Published in final edited form as:

Popul Res Policy Rev. 2014 October 1; 33(5): 673–691. doi:10.1007/s11113-013-9317-2.

Religious Affiliation and Fertility in a Sub-Saharan Context: Dynamic and Lifetime Perspectives

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Abstract

We use uniquely detailed data from a predominantly Christian high-fertility area in Mozambique to examine denominational differentials in fertility from two complementary perspectives—dynamic and cumulative. First, we use event-history analysis to predict yearly risks of birth from denominational affiliation. Then, we employ Poisson regression to model the association between the number of children ever born and share of reproductive life spent in particular denominations or outside organized religion. Both approaches detect a significant increase in fertility associated with membership in a particular type of African-initiated churches which is characterized by strong organizational identity, rigid hierarchy, and insular corporate culture. Membership in the Catholic Church is also associated with elevated completed fertility. We relate these results to extant theoretical perspectives on the relationship between religion and fertility by stressing the interplay between ideological, social, and organizational characteristics of different types of churches and situate our findings within the context of fertility transition and religious demographics in Mozambique and elsewhere in sub-Saharan Africa.

Keywords

Fertility; Religion; sub-Saharan Africa; Event-history analysis

Introduction

Understanding the nature and scope of the influence of religion on reproductive behavior and outcomes has been a major challenge in the demographic literature due both to the difficulty of defining the meaning and place of religion in individuals' lives and to the complexity of possible pathways of this influence. Not surprisingly, the association between religion and fertility has generated a considerable body of literature. Historical studies of Western Europe suggest that fertility decline there often reflected differences in religious

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affiliation and involvement (Anderson 1986; Derosas and van Poppel 2006). Numerous studies in the United States highlighted religious differences in fertility, mainly between Catholics and Protestants, in the nineteenth century and much of the twentieth century (Bouvier and Rao 1975; Dudley 1955; Freedman et al. 1959; Gutmann 1990; Parkerson and Parkerson 1988). These differences began to disappear quickly since the late 1960's (Herold et al. 1989; Mosher et al. 1992; Westoff and Jones 1979), except for religious denominations with persistently high fertility such as the LDS Church (Heaton 1986; Thornton 1979). As the denominational differences diminished, researchers shifted attention to religious involvement: several studies in western settings have shown that regardless of denominational affiliation, more religious people usually have higher fertility and lower contraceptive use (Brewster et al. 1998; Goldscheider and Mosher 1991; Hayford and Morgan 2008; Zhang 2008) or tend to favor formal marriage over cohabitation, which, in turn, leads to higher fertility (Berghammer 2012).

In developing societies, especially in those that are in early stages of fertility transition, such as those of sub-Saharan Africa, religious fertility differentials have been commonly observed. Much attention there has focused on Muslim–Christian fertility differences. The findings of this literature are not consistent across sub-Saharan settings, with some studies showing higher fertility among Muslims than among Christians (e.g., Bailey 1986; Johnson-Hanks 2006), others reporting the opposite tendency (e.g., Heaton 2011), while yet others finding no net differences between adepts of the two religious traditions (e.g., Kollehlon 1994). Studies of "Muslim fertility" outside of the sub-Sahara generally point to higher fertility among Muslims than non-Muslims (Chamie 1981, Dharmalingam and Morgan 2004; Jayasree 1989; Johnson 1993, Knodel et al. 1999; Morgan et al. 2002). Whereas most of the above studies have compared different religions, significant differences in fertility and contraception across Christian denominations have also been reported. Thus Johnson and Burton (1987) reported greater pronatalism among Catholics than Protestants even in a relatively highly educated sample in the Philippines. McKinnon et al. (2008) found a higher rate of non-marital adolescent pregnancies among Catholics than among Protestants in Brazil. Several studies have shown fertility differences among Christian denominations in sub-Saharan Africa. Thus Gregson et al. (1999) reported higher fertility among members of what they defined as "spirit-type churches" than among members of other churches in Zimbabwe. In a study of north-central Nigeria by Avong (2001), Evangelicals had lower fertility than Catholics and other Protestants. Adegbola (1988) documented higher fertility among Protestants than among Catholics in several African countries. Protestants also had higher fertility than other Christian groups in a study in Central Ethiopia (Berhanu 1994). Using data from sub-Saharan Demographic and Health Survey (DHS), Heaton (2011) detected Catholic versus Protestant differences in sub-Saharan fertility, which, while not large in general, at least in some countries persisted after controlling for key sociodemographic indicators; the limitations of the DHS data did not allow the author to examine variations within the religiously heterogeneous "Protestant" category. Yet, despite ample evidence of denominational differences in fertility and contraception, these differences, compared to differences across different religious traditions, are very difficult to explain systematically.

