premarital first birth.

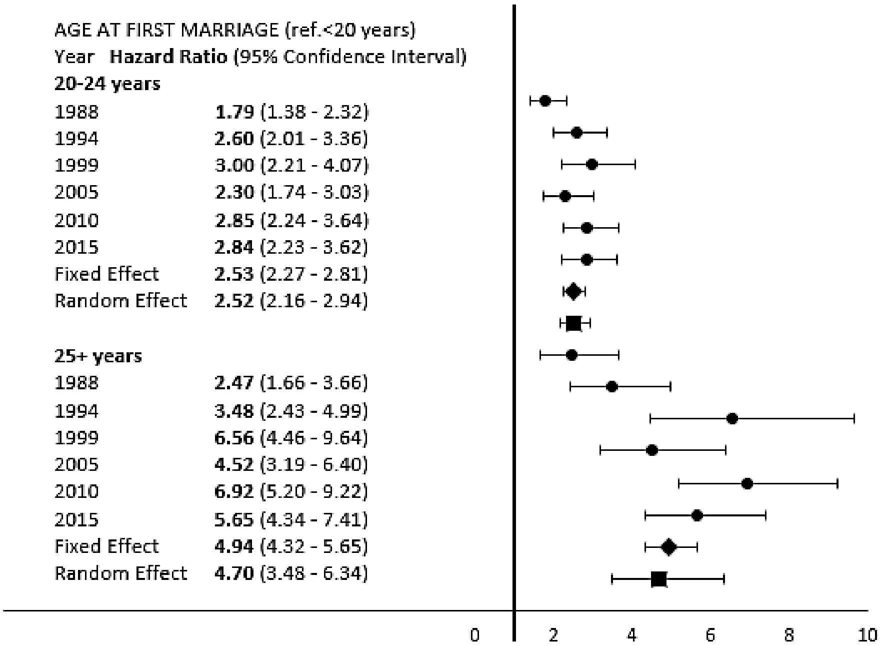

Figure 4.11: Hazard ratios (95% C.I) associated with age at first marriage from 1988 to 2015

The forest plot on Figure 4.11 displayed very wide confidence intervals for women who married at 25 years or later because in each survey very few women were still unmarried at the age of 25. However, the random effects estimate confirmed that the risk of premarital childbearing heightened as marriage was delayed.

History of contraceptive use

History of contraceptive use translated to a higher relative risk of experiencing a premarital first birth. Beside losing statistical significance in 1988 and 2015, the increase in hazard ratios between 1994 (H.R=1.43 p<0.01) and 2010 (H.R=1.60 p<0.01) showed that the risk of premarital fertility became more pronounced with time if one had ever used modern contraception. In Figure 4.12, the fixed effect estimate showed that a history of modern contraceptive use was associated with a 45.5% higher relative risk between 1988 and 2015.

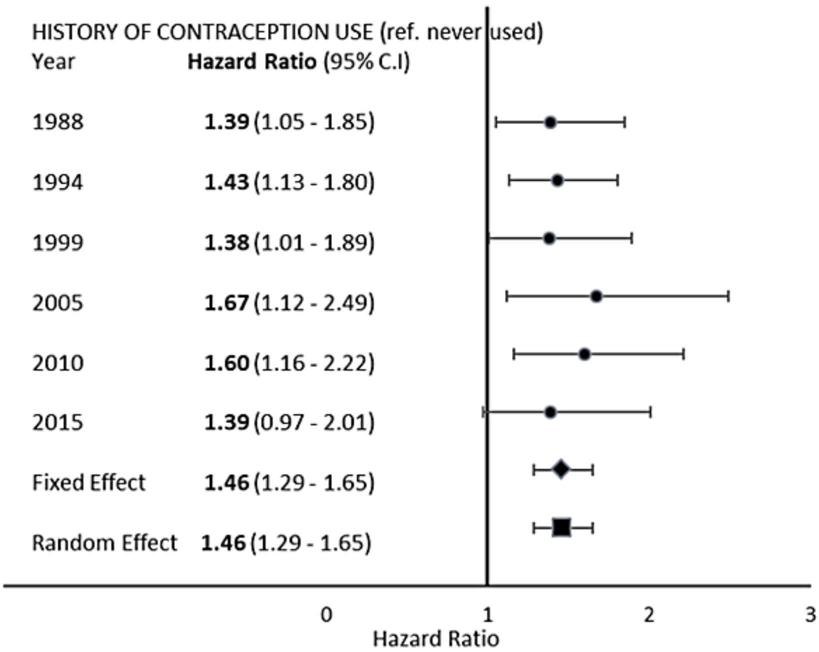

Figure 4.12: Hazard ratios (95% C.I) associated with history of contraceptive use from 1988 to 2015

Controlling for socio-economic and cultural variables in models II and III respectively, significantly inflated the hazard ratios in all six survey years. Therefore, socio-economic, and cultural factors were important in explaining the timing of premarital first births by history of modern contraceptive use.

Level of education

The variable, level of education, was used to compare the risk of having a premarital first birth between women with primary or no education and women with at least secondary education. From 1994 onwards, having secondary or higher education translated to a lower risk of premarital fertility, controlling for cultural variables (Table

4.2). In Figure 4.13, the overall random effect showed that on average women with secondary or higher education had a 22.7% lower relative risk of a premarital first birth compared to their less educated counterparts.

