Nutrition, Religion, and Widowhood in Nigeria

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I. Introduction
Globally, unmarried individuals have been found to have higher mortality and morbidity than married ones. Anderson and Ray (2018) argue that widowhood accounts for some 35% of excess adult female mortality in Africa. The plight of widows is well documented in the legal, human rights, and sociological literatures on Nigeria (see, e.g., Okoye 1995; United Nations 2001; Ewelukwa 2002; Sossou 2002; Emery 2003; Durojaye 2013; Genyi and George-Genyi 2013; NIALS 2013). In a 2008 public opinion survey, 58% of Nigerians said widows faced a great deal (25%) or some (33%) discrimination relative to other women and far more than divorced women (WorldPublicOpinion.org 2009). The mistreatment of widows is a grave and recognized concern, as evidenced by the many Nigerian-based nongovernmental organizations (NGOs) focusing on the rights of widows and by special modules in the most recent Demographic and Health Surveys (DHS) concerning violence and dispossession following a husband’s passing. Over 42% of Nigerian widows are found to be completely dispossessed.

Historically, widows (particularly when childless) have suffered harsh treatment and misery across much of Africa (Iliffe 1987). A recent body of research has shown that many African widows continue to face considerable disadvantage and, consequently, large average well-being deficits relative to married women in their first union (van de Walle 2013; Anderson and Ray 2018; Djuikom and van de Walle 2018). The evidence also points to significant heterogeneity across countries, with pronounced hardship in some and benefits to widows in others (Djuikom and van de Walle 2018). It is clear that their situation depends on the social norms concerning widows to which they are subject. These rules differ between Christian and Muslim widows, suggesting that widowhood may not necessarily have the same consequences for these groups.

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For example, the DHS data point to higher incidences of both dispossession among and violence against Christian widows compared with their Muslim counterparts. Islamic inheritance law stipulates a better treatment of widows than does customary family law, which often applies to Christians (Ostien and Dekker 2010). There is also evidence that the Muslim religion as practiced in West Africa provides a semblance of a safety net or insurance to women who have suffered marriage dissolution, through high and socially expected remarriage rates facilitated by the continued practice of polygamy (van de Walle 1990; Rehman 2007). One might thus expect African widows to fare somewhat better among Muslims.

There are no panel data that directly allow an exploration of the effects of becoming a widow. However, it is feasible to compare the situation of widows and nonwidows across religious groups in Nigeria. We do so in this paper using the Nigeria 2008 and 2013 DHS.

The data indicate a striking disparity in the nutritional status of Muslim and Christian women in Nigeria. Christian women as a group have a significantly higher body mass index (BMI)—a standard measure of nutritional status given by weight (in kilograms) divided by the square of height (in meters)—than do Muslim women, with the differential rising with age. This can be seen in figure 1, which plots BMI and the 95% confidence intervals by religion and age using nonparametric regressions. A low BMI may reflect heightened stress and undernourishment.2

As striking an observation—but one not documented before, to our knowledge—is the difference in the association of nutritional status with widowhood. In figure 2, the sample underlying figure 1 is disaggregated separately by religion into women who have never been widowed and those who have. It is arresting that among Christians, ever-widowed women show a significantly lower BMI than never-widowed women from their late twenties. Equally notable is the dissimilar pattern displayed for Muslims. Women have a similar BMI trajectory until ever-widowed women overtake never-widowed women in their mid-thirties, although these last differences are not statistically significant. Strikingly, the religious gap in BMI is largest for nonwidows and considerably smaller for ever-widowed women. This is true especially at older ages, where more widows are found. In fact, the BMI gap is not statistically significant at ages over 40.

1 In this paper, we use kernel-weighted local polynomial regressions.
2 An individual is typically considered underweight if the BMI is less than 18.5 and overweight if it is 25 and above. On the basis of the pooled 2008 and 2013 DHS, rural Muslim Nigerian women have an average BMI of 21.6 compared with 23.0 for Christian women. In urban Nigeria, the averages across the two groups are 23.2 and 24.3, respectively.
Figure 1. Body mass index (BMI) by age and religion. Data are based on kernel-weighted local polynomial regressions. Source: Nigeria Demographic and Health Survey 2008 and 2013.
These marked disparities beg for an explanation. What factors underpin the differences in nutritional status?

Muslims account for roughly half the population of Nigeria, but they tend to live in different areas to Christians. The north of the country, where Muslims predominate, has historically been disadvantaged. Poverty levels are much higher there, and access to basic social and infrastructure services is considerably worse (World Bank 1996). However, there are overlaps—places where both groups are present. Also, while Muslim women tend to receive less schooling, there are overlaps in the distribution of schooling. Given the overlaps in characteristics, we can distinguish the effect of religion from those characteristics. Thus, we can ask to what extent is the nutritional disparity between religious groups attributable to observable differences in location or poverty and its manifestation in various attributes, such as educational attainments. We also examine whether the striking nutritional disparity evident in figure 1 is widening or narrowing over time.

These questions have bearing on the appropriate policy responses. If the gap remains large once one controls for factors such as household wealth and women’s education, then it suggests that it will not be easily changed in the processes of economic and human development but will require specific efforts to change potentially deeply rooted behaviors associated with religion, interpretable as

![Figure 2. Body mass index (BMI) by age for ever-widowed and never-widowed women. a, Christian, b, Muslim. Ever-widowed women include remarried and previously widowed women as well as current widows. Data are based on kernel-weighted local polynomial regressions. Source: Nigeria Demographic and Health Survey 2008 and 2013.](image_url)
institutional differences. Alternatively, if the gap is largely explicable in terms of poverty and schooling, for example, then one expects it to be amenable to more familiar development policies aimed at sharing prosperity and promoting human capital development.

The paper aims to better understand the sources of the observed differences in BMI between Christian and Muslim women in Nigeria, with a specific focus on those who have experienced widowhood. It demonstrates that the Muslim BMI disadvantage is almost entirely explained by differences in location, living standards, education, and ethnicity. When we control for these factors, we find that religion plays a negligible role in the overall sample. Marital status is found to matter and differentially so for Christian and Muslim women. In particular, relative to women married once in each religious group, current widows are found to be disadvantaged among Christian women but not among Muslim women. Moreover, conditional on other covariates, Christian widows have a significantly worse BMI than do Muslim widows, so that the BMI religious gap is reversed among current widows. No such differences are found among remarried widows. Finally, the adverse nutritional effect of being a current widow relative to a woman married once among rural Christians is largest for childless widows but no less pronounced than for the average widow for those with a son. For rural Muslim current widows, the relative positive effect on nutritional status is more pronounced when they have a child.

