A Clash of Civilizations or Vicissitudes of History?
Christian-Muslim Differentials in Contraceptive Use in Sub-Saharan Africa

Victor Agadjanian

Scott T. Yabiku

Lubayna Fawcett

Center for Population Dynamics
Arizona State University

Abstract

In the globalization discourse Christianity and Islam are often construed as representing two civilizational traditions that are conflictual and even incompatible. This study engages the "clash of civilizations" discourse by examining Muslim-Christian differentials in the use of modern contraception in Nigeria, where Christians have a much higher contraceptive prevalence, and Tanzania, where Muslims are somewhat more likely to contracept. Using data from six nationally representative surveys conducted in the two countries between 1990 and 2004 and multilevel logistic regression we find that the effects of religion remain strong but operate largely through the community religious milieu. Contraceptive use tends to be highest in religiously-mixed areas, but the "optimal" religious makeup differs between the two nations reflecting the historically-shaped configurations of their religious expressions and politics.

INTRODUCTION

Fueled by politics, the issue of "civilizational" opposition of Christianity and Islam frequently, even if not always explicitly, makes it way into current globalization discourse. Drawing upon various dimensions and aspects of Christianity and Islam's historical patrimony and present-day realities, elaborate and forceful arguments are made both to reify a gulf dividing the two "civilizations" and, on the contrary, to reduce the differences between Christian and Muslim heritages and politico-cultural expressions to mere miscommunication or opportunistic manipulations (e.g., Akbar 2003; Asad 2003; Bulliet 2004; Huntington 1996; Said 2001; 2003).

One of the most commonly used yardsticks to assess the differences between the Christian and Muslim worlds is their receptivity to cultural and technological changes. It is often presumed that the former possesses better aptitude and flexibility to embrace and internalize innovations than the latter. These and similar assumptions and assessments, however, seldom rest on a thorough examination of empirical data—mainly because appropriate and well-measured indicators of such innovations are rare. In this study we look at contraceptive use in the context of high fertility—a sort of novel cultural technology that can be easily and unbiasedly measured. We focus on what is often labeled "modern" contraceptives—hormonal or barrier methods that are scientifically developed and industrially produced, whose invention and spread are historically recent and whose practical purposes and cultural load are often very different from "traditional" methods of birth control. Importantly, in the settings that we examine here contraceptives are usually available free of charge or are heavily subsidized, which effectively eliminates the pecuniary barriers that often hinder the spread of other novel technologies.

The several recent decades have witnessed a global contraceptive revolution. This revolution, however, has not impacted the world evenly. Sub-Saharan Africa remains one of the last "family planning frontiers" (Caldwell and Caldwell 2002), where contraceptive use is still lower and fertility rates are still higher than in most other regions. However, while low overall, contraceptive prevalence has varied greatly within sub-Saharan societies. Some patterns of that variation are universally recognizable: contraceptive use is higher among better educated people, among urban dwellers, etc. (Kirk and Pillet 1998; NRC 1993). Other patterns, such as those of ethnic or religious differentials are less inviting of straightforward explanations (e.g., Addai 1999a; 1999b; Agadjanian 2001; 2004; NRC 1993).

In this study, we argue that religious differentials in contraceptive use are rooted in country-specific historical trajectories that position religious faiths and groups that profess them in certain ways vis-à-vis each other and vis-à-vis cultural-technological innovations. We also argue that religious differentials in contraceptive use, established through a complex interplay of historico-cultural and political developments, are produced at two levels—that of individuals and that of community. To support our arguments we examine Muslim-Christian differentials in contraceptive use in the Federal Republic of Nigeria and the United Republic of Tanzania. Our choice of these two countries was determined by the large size of their Christian and Muslim populations, the availability of high-quality survey data collected at several time points over a dozen year, and above all, by what we see as two very different historical paths of political and religious development.

In the following text, we first provide a demographic, socioeconomic, and historical background for the two countries and describe their family planning policies. We then present a conceptual model that integrates the individual and contextual effects of religion while casting

these effects within the common analytical frameworks for the relationship between religion and demographic behavior and within the historico-political contexts of both countries. We use data from the Nigeria and Tanzania Demographic and Health Surveys (NDHS and TDHS) conducted in the 1990s and early 2000s and multilevel statistical techniques to test this model and then discuss our findings.

A TALE OF TWO COUNTRIES: NIGERIA AND TANZANIA

Table 1 provides a snapshot of the two countries' demographic and socioeconomic characteristics. Despite vast differences in population size, both are low-income, predominantly rural, have high infant mortality, comparably high fertility, low educational levels, and rank near the bottom on the UN Human Development Index. Notably, although oil-rich Nigeria has a somewhat higher GNI per head, its government spends proportionally less on health and education than does the Tanzanian government, and Nigerians have, on average, less access to primary health care and worse public health infrastructure than Tanzanians.

Table 1 here

Reliable official statistics on religion in countries like Nigeria and Tanzania do not exist. Table 2 shows selected data on Christians and Muslims computed from the first and last NDHS (1990 and 2003) and first and last TDHS (1992 and 2004-5). Both countries have a sizeable presence of each faith, and in both the religious makeup remained rather stable in the 1990s-early 2000s. In Nigeria, despite modest religious differences in urbanization, Christians, on average, were much better educated than Muslims. While material wellbeing—here approximated crudely

by radio ownership—rose over the thirteen years between the first and last DHS, the religious gap in it favoring Christians persisted. By a wide margin, Christian women were consistently more likely than their Muslim counterparts to work outside the home. Given this background, the wide and persistent family planning gap between Muslims and Christians is not surprising. Despite a fairly rapid rise of contraceptive prevalence among both groups, the Muslim-Christian differentials remained virtually unchanged. This, however, was not the case of total fertility rates (TFRs): Christian TFR was higher in 1990 but lower in 2003 than Muslim TFR, and the two TFRs showed opposite trends.

Table 2 here

The corresponding religious patterns and trends in Tanzania are very different. While Muslims' modern contraceptive use was only slightly below that of Christians in the first DHS, the last DHS recorded a higher prevalence among Muslims. In both DHS, Muslims had lower total fertility than Christians. True, Tanzanian Muslims were considerably more urbanized than their Christian counterparts. At the same time, however, Muslim women had a comparable or just slightly higher educational level than Christians. Muslim women were not that different from Christian women in material wellbeing and were less likely than Christian women to work outside the home. To better understand the roots of Christian-Muslim contraceptive and socioeconomic differentials in Nigeria and Tanzania we now undertake a brief excursion into both countries' history.

HISTORICAL ROOTS OF RELIGIOUS DIFFERENTIALS IN CONTRACEPTION

Islam and Christianity in Pre-Colonial and Colonial Eras

Berber traders of North Africa brought Islam southwards across the Saharan desert to what now is northern Nigeria during the eleventh century, and for centuries thereafter Islam shaped the cultural, economic, and political development in the region (Trimingham 1959). The ideological and political rise of Islam culminated in the *jihad* led by Uthman Dan Fodio against non-Islamic beliefs and practices and the establishment of the Sokoto Caliphate that by the early nineteenth century became the most formidable political power in the region. The Caliphate, governed under the Sharia (Islamic social doctrine) laws, was also a key factor in the formation of a strong collective Muslim identity among northern Nigeria's Hausa and Fulani ethnic groups. At the same time, that strong identity further underscored the distinctions and disjunctions between the Islamic empire and its pre-Islamic surroundings (Kane 2003; Quinn and Quinn 2003; Sulaiman 1987).

As in Nigeria, much of the pre-colonial history of coastal and island Tanzania was shaped as an African Islamic civilization. Islam in Tanzania was adopted via a "flexible assimilative process" Mazrui and Shariff 1993) between the ninth and twelfth centuries. Arab merchants sailed across the Indian Ocean and set up their trade settlements along the East Africa's coast, cemented by matrimonial alliances with various coastal ethnic groups. It was from those matrimonial arrangements that a new "ethno-assimilated" group emerged with its distinct Afro-Islamic culture and language—the Swahili. Their language, Kiswahili, eventually developed as the region's lingua franca (; Pouwels 1987; Trimingham 1964).

Unlike northern Nigeria, the *Tariqa* Islamic orders that established themselves on the Tanzanian coast never reached either numerical significance or socio-political prowess to mount

a movement comparable to Dan Fodio's *jihad*. At the same time, the maritime orientation of the Swahili society rendered it more permeable to sociocultural pluralism (by incorporating newcomers from India, Arabia, and later from Europe) compared to geographic and ethnocultural insulation of Muslim lands in northern Nigeria. The Afro-Islamic identity in Tanzania, shaped through centuries of trade and intermarriage and embodied in the Swahili ethnocultural complex, never reached the degree of antagonism with its non-Islamic environs typical of northern Nigeria (Pouwels 1987).

