Religious Affiliation and Reproduction in Mozambique:
A Dynamic Analysis

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Introduction

The literature on religion and reproduction is rich and growing. Historical studies of Western

Europe suggest that fertility decline often reflected differences in religious affiliation and

involvement (Anderson 1986). Numerous historical studies of the USA highlighted religious

differences, mainly between Catholics and Protestants, in fertility in the nineteenth and much of

the twentieth centuries (Freedman et al. 1959; Bouvier and Rao 1975; Parkerson and Parkerson

1988; Gutmann 1990). These differences began to disappear quickly since the late 1960s

(Westoff and Jones 1979; Mosher et al. 1992; Herold et al. 1989). However, while

denominational differences have indeed diminished, religiosity continues to play a non-trivial

role reproductive outcomes: 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). But even if the role of religion in

childbearing may have been declining in Western societies, evidence from the developing world

points to considerable religion-related differences in fertility and contraception (e.g., Agadjanian

2001; Agadjanian et al. 2009; Bailey 1986; Berhanu 1994; Chamie 1981; Cosper 1975; Gregson

et al. 1999; Jayasree 1989; Johnson 1993; Johnson and Burton 1987; Knodel et al. 1999;

Kollehlon 1994; Sembajwe 1980, Yeatman and Trinitapoli 2008).

Typically, the influence of religion on fertility is cast within three conceptual frameworks, or

general hypotheses—the particularistic theology hypothesis, characteristics hypothesis, and

minority-group status hypothesis ((Johnson 1993). However, despite the growing amount of

research that entertains each of these perspectives, little consensus has emerged even though the

characteristics hypothesis, which reduces religious differentials in fertility to sociodemographic, economic, or cultural characteristics of adherents of different religions and denominations, seems to be favored by most fertility scholars, especially in the demography camp. A common drawback of many existing studies is the treatment of both religion and reproductive behavior as static phenomena. Individuals' religious trajectories are rarely examined and explicitly linked to their reproductive careers. Yet, in many settings, especially in developing ones, religious affiliation and involvement may 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 do men, especially because of or in conjunction with marriage but also for other reasons, both spiritual and practical. Likewise, the 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 the phenomenal growth of evangelical and Pentecostal Christianity. Importantly, this complexity has not only an ideological but also a social component: churches and denominations differ not so much in their theology as in their social teachings and practices. Accounting for this complexity is necessary for a better understanding of the role of religion in the emerging fertility transition on the sub-continent.

Conceptualizations and hypotheses

Our conceptual model draws from our earlier conceptualization of religious differences in reproductive and contraceptive behavior (Agadjanian 2001). Specifically, we expect to find a particularly salient reproductive divide between what we define as well-established churches, such as Catholics and "mainline" (Mission-initiated) Protestant, and newer, locally grown,

Pentecostal-type denominations, especially those that in southern Africa are encompassed under the Zionist umbrella. We first look at the probability of birth in any given year. In this analysis, we anticipate to find significant differences across denominations, with mainline Christians (Catholics and mainline Protestants) having lower probabilities of birth than Zionists. However, we also expect that a considerable portion of these differences would be explained by other characteristics, especially education. Going beyond the denominational differences, we examine the effects of religion/church switching on birth probabilities. For this analysis we expect to find a positive effect of religious switching on birth probabilities, but this effect should only be present in cases of switching that are caused by marriage (a "true" cause of increased likelihood of birth).

The second part of the paper explores the effects of women's current religious affiliation, recent conversion, and degree of current religious involvement on reproductive preferences and contraceptive use. For this analysis, we anticipate that Pentecostals (Zionists) will be more pronotalist than members of mainline denominations, but the religious differences should be due largely to education and other sociodemographic factors. We also hypothesize that recent conversion would be associated with greater pronatalism. Based on the above cited literature showing that greater religiosity leads to higher fertility and lower contraceptive use, we also expect a greater degree of religious involvement to be associated with the desire to have more children. With respect to contraceptive use, we expect to find higher use among members of mainline churches than among Zionists but again much if not all of this gap should be explained by educational differences between the member of the two types of denominations. At the same time, recent conversion and religious involvement should make contraceptive use less likely.