The paper also finds suggestive evidence of overall improvements in nutritional status between 2008 and 2013 with a falling differential across the groups. In both urban and rural Nigeria, Muslim women experienced significantly higher gains in BMI. Qualitatively similar results are confirmed for rates of being underweight.

We discuss various possible sources of selection and provide some evidence against the possibility of differential selection into widowhood by religion. We also conduct several robustness checks. The patterns found among widows are confirmed—and stronger—after the inclusion of village fixed effects and for mixed-religion ethnic groups. This provides solid support for the relevance of religion-specific norms regarding widowhood in explaining our findings independently of other factors that may drive differences across religious groups due to individuals living in different places or belonging to different ethnic groups. The possibility that the selective mortality of Muslim widows is driving the results is also examined and rejected.

We acknowledge that the causal attribution to marital status—and specifically widowhood and the remarriage of widows—is difficult to prove conclusively. We cannot fully rule out the possibility that there are latent differences between Christian and Muslim women in the selection process leading to
widowhood, though our results are robust to the use of extensive controls for observables and to several checks. However, our main focus here is on the different processes that the sequel to marriage dissolution takes across the two religions. A more or less equal share of Muslim and Christian women experience widowhood. But once it happens, cultural and religious norms combine with a woman’s reproductive history and attributes to determine a widow’s welfare and life outcomes. Our interest is in describing these processes and investigating whether Muslim widows fare better despite their worse overall endowments.

The paper’s key finding is that among Christians, current widowhood is associated with worse nutritional status, while it is the opposite among Muslims. This effect is so strong that Muslim widows turn out to have a better nutritional status than do Christian widows. The paper finds that, all other things being equal, the average Muslim woman fares far better nutritionally and is less afflicted by dispossession and abusive behavior from her in-laws, when the shock of widowhood befalls her.

A few caveats are in order. For want of a better individual-level welfare measure, we focus on nutritional status, as proxied by BMI and rates of being underweight. We recognize that these reflect only one aspect of well-being and that widowhood—and even the risk of widowhood—may affect other facets of welfare differently. Another drawback is that BMI is collected only for women aged 15–49, so that the focus is on young women only. Older widows who not only are more plentiful but also may well be more disadvantaged are perforce left out. On the plus side, survivor bias is unlikely to be an issue in the analysis.

The paper begins with a discussion of the Nigerian context and a review of the relevant literature. Section III describes the data and preliminary descriptive statistics, while section IV investigates the determinants of the differential in nutritional status for Muslim and Christian women aged 15–49 using regression decomposition analysis. Section V further explores differences by marital status and performs robustness and sensitivity checks. Section VI concludes.

II. Women and Legal Systems in Nigeria
Islam and Christianity are the two main religions in Nigeria, with each comprising roughly half of the population. Although geographically concentrated, populations adhering to one or the other religion are both found in most of the country’s states. Moreover, while most ethnic groups are of a common religion—for example, the Hausa-Fulani are predominantly Muslims, while

3 The small remaining share subscribes to forms of indigenous worship.
the Igbo are Christians—there are also some mixed-religion ethnic groups, the largest of which are the Yoruba and Igala. This cultural and religious diversity is reflected in the variety of customary practices and legal traditions regulating family law, with bearing on marriage, divorce, and inheritance and thus women’s welfare generally.

The sources of law draw on three main legal systems: English common law (including statutory law), customary law, and Islamic law. The indigenous law of Nigeria is customary law, with each ethnic group traditionally having its distinctive set of norms and laws (Oba 2011). Islamic law applies to Muslims across the country but is more enforced in the northern states, where Muslims are more numerous. The Constitution is the supreme law of Nigeria and formally recognizes both customary and Islamic law (Hallward-Driemeier and Hasan 2013). English common law is thus the default in the absence of customary or religious law (Emery 2003).

Muslims are concentrated in the northern part of Nigeria, which is poorer and more rural than the south, where the majority of Christians are found. Home to nearly half of the poor and only one-third of the total population, the north fares worse in terms of the availability and quality of public basic social and infrastructure services (World Bank 1996). These inequalities are reflected in worse social indicators, with higher infant mortality rates and lower levels of assisted births, vaccinations, and contraceptive use on the health side as well as lower primary and secondary enrollment ratios and eventual schooling attainments on the education side (National Population Commission and ICF International 2014).

Nigeria is also a country of extraordinary ethnic diversity. The population encompasses around 374 ethnic groups, among which the largest—the Hausa-Fulani (31.3% of the population), Igbo (15.1%), and Yoruba (16.1%)—are geographically concentrated in the northern, southeastern, and southwestern parts of the country, respectively. The other ethnic groups each account for small shares of the total.

Marriage is nearly universal and first occurs at young ages for many women: about 30% of all girls between the ages of 15 and 19 have been married at least once, and the share rises to an even larger 41% in rural areas. By age 35, virtually all women have been married, while men reach that milestone around

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4 Nigeria is administratively structured into 37 states grouped into six geopolitical zones: North Central, North East, North West, South East, South South, and South West. The distribution by zone is 12.3%, 23%, 50.6%, 0.1%, 0.7%, and 13.4% for Muslims and 16.3%, 5.1%, 4.9%, 23%, 27.1%, and 23.6% for Christians.

5 These and the statistics below are based on the pooled 2008 and 2013 DHS. We discuss data sources in sec. III.
age 40. The state of widowhood is considerably more common among women than men: about 1% of all Nigerian men are current widowers, while 9% of women are current widows. Strikingly, while the share of widowers among men aged 75 and older is about 11%, it is 77% for women of the same age. This pronounced divergence by gender reflects a combination of large age gaps between spouses, higher remarriage rates as well as surviving spouses for polygamous men, and the longer life expectancy of women. Widowhood is virtually guaranteed sometime in women’s lives.