History of Christianity in most of sub-Saharan Africa parallels history of slave trade and subsequent colonial conquest. While the arrival of first Christian missionaries and the establishment of first schools in today's southern Nigeria preceded the political subjugation of the region, it was only with the establishment of the British colonial rule at the turn of the 20th century that the Christian expansion began in earnest (Bassey 1991). Not surprisingly, both the British occupation and the Christian expansion were relatively quick in the south but met with fierce resistance in the north; that resistance continued symbolically and culturally well after the military defeat of the Sokoto Caliphate in 1906 (Sulaiman 1987). These different levels of resistance largely defined the British colonial policies in Nigeria—indirect rule in the north and direct rule in the south.

In the north, the traditional administrative system was "frozen in place" (Quinn and Quinn 2003:39) and many Islamic organizations, such as *Tariqa* orders, and practices, such as *purdah* (seclusion of women), were actually strengthened under the British rule. Moreover, the northern areas were made virtually off-limits to Christian missionaries and to mission-based education. As a result, the targets of Christian conversion and education were primarily in the southeast, the home of the Igbo ethnic conglomerate, where the influence of Islam had been very limited and in

the Yoruba-speaking southwest, where Islam had made considerable inroads but the reservoir of potential neophytes was still quite large. (Hunwick 1992; Rasmussen 1993). The increasing symbolic and cultural antagonism and distancing between Muslims and non-Muslims, fueled by the colonial administrative system and corresponding religious and cultural rules and practices, manifested themselves most impressively in the educational gulf between the north and the south: thus in 1929, there were 125 primary schools with 5,210 students in the north, compared to 3,828 schools with 138,249 students in the south (Kane 2003: 62).

Christianity, in the form of both Protestantism and Catholicism, took firm roots in Tanzania also only after the German colonial occupation. Christian missionaries' proselytizing attempts were by and large futile on the heavily Islamicized coast and in the southern and western regions, where Islam had also had considerable presence. Most initial converts were therefore recruited among the pockets of "traditional" population of the interior where the influence of Islam was weak or non-existent (Nimtz 1980; Pouwels 1987). As a result, in Tanzania the Muslim-Christian boundaries did not follow ethnic boundaries as closely as they did in Nigeria, where ethnic and religious divisions intertwined and reinforced each other.

The German rulers relied heavily on the Swahili-Muslim community to advance and enhance their grip over the new colony: Muslims were widely employed to assist with lower-level administrative duties such as tax collection. Contrary to the British, the Germans from the outset favored secular education, and Muslims benefited from it (Chande 1998). Although the system began to change after the Maji-Maji rebellion of 1905-7, when the German administration shifted emphasis on promoting Christian missionary education, neither in the remainder of the German rule nor under the British colonial occupation established after World War I were Tanzanian Muslims as isolated culturally as were Muslims in Nigeria. At the politico-administrative level,

the British indirect rule in Tanganyika (as the mainland part of today's Tanzania was called before 1964) did not create any Muslim enclaves "frozen in space."

To be sure, throughout most of Tanzania's colonial history and especially under the British rule, Christianity "offered visible social advantage" (Ekechi 1971: 115) as Christian converts were subject to less discriminatory policies and were rewarded with western education which often opened doors to employment in colonial government (Chande 1998; Ekechi 1971). Yet, although Muslims' influence and power were considerably undermined during colonialism, the colony's social hierarchy, first established by Germans and later reinforced by the British, was based more on race than religion or ethnicity. Europeans and to a lesser extent Asians enjoyed a privileged status, while Africans, regardless of religion or ethnicity, formed the bottom of the social pyramid (Lagum and Mrima 1995). The promotion of Kiswahili is the language of inter-tribal communication further attenuated religious divisions among Africans.

Independence and Post-Colonial Development

The anti-colonial movement in Nigeria, instead of uniting the colony's population further exacerbated the bitter rivalry among its ethnoreligious elites. The British responded to the growing fragmentation and polarization of colonial society with the introduction in 1954 of a "federal" system of government, which consolidated regional self-rule and placed education, health, and other institutions under the jurisdiction of local authorities. Far from reducing tensions, however, these reforms reinforced the divisions within Nigerian society and especially the self-isolation of northern territories (Kane 2003; Quinn and Quinn 2003).

In contrast to Nigeria, the struggle for independence in Tanzania brought together different segments of the population. In fact, Tanzanian Muslims were in the vanguard of that struggle,

both because they felt disadvantaged in the British colonial system and because Christian churches generally discouraged their followers from any form of political expression. Yet unlike the communitarian isolationism of Nigerian Muslims, Tanzanian Muslim leaders championed the colony-wide independence agenda and mobilized the masses in support of Julius Nyerere, a devout Catholic, and his TANU party (Omari 1995). The "detribalization" of Tanzanian politics, owing both to the preeminence of race over religion and ethnicity and to the spread of "meta-tribal" Kiswahili, helped the national liberation movement transcend ethno-religious distinctions.

In Nigeria, the post-independence period saw an accelerated penetration of Islam and Christianity into each other's traditional territories: while a sizeable Muslim population emerged in the South (especially in the Yoruba-populated Southwest), Christianity spread inland far beyond its early coastal bastions (Kilani 2000; Quinn and Quinn 2003). This interpenetration of the two religions, however, did not diffuse the simmering frictions between them; on the contrary, it often threw these tensions into greater relief. The historical ethnoreligious tensions have strongly imprinted Nigeria's post-colonial development. Since its independence in 1960, the Federal Republic of Nigeria has gone through spells of social and political instability: a major civil war, several coups d'états, and countless political, cultural, and physical confrontations along the Christian-Muslim divide—be they about the legal system, women's dress, child immunization, or the publication of anti-Islamic cartoons in a faraway land (BBC 2006; Hunwick, 1992; Ilesanmi 1997; Kane 2003). Nigeria's natural riches, far from catalyzing the nation's socioeconomic progress and cementing its unity, have become a major stake in regional, ethnic, and confessional rivalries and in fact have fomented those rivalries. Flagrant socioeconomic inequality, endemic corruption, and administrative gerrymandering have further amplified ethnic and religious antagonisms (Alapiki 2005; Rasmussen 1993; Quinn and Quinn

2003). As a result, religion has remained a major political force and dominant idiom of cultural discourse in Nigeria up to this day (Obadare 2006).

In contrast, Tanzania has enjoyed relative political stability from its independence in 1961 to the present (Heilman and Kaiser 2002). The continuing spread of Kiswahili, the first sub-Saharan language to be adopted as a national language in a former colony, facilitated the national integration across ethnic and religious lines (Legum and Mmari 1995). The relative ethnoreligious harmony was also enhanced, rather coercively, by the socialist regime of the *Ujamaa* era, when any form of dissent from the nationalist cause was promptly and often severely repressed. Notably, religious and ethnic tensions in Tanzania have sprung to the surface of the body social only in recent years, since the Tanzanian leadership introduced structural adjustment and political liberalization reforms (Heilman and Kaiser 2002; US State Department 2004). However, these tensions have never approached the level of ethno-religious confrontations in Nigeria.

Historico-Religious Legacies and Family Planning Policies

Large-scale family planning programs were introduced in both countries in the 1980s. In Nigeria, the introduction of the family planning program reflected rising concerns over the nation's rapid population growth. Since 1983, the government-sponsored family planning services have been incorporated into the state health system and promoted with assistance from international agencies (Feyisetan and Ainsworth 1996). In Tanzania, the National Child Spacing Program started in 1985. Four years later, the National Family Planning Program was instituted to provide and promote family planning as part of primary health care services. Importantly, unlike the Nigerian policy that set an explicit goal of reducing the total fertility rate to four children per

woman in 2000, Tanzania's family planning program and the National Population Policy adopted in 1992 emphasized child-spacing and maternal and child health improvement, without setting any specific fertility reduction targets (Beegle 1995; Reachy 1999).

The family planning programs resonated very differently in the two historico-cultural and socio-political contexts. In Nigeria, where the approach to population policy has been criticized for cultural insensitivity (Obono 2003), the introduction of family planning, and especially the fertility reduction targets, proved very controversial. As Mazrui (1994:124) noted, "the controversy concerned not merely the rights of women, but also the costs and benefits of different ethnic groups and the rival religious denominations." The western sponsorship of family planning further heightened public skepticism and suspicion of its motives and objectives. These negative attitudes were not uniform throughout Nigeria as they were conditioned by regional and local political realities. Not surprisingly, the misgivings and fears about the family planning goals have been much stronger among Muslims who have often seen family planning activities as an attempt to undermine them both demographically and culturally (Mazrui 1994; Renne 1996). Although the legitimacy and relevance of foreign-origin reproductive ideas and technologies may also be questioned by local Christian ideologues, an overt opposition to them is much more likely to come from Muslim leaders, who may not only see them as culturally alien but also as politically hostile.