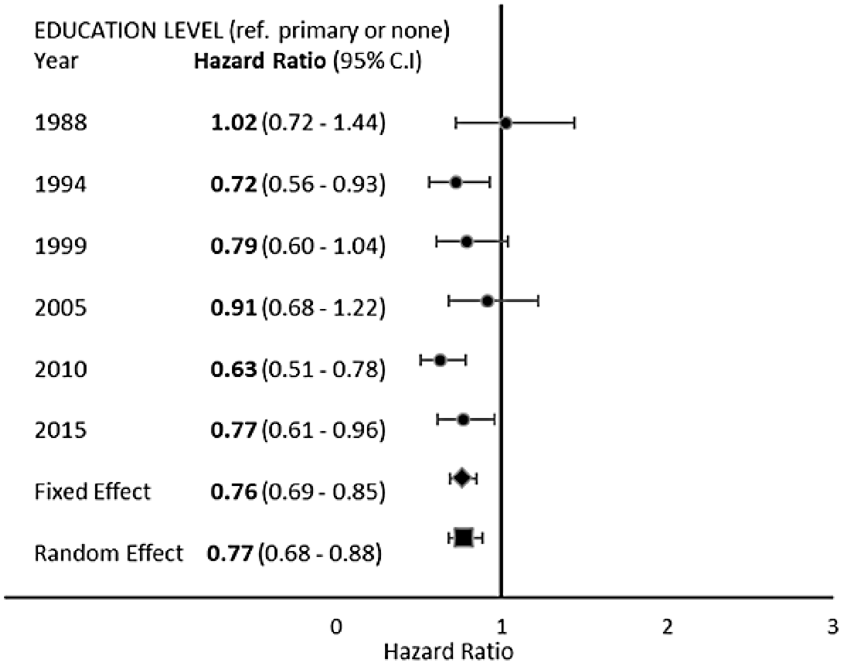

Figure 4.13: Hazard ratios (95% C.I) associated with education level from 1988 to 2015

The outlying result in 1988 can be attributed to few cases of women with secondary or higher education in 1988 and the data quality issues discussed in Chapter Three. There was strong evidence from 2010 to 2015 to suggest that improved education levels reduced premarital fertility. Therefore, between 2010 and 2015, education became a crucial factor in explaining premarital childbearing by age, sexual activity, marriage, and contraceptive use.

Wealth status

The relative risk associated with timing of premarital first births by wealth status was investigated by comparing women of five wealth classes according to DHS guidelines: poorest, poorer, middle, richer, and richest.

Wealth status was largely insignificant in explaining premarital childbearing in all surveys, even with the addition of cultural variable in model III. Where significant, that is, in 1999 (middle) and 2010 (richest), the risk of having a premarital first birth was lower compared to poorest women. Furthermore, the random effect estimates in Figure 4.14 showed that as wealth status improved, the risk of having a premarital first birth decreased by up to 21%.

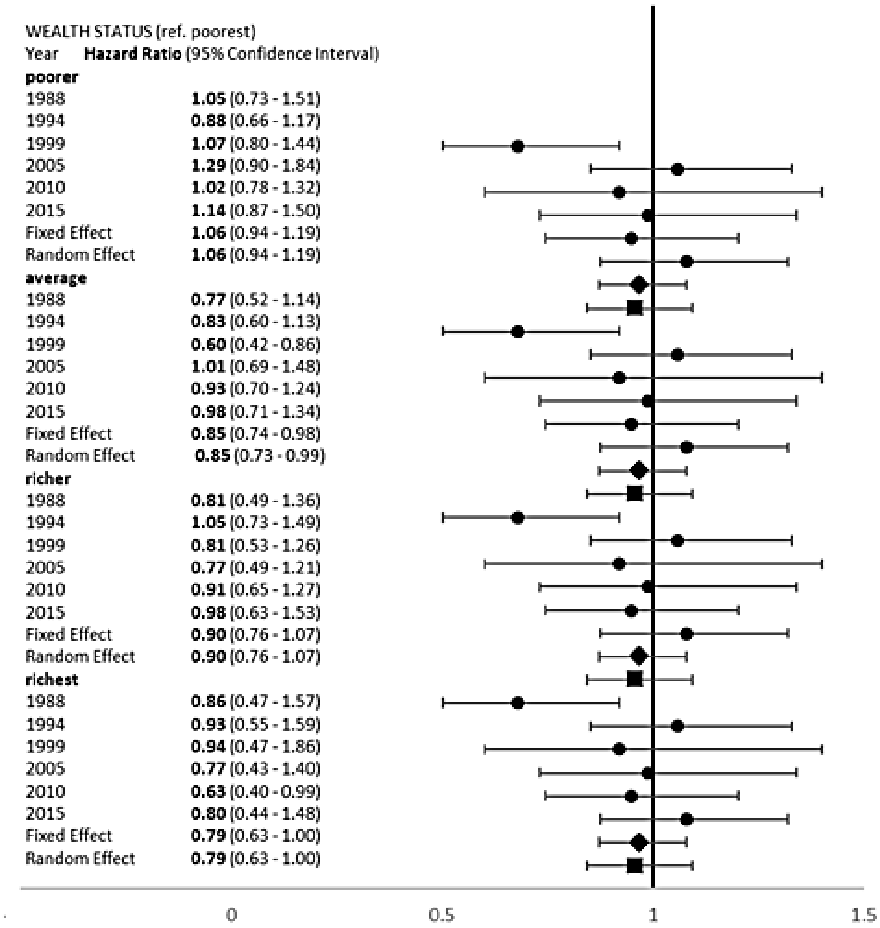

Figure 4.14: Hazard ratios (95% C.I) associated with wealth status from 1988 to 2015

Type of residence

The relative risk of premarital childbearing associated with type of residence was compared between rural and urban women. Generally, type of residence was not significant in explaining the timing of premarital first births in all surveys as shown in Table 4.2. In fact, the random effect estimate in Figure 4.15 indicated no difference in the risk of premarital childbearing between rural and urban women (H.R=1.00).