A. Inheritance
In Nigeria’s patrilineal society, a woman’s rights to property, such as land or housing, are typically dependent on her relationship with a man—usually a father, husband, or brother. A widow’s right to inherit from her late husband is formally recognized by statutory law. But this is a moot point since the majority of marriages are contracted under customary or Islamic law. Under the former, women are not in general accorded inheritance rights (Ostien and Dekker 2010; Hallward-Driemeier and Hasan 2013). In some instances and with variation across ethnic groups, this can depend on whether the widow has children with the deceased husband, whether any are sons, and whether she has remarried, with further distinction based on whether this is within the husband’s lineage and in a polygynous or monogamous relationship (NIALS 2013). Widows with children—and particularly sons—may be allowed to retain possessory (not proprietary) rights on the conjugal home or hold the estate in trust for male children who are minors. Others are deprived of the custody of their children under the customary view that offspring belong to the deceased’s lineage. Under customary law, childless widows can be asked by their in-laws to leave the matrimonial home. Numerous anecdotes suggest that this also happens to widows with children. Examples of property seizures and abandonment by in-laws are legion in the south of Nigeria. Attesting to the extent and abusive aspects of such events are the many NGOs active in the country’s southern states who focus on the rights of Christian widows, heightening awareness among the public and providing counseling, legal advice, and other forms of support.

Inheritance practices under Islamic law are more favorable to women. The Koran instructs that a deceased man’s property be inherited by his widow(s),

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6 It is still rare for Nigerians to contract solely a statutory marriage, and conflict between customary and statutory law often results (Rahmatian 1996).

7 Active NGOs include, e.g., Widows Development Organization, active in Enugu State, and the Nigerian branch of the International Federation of Women Lawyers.
his (male and female) offspring, and his relatives and specifies each individual’s share. Upon a man’s death intestate, his widow is entitled to one-fourth of the estate if childless and one-eighth if she has children with him. Cowives share the one-fourth or one-eighth equally (Ewelukwa 2002; NIALS 2013).

On paper then, Nigeria’s legal traditions suggest that Muslim widows may be better protected, and this view is reflected in the literature (Ostien and Dekker 2010). However, whether laws—statutory, customary, or religious—are in fact abided by and enforced is another matter. Islamic law is superimposed on long-standing customary practices that may be hard to fully extinguish, especially when inheritance is at stake. What happens in reality is examined by Peterman (2012) for the 15 sub-Saharan countries, including Nigeria (for 2008), for which a DHS collected a special inheritance module. Ever-widowed women aged 15–49 are asked who inherited most of their late spouse’s property. Peterman finds that less than 28% of Nigerian widows inherited most of the property. Interestingly, in Peterman’s country-specific regressions investigating the probability that a widow gets any inheritance from her husband—controlling for demographic, economic, and geographic characteristics—a dummy for being Muslim is positive and significant and has more explanatory power than the other covariates in the Nigerian case (although this is not discussed by Peterman). We revisit these data to probe deeper for differences in the experience of Muslim and Christian widows.

The consequence of inheritance for women’s economic and social support is reviewed by Cooper (2010; also see Cooper and Bird 2012). Its critical nature as well as the genuine and substantial risk of becoming a widow are fully perceived by women themselves, as suggested by evidence of behavioral responses to that risk. Although understudied, such responses are documented in recent work. The risks of widowhood are one possible explanation for findings of son preference in the literature. Milazzo (2014) provides evidence for son preference in Nigeria. Women with earlier-born daughters significantly and dangerously increase their fertility, use fewer contraceptives, and reduce birth spacing relatively more than those with firstborn sons. More direct evidence of the link to widowhood is found in Lambert and Rossi (2016), which shows that Senegalese women whose husbands have children from other marriages—and hence rivals for his inheritance—reduce birth spacing and increase the number of pregnancies to potentially dangerous levels in the attempt to have a son as insurance against widowhood. Finally, Dillon and Voena (2018) demonstrate that married couples make significantly lower productive investments in land in Zambian villages, where customary norms do not support land inheritance rights for widows. There are likely to be many as yet unresearched behavioral responses to the high threat of widowhood for women. Indeed, the fate of
widows can impact women at all stages of their lives, suggesting far-reaching societal and economic costs as well as the crucial role for policy.

B. Treatment of Widows
The potential ill treatment of widows is related not only to unfavorable inheritance practices. Widowhood entails a loss of economic means (including access to productive assets, such as land, that are conditional on marriage), of protection, and of status previously derived from a husband. The bereaved woman must also frequently endure dehumanizing and abusive rituals that are customarily part of the mourning process across Nigeria (Sossou 2002). These typically include degrading rites and extended periods of seclusion meant to showcase the intensity of sorrow over the man’s death, prove the widow’s innocence in that death, and ensure that she cannot be impregnated by another while there is uncertainty of whether she bears his child (Ewelukwa 2002; Sossou 2002; Durojaye 2013; NIALS 2013). Such indignities have been a particular focus of NGOs working with widows. Widowers are not subject to the same practices.

Some protection for widows may be provided by the opportunity to remarry. The levirate and widow inheritance—traditions once common in much of sub-Saharan Africa in which a widow remaries into her late husband’s lineage—aimed to protect the woman and her children as well as the descent’s investment in her bride price by further capitalizing on her reproductive and labor capacity (Iroegbu 2007). A widow can generally refuse this option but may then be forced to leave her children behind. Historically widespread across ethnic groups in Nigeria, the tradition appears to be in decline, although unevenly across the country.8 The influence of Christianity significantly reduced its prevalence among the Igbo and other converts (Kirwen 1979). The spread of monogamy under Christian teaching has also worked to restrict remarriage prospects. More economically independent widows are less willing to accept a levirate marriage (Ewelukwa 2002). Among certain ethnic groups who adhere to Christianity, remarriage—although tolerated—can be thwarted by the stipulation that the widow or future husband repay the original bride price (Okoye 1995). Christianity may have other dampening effects on remarriage, which, as shown below, trails among Christian relative to Muslim widows. As noted in Iliffe (1987, 152), “Christian marriage laws which deprived a widow of care or prevented a neglected woman from divorcing and remarrying were among the many ways in which colonial change damaged the situation of women.”

8 The lack of national data makes it difficult to know how prevalent the levirate remains.
In contrast, Islamic law encourages widows’ remarriage whether through the levirate or outside the lineage. Social pressures to remarry and continue to procreate are especially pronounced for young Muslim widows. When widows remarry, particularly among Muslims, they are often absorbed into polygynous households as lower-ranking wives. Polygamy is associated with higher remarriage rates. In a context where publicly provided pensions are nonexistent and women’s rights and access to property remain linked to men, remarriage can be a life saver.

A small literature in economics documents the predicament of widows in various situations in other African countries. In Uganda, Zimbabwe, and Mali, studies investigating the well-being of female-headed households find that among them, widow-headed households are particularly disadvantaged (Appleton 1996; Horrell and Krishnan 2007; van de Walle 2013). In the context of human immunodeficiency virus/acquired immunodeficiency syndrome deaths, Chapoto, Jayne, and Mason (2011) find evidence that households headed by widows whose husbands succumbed to illness are more vulnerable to losing control of agricultural land in Zambia. A number of studies have documented similar situations in Kenya, Lesotho, and Southern Africa more generally (Drimie 2002).