In contrast, the family planning program in Tanzania has not stirred up any connotations with national or local politics. While some aspects of family planning may have been viewed as culturally foreign and controversial, these views have not been cast within an ethnic or religious discourse but rather within a discourse of family planning compatibility with national and even "African" traditions and values. The avoidance of explicit references to fertility reduction in the

family planning propaganda as well as the Tanzanian government's tight control over the media may have helped diffuse controversies and challenges surrounding family planning (Richey, 1999).

CONCEPTUALIZING CHRISTIAN-MUSLIM CONTRACEPTIVE DIFFERENTIALS

Having outlined a historical framework for the divergent levels and patterns of contraceptive use in Nigeria and Tanzania, we now integrate the two countries' historical backgrounds into our conceptual model. Typically, the literature approaches the connection between religion and reproduction from three main theoretical perspectives. The first perspective searches for explanations of religious differentials in theological tenets, specifically in religious prescriptions and proscriptions that address reproduction and contraception directly. Except for some smaller and idiosyncratic religious denominations and sects, this perspective is difficult to sustain as most big religious traditions allow for a broad range of interpretations and applications of religious doctrine. Yet, one can argue that some teachings that are indirectly related to fertility and contraception—i.e., those focused on marriage, family, women's roles, etc.—and that are influential in a particular society may affect reproductive and contraceptive choices and outcomes, even when the dogma is silent or ambiguous on matters of fertility and contraception per se. A second perspective is known as the "characteristics hypothesis" and seeks to explain away whatever religious differentials in demographic behavior by statistically controlling for more conventional sociodemographic characteristics. Because of the very nature and structure of demographic analysis, virtually any demographic study of religious differentials in fertility and contraception must entertain this perspective. A third approach, christened the "minority-group status hypothesis" seeks explanations for demographic differentials across religious (and ethnic)

groups in socio-political positions of those groups. According to this perspective, religious or ethnic minorities' demographic behavior, especially in matters of reproduction, reflects their ability and willingness to protect or to improve their positions in society (Bean and Marcum 1978; Goldscheider and Uhlengberg 1969). This last perspective, while steering the inquiry away from the doctrinal intricacies of religions in question, emphasizes the importance of the environment in which minority and majority groups coexist and interact, rather than some individual or collective "characteristics" of adherents of different religions. However, although this perspective may be heuristically appealing and have found indirect support in several recent studies (e.g., Morgan et al. 2002; Dharmalingam and Morgan 2004), it is notoriously difficult to entertain with typical demographic data.

In this study we elaborate on the "minority-status" perspective while heeding McQuillan's recent emphasis on the importance of the historically-conditioned social context in which religion operates and influences reproductive attitudes and decisions (Basu and Amin 2000; McQuillan 2004). We argue that even with conventional demographic data much knowledge and understanding can be gained if one embeds this perspective within a broader historico-cultural and socio-political framework. We believe that Muslim-Christian differentials in contraceptive use in Nigeria and Tanzania are deeply rooted in the earlier described general and long-standing historico-cultural and political relationships between the two main religions—tense and antagonistic in Nigeria and relatively peaceful and mutually accommodating in Tanzania. We view religion as a fundamental and powerful force in Nigeria's political discourse and social mobilization, and reproductive and contraceptive matters as symbolic markers that religion may enlist to enhance the social construction of contested socio-political terrains and identities. And importantly, these religiously expressed contestations acquire different configurations and

potency at the national, regional, or local levels (Jeffery and Jeffery 1997; Renne 1996). In contrast, in Tanzania religion has historically been restricted to the margin of politics and therefore religious conflict did not emerge, at least until very recently, as a form and a vehicle of political and cultural contestations.

Religious relations and tensions are usually asymmetrical: in most real-life situations there are groups that are—or perceive themselves as—minorities struggling to protect their identity and wellbeing (and sometimes their very lives) from the mainstream, or to achieve greater political inclusion into that mainstream. While our approach conforms to the logic of the "minority-status" perspective, we also emphasize that Muslims have been a *symbolic* minority: although a sizable group (and in Nigeria rivaling and perhaps exceeding Christians numerically) widely represented in their respective countries' intellectual, economic, administrative, and military elites, they have been on the defensive—culturally and symbolically—since colonial times and remain so today despite considerable headways in Islam's quest for symbolic preeminence and political influence.

It therefore seems appropriate to look at the Muslim-Christian division and resulting contraceptive differentials from Muslims' standpoint. As our theory goes, because Muslims have been historically relegated to the margins of western culture in Nigeria and because of the corresponding tendency to equate things western with things Christian, Nigerian Muslims have been lagging behind Christians in contraceptive use. As the "characteristics hypothesis" would imply, we anticipate that some of this "disadvantage" may be due to other sociodemographic characteristics, especially secular (i.e., western-type) education, that distinguish Christians and Muslims. Yet, given the long-lasting and deeply entrenched religious schism in Nigeria, we also hypothesize that conventional sociodemographic controls will not erase the Christian-Muslim

differences in contraceptive use completely. In contrast, in Tanzania, where the symbolic and cultural marginalization of Muslims has never been as pronounced, the observed Chiristian-Muslim differences in contraceptive use should be fully explained by socioeconomic and demographic differences between the two religious groups.

Studies addressing the role of religion in reproduction typically compare either doctrines or individuals. Community-level religious characteristics rarely fall into the focus, even though some do control for community religious makeup (e.g., Dharmalingam and Morgan 2004). Building upon the notion of religious congregations as communities with distinctive socially-shared normative and behavioral patterns (Agadjanian 2001; Goldscheider and Mosher 1988) and on evidence of a relationship between a country's religion makeup and religious differentials in its fertility (Johnson-Hanks 2006), we propose that the societal influence of religious communities is not limited to their members but also impacts normative and behavioral preferences and choices of those around them. This conceptualization leads us to look at both individuals' religious affiliation and the religious environment in which these individuals live. At a local level, therefore, religion is as much a contextual and relational phenomenon as it is a spiritual and ideological one.

Religion therefore helps shape the social and moral milieu in which individuals live and make decisions such as whether or not to use contraception. Hence, in influencing contraceptive behavior the community religious context operates in parallel with and independently of individual religion identity. This assumption produces the following additional hypotheses regarding the effects of community religious environment. First, we propose that the religious milieu should have an effect on contraceptive use that is largely independent of that of individual religious affiliation, even though the two effects should be in the same direction. Specifically, we

expect that the likelihood of contraceptive use should decrease as the presence of Muslims in an area of residence increases. However, these effects may not be linear, and we will examine the data for possible non-linearity. Second, we expect that the effect of the religious milieu will explain a considerable part of the effect of individual religious affiliation. And third, we posit that the effect of the religious milieu will persist even after controlling for community access to family planning and other community characteristics.

Yet we also argue that both individual and community-level Christian-Muslim contraceptive differentials should be examined within concrete historico-political contexts in which such novel cultural technologies as contraception are introduced. Therefore what appears to be an inherent disadvantage of Muslims vis-à-vis access to contraceptive use may be either amplified in a historical context where Muslims are culturally and politically alienated or mitigated and even fully effaced in a context where Muslims are integrated into cultural and political mainstream. Given the described contrasting historical religious trajectories of Nigeria and Tanzania, it is in Nigeria that we expect to find an effect of community religious makeup to be strong and independent of individual effects. In Tanzania, we anticipate the influence of community religious composition to be less noticeable if present at all.

MODELING RELIGIOUS DIFFERENTIALS IN CONTRACEPTIVE USE

Our data come from the 1990, 1999, and 2003 NDHS and 1992, 1996, and 2004-5 TDHS (we do not use the data from the 1999 Tanzania Interim DHS and 2003 AIS DHS because of their smaller sample sizes and lack of some comparable indicators). We use the data from multiple DHS to be sure that our results are robust; this also allows us to look at possible changes in the

individual and community-level effects of religion over a period of more than ten years during which contraceptive prevalence rates rose considerably in both countries.