Data

Data for this study come from a representative population-based cluster survey of 2013 women aged 18-50 conducted in 2008 in Chibuto district of southern Mozambique, a high-fertility and predominantly Christian area with nearly universal religious membership and considerable denominational diversity. Indeed, based on our fieldwork we estimate that there is one religious congregation for about every 200 district residents. Before Mozambique's independence from Portugal in 1975, Catholicism was the colony's quasi official religion. Yet the colonial era also saw a considerable growth of mission-initiated (or "mainline" in our definition) Protestant churches. Besides these churches, the study area has a considerable presence of other denominations. Most remarkable, however, has been the explosive growth of Pentecostal churches, especially Zionist (locally known as *zione*) churches. Some of the Zionist churches were imported from South Africa, but many are homegrown in southern Mozambique. They are characterized by a strong emphasis on miracle healing that is often aided by herbs and similar medicines often borrowed straight from traditional healers' (*tin'anga*) healing kits, despite Zionists' vehement rejection of the very institution of traditional spirit-based medicine.

The survey was carried out in 82 randomly selected communities (clusters), both in the 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: 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 different reasons); characteristics of current religious involvement; complete birth histories; and reproductive

preferences and current contraceptive use.

Methods

For the analysis of relationship between religious affiliation, religious switching, and fertility, we fit a discrete-time event history model. Going beyond most prior research in the field we treat religious affiliation as a time-varying predictor in our models. This approach allows us to examine the relationship between religious affiliation and births dynamically. In addition to affiliation in any given year, we create variables that capture religious switching behavior, the duration of membership with each church, and the number and types of different churches to which a women belonged in her life. Among other advantages, this approach allows us to control for endogenous effects of fertility on religious affiliation (e.g., when women enter and switch churches seeking cure for infertility). Because the data were collected in a clustered community design, we employ multilevel methods (random effects models) to adjust for non-independence between clustered respondents. The models also account for the repeated nature of the event in question (birth to a woman) over the observation period. We use logistic regression to fit a discrete-time event-history model in which the rate of birth in year t is the event of interest, and respondent's religious affiliation in either current year t or the previous year, $t-1$ (depending on model specification) and switching affiliation in either current year t or the previous year, $t-1$ (again, depending on specific models), are the primary predictors.[1] We define five denominational categories: Roman Catholic, mainline Protestant (e.g., Presbyterian, Methodist, Anglican, etc.), Zionist, Other, and No religion.

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[1] Strictly speaking, a discrete-time model estimates the effects of predictors on the odds of an event, but as the number of periods of exposure to risk increases, the odds of the event approximate the rates. We therefore use the term "rates" in the following text.

For the analysis of reproductive intentions and contraceptive use we employ logistic regression for binary outcomes. Whereas these statistical models are simpler that the one used for the first part of the paper, this analysis utilizes more of the data resources. Specifically, these models account not only for religious affiliation at the time of the survey but also for recent conversion and frequency of religious attendance. Also, these logistic models control for other characteristics measured at the time of the survey. Finally, as in the event-history models, a random-intercept approach is employed to account for possible shared characteristics of respondents residing in the same survey clusters. For these analyses, we use the same classification of religious denominations as for the event-history analysis of birth rates. All the statistical analyses are fitted using the GLIMMIX procedure in SAS.

Results

Religious affiliation, religious switching and birth rates

The results of event-history models are presented in Table 1. The first column displays results of a model that includes respondent's age and age squared (the baseline hazard), being married in the previous year, number of children, having experienced a child death, and education (all but the last control are time-varying) and religious affiliation in the current year. Zionist is the reference category. As the results show, the only group that has a significantly lower birth rate than Zionist is Catholic. Column 2 presents the results of the same model but with religious affiliation lagged by one year. Again, Catholics are significantly different from the reference group. Mainline Protestants' birth rates are now much closer than to those of Catholics but their distance from Zionists is only marginally significant. In the model displayed in Column 3 we

expand the second model by adding the dummy variables for conversion: joined another church in the current year primarily because of marriage, primarily for health reasons, primarily for a reason other than marriage and health, or did not join another church. Two results from this model are particularly noteworthy. First, the effects of religious affiliation decreased somewhat but Catholics' birth rates remained significantly different from those of Zionists. And second, joining another church or religion significantly increases the birth rate. This effect has little to do with the reason for joining a(nother) church: although, as one would expect, joining another church or religion because of marriage has the strongest effect on birth rates relative to not joining another religion, the effect of joining for health reasons is only slightly lower. The effect of the residual category, joining for other reasons, is the smallest in magnitude but even that effect is highly statistically significant.