Elsewhere in the developing world, a literature focuses on the plight of widows in South Asia and particularly India, where widows also face many social and economic constraints (Chen and Drèze 1995; Drèze and Srinivasan 1997; Chen 2000; Jensen 2005). Jensen (2005) analyzes the well-being of widows as proxied by their nutritional status. Wealthier upper-caste widows are found to be no better off than poorer lower-caste widows. This is explained in part by the more severe restrictions placed on their behavior, socioeconomic opportunities, and remarriage options. Lloyd-Sherlock, Corso, and Minicuci (2015) compare various socioeconomic and health attributes of widows aged 50 and older across five countries (China, India, the Russian Federation, Ghana and South Africa) and find evidence of disadvantage but also variance in its manifestation.

III. Data and Descriptive Statistics

The analysis uses two nationally representative cross-sectional samples of women aged 15–49, pooled from the Nigeria DHS 2008 and 2013. We create a data set that draws on the household-level questionnaire for information on each household, its head, and other members and on the women’s questionnaire for information on anthropometrics, marital status, religion, and other relevant individual characteristics. The latter questionnaire is administered only to women in the 15–49 age range. This age limit presents a drawback for an analysis of widows, given that a majority are clearly beyond it. As the
required data are not available for older women, the paper focuses on young widows, which is in and of itself of policy interest. In addition, focusing on younger women helps avoid the problem of survivor bias, which can become severe when examining older cohorts.

A. Individual Welfare Indicators

An advantage of the DHS for this purpose is that it provides an individual measure of adult women’s welfare, namely, nutritional status as indicated by her BMI. We also use an indicator for being underweight that is equal to 1 if a woman’s BMI is lower than 18.5 and 0 otherwise. It has become common to use nutritional status as an indicator of individual economic well-being in the economic literature focusing on developing countries (Steckel 1995; Jensen 2005; Sahn and Younger 2009; Molini, Nubé, and van den Boom 2010). Using BMI, van de Walle (2013) identifies a relative disadvantage for ever-widowed women relative to others in Mali. DHS-reported BMI is based on physical measurements and is arguably more objective than self-reported measures of health status. Sahn and Younger (2009) argue that the advantages of using BMI (as opposed to, say, household consumption) include the following: it is measured at the individual level, not the household level; it reflects command over food but also sanitation conditions; it accounts for caloric consumption relative to needs; and errors in its measurement are likely to be random (also see Steckel 1995). Nonetheless, it should be kept in mind that BMI reflects only one aspect of individual-level well-being.

From a health standpoint, BMI can also be too high. Obesity is an increasing concern in developing countries, as it has been in the developed world for some time. A systematic review of studies on the prevalence of obesity among adults finds that about 20%–35% of Nigerians are overweight, while 8%–22% are obese (Chukwuonye et al. 2013). Importantly, while socioeconomic status is negatively associated with obesity in developed countries, this association is usually found to be positive in developing countries (McLaren 2007). For example, Wittenberg (2013) finds that the relationship between BMI and socioeconomic status is nondecreasing over the entire range of income/wealth in South Africa, and this relationship holds for other countries in sub-Saharan Africa. In this paper, our focus is on the lower end of the BMI distribution and potential undernutrition as opposed to obesity.

On the basis of the pooled 2008 and 2013 DHS, 24% of women aged 15–49 are overweight (BMI of 25 or higher), 7% are obese (30 or higher), and 11% are underweight (BMI lower than 18.5). These means mask significant geographic variation: overweight rates are highest in the South (around 31%), and rates of being underweight are highest in the North East (17%) and North West (15%).
A positive relationship between marriage and BMI has been documented for many countries, both developed and developing (United States: Jeffery and Rick 2002; Italy: Tavani, Negri, and La Vecchia 1994; Guatemala: Nagata et al. 2009; Ethiopia: Girma and Genebo 2002). In Ethiopia, single women are more likely to be undernourished relative to currently married women (Girma and Genebo 2002). Given high marriage rates, almost all single women are adolescent or young, when nutritional needs increase substantially because of growth spurts. Early childbearing may further deteriorate a young woman’s nutritional status.

B. Covariates and Other Variables
All regressions control for a large set of individual- and household-level characteristics, a dummy for the 2013 survey round, and state fixed effects.

Luckily, both DHS rounds include information on marital history for women who are currently married but report having had a prior union. This information is rarely collected in surveys and not available in previous rounds of the Nigeria DHS. It allows us to construct a marital status variable that differentiates among currently married women to include the following categories: single (i.e., never married), married in first union (i.e., married once), married and previously widowed, married and previously divorced or separated, currently widowed, and currently divorced or separated. Even so, these variables do not encompass a woman’s entire marital history: although we know how a remarried woman’s last union ended, information is not available for all possible prior unions. Similarly, for current widows and divorcees, no detail is collected on previous unions other than that there was one or more.

Other individual-level covariates include the woman’s age and its square, years of education, whether pregnant, head of household or head’s spouse, and her ethnic group. We are able to control for the five major groups (Hausa, Fulani, Igbo, Yoruba, and Igala), as all have at least some within-group religious variation (these are entered as five dummies). Characteristics of the woman’s household include size and composition (shares of members aged 0–5, 6–14, 15–64, and 65 and older, all by gender), the head’s gender (1 if female),

10 The marital status of household members is collected in the household questionnaire. Details on marital history are from the women’s questionnaire and are thus available only for the 15–49 age group. Married includes women who report cohabiting with a man (1.8% of the sample). The divorced and separated are grouped together. Currently separated women and remarried and previously separated women account for 1% and 1.9% of all women, respectively.

11 We tested controls for age at first marriage and first birth, husband’s education, and whether polygamous with qualitatively similar results. As these attributes do not apply to all women (e.g., single women), we prefer to omit them rather than restrict the sample further.
age, age squared, education, and the log of the household’s DHS-computed wealth index.\textsuperscript{12} The last could raise endogeneity concerns. Against that, omitted variable bias is likely to be a potential concern if we exclude wealth, so we leave it in. That said, leaving the wealth index out makes little difference to the variables of interest.

Religion is asked of all interviewed women. Note that there is heterogeneity among Christians, as we aggregate Catholics and other Christians together. The same can be said of Muslims, as different variants of Islam are practiced across Nigeria (predominantly Sunni, with a Shia minority).