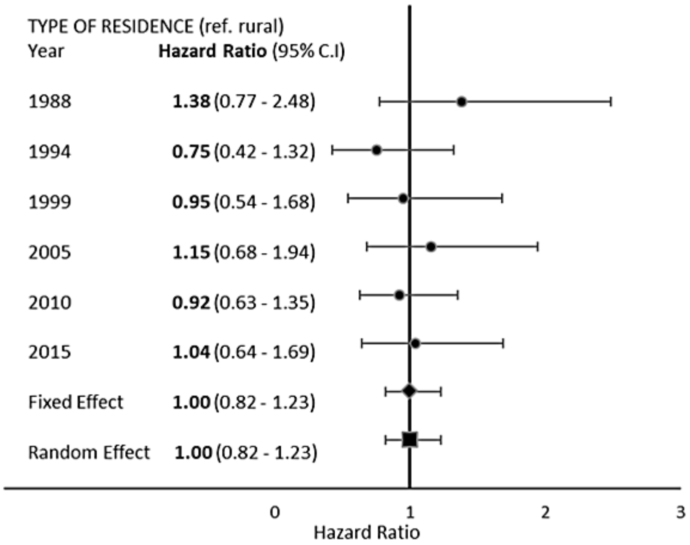

Figure 4.15: Hazard ratios (95% C.I) associated with type of residence from 1988 to 2015

Media exposure

The research tested the hypothesis that media exposure lowered the risk of experiencing a premarital first birth. Media exposure was strongly significant in 1988 alone (H.R = 0.68 $p<0.01$), hence the hypothesis was only valid in 1988. Adding cultural variables neither changed this result nor its significance in explaining timing of premarital first births by age, sexual activity, marriage, and contraceptive use. The overall random effect estimate in Figure 4.15 showed that between 1988 and 2015, having media exposure was associated with a 4% lower hazard of experiencing a premarital first birth. Therefore, media exposure did not explain the timing of premarital first births from 1994 to 2015.

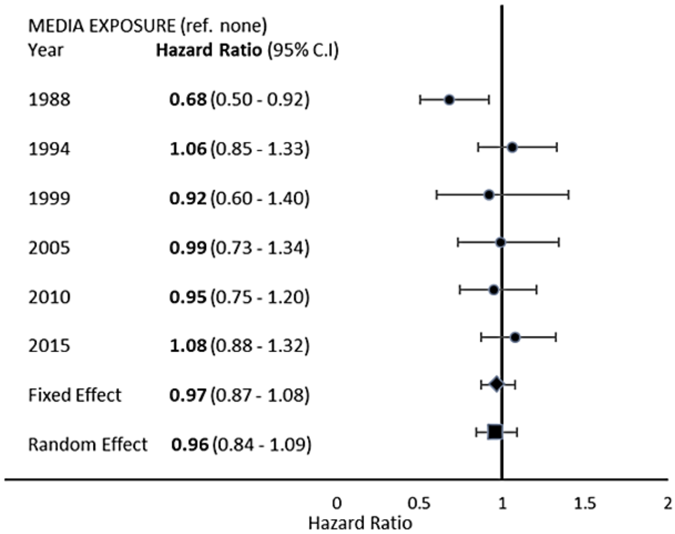

Figure 4.16: Hazard ratios (95% C.I) associated with media exposure from 1988 to 2015

Religion

The Apostolic sect following has doubled between 1988 and 2015 while the followings for other religions have declined. Hence, when testing the effect of religion on timing of premarital first births, Christians and other religions' women were compared to Apostolic women.

The results from the Cox regression models shown in Table 4.2 were insignificant with respect to religion except in 2005 where Christians had a higher relative risk of having a premarital first birth compared to Apostolic women, holding other covariates constant (H.R =1.36 p<0.05). Although the random effect estimates in Figure 4.17 also indicated that women of religions other than the Apostolic sect had a higher risk of having premarital first births, lack of significance meant that religion was not crucial in explaining premarital fertility.

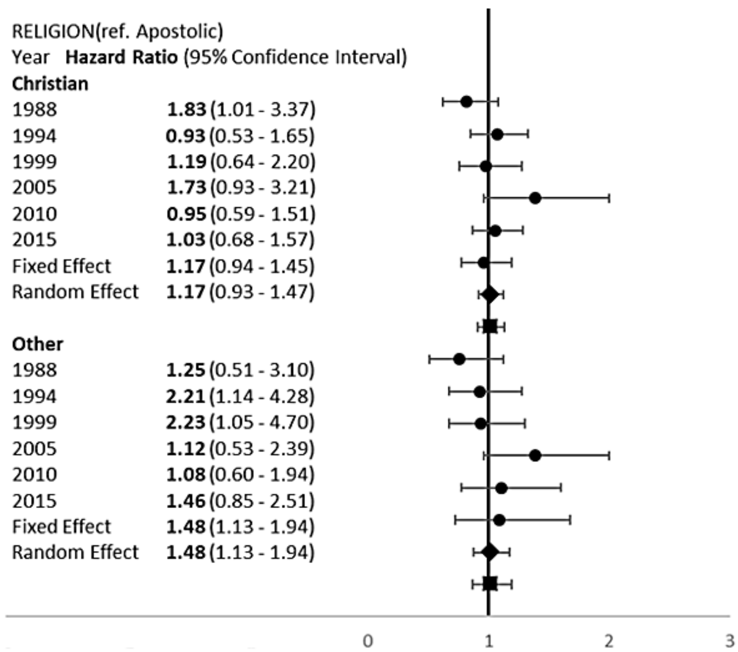

Figure 4.17: Hazard ratios (95% C.I) associated with religion from 1988 to 2015

Ethnicity

When testing the significance of ethnicity in explaining timing of premarital first births, Shona women's relative risk of premarital fertility was compared to that Ndebele women. The results shown in Table 4.2 indicate that generally Ndebele women had a significantly higher relative risk of having a premarital first birth compared to Shona women between 1988 and 2015. This risk was halved between 1988 (H.R = 4.39 p<0.01) and 2015 (H.R = 2.36 p<0.01) but remained strongly significant in explaining premarital fertility. A loss in statistical significance in 1999 indicated possible data quality issues but did not alter the pattern of positive association.