The core of each of the six DHS was a nationally representative survey women aged 15-49. We use the NDHS and TDHS individual women's files for these analyses. The surveys collected a wealth of reproductive and health information but their socioeconomic and cultural data are not as rich. As in all DHS, the NDHS and TDHS questionnaires included only one question on religion affiliation ("What is your religion?"). The absence of any other measures of religious membership and religiosity limits our analysis. Intra-Christian and intra-Muslim differences in fertility and contraception within same countries can be quite substantial (e.g. Agadjanian 2001; 2004; Bailey 1986). In the case of Nigeria and Tanzania, the DHS does report major (even if imprecise) types of denominational affiliations among Christians. According to DHS data, in both countries Roman Catholics have slightly lower levels of modern contraceptive use than do Protestants and "other Christians," but the differences did not significantly affect the results of the analysis presented below. Unfortunately, the DHS data make no distinctions among Muslims (e.g., belonging to various brotherhoods and currents of Islam that differ vastly in the degree of religious purism and exclusivism). Acknowledging this limitation, we nonetheless believe that even a simple Muslim-Christian dichotomy can be sufficiently illuminating.

To sharpen the comparison, we restrict the analysis to Christians and Muslims, excluding respondents who either identified themselves as followers of traditional/other religions or declared no religious affiliation (c. 1-4% in NDHS and 12-15% in TDHS samples). We also restrict our analysis to currently married women (the vast majority of DHS respondents in both countries), because premarital and extramarital contraceptive use was still very uncommon in the

period under observation and because the Christian-Muslim gap in such use, influenced by differences in non-marital sex, would be particularly wide.

Our dependent variable is whether or not the woman is currently using any modern contraceptive method such as the pill, IUD, injections, Norplant, diaphragm/foam/jelly, condom, or sterilization. This variable is coded 1 if the woman is using such a method; in all other cases, such as no contraceptive use or use of a traditional or folkloric method, the variable is coded 0. We do not distinguish between contraceptive use for spacing births and for stopping reproduction because the difference between the two motivations, as articulated by survey respondents, is not clear-cut, especially at lower parities, and because western contraceptive use per se is a less ambiguous measure of the adoption of novel cultural technologies than stated fertility preferences.

The independent variables of primary interest are religion variables, which are measured at two levels. At the individual level, religion is measured with a dichotomous indicator that is coded 1 if the woman is Muslim, and 0 if the woman is Christian. As our measure of religious context we use the proportion of the surveyed women in the DHS enumeration area. We choose to use the share of Muslims because of our conceptualization of Muslims as a "symbolic minority" vis-à-vis such western-origin techno-cultural innovations as modern contraception. However, in most enumeration areas there is a close negative correlation between the proportions of Muslims and Christians, since the share of other religions is small. We use the continuous specification of the proportion (percentage) of Muslims in our analysis because there is no substantive reason for picking a discrete "tipping" point or points at which the effect of religious milieu should change strength or direction. However, we do allow for non-linearity in that effect by introducing a quadratic term for the percentage of Muslims.

As controls, we include several measures to avoid confounding the effect of religion with those of the socioeconomic factors that are expected to correlate with religious affiliation in both societies. For example, as we already observed in Table 2, there are differences between Muslim and Christian women in education, urban vs. rural residence, and levels of outside-the-home labor force participation. We control for education with a set of dummy variables to represent three categories: no education, primary education, and secondary or higher education. Whether or not a woman's household owns a radio is a simple proxy for household material conditions. (The DHS data do not allow constructing more sophisticated and universally comparable indicators of affluence, but because contraceptives in these settings are either free or very cheap, such indicators do not seem necessary.) Rural/urban residence is controlled with a variable coded 1 if rural and 0 if urban (city or town). Labor force participation is coded 1 if the woman is currently working outside the home and 0 if otherwise. We also control for the number of living children, woman's age and woman's age squared, and the type of marital union—monogamous vs. polygynous. We cannot control for ethnicity because in neither country ethnicity was recorded. Of course, ethnicity is closely intertwined with religion in many sub-Saharan settings, but there are more reasons to believe that ethnic differences in fertility regulation are rooted in religious differences than the other way around (e.g., Benefo, et al. 1994).

Because we hypothesize that religion affects contraception not only at the individual but also the community level, it is also important to control for community-level characteristics that could be confounded with the religious milieu. Thus Muslims may tend to live in areas that are more disadvantaged than areas inhabited by Christians in terms of affluence or educational opportunities, access to health and family planning services, etc. We therefore control for the level of radio ownership and mean educational level which we obtain by aggregating

corresponding individual-level data for each of the six surveys. Family planning service and health clinic availability information were collected in parallel with women's individual data only in the 1999 NDHS, and we control for those factors only in corresponding models. Community measures that we construct from those data are whether or not a community-based family planning program is available and whether or not a general health clinic is available. As in the case of our measure of religious milieu, all of the other contextual measures that we use are aggregated at the level of DHS enumeration areas, which are typically larger than an immediate community of residence such as a neighborhood or a village.

Because the outcome of interest is dichotomous, logistic regression is an appropriate statistical tool. We fit models that estimate the relationship between independent variables and the log-odds of currently using a modern form of contraception versus not using. A potentially serious methodological problem in our models is introduced by the clustering of observations, especially within enumeration areas, as by our study design, women in the same enumeration areas are assigned identical community measures. Furthermore women in the same areas are likely to share unmeasured characteristics, which violates the assumption of observation independence in logistic regression. To protect against deflated standard errors and a bias in results, we estimate multilevel models that account for clustering of the women into those enumeration areas. We employ a random intercept approach, i.e., the approach that allows the intercept level of contraceptive use to vary randomly by enumeration area. Finally, we also apply the NDHS and TDHS sample weights to properly reflect the population of Muslim and Christian women in both samples. The estimations are done using the GLIMMIX procedure in SAS.

STATISTICAL RESULTS

Table 3 presents the odds ratios for the religion predictors (the complete set of logistic regression parameter estimates and standard errors is presented in Appendix). For each survey, the results of two models are presented: one with the effects of individual-level religious affiliation and another with the effects of individual affiliation and the linear and quadratic effects of the proportion of Muslims in the community (enumeration area). These results are quite revealing—in terms of both cross-country and cross-time comparisons. In Nigeria, which in the beginning of the 1990s had a very low level of contraceptive use, no net individual-level Muslim-Christian differences are noticeable at the time of the 1990 NDHS (Models 1 and 2). Nine years later, however, Muslims clearly lagged behind Christians in contraceptive use, controlling for sociodemographic differences (1999 NDHS, Model 1). The individual-level gap does not change much after we control for community religious makeup (Model 2). Another four years past, the Muslim-Christian difference seems strong (2003 NDHS, Model 1), but when we control for area religious composition, this difference is no longer statistically significant. Most interestingly, both the linear and quadratic effects of the area religious makeup are significant throughout all three surveys: as the proportion of Muslims in the area rises (and that of Christians declines), the odds of contraceptive use first increase and then decrease. The strength of the community-level effects of religion proves impervious to possible differences in the availability of family planning services in the area (in the 1999 NDHS only).

Table 3 here

Tanzanian Muslims also started the period under observation with somewhat lower odds of contraceptive use than Christians, but in the two subsequent surveys the tendency appears to have reversed itself. Yet, in none of the three surveys the net individual-level differences between Muslims and Christians are statistically significant. In contrast, in all three surveys the effects of the share of Muslims in the area's population are strong and statistically significant (Models 2): as in the Nigerian models, the linear effect is positive while the quadratic effect is negative.

The magnitudes of the corresponding estimates for each country, however, tell somewhat different stories. For a better grasp of the contextual effects of religion we present them graphically in Figures 1 (Nigeria) and 2 (Tanzania). In Nigeria of the early 1990s, the relative odds of contraceptive use rise as the share of Muslims increases from nil to just over one-third and then fall as the share of Muslims continues to rise (and the share of Christians continues to decline). As the share of Muslims passes three-quarters of the population, the odds of contraceptive use drop below the reference level, i.e., that of a community with no Muslims, and keep plunging as the proportion of Muslims approaches unity. In the two subsequent surveys the curves display essentially the same pattern but are somewhat flatter, with contraceptive use peaking in communities that are about forty percent Muslim (and consequently about sixty percent Christian) and then declining to below the reference level.

Figures 1 and 2 here

The initial increase and subsequent decrease in predicted odds of contraceptive use is present in all three Tanzanian DHS too. Yet the three Tanzanian curves are rather similar to one another

and are notably different from the Nigerian ones. First, they display a greater increase in the odds of contraceptive use as the share of Muslims rises, and although the odds decline as the predominance of Muslims grows, even the overwhelmingly Muslim communities seem to have much higher odds of contraceptive use than the communities with very few Muslims. And second, the Tanzanian curves have very different "tipping points" from those observed in Nigeria: the odds do not start to decline until after the share of Muslims reaches some sixty percent of the population.