The 2008 and 2013 DHS also fielded questions of particular relevance to this study. The surveys asked ever-widowed women (i.e., current and remarried widows) about who received most of their deceased husband’s property. Possible responses include the respondent, another wife, the dead man’s children, his family, other, and husband had no property. The widow is also asked whether she was dispossessed of property, defined as not having received any of her late husband’s assets or valuables.

The 2013 round additionally asks current widows whether they experienced ill treatment by in-laws. As discussed in section II, abusive rituals and other forms of mistreatment inflicted by the late husband’s family are thought to be a common human rights issue in Nigeria. The questionnaire asks about violence perpetrated by the husband’s relatives, including whether the respondent was blamed for the death, compelled to undergo cultural practices to prove her innocence, physically or verbally abused, and/or maltreated. Whether her children were ill treated is also queried. Unfortunately, the question was not asked of remarried widows, which makes it impossible to assess whether remarriage is associated with such violence and results in a small sample size, particularly for Muslim women.

We impose a few sample restrictions. As the focus is with Muslim and Christian women, those who subscribe to a traditional religion (1.1% of the sample) are dropped, as are observations with missing information for key variables (5.8% of the sample).\textsuperscript{13} This results in a sample of 66,320 women, of which 31,590 are Muslim and 34,730 are Christian. Muslims make up 55% of the rural sample and 39% of the urban sample. A total of 1,782 villages are included in the pooled data set. There is religious variation in 711 villages.

\textsuperscript{12} The share of male members aged 65 and older is the omitted household composition group. The wealth index is a proxy for household welfare generated using principal component analysis on assets, housing construction material, and type of water access and sanitation facilities. The index places households on a continuous scale of relative wealth.

\textsuperscript{13} We consider women who are usual resident members of the household and drop those who report being both the head’s spouse and not married (57 women).
C. Summary Statistics

Table 1 reports key summary statistics for our sample of women by religion and urban and rural location. A number of between-group differences in mean attributes stand out. Muslims complete considerably fewer years of education—about 6 and 4 years less in rural and urban areas, respectively. Gaps of similar size are apparent for their husbands and the heads of the households in which they live. Consistent with their lower levels of schooling, average age at first marriage is appreciably lower for Muslim women—15.5 and 17.6 years in rural and urban Nigeria, respectively, compared with 19.0 and 21.4 years for Christian women.

Muslims live in households that are larger, have higher dependency ratios, and are more likely to be headed by a male. The fraction living in female-headed households is 5% (14%) in rural (urban) areas for Muslims, while it is 26% (28%) for Christians. Consistent with this, the probability that a woman is the head is lower for Muslims, while the opposite is true for being the spouse of the head. These differences are larger in rural areas.

Table 1 also exposes quite distinctive marital profiles by religion. Singlehood is much more frequent among Christians and in urban areas, consistent with higher age at first marriage among them. The opposite holds for women married once, who account for 79% of rural and 64% of urban Muslim women compared with 55%–53% of Christian women.

Figure 3 delves a bit deeper into marital history, omitting singles and women married once to focus on the relative prevalence of remarriage among ever-widowed and ever-divorced women. Controlling for age, incidence is shown by religion for rural (fig. 3a) and urban (fig. 3b) areas. Among rural Christians, the fraction of current widows increases steadily, starting around 22 years of age, and then much more precipitously for women in their late thirties to reach a high of over 20% of women who are age 49 (fig. 3a). Among Muslims, there are far fewer current widows among women under age 40, when their share rises slowly to reach a maximum of less than 5% of women aged around 50. These patterns—together with those observed for married and previously widowed women—are consistent with significantly higher remarriage rates among young Muslim women who experience a husband’s death before age 40. Indeed, a large majority of Muslim widows are older

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14 All graphs and tables with summary statistics use survey weights provided by the DHS.
15 The dependency ratio is the number of members under age 15 and over age 65 to the number of members aged 15–64.
16 Regressions indicate that unconditionally, the probability of remarriage for widowed women is 43% higher for Muslim women than for Christian women in rural areas and 29% higher in urban areas. Conditioning on age and age squared, years of education, height, and the household’s wealth index reduces the differential to 37% and 24% in rural and urban areas, respectively.
### TABLE 1
SUMMARY STATISTICS FOR WOMEN AGED 15–49 BY RELIGION AND URBAN/RURAL RESIDENCE