In Figure 4.18, the random effect estimate showed that being Ndebele compared to being Shona was associated with double the risk of experiencing a premarital first birth. Notably, adding ethnicity (religion and region) also brought out the significance of contraception use in explaining premarital fertility between 1994 and 2010. Hence Ndebele women who have used contraception were more likely to experience a premarital first birth. Overall, ethnicity was an important factor in explaining premarital fertility through the proximate determinants in the model.

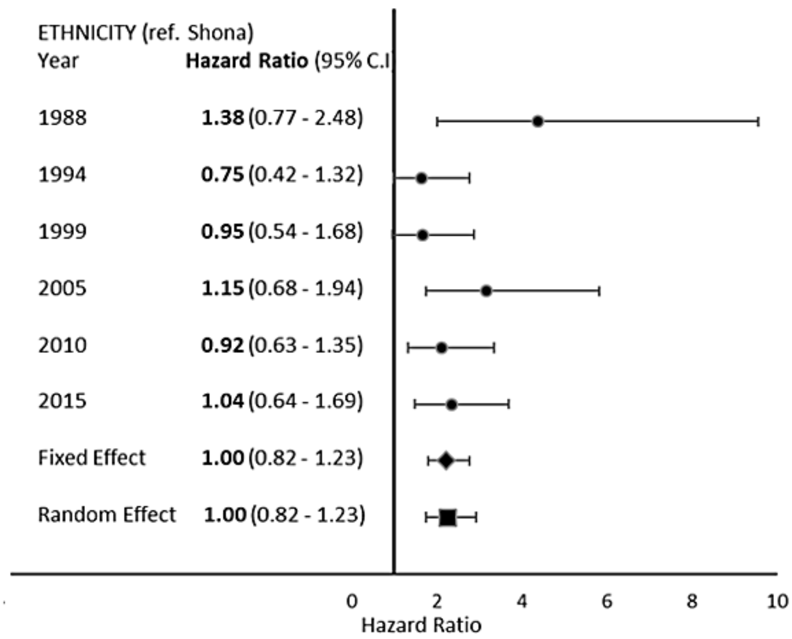

Figure 4.18: Hazard ratios (95% C.I) associated with ethnicity from 1988 to 2015

Region

Due to the few cases of premarital first births distributed across the ten regions; most of the results in all survey years were statistically insignificant as shown in Table 4.2. The overall random effects estimate shown in Figure 4.19 suggests that between 1988 and 2015 there was a higher hazard of experiencing a premarital first birth for women living in any region other than Manicaland except in Masvingo where the risk was equal.

The ethnic differences were also visible in that in 1994 and 1999, women in the Matebeleland North, Matebeleland South and Midlands regions, where the Ndebele are largely concentrated, had up to 135% higher relative risk of having premarital first births compared to those in Manicaland. The fact that the risk associated with premarital childbearing in Bulawayo, a Ndebele dominated city, was twice that in Harare, a Shona dominated city, further validated the findings on the effect of ethnicity on premarital fertility.