Table 1 about here

Lifetime parity and fertility intentions

As Table 2 shows, the average number of children ever born does not vary much across different groups of current religious affiliation and experience of religious switching (admittedly, current affiliation is a rather crude proxy for individual religious trajectories). Roman Catholics had the smallest average number of children but they were closely followed by mainline Protestants. On the other extreme, respondents with no current religion had the highest average number of children: .5 child more than did Catholics. Among respondents with a religious affiliation at the time of the survey, lifetime conversion experience did not seem to affect parity either. To account for a number of factors that may influence lifetime fertility, we fit a multivariate

negative binomial regression model predicting the number of children ever born from religious

affiliation and sociodemographic characteristics such as age, education, marital experience, and

place of residence. The results of this model confirm the lack of any significant differences

across religious denomination. Likewise, the model does not reveal any cumulative effect of

conversion experience (the results of the multivariate tests are not shown but are available from

the first author upon request).

Table 2 about here

We then examine fertility intentions as stated by the survey respondents. The second column, of

Table 2 shows the variation by religious category in the percentage of respondents who stated

that they wanted to have at least another additional child (as opposed to wanting no more

children or being unsure). Again, this variation is rather small. We also look at the variation in

the intention to have another child by frequency of church/mosque attendance: this variation also

appears negligible. Perhaps the most noticeable difference is between women who switched

affiliation recently and those who did not: the former appeared somewhat more pronatalist that

the latter. However, this difference may have been due to marriage that often triggers conversion

and a possible other factors unrelated to religion. To account for the effects of these factors we fit

a logistic regression predicting the intention to want more children. As in the previous

multivariate test, the results of this model show no significant differences across the categories of

religious affiliation, conversion, or frequency of attendance (the results are not shown but are

available from the first author upon request).

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Modern contraceptive use

Finally, we look at religion-related differences in contraceptive use. The last column of Table 2 presents the percentages of non-pregnant respondents who were using a modern contraceptive method (the pill, injectables, IUD, condom, or tubal ligation) at the time of the survey by religious characteristics. Unlike the distributions for the number of living children and fertility intentions, the distribution of modern contraceptive users across the categories of religious affiliation and involvement displays considerable variation. On the one end of the rather wide range are Roman Catholics, among whom almost a third were using a method. On the other end of that range are respondents with no affiliation, with only 14% of current users. Mainline Protestants are very close to Catholics, whereas Zionists gravitate more toward non-affiliated women. Finally, members of the residual group of other denominations stand more or less in the middle of the distribution. Among women who declared an affiliation, those who had recently switched affiliations were somewhat less likely to be using a modern contraceptive method. Most interestingly, the prevalence of modern contraceptive use seemed to increase linearly with frequency of church attendance, reaching 28% among women who went to church or mosque more than twice in the two weeks preceding the survey, compared to 20% among those who did not go to church or mosque in that time period.

Table 3 presents the results of several logistic regression models. We start with a pair of models that predict current use of modern contraception from current religious affiliation of non-pregnant respondents. Zionist is a reference category. In the baseline model (no controls), we can see a particularly sharp statistical contrast between Catholics and Zionists, even though in substantive terms the difference is not that large: the odds of using modern family planning

among Catholics are 12 percent higher than among Zionists. Members of mainline Protestant churches are also significantly different from Zionists, with odds ratios not far below those for Catholics. In contrast, the other two groups—women affiliated with other churches or religions and women without an affiliation—are not significantly different from Zionists. Most of the sociodemographic controls added in Model 2 are themselves powerful predictors of contraceptive use. However, although the effect of being Catholic diminishes, it remains statistically significant. In comparison, the coefficient for mainline Protestant affiliation, which also declines in magnitude, is no longer statistically significant. The other two groups are now indistinguishable from Zionists.

Table 3 about here

To allow inclusion of measures of religious participation (as different from affiliation), we restrict the next test to non-pregnant respondents who reported a religious affiliation at the time of the survey. In addition to the same religious affiliation groups (with the exception of non-affiliated women) and controls that were used in the previous model, we include frequency of recent attendance of religious services and whether or not the respondents converted from another church (or joined a church after not having any affiliation) in the three years preceding the survey. The results of this test are presented in Column 3 of Table 3. As we can see, the effects of religious affiliation do not change much after conversion and frequency of attendance are added: Catholics and possibly mainline Protestants have significantly higher odds of contraceptive use than Zionists, while members of the residual affiliation category are no different from the reference group. The fact of recent conversion does not seem to matter at all,

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but frequent church attendance has a highly statistically significant (even if substantively rather modest) *positive* effect on contraceptive use relative to not attending church at all.