DISCUSSION AND CONCLUSION

Our results are illuminating as they both buttress and expand on our premises and hypotheses. Although with the data at hand we could not directly test the imprint of the historically-shaped sociocultural and political context on Christian-Muslim differentials in contraceptive use, the contrast between two African countries lends considerable support to the thesis that this imprint is critical and long-lasting. The differences between Nigeria and Tanzania are indeed striking.

Our analysis shows that the historical legacy of religious development and relations is manifested at both the individual and community level. At the individual level, the Muslim contraceptive disadvantage in Nigeria appears negligible when overall contraceptive use is low, increases as contraceptive use increases, and then shows signs of lessening. Yet while the Muslim contraceptive disadvantage in Nigeria is quite pervasive, it is important to realize that it is neither culturally inherent nor universal. Evidence, both anecdotal and systematic, points to important exceptions to the general pattern. Thus a study conducted among clients of a Planned Parenthood Federation's clinic in Ilorin, a southwestern city with a mixed Muslim and Christian

population, found that Muslim clients outnumbered Christian clients by a ratio approaching two to one (Anate 1995).

As we expected, in Tanzania, the trends in individual-level Christian-Muslim differentials displayed a remarkable contrast with Nigeria's. Over the dozen years under observation Muslims not only caught up with Christians in contraceptive use but exceeded them by a noticeable margin (although the differences were ultimately explained by other characteristics of the two groups). Interestingly, the emergence of the Muslim contraceptive advantage during the 1990s-early 2000s coincided with the heightening of Christian-Muslim political and cultural tensions in Tanzania.

Our approach led us beyond a simple individual-level test of the "characteristics" hypothesis, at which most studies of religious differentials in demographic outcomes typically stop. As did Dharmalingam and Morgan (2004) in their analysis of Hindu-Muslim fertility differentials in India, we see our results as lending support to the minority-group status perspective. At the same time, the distinction that we made between the individual and contextual levels at which the effect of religion operates expanded the conventional notion of minority-group status. Our analysis illustrates the dynamic, multi-level nature of "minority" and "majority" and their relationships as they are embedded within specific historico-cultural, socio-political, and demographic contexts. The context of Christian-Muslim relations in Nigeria helps understand why living in an area with a large Muslim population translates into a contraceptive "disadvantage" and, why such a milieu becomes, on the contrary, advantageous in a country like Tanzania.

Yet, our analysis also shows that in the Nigerian context the overwhelming numerical (and therefore cultural and political) predominance of Christians, supposed "natural" adopters of

western ideas and practices, in a community yields no contraceptive "benefits." In fact, our findings suggest that a religiously mixed environment—where Christians predominate but Muslims are strongly represented—leads to greatest gains in contraceptive adoption. This pattern appears to have weakened somewhat over the 1990s but remained salient and statistically significant into the early years of this century. In Tanzania, the premium of "unbalanced diversity" is also evident, but the "optimal" religious mix seems to be that in which Muslims predominate. This general pattern held fairly consistent over the period under observation and even appeared somewhat more pronounced in the middle of that period. In sum, then, settings where distinct religious and cultural traditions interact (but not necessarily "clash") appear most conducive to cultural-technological innovations.

Our data do not allow us to examine and explain the pathways and mechanisms through which the community religious makeup may help shape individual contraceptive outcomes. At the current level of knowledge, we can only speculate why religious diversity may be conducive to greater receptivity of novel cultural technologies such as contraception. For example, community-level religious pluralism may produce a greater opportunity for and ability of inter-faith cultural dialogue and compromise, or greater habituation to and tolerance of otherness, thus paving way to the spread of innovations. It may also be that religious diversity is only one face of community social complexity shaped by population movements and interactions. Regardless of specific pathways and mechanisms, however, it is quite remarkable that historico-religious legacies influence not only the role of individual religious identity in the adoption of innovative cultural technologies but also the *type* of community religious mix that would be most beneficial for the spread of such technologies.

We limited our analysis to two countries where the patterns of Christian-Muslim contraceptive differentials are strikingly different in order to make the contrast starker and to better illustrate the importance of the historical legacy of inter-religious relations rather than of some intrinsic predispositions of the two religions. Both the Christian and Muslim religious traditions are ample and diverse enough to allow for a variety of views on reproductive behavior and technologies. Specifically, the Islamic moral and judicial teachings pertaining to marriage and family can be easily interpreted as supportive of family planning (e.g., Omran 1992). On the other hand, however, some passages of the Qur'an, such as the one mandating two years of breastfeeding after birth (The Cow:233) or the Bible's appeal to "be fruitful and multiply" (Genesis 1:28) and the stories like that of God's punishment of Onan for spilling semen (Genesis 38: 8-10) can, in a propitious ideological climate, become obstacles to contraceptive use. The country and setting-specific interpretations and enforcement of religious canons also vary widely (Krehbiel Keefe 2006; Roudi-Fahimi 2004; Verkuyl 1993). Yet governments of many Muslim nations, including such religiously conservative ones as that of the Islamic Republic of Iran, explicitly support family planning and promote access to contraceptives (Hoodfar and Assadpour 2000; Roudi-Fahimi 2004). In fact, the most vigorous religious opposition to modern contraception has come from some Christian denominations, including the Roman Catholic Church. However, where Muslims construe the national family planning policy as pursuing hostile political aims, their resistance to this policy—or at least their reluctance to embrace it fully—are likely to be stronger (e.g., Jeffery and Jeffery 1997; Renne 1996).

Although the patterns that we observed over the 1990s and early 2000s do not allow us to conclude that religious differences in contraceptive use were decreasing, an eventual convergence in contraceptive prevalence between Christians and Muslims in Nigeria and

Tanzania, and in any other settings where Christian-Muslim differences might exist, is probably inevitable. However, even in societies saturated with contraceptives religious differences in patterns of contraceptive use endure (e.g., Goldscheider and Mosher 1991). In sub-Saharan settings like the ones we examined here, the differences may also persist longer than simplistic, individual-focused perspectives on religion might predict, especially as the Muslim-Christian relations, manipulated by external forces and local elites, continue to generate tensions.

How the Muslim-Christian differentials in contraceptive use may have affected or will affect fertility trends in the two countries is, of course, an altogether different question. Studies focusing on fertility in sub-Saharan Africa have not produced a universally consistent pattern of Muslim-Christian differentials (e.g., Agadjanian 2004; Bailey 1986; Gaisie 1972; Johnson-Hanks 2006; Karim 1997; Kollehlon 1994; Sembajwe 1980). In multi-religious settings outside of the sub-Sahara, Muslims do tend to have higher fertility than the rest (e.g., Dharmalingam and Morgan 2004; Morgan et al. 2002). Yet the literature has questioned the view of "Muslim fertility" as being inherently higher than that of non-Muslims (Jeffery and Jeffery 2002; Johnson-Hanks 2006; Obermeyer 1992; 1994). Total fertility rates presented in Table 2 indicate a divergence of Muslim and Christian fertility trends over the period under observation. In Nigeria, the earlier excess of Christian fertility turned into a deficit by the early 2000s, with Muslim TFR registering an increase. In contrast, in Tanzania, Muslim fertility, already lower than Christian fertility in the early 1990s, declined at a faster pace than the latter. These trends generally conform to the religious contraceptive differentials examined in this study but may owe not only to contraception but also to other factors, such as differences in age at sexual debut, first marriage, and onset of childbearing (Agadjanian 2004). The effects of those other factors require separate investigations, but as our study demonstrates, no such investigation will be adequate and

revealing enough if it does not take into account the historically conditioned multi-dimensional and multi-level complexity of religious manifestations.

REFERENCES

Addai, Isaac. 1999a. "Does Religion Matter in Contraceptive Use among Ghanaian Women?" *Review of Religious Research* 41(3):259-277.

---------. 1999b. "Ethnicity and Contraceptive Use in sub-Saharan Africa: The Case of Ghana." *Journal of Biosocial Science* 31(1):105-120.

Agadjanian, Victor. 2001. "Religion, Social Milieu, and the Contraceptive Revolution." *Population Studies*, 55(2):135-148.

----------. 2004. *The Muslim-Christian Gap in Sub-Saharan Fertility Transitions*. Unpublished Manuscript.

Akbar, M.J. 2003. *The Shade of Swords: Jihad and the Conflict Between Islam and Christianity*. Routledge.

Alapiki, Henry E. 2005. "State Creation in Nigeria: Failed Approaches to National Integration and Local Autonomy." *African Studies Review* 48(3):49-65.