Traditionally, most analyses of the influence of religion on fertility have been cast within three conceptual frameworks, or general hypotheses. Thus the "particularistic theology" seeks explanations for religious differences in fertility in both general and specific religious teachings on procreation, family, etc. Yet, as Goldscheider (1971) observed a long time ago, fertility-specific teachings are but one channel through which religious organizations can influence fertility behavior. Thus the "minority-group status" hypothesis, which posits that religious minority groups adjust their fertility so as to preserve their privileged status or counterbalance their disadvantaged status in society, has been proposed as an alternative explanation for the religion-fertility relationship. Finally, the "characteristics" hypothesis, which reduces religious differentials in fertility to socio-demographic, economic, or cultural characteristics of adherents of different religions and denominations, essentially assumes that religion per se has no relevance to reproduction (Goldscheider 1971; Johnson 1993). However, despite the growing body of research that entertains these perspectives and various attempts to bridge them (e.g., Agadjanian 2001; Chamie 1981), little consensus has emerged even though the characteristics hypothesis seems to be favored by most fertility scholars, especially in the demography field, not least because the effects of religious teachings and especially of a religious group's status on fertility are notoriously difficult to operationalize and measure (McQuillan 2004).

These difficulties result, at least in part, from data limitations. Thus rarely do demographic surveys collect individuals' religious histories, and therefore most analyses are limited to religious affiliation at the time of data collection. Yet, in many settings, especially in developing ones, religious affiliation and involvement often change over a person's life course. This is particularly true of women, who often tend to be more involved with religion than men and who also change religious affiliation more often than men do because of marriage, but also for other reasons, both spiritual and practical. Likewise, due to data constraints, the demographic literature often fails to fully capture the dramatic transformation and diversification of the contemporary religious landscape, especially in many sub-Saharan settings where these changes have been fueled to a large extent by a phenomenal growth of locally-originated Christian churches as well as an increasing presence of relatively recent religious imports, especially those of Pentecostal bend (Anderson 2005; Gifford 1998; Meyer 2004). Importantly, this growing diversity of religious affiliation has not only an ideological, but also a social dimension: in fact, churches and denominations differ not so much in their theology as in their social teachings, organization, and practices, which in turn may be no less consequential for their members' family and health-related behavior than the tenets of religious ideology (Agadjanian and Menjívar 2008; Garner 2000; Yeatman and Trinitapoli 2008).

In this study, we use uniquely rich data from a predominantly Christian area in Mozambique to examine the effect of affiliation with a particular type of religious denomination on fertility both dynamically, by looking at risks of birth in any given year, and cumulatively, by examining completed fertility. After describing the setting, we present our conceptual framework and hypotheses, then describe data and methods and then report the results of statistical tests. We conclude with a discussion of the implications of our findings for a better understanding of the fertility transition unfolding in sub-Saharan Africa and the sub-content's religious demographics.

The Setting

The survey data on which this analysis is based were collected in Chibuto district of southern Mozambique. With an area of 5,650 km^2 and a population of some 200,000 residents Chibuto is a typical landlocked mainly rural district of Mozambique's Gaza province. The mainstay of the district's economy is subsistence agriculture; low and unpredictable agricultural yields and proximity to South Africa has made male labor out-migration a major source of livelihood in the district as in southern Gaza in general (Agadjanian et al. 2011; De Vletter 2007).

The district is overwhelmingly Christian with a very high level of formal religious membership and considerable denominational diversity. Indeed, based on our fieldwork we estimate that there is one religious congregation for about every 150–200 district residents. Before Mozambique's independence from Portugal in 1975, Catholicism was the colony's quasi-official religion and the dominant denomination in Chibuto. Yet the colonial era also saw a strong growth of mission initiated (or "mainline," in our definition) Protestant churches, such as the Presbyterian, Anglican, and Methodist Churches. Although numerically dominant in the colonial and early post-colonial period, the Catholic Church and mainline Protestant denominations have lost much of their following to African-initiated churches.[1] Thus a sizeable share of the population now belongs to the so-called "Apostolic" churches (particularly the Church of Old Apostles) a variety of African-initiated churches first established in South Africa that have now spread throughout the southern African region. These churches are distinguished by strong organizational identity and hierarchy and by insular corporate culture (Mpofu et al. 2011). In several past decades, the study area, like much of the southern African region (e.g., Sundkler 1961; Anderson 2000), has also seen an explosive growth of African-initiated "healing" churches, especially Zionist (locally known as *zione*) churches. Some of the Zionist churches were imported from South Africa, but many are home grown in southern Mozambique. They are distinguished by a strong emphasis on miracle healing that is often aided by herbs and similar medicines borrowed straight from traditional healers' (*tin'anga*) healing kits (Agadjanian 1999). In addition, the country has seen a proliferation of foreign origin Pentecostal churches, such as the Assemblies of God and the Universal Church of the Kingdom of God (a Brazilian import), which align more closely with western Pentecostalism in their outright rejection of African traditional beliefs and practices and in their emphasis on achieving holistic prosperity through faith, as opposed to a narrow health focus of Zionists (Anderson 2005; van de Kamp and van Dijk 2010). Importantly, although Apostolic, Zionist, and Pentecostal churches in the Mozamb-ican context may have historically emerged on the periphery of the local religious marketplace, they should not be thought of as a homogeneous organizational mass. Most notably, while doctrinal subtleties of these churches may not be fully obvious even to their own members, the already mentioned strong corporate-like identity and organizational insularity of Apostolic stands in contrast with rather loosely organized Zionists and Pentecostals who are typically more socially engaged with the outside world.