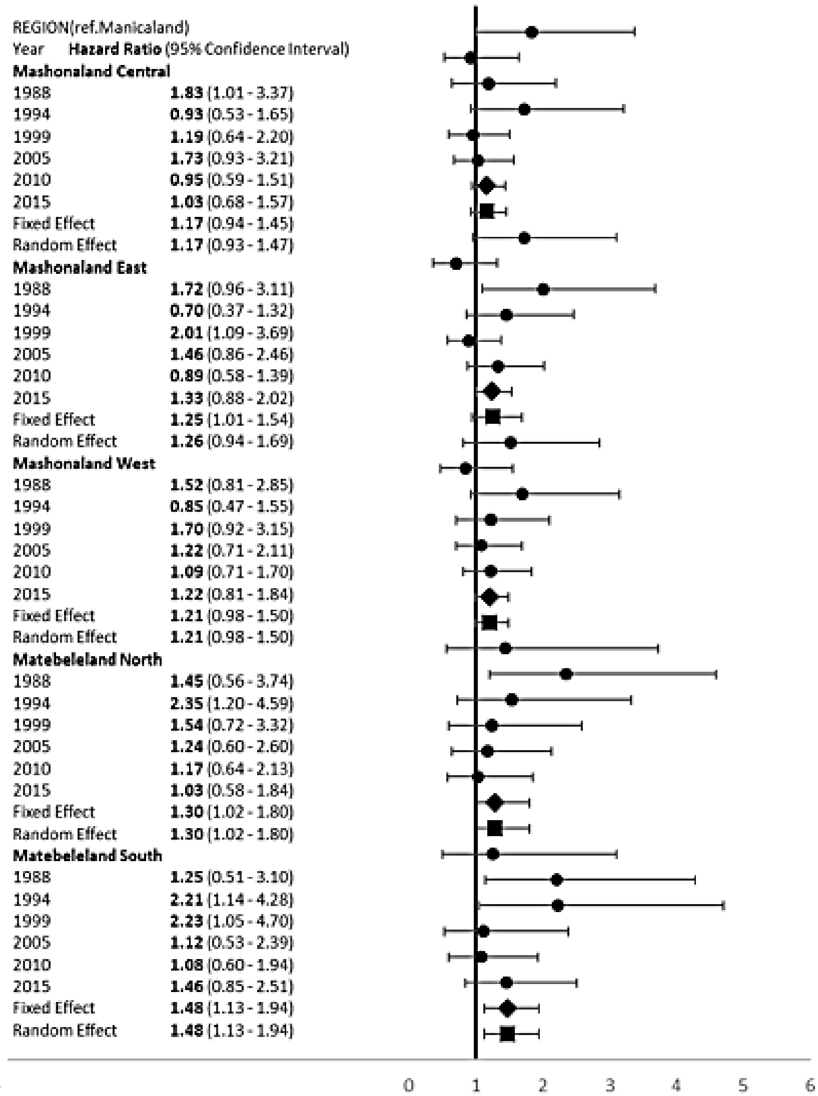

Figure 4.19: Hazard ratios (95% C.I) associated with region from 1988 to 2015

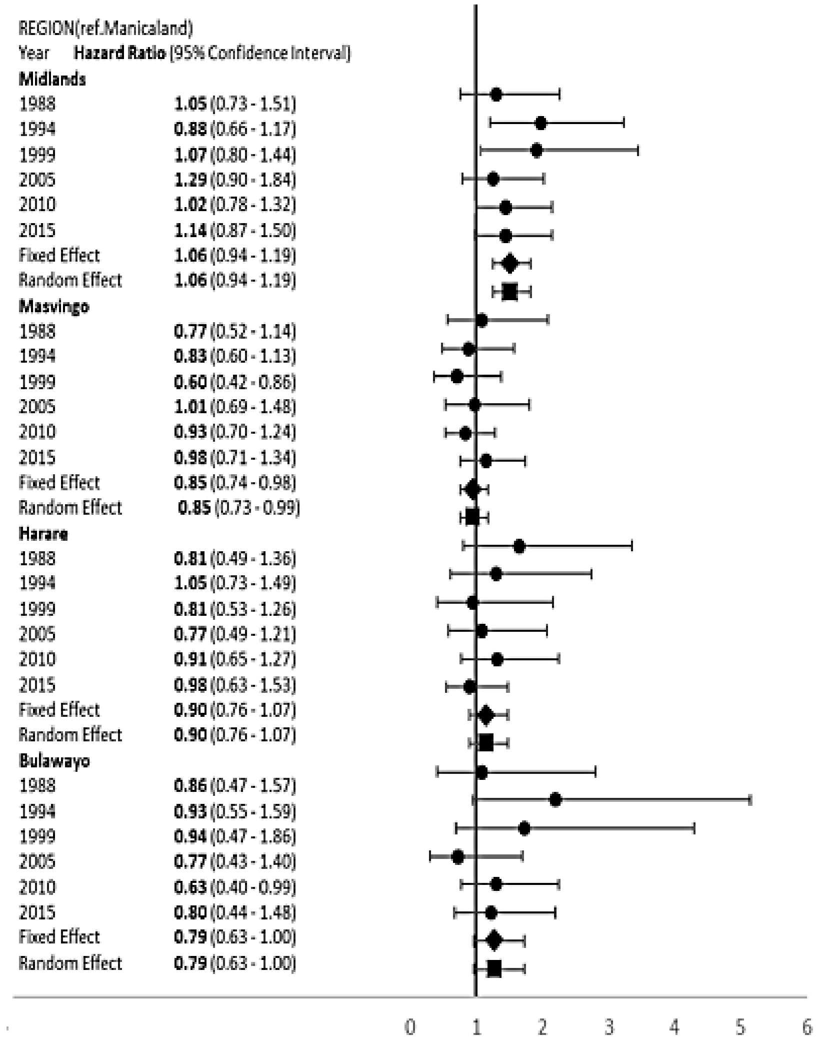

Figure 4.19 (continued)

4.4 SUMMARY OF FINDINGS

This chapter presented the results obtained from analysing changes in premarital childbearing patterns in Zimbabwe between 1988 and 2015 using direct estimation and Cox proportional-hazards regression.

The results showed that premarital fertility had been constant while marital and overall fertility had rapidly declined from the mid-1980s to mid-1990s and then stalled thereafter. An underestimation of distant premarital fertility in earlier surveys potentially concealed premarital fertility decline so that the most reliable premarital fertility indicators were obtained in 2010 and 2015 where data were of high quality. Data errors in 1999 and 2005 and few cases of premarital births in general often affected significance of findings throughout the analysis.

Although exhibiting unchanging premarital fertility levels since the fertility transition, notable changes were observed with respect to factors that explain the timing of premarital first births. Age at first sexual activity, age at first marriage, and ethnicity were strongly significant factors in explaining the timing of premarital fertility among Zimbabwean women between 1988 and 2015. The earlier sexual activity was initiated, the greater the risk associated with having a premarital first birth, especially if sexual activity was initiated before 15 years. Conversely, delaying entry into first marriage increased the risk of having a premarital first birth. The risk of premarital fertility if entry into marriage was delayed increased significantly between 1988 and 2015.

Despite fluctuating hazard ratios between 1988 and 2015, an increase in age of respondent consistently translated to a lower risk of having a premarital first birth. Women aged 25 years and above only bore half the same risk as their younger counterparts. History of modern contraception use was associated with a higher risk of premarital fertility. These findings suggest that contraceptive use became more accessible to young women only after their first birth, whether the reason was fear to or that they were barred by health workers was beyond the scope of the study.

Ndebele women had up to 5 times the risk of having a premarital first birth compared to Shona women and were likely to experience premarital first births at younger ages compared to Shona women (22 years vs. 25 years). Adding cultural factors was important in explaining premarital fertility by history of contraception use. This result suggests that Ndebele women with a history of contraception use were more likely to have had premarital first births compared to Shona women with or without a history of contraception use.