Anate, M. 1995. "Factors Influencing Family Planning Use in Ilorin, Nigeria." *East African Medical Journal* 72(7):418-20

Asad, Talal. 2003. *Formations of the Secular: Christianity, Islam, Modernity*. Stanford: Stanford University Press.

[BBC] British Broadcasting Corporation. 2006. "Nigeria cartoon protests kill 16." BBC News. 19 February 2006. http://news.bbc.co.uk/1/hi/world/africa/4728616.stm (Accessed in August 2007).

Bailey, M. 1986. "Differential Fertility by Religious Groups in Rural Sierra Leone." *Journal of Biosocial Science* 18(1):75-85.

Bassey, M. O. 1991. "Missionary Rivalry and Education Expansion in Southern Nigeria, 1885-1932." *The Journal of Negro Education* 60(1):36-46.

Basu, Alaka M. and Sajeda Amin. 2000. "Conditioning Factors for Fertility Decline in Bengal: History, Language Identity, and Openness to Innovations." *Population and Development Review* 26(4):761-794.

Bean, Frank D. and J. P. Marcum. 1978. "Differential Fertility and the Minority Group Status Hypothesis: An Assessment and Review." In F. D. Bean and W. P. Frisbie (eds.) *The Demography of Racial and Ethnic Groups*. New York, NY: Academic Press.

Beegle, Kathleen. 1995. "The Quality and Availability of Family Planning Services and Contraceptive Use in Tanzania." Living Standards Measurement Study Working Paper No.114. The World Bank: Washington, DC.

Benefo, Kofi D., Amy O. Tsui, and Joseph D. Johnson. 1994. **"**Ethnic Differentials in Child-Spacing Ideals and Practices in Ghana." *Journal of Biosocial Science* 26(3):311-326.

Bulliet, Richard W. 2004. *The Case for Islamo-Christian Civilization*. Columbia University Press.

Caldwell, John J. and Pat Caldwell. 2002. "Africa: The New Family Planning Frontier" *Studies in Family Planning* 33(1):76-86.

Chande, Abdin N. 1998. *Islam, Ulamaa and Community Development in Tanzania: A Case Study of Religious Currents in East Africa*. San Francisco: Austin & Winfield.

Dharmalingam, A. and S. Philip Morgan 2004. "Pervasive Muslim-Hindu Fertility Differences in India" *Demography* 41(3):529-545.

Ekechi, F.K. 1971. "Colonialism and Christianity in West Africa: The Igbo Case, 1900-1915." *Journal of African History* 12(1):103-115.

Feyisetan, Bamikale J. and Martha Ainsworth. 1996. "Contraceptive Use and the Quality, Price, and Availability of Family Planning in Nigeria. *The World Bank Economic Review* 10(1):159-187.

Gaisie,S.K. 1972. "Fertility Levels among the Ghanaian Tribes." In *Population Growth and Economic Development in Africa.* Ed. By S.K. Ominde and C.N. Ejiogu. London: Heinemann.

Goldscheider, Calvin and William D. Mosher. 1988. "Religious Affiliation and Contraceptive Usage: Changing American Patterns, 1955-82." *Studies in Family Planning* 19(1):48-57.

Goldscheider, Calvin and William D. Mosher. 1991. "Patterns of Contraceptive Use in the United States: The Importance of Religious Beliefs." *Studies in Family Planning* 22(2):102-115.

Goldscheider, Calvin and Peter H. Uhlenberg. 1969. "Minority-Group Status and Fertility." *American Journal of Sociology* 74:361-372.

Heilman, Bruce E. and Paul J. Kaiser. 2002. "Religion, Identity and Politics in Tanzania." *Third World Quarterly* 23(4):691-709.

Houdfar, Homa and Samad Assadpour. 2000. "The Politics of Population Policy in the Islamic Republic of Iran." *Studies in Family Planning* 31(1):19-34.

Huntington, Samuel. P. 1996. *The Clash of Civilizations and the Remaking of World Order*. New York: Simon & Schuster.

Hunwick, John J. (Ed.) 1992. *Religion and National Integration in Africa: Islam, Christianity, and Politics in the Sudan and Nigeria.* Evanston: Northwestern University Press.

Ilesanmi, Simeon O. 1997. *Religious Pluralism and the Nigerian State.* Athens: Ohio University.

Jeffery, R. and P. Jeffery 1997. *Population, Gender, and Politics: Demographic Change in Rural North India*. Cambridge: Cambridge University Press.

---------. 2002. "A Population out of Control: Myths about Muslim Fertility in Contemporary India." *World Development* 30(10):1805-1822.

Johnson-Hanks, Jennifer. 2006. "On the Politics and Practice of Muslim Fertility: Comparative Evidence from West Africa." *Medical Anthropology Quarterly* 20(1):12–30.

Kane, Ousmane. 2003. *Muslim Modernity in Postcolonial Nigeria: A Study of the Society for the Removal of Innovation and Reinstatement of Tradition*. Leiden ; Boston: Brill.

Karim, M. S. 1997. *Reproductive Behavior in Muslim Countries.* DHS Working Papers, Number 23. Macro International and UNFPA: Calverton, Maryland and New York.

Kilani, Abdul Razaq. 2000. "Islam and Christian-Muslim Relations in Niger-Delta" *Journal of Muslim Minority Affairs* 20(1):129-136.

Kirk, Dudley, and Bernard Pillet. 1998. "Fertility Levels, Trends, and Differentials in Sub-Saharan Africa in the 1980s and 1990s." *Studies in Family Planning* 29(1):1-22.

Kollehlon, K. T. 1994. "Religious Affiliation and Fertility in Liberia." *Journal of Biosocial Science* 26(4):493-507.

Krehbiel Keefe, S. 2006. "Women Do What They Want": Islam and Permanent Contraception in Northern Tanzania." *Social Science & Medicine* 63(2):418-29

Legum, Colin and Geoffrey Mmari**.** (Eds.). 1995. *Mwalimu: The Influence of Nyerere*. London: James Currey.

Mazrui, Ali A. 1994. "Islamic Doctrine and the Politics of Induced Fertility Change: An African Perspective." Supplement: The New Politics of Population: Conflict and Consensus in Family Planning. *Population and Development Review* 20(Supplement):121-134.

Mazrui, Alamin M. and Shariff, Ibrahim N. 1993. *The Swahili: Idiom and Identity of an African People*. Trenton: African World Press.

McQuillan, Kevin. 2004. "When Does Religion Influence Fertility?" *Population and Development Review* 30(1):25-56.

Morgan, S. Philip., Sharon Stash, Herbert Smith, and Karen O. Mason. 2002. "Muslim and Non-Muslim Differences in Female Autonomy and Fertility: Evidence from Four Asian Countries." *Population and Development Review* 28(3):515-537.

[NRC] National Research Council. 1993. *Factors Affecting Contraceptive Use in Sub-Saharan Africa*. Washington, DC: National Academy Press.

Nimtz, August H. 1980. *Islam and Politics in East Africa: The Sufi Order in Tanzania*. Minneapolis: University of Minnesota Press.

Obadare, Ebenezer. 2006. "Pentecostal Presidency? The Lagos-Ibadan Theocratic Class and the Muslim 'Other'" *Review of African Political Economy* 110:665-678.

Obermeyer, Carla M. 1992. "Islam, Women, and Politics: The Demography of Arab Countries." *Population and Development Review* 18(1):33-60.

----------. 1994. "Religious Doctrine, State Ideology, and Reproductive Options in Islam." In G. Sen and R.C. Snow (eds) *Power and Decision: The Social Control of Reproduction*, pp.59-75. Cambridge, MA: Harvard University Press.

Obono, Oka. 2003. “Cultural Diversity and Population Policy in Nigeria.” Population and Development Review 29(1):103-111.

Omari, C. K. 1995. “Managing Tribal and Religious Diversity.” In *Mwalimu: The Influence of Nyerere*, edited by C. Legum and G. Mmari. London: James Currey.

Omran, Abdel R. 1992. *Family Planning and the Legacy of Islam*. London: Routledge.

Pouwels, Randall L. 1987. *Horn and Crescent: Cultural Change and Traditional Islam on the East African Coast, 800-1900*. Cambridge: Cambridge University Press.

Quinn, Charlotte A. and Frederick Quinn. 2003. *Pride, Faith, and Fear.* Chapter I. Islam in Nigeria: Seeking a competitive edge, pp.33-64. Oxford: Oxford University Press.

Rasmussen, Lissi. 1993. *Christian-Muslim Relations in Africa: The Cases of Northern Nigeria and Tanzania Compared.* London: British Academic Press.