Conclusion

By looking at religion and fertility through a dynamic lens this study made a contribution to the understanding of the place of religion in sub-Saharan fertility transition. Our hypothesis about denominational differences in birth rates was confirmed with respect to Catholic-Zionist differentials. Mainline Protestants also proved to be close to Catholics, as we had expected, but not so to be statistically distinguishable from Zionists. Our hypothesis about the effect of conversion on birth rates was partially confirmed: conversion was associated with increased birth rates, as we anticipated, but the increase was not confined to conversions due to marriage.

Despite Catholics' lower odds of giving a birth in any given year, we did not find any denominational differences in lifetime parity. Admittedly, religious affiliation at the time of the survey may not be a good proxy for lifetime religious experience, and other formulations of this experience should be explored in the future. However, what is perhaps more telling—and certainly less questionable on the methodological ground—is lack of any appreciable religious differentials in fertility intentions. In fact, not only women from different denominations were similar in their inclinations to continue childbearing but also religiosity, approximated by recent conversion and frequency of church attendance, did not seem to matter. The results for religious differentials in contraceptive use stand in sharp contrast to those from the models of fertility intentions, and when paired with the results of the event-history analysis of birth rate these results tell an interesting and credible story of denominational differences in fertility behavior.

Although we do not have data on past contraceptive use, we can speculate that higher contraceptive use among Catholics at least in comparison to Zionists, can at least partly account for the observed differentials in birth rates, even in the absence of any religious differences in explicit fertility preferences.

Catholics' contraceptive advantage, however modest, may seem counterintuitive given the Church's official position on artificial contraception. What then makes Roman Catholics more receptive to contraceptive technologies? At this point of our inquiry we can offer only a tentative interpretation of this finding. Of course, hardly any church explicitly promotes contraceptives (perhaps with the exception of condoms for HIV/STI prevention). If anything, the messages extolling family and motherhood values and wife's submission to husband's will are more likely to discourage fertility control. It is possible, as Yeatman and Trinitapoli (2008) showed in the study in Malawi, that some church leaders may approve of family planning (even if sometimes contrary to their churches' official stance) and that approval, rather than denominational identity, is what matters most for church members' contraceptive behavior. Yet, as we also think, women are exposed to more than the teachings they hear from the pulpit when they come to church. Informal communication with and learning from other church members on the margins or even outside of the church official routine can be more consequential for their contraceptive education (see Kohler 1997; Rutenberg and Watkins 1997) as for other health-related outcomes such as HIV/AIDS attitudes and behavior (Agadjanian and Menjívar 2008). The limitations of our data do not allow us to explore this issue directly. However, indirectly the finding that frequent attendance of church (mosque) is associated with increased contraceptive use regardless of affiliation—a finding that counters our initial expectations—lends support to the idea that active

social involvement may be conducive to faster learning and adopting of novel technologies such as contraceptives.

The finding that Catholics and perhaps mainline Protestants in that setting are early adopters of modern contraception does not imply that members of other churches or religion are inherently and inextricably disadvantaged in contraceptive matters by their religious affiliation. Our results only suggest that they may be slower in adopting modern contraceptives and possibly in experiencing fertility reduction than affiliates of the Roman Catholic and mainline Protestant churches. As the evidence from more developed settings has shown, religious differentials in fertility disappear as fertility transition advances (Westoff and Jones 1979; Mosher et al. 1992; Herold et al. 1989). However, much of the literature on the declining religious differentials in fertility has been premised on the assumption of the decline in the overall societal importance in religion as modernization and secularization take hold and rational decision-making takes place of normatively driven behavior (Lesthaeghe 1983; Thornton 1985; Lesthaeghe and Wilson 1986; Goldscheider and Goldscheider 1988). Needless to say, the earlier forecasts of an exorable decline in the role of religion have proven largely unfounded in most parts of the world.