|                        | Rural Total | Rural Muslim | Rural Christian | Urban Total | Urban Muslim | Urban Christian |
|------------------------|-------------|--------------|-----------------|-------------|--------------|-----------------|
| **A. Women’s Characteristics** |             |              |                  |             |              |                  |
| Age                    | 28.74       | 28.79        | 28.69           | 28.75       | 28.43        | 28.96           |
| (9.60)                 | (9.55)      | (9.67)       | (9.41)          | (9.49)      | (9.36)       |                 |
| Education (years)      | 4.33        | 1.57         | 7.76            | 8.94        | 6.39         | 10.57           |
| (4.94)                 | (3.99)      | (4.38)       | (4.93)          | (5.33)      | (3.86)       |                 |
| Single                 | .19         | .07          | .33             | .33         | .23          | .39             |
| (39)                   | (26)        | (47)         | (47)            | (42)        | (49)         |                 |
| Married once           | .68         | .79          | .55             | .57         | .64          | .53             |
| (47)                   | (41)        | (50)         | (50)            | (48)        | (50)         |                 |
| Married, previous widow| .02         | .02          | .02             | .01         | .01          | .01             |
| (13)                   | (14)        | (12)         | (09)            | (11)        | (08)         |                 |
| Married, previous divorcee | .08    | .10          | .05             | .04         | .07          | .02             |
| (26)                   | (30)        | (21)         | (20)            | (26)        | (16)         |                 |
| Widow                  | .02         | .01          | .04             | .03         | .02          | .03             |
| (15)                   | (10)        | (20)         | (16)            | (14)        | (17)         |                 |
| Divorcee               | .02         | .01          | .03             | .02         | .02          | .02             |
| (14)                   | (11)        | (17)         | (14)            | (15)        | (14)         |                 |
| Age at first marriage  | 16.82       | 15.53        | 19.01           | 19.68       | 17.61        | 21.35           |
| (4.19)                 | (3.21)      | (4.73)       | (5.04)          | (4.17)      | (5.06)       |                 |
| Pregnant               | .13         | .15          | .10             | .09         | .12          | .08             |
| (33)                   | (36)        | (29)         | (29)            | (32)        | (27)         |                 |
| Age of husband         | 41.43       | 41.39        | 41.51           | 41.99       | 42.39        | 41.66           |
| (11.84)                | (11.98)     | (11.57)      | (10.70)         | (11.42)     | (10.05)      |                 |
| Husband’s education (years) | 4.78   | 2.63         | 8.41            | 9.32        | 7.62         | 10.69           |
| (5.46)                 | (4.59)      | (4.87)       | (5.45)          | (6.06)      | (4.45)       |                 |
| Polygynous husband     | .38         | .46          | .22             | .22         | .35          | .11             |
| (48)                   | (50)        | (41)         | (41)            | (48)        | (31)         |                 |
| Head                   | .08         | .04          | .13             | .12         | .07          | .15             |
| (27)                   | (19)        | (34)         | (33)            | (26)        | (36)         |                 |
| Head’s spouse          | .68         | .85          | .48             | .53         | .65          | .45             |
| (47)                   | (36)        | (50)         | (50)            | (48)        | (50)         |                 |
| Muslim                 | .55         | 1.00         | .00             | .39         | 1.00         | .00             |
| (50)                   | (00)        | (00)         | (49)            | (00)        | (00)         |                 |
| Fulani                 | .09         | .17          | .00             | .02         | .04          | .00             |
| (29)                   | (38)        | (03)         | (13)            | (21)        | (01)         |                 |
| Hausa                  | .30         | .53          | .00             | .18         | .44          | .01             |
| (46)                   | (50)        | (06)         | (38)            | (50)        | (08)         |                 |
| Igbo                   | .09         | .00          | .21             | .24         | .00          | .39             |
| (29)                   | (03)        | (41)         | (43)            | (04)        | (49)         |                 |
| Yoruba                 | .08         | .06          | .10             | .29         | .31          | .27             |
| (27)                   | (24)        | (30)         | (45)            | (46)        | (44)         |                 |
| Igala                  | .01         | .01          | .02             | .01         | .01          | .01             |
| (11)                   | (10)        | (12)         | (11)            | (11)        | (10)         |                 |
| **B. Household Characteristics** |         |              |                  |             |              |                  |
| Household size         | 6.54        | 7.07         | 5.87            | 5.96        | 7.21         | 5.16            |
| (3.58)                 | (3.82)      | (3.13)       | (3.71)          | (4.69)      | (2.61)       |                 |
| Dependency ratio       | 1.18        | 1.30         | 1.02            | .95         | 1.15         | .83             |
| (88)                   | (86)        | (89)         | (85)            | (88)        | (81)         |                 |
| Female headed          | .15         | .05          | .26             | .22         | .14          | .28             |
| (35)                   | (23)        | (44)         | (42)            | (35)        | (45)         |                 |
than 49 years of age. Divorce and separation appear to be more prevalent among Muslims, and remarriage rates are extremely high here as well. For Christians, the remarriage of divorcees is more common than that of widows but still less frequent than for Muslims. Comparing figures 3a and 3b, we see that in urban areas, where being single is more widespread for both groups, remarriage prevalence is similar to that in rural areas, except that Muslim widows and divorcees remarry less from an earlier age.

Table 2 presents selected summary statistics for women further disaggregated by marital status. There are some notable patterns. Remarried widows have the lowest mean years of education in both groups in rural and urban areas. Age and rising schooling levels over time could account for part of this.
Figure 3. Proportions of women aged 15–49 by religion and marital status in Nigeria. a, Rural Nigeria. b, Urban Nigeria. Left, Christian. Right, Muslim. Single women and women married once are excluded. Data are based on kernel-weighted local polynomial regressions. Source: Nigeria Demographic and Health Survey 2008 and 2013.
However, it can also be observed that, although on average older, current widows have somewhat higher educational attainments among Christians and the highest average among rural Muslim women. The abysmally low schooling of remarried widows (and less so remarried divorcees) probably also reflects the fact that among widows, those from more disadvantaged socioeconomic backgrounds have a more pressing need to remarry, consistent too with their lower age at first marriage. As noted, most Muslim widows under age 40 remarry.

Muslim widows and divorcees typically remarry polygynous men. Whereas the share of women married once with a polygamous husband is 43% in rural and 31% in urban areas among Muslims and 19% and 9%, respectively, for Christians, these fractions are much higher for remarried women in both groups: close to two-thirds of Muslim and half of Christian remarried women have polygamous husbands. While remarried women are reabsorbed into male-headed households, current widows and—to a lower extent—divorcees are more likely to live in a female-headed household and to be heads. Some women have experienced multiple marriage breakdowns. Indeed, the share of rural widows and divorcees who have been married only once is 84% and 77% for Muslims and 91% and 85% for Christians, respectively. The shares are similar, though slightly higher for both groups, in urban areas.

Panel C of table 1 presents statistics for BMI, shares considered underweight, and height (reflecting nutrition during childhood). Overall, Christian women exhibit a higher BMI, are less likely to be underweight, and are taller. For example, the shares of Muslim women who are underweight are 16% in rural and 12% in urban areas—double that of Christian women. In line with international evidence (Garenne 2011), BMI is an increasing function of age, as seen in figure 1. It can also be seen that the BMI religion gap rises to age 35 approximately, where it is about 2 BMI points.

Nutritional indicators by marital status are given in table 2. The most relevant aspect is shown in figure 2, where ever-widowed women are distinguished from those who have never been widowed for the two religious groups. As already discussed in the introduction, beyond their late twenties ever-widowed Christian women have a significantly lower BMI than their nonwidowed counterparts. In contrast, there are no BMI differences among Muslim women until ever-widowed women overtake nonwidowed women in their midthirties. The latter differences remain statistically insignificant. Most strikingly, the BMI religious gap is largest for nonwidows and otherwise small or not statistically significant for widowed women, particularly at older ages where widowhood becomes more common.17