[1]We are well aware of the continuing debate about definitions and classifications of African religious diversity, and especially of churches labeled as "African independent" or "African initiated" (Anderson 2001; Meyer 2004), but we use these conventional terms for simplicity.

The district, as the rest of Gaza province, is characterized by high fertility albeit with signs of a gradual reduction: the total fertility rate[2] in Gaza decreased from 5.9 to 5.4 children per woman between the first two DHS, conducted in 1997 and 2003, but then declined only by one decimal point, to 5.3, by the 2011 DHS. The ideal family size reported by DHS female respondents declined more noticeably—from 5.6 to 4.3 to 4.0 children, and modern contraceptive prevalence rose markedly—from 1.8 % in 1997, to 14.4 % in 2003, to 18.2 % in 2011 (Instituto Nacional de Estatística e Ministério da Saúde 1999, 2005, 2013). These DHS figures suggest a rise in unwanted fertility and growing unmet need for family planning.

Conceptualization and Hypotheses

The focus of our study is on the relationship between women's membership in different types of religious denominations and their fertility. To reflect the religious makeup of the study area, we compare five denominational groups—the Roman Catholic Church, mainline Protestant churches, Apostolic churches, Zionists, and Pentecostals; in addition, we look at the effect of not having a formal church affiliation. Our theoretical approach engages the three main perspectives on religion and fertility. Depending on the theoretical angle, different effects of religious membership on fertility may be hypothesized. Thus, as would be predicted by the characteristics hypothesis, whatever variations in fertility across these denominational categories are found, they would be due to factors that are not directly related to religion such as education or urban background. For example, in our study context, members of the Catholic Church and mainline Protestant churches, which have been traditionally more exposed to educational opportunities thanks to their stronger connections with the colonial and post-colonial state, may have higher levels of education and therefore lower fertility. At the same time, particular churches' and denominations' ideological emphases may play a role beyond individual characteristics of church members (the particularistic theology perspective). Thus the Catholic Church's official pronatalism and opposition to birth control may manifest itself in higher fertility among Roman Catholics after accounting for possible educational and other religion-unrelated socio-demographic confounders.

Yet, in a generally high-fertility setting as the one under study, pronatalist ideology is infused, directly or indirectly, in every church's social teachings, however elaborate and forceful the pronouncements of the church distant elites may be. At a local level, what may matter more is the social position of a church vis-à -vis other churches and denominations. If a church or denomination insulates itself from (or is insulated by) others, its unique status may play a role in individual fertility decisions and behavior, as would be generally predicted by the minority-group status hypothesis. Such (self-) insulated churches are typically characterized by highly loyal membership, and as McQuillan (2004) argued, a strong sense of attachment to a religious organization among its members may strengthen the influence of religion on demographic behavior. From this perspective, one would hypothesize higher fertility among Apostolics, whose introverted corporate culture, strong

[2]The total fertility rate is the average number of children a woman would have if she were to experience current age-specific fertility rates and were to survive through the end of her reproductive span.

loyalty to congregation and cohesive membership may enhance "family values," including pronatalism. In comparison, organizational and ideological loyalty may be weaker among Catholics and mainline Protestants, thus enhancing their proclivity to reproductive innovations. In turn, membership in Zionist and Pentecostal churches is often driven by specific pursuits of health and/or fortune. While Zionist and Pentecostal churches tend to be ideologically conservative, this conservative ideology is often conveyed through fairly loose social and organizational channels and mechanisms, which may limit its impact on individual members' family values and reproductive behavior.

In a departure from most studies of religion and fertility, we test this conceptual framework from two different yet interrelated angles. First, taking advantage of our unique retrospective church membership and childbearing data, we examine the association between the risks of birth in any given year with religious denominational membership a year earlier. And second, we look at the association between the number of children ever born and the share of life spent in a certain type of denomination and outside religious membership. The two approaches are complementary: whereas the first approach allows us to see any discrete effects of denominational affiliation on fertility, the second approach captures the effects resulting from long-term accumulation of denominational experience.