Although the significance of socio-economic variables was haphazard, improved socio-economic status generally translated to a lower risk of premarital fertility. Media exposure was important in explaining premarital fertility in the early years of the fertility transition but ceased to matter at the turn of the 1990s. On the other hand, education level did not matter until 2010, where it became clear that improved education translated to lower risks of having premarital first births. Regardless of which measure of socio-economic status was significant in any given survey year, improvement in socio-economic status always translated to a lower risk of experiencing premarital fertility.

The following chapter will provide a detailed interpretation of these findings and recommend areas for future research.

5 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter is a discussion on the major findings from the analysis in the preceding chapter, relating them to the literature reviewed in Chapter Two on theories of premarital fertility. The chapter concludes with recommendations for future research and improvement in data collection.

5.2 DISCUSSION

Premarital fertility, defined as childbearing before first marriage, is an under researched socio-demographic topic in the greater part of sub-Saharan Africa. The purpose of this research was to contribute to the body of knowledge on premarital childbearing by investigating how premarital fertility, and the timing thereof, has evolved since the onset of Zimbabwe's fertility transition. The research sought to answer the following questions using direct estimation of fertility and time-to-event analysis:

1. Since the onset of the fertility transition in mid-1980s, how has the trend of premarital fertility levels compared to overall and post marital fertility. Could premarital fertility have contributed to the stall in overall fertility decline in Zimbabwe?

2. What changes, if any, can be noted in factors associated with timing of premarital first births between 1988 and 2015?

Premarital fertility has been constant since the start of the fertility transition, hardly contributing to the decline and stall of overall fertility. The findings validate that premarital fertility in Zimbabwe is moderate compared to other sub-Saharan African countries (Clark, Koski & Smith-Greenaway, 2017). They also corroborate that premarital childbearing is a socio-economic issue that affects adolescents and young women alike (Chimere-Dan, 1997; Garenne, Tollman, Kahn *et al.*, 2001) so that the risk of premarital fertility after young womanhood declines markedly.

It proved useful to investigate premarital fertility beyond young womanhood as suggested by Seltzer (2000) and Garenne, Tollman, Kahn *et al.* (2001) as the timing of premarital first births gradually delayed past 24 years from 2005 onwards. By not limiting premarital fertility to just the adolescent population, this research successfully captured the right skewing trend from the early 2000s, thereby making the sampling technique chosen a robust one.

Delaying premarital childbearing provides opportunity for more Zimbabwean women to complete secondary education and to actively participate in the labour force. Boohene, Tsodzai, Hardee-Cleaveland *et al.* (1991) argue that premarital fertility steals from women the opportunities to achieve educational and career goals. Second, delaying premarital fertility contributes to averting maternal and child deaths that occur as a result of young mothers whose bodies are not yet fully matured for child birth (Mturi & Moerane, 2001; Gupta & Mahy, 2003).

As per availability of data, the explanatory power of the following theories was tested with respect to premarital fertility: the rational adaptation, social disorganisation, social capital, migrancy and premarital sexual behaviour, demographic, and cultural inheritance theory.

5.2.1 Social disorganisation, rational adaptation, and social capital theory

The social disorganisation theory states that premarital fertility is a spontaneous or accidental event whereas the rational adaptation theory states that premarital fertility is a pre-planned decision (Cherlin & Riley, 1986; Meekers, 1993). The concentration of premarital fertility among young women suggests spontaneity. Reasons such as sexual violence and coercion and ambivalence on controlling sexual urges and fertility or making decisions on safe sex are said to contribute immensely to teenage and adolescent premarital pregnancies (Fry, Hodzi & Nhenga, 2006). Chikovore, Nystrom, Lindmark, and Ahlberg (2003) argued that adolescents exhibited little knowledge of their ovulatory cycles, a remark which men found suspicious.

The gradual delay in the age at premarital childbearing to 25 years and beyond over time indicated that although premarital births remained mostly accidental, they were increasingly becoming rational decisions. Pitso and Carmichael (2003) explained how Tswana women of Botswana made a conscious decision to conceive before marriage after the age of 25 years for social security reasons. However, the rational adaptation theory applies just as well to young women who make a conscious decision to fall pregnant to score marriage or attain financial stability. Men described women as ‘calculating agents’, secretly engaging with many partners at a time, on their most fertile days to force commitment while women stated the need for financial security as their reason for premarital pregnancies (Chikovore, Nystrom, Lindmark *et al.*, 2003; Manamere, 2014).

The fact that delaying marriage past young womanhood was found to be strongly significant in explaining premarital fertility further confirms the explanatory power of the rational adaptation theory. Motherhood is important in Zimbabwe such that media portrays it in good light compared to childlessness (Marindo, Pearson & Casterline, 2003; Maunze, 2009). Women also fear being called "*tsikombi*", a derogatory Shona term used to refer to an unmarried woman who has exceeded the recommended age of marriage , usually 25 years (Shoko, 2010). The fact that the median age at premarital first birth among Shona women is 25 years, 3 years later than that of Ndebele women shows that for Shona women, premarital childbearing is likely a decision made at a later age to salvage one's dignity after failing to marry at the recommended age.

The findings also validate the explanatory power of the social capital theory in describing premarital fertility in sub-Saharan Africa by proving that improvement in education beyond primary level, exposure to media and higher wealth status all translate to a lower risk of experiencing premarital fertility (Garenne & Zwang, 2006; Mashamba, 2009; Soura, Lankoande, Sanogo *et al.*, 2018). These findings align with the views of Mberu and White (2011) who argue that although premarital sexual activity and fertility are rational decisions, they are taken based on an individual's prior and present circumstances. Investing in a child's social capital reduces their risk of having a premarital first birth as a means of seeking social validation or financial security.