17 Note that it is the numerous singles at young ages who lower the nonwidow line among Christians.
|                                | Married Once | Married, Previous Widow | Widow | Married, Previous Divorcee | Divorcee |
|--------------------------------|--------------|------------------------|-------|---------------------------|---------|
|                                | Muslim       | Christian              | Muslim| Christian                 | Muslim  |
| Age                            | 28.98        | 31.91                  | 38.12 | 37.53                     | 39.15   |
|                                | (9.13)       | (8.30)                 | 7.79  | (7.74)                    | 9.02    |
|                                |              |                        | 5.03  | 1.50                      | 1.00    |
|                                |              |                        |       | 5.26                      | .94     |
|                                |              |                        |       | 9.4                       | 5.30    |
|                                |              |                        |       | 1.82                      | 6.92    |
| Education (years)              | 1.25         | 7.23                   | .83   | 1.50                      | 1.82    |
|                                | (3.04)       | (4.63)                 |       | (3.06)                    | (3.19)  |
|                                |              |                        |       | (4.25)                    | (4.35)  |
|                                |              |                        |       | .94                       | .32     |
|                                |              |                        |       | 5.30                      | .79     |
| Age at first marriage          | 15.61        | 19.19                  | 15.00 | 17.43                     | 16.03   |
|                                | (3.19)       | (4.68)                 |       | (4.25)                    | (4.35)  |
|                                |              |                        |       | (4.79)                    | (4.79)  |
|                                |              |                        |       | (3.90)                    | (3.90)  |
| Husband's education (years)    | 2.71         | 8.66                   | 1.82  | 6.59                      | 3.25    |
|                                | (4.63)       | (4.79)                 |       | (3.03)                    | (3.63)  |
|                                |              |                        |       | (5.21)                    | (4.79)  |
|                                |              |                        |       | (5.05)                    | (4.87)  |
| Polygynous husband             | .43          | .19                    | .69   | .53                       | .65     |
|                                | (.50)        | (.39)                  | (.46) | (.50)                      | (.48)   |
|                                |              |                        |       | (.45)                      | (.50)   |
| Married only once              | 1.00         | 1.00                   | .00   | .00                       | .84     |
|                                | (.00)        | (.00)                  |       | (.00)                     | .91     |
|                                |              |                        |       | (.00)                     | .00     |
| Household size                 | 6.84         | 5.88                   | 7.57  | 6.13                      | 5.74    |
|                                | (3.70)       | (2.94)                 |       | (3.29)                    | (4.16)  |
|                                |              |                        |       | (2.58)                    | (3.70)  |
|                                |              |                        |       | (3.49)                    | (4.74)  |
| Dependency ratio               | 1.33         | 1.21                   | 1.34  | 1.21                      | 1.40    |
|                                | (.86)        | (.91)                  |       | (.88)                     | (1.34)  |
|                                |              |                        |       | (.97)                     | (1.07)  |
|                                |              |                        |       | (.83)                     | (.93)   |
| Female headed                  | .04          | .14                    | .05   | .21                       | .72     |
|                                | (.19)        | (.35)                  |       | (.41)                     | (.45)   |
|                                |              |                        |       | (.37)                     | (.18)   |
| Woman is head                  | .03          | .10                    | .04   | .16                       | .65     |
|                                | (.17)        | (.29)                  |       | (.20)                     | (.48)   |
|                                |              |                        |       | (.36)                     | (.43)   |
| Body mass index                | 21.68        | 23.75                  | 22.13 | 23.65                     | 23.09   |
|                                | (3.88)       | (4.22)                 |       | (4.13)                    | (4.72)  |
|                                |              |                        |       | (4.36)                    | (4.12)  |
| Underweight                    | .15          | .05                    | .14   | .04                       | .12     |
|                                | (.36)        | (.22)                  |       | (.35)                     | (.33)   |
|                                |              |                        |       | (.19)                     | (.25)   |
| Height                         | 157.05       | 158.41                 | 157.63| 157.98                    | 158.58  |
|                                | (6.67)       | (6.50)                 |       | (7.23)                    | (6.72)  |
|                                |              |                        |       | (6.97)                    | (6.31)  |
|                                |              |                        |       | (6.66)                    | (6.66)  |
| Constraint: permission         | .21          | .08                    | .18   | .07                       | .10     |
|                                | (.41)        | (.27)                  |       | (.39)                     | (.30)   |
|                                |              |                        |       | (.26)                     | (.20)   |
| Constraint: money              | .55          | .57                    | .58   | .58                       | .54     |
|                                | (.50)        | (.49)                  |       | (.49)                     | (.50)   |
|                                |              |                        |       | (.46)                     | (.46)   |
|                                |              |                        |       | (.50)                     | (.48)   |
|                                | B. Urban |
|--------------------------------|---------|
| Age                            |         |
| 30.72                          | 33.30   |
| (8.53)                         | (7.67)  |
| Education (years)              |         |
| 5.70                           | 10.40   |
| (5.45)                         | (4.23)  |
| Age at first marriage          |         |
| 17.78                          | 21.64   |
| (4.15)                         | (4.99)  |
| Husband’s education (years)    |         |
| 7.88                           | 10.91   |
| (6.02)                         | (4.31)  |
| Polygynous husband             |         |
| .31                            | .09     |
| Married only once              |         |
| 1.00                           | 1.00    |
| Household size                 |         |
| 6.72                           | 5.08    |
| (4.31)                         | (2.27)  |
| Dependency ratio               |         |
| 1.27                           | 1.06    |
| Female headed                  |         |
| .07                            | .14     |
| Woman is head                  |         |
| .06                            | .11     |
| Body mass index                |         |
| 23.83                          | 25.62   |
| (4.89)                         | (5.06)  |
| Underweight                    |         |
| .09                            | .03     |
| Height                         |         |
| 158.51                         | 160.59  |
| (6.41)                         | (6.72)  |

Source. Nigeria Demographic and Health Survey 2008 and 2013.
Note. Standard deviations are in parentheses.
Figure 4 provides a pictorial representation of the unconditional differences between Muslim and Christian women in average nutritional status—as reflected in mean log BMI and underweight disparities—by marital status. The differences are predicted on the basis of a regression of log BMI on a dummy variable for Muslim, dummies for marital status, and interactions between Muslim and each marital status. The vertical line at zero indicates no difference between women of the two religious groups, and 95% confidence intervals for the difference by marital status group are given. Figure 4a shows that in rural areas, the largest gap (close to −0.1 log BMI points) is for women married once and the smallest—and insignificant—gap is for widows. Given the small number of widows in the sample, the confidence intervals are large. In urban areas, remarried and current widows exhibit the smallest (and insignificant) gaps (fig. 4b). Figures 4c and 4d show the unconditional religious differences in the shares of underweight women by marital status. This addresses the issue of inequalities among the nutritionally worse off. The patterns essentially parallel those for BMI. Here too, the unconditional disparities are smallest for widows, followed in urban Nigeria by those for remarried widows.