Data and Method

Data for this study come from a representative population-based cluster survey of 2019 women aged 18–50 conducted in Chibuto in 2008. The survey was carried out in 82 randomly selected communities (clusters), both in neighborhoods of the district's administrative center and in villages of its rural areas. In addition to standard socioeconomic and cultural information, the survey collected information on a wide range of individual characteristics, namely women's complete religious affiliation histories since birth, including years of membership and reasons for membership (e.g., born into the religion or switched to it for various reasons), and complete birth histories.

Whereas the amount of detailed information on women's religious histories in the survey is quite unique for sub-Saharan Africa, the survey did not collect information that would allow us to reconstruct respondents' religious involvement (frequency of religious attendance, prayers, or rituals) over their life course—collecting reliable data on past involvement retrospectively is simply not feasible in a cross-sectional survey in a sub-Saharan setting. As we mentioned earlier, religious involvement and commitment are arguably more accurate predictors of fertility behavior than affiliation in more developed settings (Berghammer 2012; Hayford and Morgan 2008). However, in a developing rural and small-town settings like the one examined in this study the very distinction between women's religious belonging and involvement is rather tenuous: in fact, as our ethnographic observations show, for most women belonging to a church does mean attending it and otherwise participating in the life of the congregation more or less regularly. This is particularly true of reporting past religious membership: women who were not active in a church in some spells in their past lives would typically not report any religious affiliation for those spells. Also, like the DHS and similar sociodemo-graphic cross-sectional surveys, the Chibuto survey did not collect information on past contraceptive use or post-partum abstinence, and therefore we are

unable to account for the effects of these proximate determinants on past and cumulative fertility. Likewise, changes in respondents' and their households' socioeconomic characteristics over their reproductive spans could not be recorded. However, there is little evidence that economic wealth has played an important role in pre- and early transitional settings. In contrast, education has proven by far a more powerful predictor of fertility in such settings (e.g., Garenne 2012), and our analyses do account for the effects of women's education.

For the analysis of the relationship between religious affiliation and birth risk, we use event-history (survival) analysis. Event-history analysis models the risk (hazard) of an event, such as child birth, to occur at any given time as a function of a set of time-varying and time-invariant predictors. Going beyond most prior research in the field we treat religious affiliation as a time-varying characteristic and thus examine the relationship between religious affiliation and births dynamically. We start exposure to the hazard of birth at age 12.

Because exposure to the risk of birth is measured in discrete time intervals (years), we choose to fit discrete-time logistic regression model. In discrete-time models, a birth in current year *t* is the event of interest and religious affiliation in year *t*-1 is the main predictor. Affiliation is lagged by a year to establish proper temporal sequence: although the ordering of conditions or events in time does not automatically imply a causal relationship, it, at the very least, guards against reverse causality (e.g., that religious affiliation is somehow influenced by child birth). Following the earlier presented religious classification, we define five denominational categories—Roman Catholic, mainline Protestant (e.g., Presbyterian, Methodist, Anglican, etc.), Apostolic, Zionist, and Pentecostal—in addition to not having any religious affiliation. Although this classification inevitably simplifies the religious diversity of the study setting, it nonetheless reflects the most important groupings of Christian churches there. Eleven respondents who were Muslim at the time of the survey are excluded from the analysis.

The event-history model is limited to respondents who have ever been in a marital union, broadly defined to include both fully formalized and consensual unions, which, given the near universality of marriage in that setting, excludes primarily youngest childless respondents (five percent of the sample). Only women for whom age at marriage can be reliably established are included in the analysis. We start with a model that includes only religious denomination and respondents' time-varying age and age squared (baseline hazard). We then add time-varying dichotomous marital status (married or not) in year *t*, number of births prior to year *t* (time-varying), and the experience of a child's death in year *t*-1 (a time-varying dichotomy). The survey data do not contain complete residential histories, and we include as a control the type of area—urban or rural—where a respondent lived by the year she turned 12 years old (i.e., the age at which exposure to the risk of birth starts). We should note that in the study setting differences between urban (i.e., typically small town) and rural areas in the level and type of economic development and cultural characteristics are relatively small and migration between town and village is rather modest. Area of residence at age 12 and area of residence at the time of the survey are therefore highly correlated. The models also include a control for respondents' education which is

operationalized as a set of time-invariant dichotomies—no education, 1–4 years of schooling, and 5 or more years of schooling (the vast majority of women in that setting complete their education by around age 12 and therefore the operationalization of this covariate as time invariant is justified). Other socioeconomic characteristics, such as household income and assets or women's employment, recorded at the time of the survey are not included as covariates because they may have changed over respondent's reproductive years.