5.2.2 Demographic theory

The demographic theory suggests that premarital fertility is explained by low contraception uptake and the growing gap between puberty and first marriage. Gupta and Mahy (2003); Fry, Hodzi and Nhenga (2006); Garenne and Zwang (2006), and Presler-Marshall and Jones (2012) described premarital fertility as a result of competition between sexual activity initiation and entry into first marriage. The study findings strongly validated the explanatory power of the demographic theory in premarital fertility between 1988 and 2015.

First, delaying sexual activity debut past adolescence significantly lowered the risk of having a premarital first birth. This is likely because sexual activity initiated after adolescence is likely to occur within marriage since the median age at first marriage in Zimbabwe is as early as 19.8 years. Hence, what could otherwise have been premarital fertility in a country where marriage is late becomes marital fertility due to early entry into marriage.

Second, the findings verified that indeed delaying marriage past adolescence increased the window of susceptibility to premarital fertility (Presler-Marshall & Jones, 2012; Rossier, Sawadogo & Soubeiga, 2013; Maluleke, 2017) since the median age at first sexual activity was early. In fact, it became increasingly likely over time that delaying entry into first marriage would result in a woman having a premarital first birth. Also, percentages of women who had never married by age 25 increased between 1988 and 2015. This shows that Zimbabwean women are slowly delaying marriage, as more women become educated and pursue careers outside the home. It further aligns with annotations by Rossier, Sawadogo and Soubeiga (2013) and Moultrie, Sayi and Timæus (2012) that delay and abandonment of marriage opens a window for premarital fertility.

Interestingly, however, history of contraception use translated to a higher risk of premarital fertility contrary to what the demographic theory suggests. Commenting on similar findings, Muzadzi (2013) concluded that unmarried women only began using contraception after a first birth to avoid or space the second one. Certainly, no more than 20% of women who had had premarital first births between 1988 and 2015 proceeded to have second premarital births. Lack of knowledge on contraceptives, desire to fall pregnant, shame, fear, and health workers' tendencies to administer contraception to older married mothers while hindering young unmarried women are some reasons that explain this result (Vos, 1994; Marindo, Pearson & Casterline, 2003; Fry, Hodzi & Nhenga, 2006; Fagbamigbe & Idemudia, 2016).

5.2.3 Cultural inheritance theory

The validity of the cultural inheritance theory in explaining premarital fertility was tested using ethnicity and religion. Hammel (1990) states that culture explains why people existing in a similar social or economic environment may exhibit different behaviours. The importance of ethnic culture in explaining premarital fertility was apparent throughout the analysis whereas evidence by religion was rather weak.

Premarital fertility was lowest among Shona women and in Shona dominated regions; Manicaland, Masvingo, and Mashonaland where early and child marriages are widespread (Cremin, Mushati, Hallett *et al.*, 2009; Sibanda, 2011; Dzimiri, Chikunda & Ingwani, 2017; Kurebwa & Kurebwa, 2018; UNFPA-UNICEF, 2018). It was moderate in Midlands where both ethnicities almost equally dominate and highest in Matebeleland regions including Bulawayo dominated by the Ndebele. Sambisa, Curtis and Stokes (2010) found that Shona youth were more abstinent while Ndebele youth were more likely to have engaged in risky sexual activities. Garenne and Zwang (2006) also found similar ethnic variations in Namibia.

The Shona culture generally frowns upon premarital fertility (Mawere & Mbindi-Mawere, 2010; Sibanda, 2011). This explains the significantly lower incidences of premarital births. However, when a woman is past 'marriageable' age, it becomes more acceptable for her to have a premarital birth. Moreover, it is Shona culture to quickly marry off a pregnant woman to avoid the humiliation of a premarital pregnancy (Mawere & Mbindi-Mawere, 2010). Thus, what starts off as a premarital pregnancy likely ends in a marital birth.

It is said that tribes in Matebeleland share cultures with tribes in South Africa and Botswana from whence they originate and the porous borders allow these tribes to continuously interact and influence each other's sexual and fertility behaviour (Solidarity-Peace-Trust, 2009). In some parts of Matebeleland, local media signals cannot be accessed (Crush & Tevera, 2010) hence the people consume South African media some of which as opposed to Zimbabwean media promotes free-lovism among young people. Thus, the results not only validated the cultural inheritance model in explaining premarital fertility in Sub-Saharan Africa, but also showed that the blending of cultures leads to a form of social disorganisation.

Contrary to what was expected, there was no significant difference in premarital childbearing risks between Christian women and Apostles. This was important to investigate because both religions condemn premarital fertility and the use of contraception (Makatjane, 2002; Garenne & Zwang, 2004; Mboho, Furber & Waterman, 2013) but late marriages are common among Christians as opposed to Apostles, and this is expected to open a window of risk for premarital fertility.

5.2.4 Migrancy and premarital sexual behaviours

By analysing incidences and relative risks of premarital births by region (and ethnicity), the research tested the validity of migration as a factor of premarital childbearing.

Since the main border towns, Plumtree, Beitbridge and Victoria falls (also the main tourist resort) separating Zimbabwe with Botswana, South Africa and Zambia are located in Matebeleland North and South, the results verified that migration, cross border labour, sexual abuse, sex work and poor education outcomes also explain premarital fertility (Meursing, Vos, Coutinho *et al.*, 1995; Fry, Hodzi & Nhenga, 2006; Takawira, 2016; Mlotshwa, 2018). Although, Chimanimani is both a border town in Manicaland separating Zimbabwe and Mozambique and a tourism town, it had the lowest incidences of premarital births. This is likely because, Mozambique is not an economic giant like South Africa and Botswana. Additionally, strong cultural values probably regulate sexual behaviour of unmarried women in Manicaland. Indeed, culture explains how people living in a similar economic environment may have widely varying sexual and fertility behaviours.