Renne, Elisha P. 1996. “Perceptions of Population Policy, Development, and Family Planning Programs in Northern Nigeria.” *Studies in Family Planning* 27(3):127-36.

Richey, Lisa. 1999. “Family Planning and the Politics of Population in Tanzania: International to Local Discourse.” *The Journal of Modern African Studies* 37:457-487.

Roudi-Fahimi, Farzaneh. 2004. *Islam and Family Planning*. Population Reference Bureau Policy Brief. Washington, DC.

Said, Edward W. 2001. “The Clash of Ignorance.” *The Nation* (October 22).

----------. 2003 (1979). *Orientalism*. New York: Pantheon Books.

Sembajwe, I. 1980. “Religious Fertility Differentials among the Yoruba of Western Nigeria” *Journal of Biosocial Science* 12(2):153-164.

Sulaiman, Ibraheem. 1987. *The Islamic State and the Challenge of History: Ideals, Policies, and Operation of the Sokoto Caliphate*. London: Mansell Publishing.

Trimingham, J. Spencer. 1959. *Islam in West Africa*. Oxford: Clarendon Press.

---------. 1964. *Islam in East Africa*. Oxford: Clarendon Press.

US State Department (2004). *Country Reports on Human Rights Practices: Tanzania*. US State Department. http://www.state.gov/g/drl/rls/hrrpt/2004/41630.htm. (Accessed in August 2007)

Verkuyl, Douwe A.A. 1993. "Two World Religions and Family Planning" *The Lancet* 342(8869):473-475.

Table 1. Selected socioeconomic and demographic indicators, Nigeria and Tanzania, 2003-4

	Nigeria	Tanzania
Population size (millions)	137	36
Population annual growth rate	2.4	2.0
Percent of urban population	35	31
Life expectancy at birth (years)	45	43
Infant mortality rate (per thousand)	98	104
Gross National Income per head (US Dollars)	350	310
Adult literacy rate (percent of 15 years and older)	67	69
Percent of population with access to:		
Clean water	60	73
Sanitation	38	46
Primary Health Care	66	80
Government expenditures (as percent of GDP) on:		
Health	1	6
Education	3	8
Human Development Index rank (1 is highest)	158	164

Data sources: World Bank, United Nations, Nigeria 2003 DHS, Tanzania 2004 DHS.

Table 2. Women's selected sociodemographic characteristics by religion, Nigeria and Tanzania, first and last DHS

	Nigeria 1990	Nigeria 2003	Tanzania 1992	Tanzania 2004
Percent in population				
Christians	47.7	48.0	55.0	57.6
Muslims	47.6	50.7	30.1	30.0
Percent urban				
Christians	29.7	37.1	22.6	26.0
Muslims	21.9	32.6	38.5	44.0
Percent with no education				
Christians	29.9	12.0	25.5	17.7
Muslims	82.6	69.0	33.3	20.3
Percent with secondary or higher education				
Christians	32.2	60.1	5.6	9.0
Muslims	7.2	16.0	5.5	11.2
Percent owning radio				
Christians	63.2	81.6	41.7	63.4
Muslims	52.4	73.3	42.8	70.0
Percent working outside the home				
Christians	65.0	59.8	69.1	81.8
Muslims	57.1	52.3	60.4	68.5
Total fertility rate (TFR)				
Christians	7.2	6.1	7.2	6.6
Muslims	6.5	7.2	6.4	5.3
Modern contraceptive prevalence [§]				
Christians	6.7	15.1	8.0	21.6
Muslims	1.6	4.3	7.5	25.2

Notes: [§] Currently married women only.

Table 3. Effects of individual religion and area religious makeup on current use of modern contraception, Nigeria and Tanzania DHS, ever-married Christian and Muslim women (odds ratios)

NIGERIA						
Predictors	NDHS 1990		NDHS 1999		NDHS 2003	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Muslim (individual)	0.87	0.96	0.73*	0.72*	0.75*	0.79
{Christian]	1	1	1	1	1	1
Proportion of Muslims in area		30.34**		8.12**		7.64**
Proportion of Muslims in area, squared		0.01**		0.09**		0.09**

TANZANIA						
Predictors	TDHS 1992		TDHS 1996		TDHS 2004	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Muslim (individual)	0.96	0.87	1.17	.98	1.10	0.98
[Christian]	1	1	1	1	1	1
Proportion of Muslims in area		8.16*		12.16**		9.09**
Proportion of Muslims in area, squared		0.17*		0.13**		0.15**

Notes: Reference in brackets; Proportion of Muslims is defined in increments of 0.01; All models control for age, age squared, number of living children, urban or rural residence, type of marriage, education, radio ownership, work outside the home, area mean educational level and proportion of radio owners. The Nigeria 1999 DHS models also control for presence of a family planning unit and of a health clinic in the enumeration area; Significance level: + p≤.1, * p≤.05, ** p≤.01, two-tailed tests.

Figure 1. Effect of share of Muslims in the area on odds of modern contraceptive use, Nigeria 1990, 1999, and 2003 DHS

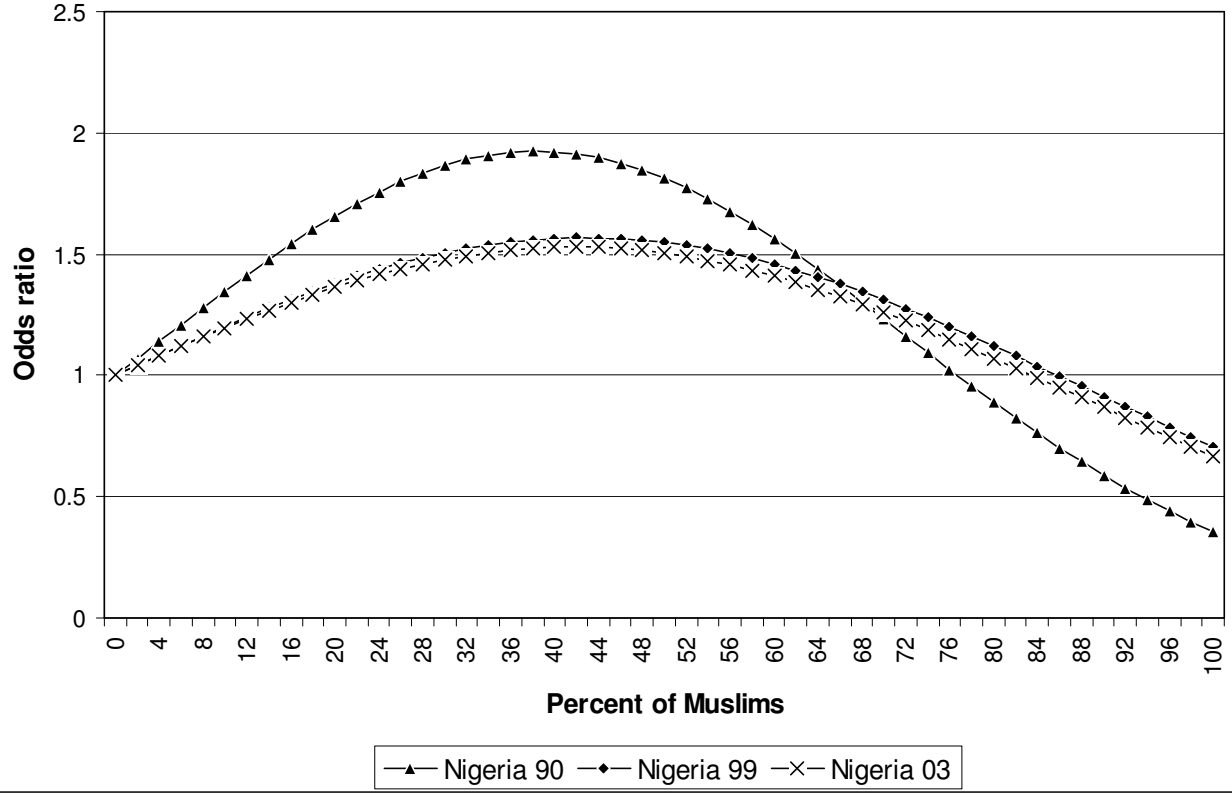
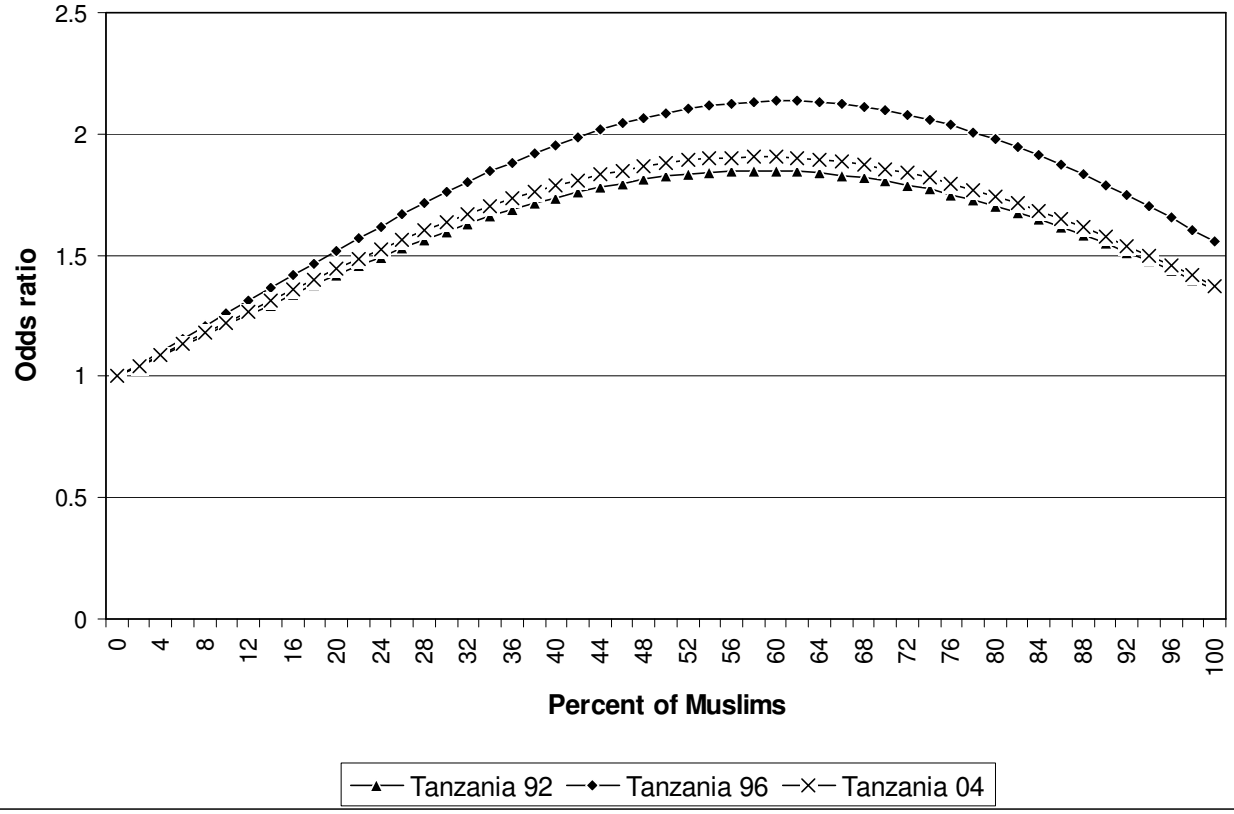