The event-history model also controls for experience of joining a church or switching between churches.[3] Joining/switching may not be a simple shift of organizational loyalty; it often accompanies and produces major changes in joiners' and switchers' identity, worldviews, social networks, and behaviors (Machado 1996; Stark and Finke 2000). However, because joining/switching among women may be highly correlated with marriage (women marrying men of other churches switch to their churches), which is a proximate determinant of fertility, it is particularly important to examine possible effects of joining/switching that are not directly triggered by marriage to men of different religious affiliation. Notably, because women's marriage-unrelated joining/switching is often driven by their search for faith-based cures for health problems, including those related to reproduction, this control also helps to account, even if indirectly, for possible past fecundity impairments. The corresponding variable is a time-varying dichotomy, which takes the value of 1 if a respondent joined or switched to a (nother) church for reasons unrelated to marriage at least once between the year in which she turned 12 and year *t*-1; 0 if otherwise. Respondents who changed religious affiliation at least once, but could not recall the years in which their church membership started and ended (6 % of the total sample) are excluded from the event-history analysis.

To account for the repeated nature of the event of interest (birth to a woman) over the observation period the event-history models employ a random intercept approach, which adjusts for potential non-independence of within woman observations. This approach allows the intercept to vary randomly across women, to account for a unique and unobserved woman-level tendency in the risk of birth. Finally, the intercept is allowed to vary randomly across the survey clusters (communities).

The analysis of yearly risks of birth, which gauges the immediate effect of denominational membership, is complemented by that of lifetime fertility, which captures the accumulated effect of religious affiliation on fertility across the life course. For this analysis, we employ Poisson regression predicting the number of live births a woman had in her entire reproductive career prior to the survey date; the model assumes that the outcome has a Poisson distribution and models the logarithm of the expected count of live births as a function of a linear combination of religious affiliation and other covariates. This analysis is also limited to ever-married women and includes the same categories of religious affiliation as the event-history analysis. For this analysis, the main predictor is the share of life spent in each denominational category since the age of 12 years. We fit two models. A baseline

[3]Following Stark and Finke (2000), we use *switching* to denote "shifts within religious traditions," as different from *conversions*, or "shifts across religious traditions."

model includes only respondent's share of life in a specific religious denomination. The second model adds controls—age at the time of the survey, age squared, age at first marital union, education, her rural versus urban background (the type of area where she lived in the year when she turned 12), and respondent's experience of joining/switching to a church for a reason other than marriage. As was the case of the event-history models, because the socioeconomic characteristics measured at the time of the survey, such income and wealth, cannot serve as reliable proxies for respondent's socioeconomic status throughout her past life, these characteristics are not included in the analysis. As in the analysis of risk of birth, in the completed fertility models the intercept is allowed to vary randomly across communities (survey clusters). All the statistical analyses are fitted in STATA, version 13.

Table 1 presents the sociodemographic profile of the survey sample and its breakdown by denominational category of current religious affiliation and the share of life since the age of 12 spent in each category. It illustrates the aggregate numeric prominence of Zionists, but also shows that many women spend considerable portions of their lives (more than a quarter, on average) outside organized religion even though the time spent without any affiliation may be inflated because some women may only recall or report episodes of active church membership in the past. Half of the survey respondents joined/switched to a church for reasons unrelated to marriage at least once after their twelfth birthdays.

Results

Religious Affiliation and Birth Risk

The parameter estimates and corresponding standard errors from the event-history logistic regression models predicting the hazard of birth in a given year *t* are presented in Table 2. When exponentiated, a regression parameter indicates the increase or decrease in the odds of having a birth in year *t* associated with one unit increase of the corresponding covariate (or, in the case of categorical covariates, with being in a particular category relative to being in the reference category). The first column (Model 1) displays the results of a baseline model, which includes only the baseline hazard function (age in linear and quadratic forms) and the dummies for denominational affiliations in year *t*-1. Pentecostal women are the reference category. The results show some variation in the hazard of birth across denominational groups. Apostolics, among whom the hazard of birth is significantly higher than among Pentecostal women, clearly stand out. The difference of Catholics, the non-affiliated, and Zionists from Pentecostal women is in the same direction, but the corresponding coefficients are not statistically significant at a conventionally acceptable level. With respect to age, the model shows a predictable pattern: as age rises, the hazard of birth first increases and then declines.

Model 2 (the second column of Table 2) adds sociodemographic controls—marital status, number of prior births, child death in previous year, woman's education and urban background. The model also includes the experience of having ever joined or switched to a church for reasons other than marriage prior to year *t*. However, even after the inclusion of controls in the model the difference between Apostolics and the reference group remains large and statistically significant. The odds of having a birth in any given year are 23 percent higher among Apostolics than among Pentecostals (odds ratio = exp (.2045) = 1.2269). The

magnitudes of the coefficients for the other denominational groups change somewhat, with Catholics showing the largest positive difference, but none of these coefficients is statistically significant. The coefficient for joining/switching experience has a positive sign, but it is not statistically significant. The effects of other controls are generally in predictable directions.