Additionally, since migration and tourism are not as widespread in Manicaland as in Matebeleland, female Manicaland migrants may not suffer the same degree of distress which causes them to seek consolation in casual premarital sex (Stack, 1994; Mberu & White, 2011). It is reported that in many instances, young Matebeleland women return with children born out of wedlock from their stay in neighbouring South Africa (Fry, Hodzi & Nhenga, 2006).

Cross border goods transporters known as "*omalayitsha*" or "*injiva*" in Matebeleland are the most popular migrant workers who frequent both South Africa and Botswana. Their possession of foreign currency with better buying power compared to the local currency makes them attractive potential spouses for unmarried women. The same is reported of migrant workers in Mashonaland known as "*majoni-joni*" (Crush & Tevera, 2010). In the event of a premarital pregnancy, dire economic conditions sometimes (or immaturity) cause men to flee the responsibility of fatherhood by crossing the border while some genuinely fail to pay the bride price for their pregnant partners (Calves, 2000; Mensch, Grant & Blanc, 2006; Mawere & Mbindi-Mawere, 2010; Posel & Rudwick, 2013).

5.3 CONCLUSION

The research aimed to investigate the progression of premarital fertility in Zimbabwe since the fertility transition. Based on these findings, I conclude that premarital fertility has been moderate and constant in Zimbabwe. Lowering premarital fertility levels from moderate to low levels in the foreseeable future seems unlikely. I argue however, that there have been significant changes in factors that explain the timing of premarital first births in Zimbabwe over the same period.

The interplay between puberty, sexual activity debut and entry into first marriage when explaining premarital fertility is indisputable. That sexual activity debut in Zimbabwe is early cannot be argued, although it is later than in other countries, but what gives premarital fertility its apparent ethnic bias is how long marriage is delayed so that the window of exposure is elongated. The findings suggest a possible relationship between early sexual activity initiation and late marriage that exposes women of Ndebele ethnicity to higher risks of premarital fertility. On the other hand, although early sex may occur to Shona women, it likely occurs within marriage, which is equally early, hence the chances that a Shona woman's first birth will be classified as premarital are very low. Additionally, should a premarital first birth occur to a woman of Shona ethnicity, it is likely to occur about three years later than it would to a Ndebele woman.

What is striking about premarital fertility in Zimbabwe is that it does not seem to result in large completed family sizes as other studies have suggested. Instead, where premarital fertility is highest (Bulawayo, Midlands and Matebeleland regions) overall fertility is lowest and where premarital fertility is lowest (Manicaland and Masvingo) and low (remaining Mashonaland regions including Harare) overall fertility is highest. Therefore, premarital fertility is likely an inhibiting factor of high fertility as higher birth orders are then avoided altogether.

Overall, I conclude that the complexity of the dynamics of premarital fertility are entwined in the fact that premarital fertility is both a social disorganisation and a rational adaptation deeply embedded in ethnic culture and the effects of growing frequency of migrancy.

5.4 LIMITATIONS TO STUDY FINDINGS

While the data were largely sufficient to carry out the analysis, data on parental presence in the household and their education level which would have further validated the notion of loss of parental control as a form of social disorganisation, was not collected in all surveys. Also, the DHS, by not taking into consideration long distance or cross border unions (not marriages) led to the assumption that births occurring in such relationships were premarital without probing further into the nature of the relationship. Additionally, rural and urban women may have different definitions of marriage. Likewise, this definition may differ by ethnicity depending on the value placed on marriage by either ethnic group.

5.5 RECOMMENDATIONS

The research findings showed that regional differences not only explained premarital fertility by culture but also by migrancy. Premarital fertility was always lower in Mashonaland, Harare, Manicaland, and Masvingo regions which are Shona dominated and higher in Matebeleland and Bulawayo regions which are Ndebele dominated. Also, in border towns located in Matebeleland, the incidences of premarital childbearing were highest due to the frequency of mostly Ndebele migrants from those towns to South

Africa and Botswana. However, the same effect was not observed among Manicaland women who also reside near the Mozambique border. This is because both South African and Tswana cultures are tolerant of premarital fertility while the opposite is true for Mozambique. Hence, blending cultures due to migrancy leads to significant regional variations in incidences of premarital fertility. Additionally, due to the thriving economies of both South Africa and Botswana, Ndebele women are more vulnerable to transactional sex with migrant and cross border workers.

The migrancy and premarital sexual behaviour theory touches on how migrancy causes deviation from social controls. From the findings in this research, I recommend, following further research, an extension into this theory to detail how locals living in migrant frequented areas who are not migrants themselves are exposed to high risks of premarital fertility due to the nature of the economy in a migrant or tourism region.

The results also showed that being in school significantly lowered the risk of occurrence of premarital fertility since 2010. The government must direct the same effort towards universality of secondary education as was done with primary education, especially in Matebeleland and Midlands where quality of secondary education has been questioned and migration and tourism are common. This is important since adolescent girls and young women, who are high school and college/university attendees, are at the highest risk of having premarital first births. Learning curriculums can also be modified to include correct and consistent use of contraception and contraception can be availed in schools; a topic currently being debated on in parliament.

This research raises questions on how much premarital fertility is a result of births that occurred to women whose spouses are migrants who come home once a year and during their short stay cohabit with their partners. Interviewers must be trained to fully examine respondents and understand the nature of long-distance unions between migrants and their partners which have become more common due to the prevailing economic conditions. This is especially important in the case of Matebeleland wherein border and tourist towns Plumtree, Beitbridge and Victoria Falls are located.

When addressing premarital fertility, as with other forms of fertility, ethnic norms must be properly understood to better understand types of services required by each population and set up interventions that suit each population's needs such as contraceptive and abortion services for sex workers and school goers.

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