Figure 2. Effect of share of Muslims in the area on odds of modern contraceptive use, Tanzania 1992, 1996, and 2004 DHS



APPENDIX. Effects of individual religion and area religious makeup on current use of modern contraception, Nigeria and Tanzania DHS, ever-married Christian and Muslim women (logistic regression parameter estimates and standard errors)

Predictors	Nigeria 1990		Nigeria 1999		Nigeria 2003		Tanzania 1992		Tanzania 1996		Tanzania 2004	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Religion												
Muslim (individual) §	-0.142	0.039	-0.319*	-0.330*	-0.294*	-0.232	-0.042	-0.139	0.159	-.0162	0.098	-0.021
	(0.148)	(0.165)	(0.148)	(0.171)	(0.142)	(0.170)	(0.120)	(0.142)	(0.100)	(0.121)	(0.081)	(0.097)
Proportion of Muslims in area		3.341**		2.094**		2.034**		2.099*		2.499**		2.207**
		(0.983)		(0.778)		(0.805)		(0.923)		(0.741)		(0.641)
Proportion of Muslims in area squared		-4.447**		-2.440**		-2.435**		-1.792*		-2.057**		-1.890**
		(0.983)		(0.885)		(0.843)		(0.911)		(0.734)		(0.632)
Individual-level controls												
Age	0.092+	0.090	0.372**	0.370**	0.012	0.015	0.286**	0.283**	0.072+	0.071+	0.105**	0.101**
	(0.055)	(0.057)	(0.068)	(0.071)	(0.047)	(0.048)	(0.054)	(0.055)	(0.040)	(0.040)	(0.032)	(0.032)
Age squared	-0.001	-0.001**	-0.005**	-0.005**	-0.001	-0.001	-0.004**	-0.004**	-0.002**	-0.002**	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Number of living children	0.193**	0.194**	0.158**	0.161**	0.316**	0.323**	0.134**	0.139**	0.283**	0.289**	0.219**	0.227**
	(0.028)	(0.030)	(0.031)	(0.032)	(0.030)	(0.031)	(0.030)	(.030)	(0.026)	(0.026)	(0.021)	(0.022)
Lives in a rural area	-0.493*	-0.473*	-0.377*	-0.304+	-0.338*	-0.344*	-0.022	0.165	-0.402*	-0.228	-0.575**	-0.407**
	(0.235)	(0.243)	(0.158)	(0.168)	(0.160)	(0.168)	(0.203)	(0.214)	(0.166)	(0.172)	(0.138)	(0.145)
Married polygynously ‡	-0.423**	-0.442**	-0.095	-0.117	-0.355**	-0.362**	-0.349**	-0.337*	-0.215*	-0.205*	-0.265**	-0.251**
	(0.118)	(0.123)	(0.132)	(0.137)	(0.118)	(0.118)	(0.139)	(0.140)	(0.104)	(0.104)	(0.090)	(0.090)
Primary education †	0.757**	0.740**	0.444**	0.439**	1.061**	1.043**	1.229**	1.219**	0.938**	0.939**	0.640**	0.645**
	(0.148)	(0.152)	(0.168)	(0.173)	(0.156)	(0.157)	(0.157)	(0.158)	(0.121)	(0.122)	(0.101)	(0.101)
Secondary education †	1.742**	1.729**	0.983**	0.986**	1.630**	1.634**	1.937**	1.930**	1.065**	1.061**	0.832**	0.830**
	(0.171)	(0.175)	(0.175)	(0.181)	(0.170)	(0.170)	(0.244)	(0.246)	(0.201)	(0.202)	(0.159)	(0.160)
Owns radio	0.189	0.187	0.343*	0.359*	-0.200	-0.201	0.595**	0.592**	0.297**	0.302**	0.219**	0.217**
	(0.128)	(0.133)	(0.157)	(0.163)	(0.137)	(0.137)	(0.117)	(0.118)	(0.091)	(0.091)	(0.077)	(0.077)
Works outside the home	0.740**	0.717**	0.230	0.184	0.259*	0.227+	0.154	0.161	0.191*	0.204*	0.368**	0.385**
	(0.152)	(0.157)	(0.142)	(0.147)	(0.119)	(0.120)	(0.110)	(0.113)	(0.084)	(0.084)	(0.095)	(0.095)

Appendix (continued)

Area-level controls												
Average educational level	0.136**	0.025	0.160**	0.131**	0.117**	0.071*	0.331**	0.335**	0.183**	0.193**	0.191**	0.196**
	(0.046)	(0.058)	(0.036)	(0.043)	(0.029)	(0.037)	(0.071)	(0.071)	(0.040)	(0.040)	(0.035)	(0.035)
Proportion owning radio	1.208*	1.402**	0.333	0.241	0.479	0.601	0.572	0.539	1.175**	0.958**	-0.158	-0.313
	(0.556)	(0.572)	(0.449)	(0.460)	(0.483)	(0.465)	(0.457)	(0.451)	(0.344)	(0.348)	(0.302)	(0.304)
Family planning program in area[a]			0.403**	0.375**								
			(0.149)	(0.149)								
Health clinic in area[a]			0.078	0.127								
			(0.153)	(0.153)								
Intercept	0.975	0.807	0.391	0.333	0.611	0.591	0.681	0.630	0.622	0.613	0.617	0.606
Area-level variance	0.449	0.485	0.968	1.048	0.683	0.601	0.690	0.706	0.745	0.747	0.849	0.849
Number of cases	6385	6385	5312	5312	4948	4948	5020	5020	4796	4796	6029	6029

Notes: Proportion of Muslims and of radio owners is defined in increments of 0.01; Significance level: +p≤.1, *p≤.05, **p≤.01, two-tailed tests; Standard errors in parentheses; § Christian is reference; † No education is reference; ‡ Married monogamously is reference; [a] available for Nigeria 1999 DHS only.