Because women who are not affiliated to a church in a given year may be different from affiliated women in some unobserved characteristics and their joining a church may have different motivations and implications from women who switch from one church to another, in Model 3 we replicate the last test excluding time spent outside formal religion. In this model, person-years spent in the “no affiliation” category are dropped and therefore that coefficient is not estimated. Although the exclusion of the person-years spent outside organized religion reduces the analytical sample by almost a third, the results for religious denominational categories do not change: the difference between Apostolics and the reference group remains large (and in fact, increases somewhat compared to the previous model) and highly significant. The effect of being a Catholic strengthens, but still does not reach a conventional threshold of statistical significance.

Religious Affiliation and Completed Fertility

Table 3 shows the mean number of children ever born among ever-married respondents by reported religious denomination at the time of survey. As can been seen, Apostolic women stand out with a considerably higher number of children ever born than the rest. Interestingly, the average number of children ever born among non-affiliated women is considerably higher than that among all the affiliated groups except for Apostolics. Pentecostal women display the lowest mean number of children ever born, followed by Catholics, whereas Protestants and Zionists have identical levels of lifetime fertility.

The bivariate associations presented in Table 3 may be misleading as they do not account for the time spent in a particular denomination and for demographic and social characteristics that typically affect fertility. To take account of individuals’ religious trajectories and to control for other factors, we fitted a Poisson regression model predicting the number of children ever born from the share of life a respondent spent in a particular religious denomination (including not being affiliated) since the age of 12 among ever-married women. In this model, a regression coefficient for a particular religious denomination variable indicates the increase (decrease) in the log of expected number of children ever born associated with one percentage point change in the share life spent in that denomination while holding the other predictors constant. The results are presented in Table 4.

The baseline model, which includes only the religious variables (Model 1) shows significantly positive effects on completed fertility of the share of life spent in the Catholic Church and an Apostolic church, relative to share of life spent in a Pentecostal church. The effect of Catholic membership is particularly noteworthy, as it is stands in sharp contrast with the relatively low mean number of children ever born among those with Catholic affiliation at the time of survey (Table 3). The share of life spent outside organized religion also exerts a positive effect on completed fertility; in fact, the magnitude of that effect is

larger than in the cases of Catholic and Apostolic membership. The effects of the shares of life spent in the other denominations are not statistically significant.

When the demographic and sociocultural controls are added (Model 2), the positive association of relative duration of membership in an Apostolic church with predicted number of children ever born weakens, but remains statistically significant. The effect of the relative time spent in the Catholic Church shows an even larger decrease and is now marginally significant. Every additional percent of life after reaching the age of 12 spent in a Pentecostal church or the Catholic Church raises the expected number of children ever born by about .0017 (exp (.0017) = 1.0017) net of other factors. An increase of lifetime fertility associated with time spent in the Catholic Church is slightly lower, .0014 (exp (.0014) = 1.0014). In comparison, as a result of the addition of controls (and especially age and education), the effect of years spent outside organized religion completely disappears. The effects of time spent in a mainline Protestant church or a Zionist church remain statistically non-significant.

We also fitted a model in which the predictor is the number of years, rather than the share of life, since age 12 spent in a particular denominational category. The results of that test are essentially the same as above, and we do not present them here (these results are available from the authors upon request).

Discussion and Conclusion

By looking at religious affiliation through both a dynamic and a lifetime lens and by employing a better contextualized and nuanced classification of denominational diversity than most studies on religion and fertility typically use, our study makes a contribution to the understanding of the relationship between religion and reproduction and, more generally, of the place of religion in sub-Saharan demographic processes. Although the setting of the study, like any sub-Saharan setting, is unique in many respects, we believe that the detected associations are informative beyond its boundaries. First, our analysis found considerable variation across denominational affiliation categories in both the yearly hazard of birth and in the number of children ever born. As the characteristics perspective would suggest, some of these associations were due to inter-denominational differences in age, education, marriage experience, and urban background; however, others could not be fully explained by these factors. Apostolic churches, however, stood out: the share of reproductive life spent in one of those churches was associated with significantly higher completed fertility regardless of other factors; Apostolics also had a significantly higher net risk of birth in any given year. Although the risk of birth among Catholics was not statistically different from that of the reference group, the share of reproductive life time spent in affiliation with the Catholic Church was positively (even if marginally) associated with the number of children ever born.

It is tempting to draw parallels between the apparent excess of completed fertility among Catholics, however modest after accounting for age and other factors it may be, with the findings on “Catholic fertility” in the United States and other historical western settings. Yet, because of the limitations of the data at hand we can only speculate about the extent to

which the results for Catholics reflect the Catholic Church-nurtured pronatalist values that most studies in the United States and Western Europe have typically identified as the root of the Catholic-Protestant fertility differentials. Earlier research in Mozambique, including analyses using the same dataset as in this study, did not detect any disadvantage of Catholics with respect to fertility regulation; on the contrary, in modern contraceptive use Catholics, along with mainline Protestants, were ahead of other religious groups (Agadjanian 2001, 2013). As Hirsh (2008) showed in her study in rural Mexico, Catholics find ways to reconcile the practice of contraception with their faith even in very conservative settings. And some historical research suggests that Catholic areas led the European fertility transition (e.g., Coale and Treadway 1986). Yet, across sub-Saharan Africa, Catholics' fertility has not shown consistent patterns (Heaton 2011).