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Table 1. Random intercept discrete time logistic regression of yearly rate of birth, parameter estimates and standard errors

Predictor	Model 1			Model 2			Model 3		
	Estimate	SE		Estimate	SE		Estimate	SE	
Catholic in current year	-0.010	0.004	**						
Mainline Protestant in current year	-0.006	0.005							
Other denomination in current year	0.001	0.004							
Zionist in current year	0.003	0.003							
No affiliation in current year (ref.)									
Catholic in previous year				-0.011	0.004	**	-0.009	0.004	*
Mainline Protestant in previous year				-0.008	0.005	+	-0.006	0.005	
Other denomination in previous year				-0.003	0.004		0.000	0.004	
Zionist in previous year				-0.003	0.003		0.000	0.003	
No affiliation in previous year (ref.)									
Joined a(nother) church for marriage							0.119	0.014	**
Joined a(nother) church for health reasons							0.084	0.011	**
Joined a(nother) church for other reasons							0.040	0.012	**
Did not join a(nother) church (ref.)									
Respondent's age	0.020	0.000	**	0.020	0.000	**	0.019	0.000	**
Respondent's age, squared	-0.001	0.000	**	-0.001	0.000	**	-0.001	0.000	**
Number of children	0.082	0.001	**	0.082	0.001	**	0.082	0.001	**
At least one child death	0.015	0.009		0.015	0.009		0.014	0.009	
No child died									
In marital union in previous year	0.173	0.007	**	0.173	0.007	**	0.171	0.007	**
Not in marital year in previous year									
No education (ref.)									
Education, 1-4 years	-0.001	0.003		0.000	0.003		-0.001	0.003	
Education, 5 or more years	-0.004	0.003		-0.003	0.003		-0.005	0.003	
Number of cases (person-years)	54755			54755			54755		

Note: Significance levels: + p<=.010; * p<=.05; ** p<=.01

Table 2. Number of children ever born, desire for additional children, and current use of modern contraception by religious affiliation.

	Number of children ever born, mean (s.d.)	Wants to have more children vs. wants no more or does not know, %	Current use modern contraception
Catholic	3.2 (2.5)	49.8	32.4
Mainline Protestant	3.3 (2.5)	51.0	30.6
Zionist	3.5 (2.4)	49.7	19.1
Other	3.5 (2.6)	47.4	22.8
No current affiliation	3.7 (2.5)	47.2	14.0
Those with current religious affiliation:			
Switched church/denomination at least once	3.4 (2.5)	--	--
Never switched church/denomination	3.4 (2.5)		
Switched church/denomination in last three years	--	53.2	20.8
Did not switched church/denomination in last three years	--	47.4	24.3
Did not attend church/mosque in past two weeks	--	47.3	19.7
Attended church/mosque once or twice in past two weeks	--	50.1	22.9
Attended church/mosque more than twice in past two weeks	--	48.1	27.5

Table 3. Random intercept logistic regression of current use of modern contraception, parameter estimates and standard errors

Predictor	Model 1 Estimate	SE		Model 2 Estimate	SE		Model 3 Estimate	SE	
Catholic	0.114	0.032	**	0.071	0.031	**	0.079	0.032	**
Mainline Protestant	0.081	0.039	*	0.055	0.038		0.063	0.038	+
Zionist (ref.)									
Other religion/denomination	0.019	0.025		-0.004	0.024		-0.007	0.025	
No religious affiliation	-0.051	0.033		-0.025	0.031		--	--	
Switched in past 3 years							-0.018	0.024	
Did not switch in past 3 years (ref.)									
Did not attend church/mosque in past two weeks (ref.)									
Attended church/mosque 1-2 times in past two weeks							0.032	0.026	
Attended church/mosque 3 or more times in past two weeks							0.072	0.028	**
Age 18-24 (ref.)									
Age 25-34				-0.080	0.026	**	-0.081	0.028	**
Age 35 or more				-0.199	0.031	**	-0.209	0.034	**
In monogamous union				0.072	0.023	**	0.075	0.025	**
In polygamous union				0.106	0.029	**	0.106	0.032	**
Not in union (ref.)									
Number of living children				0.042	0.006	**	0.044	0.007	**
No education (ref.)									
Education, 1 to 4 years				0.052	0.023	*	0.052	0.025	*
Education, 5 or more years				0.191	0.027	**	0.180	0.029	**
Currently works outside the home				0.035	0.020	+	0.039	0.022	+
Currently does not work outside the home (ref.)									
Lives in urban area				0.110	0.025	**	0.111	0.026	**
Lives in rural area (ref.)									
Wants more children				-0.012	0.023		-0.013	0.025	
Does not want more children (ref.)									
Number of cases	1764			1760			1555		

Note: Significance levels: + p<=.010; * p<=.05; ** p<=.01