Whereas the results for Catholic membership and lifetime fertility call for caution in interpretation due to their marginal statistical significance, our findings with regard to Apostolics are more robust and help illuminate the complexity of pathways through which religion may relate to fertility. They invite demographers to look for diversity in what may appear to some observers as a uniform block of religious denominations and prove the value of a more nuanced, contextually grounded denominational classification. Specifically, our results suggest that lumping all "African-initiated" churches together, or even putting them in a pan-Protestant (i.e., non-Catholic) category, as it is sometimes done or implied in the literature on the basis of apparent doctrinal and liturgical similarities or due to data limitations (e.g., Gregson et al. 1999; Heaton 2011), may obfuscate consequential distinctions in their social organization. Our field observations among Apostolics in Mozambique, and especially among the Church of Old Apostles, by far the largest Apostolic church in Mozambique, suggests that the high level of organizational commitment and support in those churches that we described in the introduction is unmatched in Zionists and Pentecostals denominations and may indeed enhance the family bond and galvanize pronatalist ideology that is otherwise inherent to almost any church in that patriarchal, high-fertility setting. In this sense, but with appropriate caveats, Apostolics may be compared to other religious groups whose high fertility levels stand out of their contexts. For example, Heaton (1986) explains high fertility of Mormons in the United States by their socialization into a highly pronatalist subculture through intensive involvement in various church activities and interactions with other church members. While vastly different from the Mormon Church theologically, the Apostolic churches in southern Mozambique are characterized by similarly strong institutional commitment and social cohesiveness, with arguably similar implications for marital relationships, family structure, and reproductive outcomes. The paucity of research on these churches' organizational and social aspects precludes more assertive conclusions.

Although our results do not directly support either the minority-group status perspective or the particularistic theology perspective, they call for a reflection on how universal religious teachings and prescriptions can be amplified by organizational characteristics and social environments of certain types of churches. Thus, our findings parallel and add to the earlier studies arguing that religious differentials in reproductive behavior are produced by complex interactions of theological tenets with social and institutional environments both within and outside religious organizations (e.g., Agadjanian 2001; Chamie 1981; Heaton 1986;

McQuillan 2004; Yeatman and Trinitapoli 2008). Future research on the association between religion and demographic outcomes should therefore pay greater attention to the institutional and social milieus that different religious groups cultivate and impose on their members.

While employing unique retrospective data specifically tailored to capture denominational variations in fertility, our study, like any study based on one-time data collection, has several limitations that must be acknowledged. First, as was already mentioned in the overview of the data, no retrospective information on religiosity and religious involvement, as distinct from church membership, is available. The reconstruction of women's past socioeconomic characteristics and environment beyond their educational level and rural versus urban background was also impossible. Further, while respondents' marital history was recorded, no retrospective information on their partners was collected. We are therefore unable to document how decisions about fertility are made by marital partners across their reproductive spans and how these decisions are contingent on both partners' religious membership and beliefs. Finally, even though our event-history models lag exposure to risk of birth relative to denominational membership, this time ordering alone does not assure a causal relationship between religion and fertility.

These limitations notwithstanding, our findings shed important light on the intricate religious-fertility nexus. As Mozambique and much of sub-Saharan Africa advance through fertility transition, the religious differences in fertility of the kind that we detected in this study may play a non-trivial role in shaping this transition even though the specific configuration and strength of these differences may evolve in the process. Perhaps even more importantly, religious differences in reproductive and marital behavior may affect denominational demographics and the religious composition of African societies: a common assumption of research on African religious demography that the religious composition of sub-Saharan countries is shaped entirely by the redistribution of the population across religions and denominations through conversion or switching overlooks the contribution of religion-based fertility differentials (Scheitle and Kane 2011). Although our conclusions in this study remain tentative, they help to chart directions for future research on interconnections between religion and demographic behavior and outcomes in the sub-Sahara and beyond.

Acknowledgments

We gratefully acknowledge the support of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Grant # R01HD050175.

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Table 1

Characteristics of the survey sample[a]

Sociodemographic characteristics at time of survey	
Age (mean and standard deviation)	31.3 (9.1)
Lived in an urban area at age 12	24.3
Lived in a rural area at age 12	75.7
No education	33.5
1 to 4 years of education	37.4
5 or more years of education	29.2
Ever been in marital union	94.7
Currently in a marital union	78.0
Denominational affiliation at time of survey	
Roman Catholic	12.5
Mainline Protestant	9.7
Zionist	42.8
Pentecostal	11.0
Apostolic	11.9
None	11.5
Average share of life since age 12 spent in a denominational category[b]	
Roman Catholic	15.2
Mainline Protestant	8.7
Zionist	28.9
Pentecostal	8.1
Apostolic	10.0
None	28.9
Joining/switching experience	
Ever joined/switched to a church for reasons other than marriage since age 12	49.9

[a] Percent unless noted otherwise;

[b] Excludes cases in which duration of denominational membership cannot be determined due to reporting problems

Table 2

Yearly risk of birth, random-intercept discrete-time logistic regression parameter estimates (standard errors in parentheses), ever-married women

	1	2	3
Denominational affiliation in year t–1			
Roman Catholic	0.0882 (0.0708)	0.0890 (0.0908)	0.1023 (0.0795)
Mainline Protestant	−0.0133 (0.0802)	−0.0508 (0.1010)	−0.0103 (0.0889)
Zionist	0.0517 (0.0650)	0.0109 (0.0815)	0.0284 (0.0720)
Pentecostal (ref.)			
Apostolic	0.2001 (0.0745)**	0.2045 (0.0935)*	0.2055 (0.0825)**
No affiliation	0.0768 (0.0639)	0.0399 (0.0820)	
Controls			
Age	0.5885 (0.0150)**	0.6665 (0.0192)**	0.6477 (0.0222)**
Age squared	−0.0106 (0.0003)**	−0.0108 (0.0003)**	−0.0112 (0.0002)**
Marital status			
Married in year *t*–1		0.9072 (0.0628)**	1.006 (0.0722)**
Not married in year *t*– 1 (ref.)			
Number of births before current year *t*		−0.2793 (0.0354)**	−0.1177 (0.0372)**
Child death in year *t*–1			
A child death in year *t*–1		0.3812 (0.0797)**	0.3663 (0.0970)**
No child death in year *t*– 1 (ref.)			
Area of residence at age 12			
Lived in an urban area at age 12		−0.0595 (0.0559)	−0.0561 (0.0525)
Lived in a rural area at age 12 (ref.)			
Education			
No education (ref.)			
1–4 years of school		0.0552 (0.0553)	0.0415 (0.0545)
5 or more years of school		−0.1626 (0.0642)**	−0.1629 (0.0617)**
Joining/switching to a church for reasons other than marriage prior to year *t*			
Joined/switched at least once		0.0318 (0.0491)	0.0225 (0.0477)
Never joined/switched (ref.)			
Intercept	−9.1574 (0.1954)**	−10.5482 (0.2857)**	−10.0592 (0.3154)**
Log likelihood	−14,506.52	−14,340.15	−9,759.28
Number of person-years	35,386	35,386	24,249

Significance levels: + $p \leq 0.10$;

* $p \leq 0.05$;

** $p \leq 0.01$

Table 3

Number of children ever born among ever-married respondents by religious affiliation

Religious characteristics	Number of children ever born, mean (s.d.)
Denominational affiliation at time of survey	
Catholic	3.47 (2.43)
Mainline Protestant	3.54 (2.54)
Zionist	3.54 (2.40)
Pentecostals	3.39 (2.52)
Apostolic	3.84 (2.45)
No current affiliation	3.73 (2.53)
All	3.57 (2.45)

Table 4

Children ever born, random-intercept Poisson regression parameter estimates (standard errors in parentheses), ever-married women

	1	2
Percent of life since age 12 spent in a denomination		
Roman Catholic	0.0020 (0.0007)**	0.0014 (0.0007)+
Mainline Protestant	0.0005 (0.0009)	0.0001 (0.0008)
Zionist	0.0006 (0.0007)	0.0008 (0.0007)
Pentecostal (ref.)		
Apostolic	0.0021 (0.0008)**	0.0017 (0.0008)*
No affiliation	0.0029 (0.0007)**	0.0002 (0.0007)
Controls		
Age†		0.0648 (0.0022)**
Age squared		−0.0024 (0.0002)**
Age at first marriage†		−0.0269 (0.0034)**
Area of residence at age 12		
Lived in an urban area at age 12		−0.0454 (0.0338)
Lived in a rural area at age 12 (ref.)		
Education		
No education (ref.)		
1–4 years of school		−0.0272 (0.0304)
5 or more years of school		−0.1421 (0.0409)**
Marriage-unrelated joining/switching experience		
Joined/switched to an(other) church at least once		0.0236 (0.0267)
Never joined/switched to an(other) church (ref.)		
Intercept	1.0681 (0.0633)**	1.2828 (0.0675)**
Log likelihood	−3,994.85	−3,327.65
Number of cases	1,792	1,792

Significance levels:

+ $p \leq .10$;

* $p \leq .05$;

** $p \leq 0.01$

† Grand mean centered