The DHS asks about specific factors that prevent women from obtaining medical advice or care for themselves. We consider two factors: getting permission and sufficient money. The shares of women agreeing that each is a constraint are shown in tables 1 and 2 as the final two outcomes. Overall, Muslim women report themselves to be more constrained with respect to obtaining permission (20% and 11% in rural and urban areas, respectively) than Christian women (8% and 6%). Financial constraints to seeking health care are a self-reported barrier for the majority of women in rural areas and for more than one-third of women in urban areas. Delving deeper by marital status, it is noteworthy that the constraint is considerably more pronounced for Christian widows: 71% in rural and 53% in urban areas report this as a handicap. This is well above the average shares for other women (table 2).

IV. Explaining the Religion Differential in Nutritional Status

The differences by religion described in section III could reflect numerous factors. To explore the determinants of women’s nutritional status, we regress the natural log of BMI for the $i$th woman in religious group $r$ living in state $k$ at

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18 To compute predicted lnBMI and share of being underweight, we use the Stata margins command. The predictions are calculated at the mean sample values of the included variables (i.e., shares of Muslim and Christian and of each by marital status).
time $t$ against a set of attributes $X_{irkt}$, allowing for a religion effect $\alpha_r$, state fixed effects $\eta_k$, and a year effect $\delta_t$, as follows:

$$\ln \text{BMI}_{irkt} = \beta X_{irkt} + \alpha_r + \eta_k + \delta_t + \epsilon_{irkt},$$

with $r = C, M$ and $t = 2000, 2013$. Here $\epsilon_{irkt}$ is an error term. As described in section III, the controls include all variables in the data set that may be expected to affect current nutrition. We use ordinary least squares on the full sample of women aged 15–49 and run the regressions separately for urban and rural areas. A similar regression is then run for underweight using a linear probability model. A limitation of the specification in equation (1) is that it does not allow the returns to characteristics or the state and time effects to vary by religion. For this reason, we also estimate separate regressions for each religion in which all coefficients are allowed to vary by religious group.

In all regressions, robust standard errors are clustered at the village level.
A. Regressions for BMI

We examine the unconditional overall BMI difference between the two religious groups. Columns 1 and 5 of table 3 present the regression of log BMI on a dummy for being Muslim, followed by regressions in columns 2 and 6 that add all the covariates as well as state fixed effects.

Unconditionally, rural Muslim women have an approximately 6.5% lower BMI on average than their Christian counterparts (statistically significant at the 1% level). However, as can be seen in column 2, the average rural BMI gap—reduced to a statistically insignificant 0.6%—is largely explained by the covariates. Here, the marital status coefficients indicate that single (widowed) women have a 4% (1%) lower BMI (significant at the 1% and not quite 10% levels \[ p = .102 \], respectively) than women married once (the omitted category). The nutritional disadvantage of single women echoes evidence from Ethiopia (Girma and Genebo 2002) and elsewhere. The negative effect for widows is consistent with the earlier reviewed evidence that Nigerian widows face economic and social difficulties.

The estimated coefficients on age reflect the patterns seen in figure 1, with BMI rising with age but at a slower rate as women become older. Each year of completed schooling increases women’s nutritional status by 0.3% (significant at the 1% level). Unsurprisingly, pregnancy is strongly positively associated with BMI. Household structure plays a larger role than household size, as shown by the insignificant coefficient for the latter and the significant (negative) association with larger shares of children, especially young ones (the share of men age 65 and older is omitted). Living in a female-headed household and being the head or his spouse are all linked to a higher BMI (the coefficients are large and highly significant). The head’s education has its own role, equal to one-third of the effect of the woman’s own education. As one might expect, the wealth index is positively associated with BMI (significant at the 1% level). Ethnicity plays a key role, with Hausa-Fulani women having a significantly lower BMI and those from the mixed-religion Yoruba and Igala groups enjoying a higher BMI. The correlation is found despite state fixed effects, suggesting ethnic-specific factors that affect BMI over and above location.

The positive and significant dummy for the later survey year indicates that, controlling for other factors, Nigerian women’s BMI increased between 2008 and 2013. As noted, the regression specification in column 2 obscures the possibility of catching up over time or, indeed, of any other parameter differences.

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19 Here and in what follows, we refer to differences in logs consistent with the table 3 estimates. Strictly, the corresponding percentage difference is 6.3% in this particular case \( e^{b_1} - 1 = -0.063 \) when \( b = -0.065 \).
between the groups. Separate regressions for each religious group address this concern. Columns 3 and 4 of table 3 present the results when all coefficients are allowed to vary by religion. Although BMI rose for both groups between 2008 and 2013, the improvement disproportionately favored rural Muslim women. Their BMI rose a dramatic 2.9% over the 5-year period, or 0.6% annually. This was considerably higher than the annual 0.2% increase experienced by Christians (t = 3.95 on the difference). These results are encouragingly suggestive of convergence. However, an important caveat is in order. As in the rest of the world, 2008 was a high food price year in Nigeria. The estimates may simply reflect a recovery rather than a trend. For example, the poorest may have struggled to feed themselves more so than the less poor, resulting in the food price crisis affecting Muslims and Christians differentially. Against that, rural food producers, more numerous among Muslims, may have been better protected and able to rely on nontraded staples, such as yams, more so than net consumers.

Comparing columns 3 and 4, we find that there is heterogeneity by marital status. Holding other things constant, single women have a worse BMI than women married once in both groups (the between-group difference is not statistically significant). Interesting patterns emerge when comparing the coefficients for widows. Muslim widows enjoy a 2.4% higher BMI than Muslim women married once, while the opposite is found for Christian widows, who have a 2.3% lower BMI than their own married counterparts. The difference between the coefficients on current widows by religion is statistically significant at the 1% level (t = 3.23).

Among Muslims, currently divorced women also have a higher BMI than do women married once, and the difference with Christians is statistically significant at the 5% level (t = 2.20). This may reflect the fact that a majority of rural Muslim women (about 90%) who divorce or separate from their husbands eventually remarry (fig. 2). Those who do not may have chosen not to do so or simply be between marriages.

Other pronounced differences in the returns to characteristics emerge from the comparison of the rural group-specific regressions. We highlight the statistically significant differences. The contribution of each year of education to BMI is larger for Christian women (we can reject equality of the coefficients at the 1% level; t = −3.37). Thus, Muslim women not only reach lower levels of education but also achieve lower nutritional returns for each completed year. Pregnancy is more strongly associated with BMI among Muslims (t = 1.67). For Muslims too, a large and significant nutritional advantage is associated with being the head or the head's spouse, effects that are not present for Christian women. However, the difference is significant only in relation to being the head
|                  | Rural Pooled | Rural Muslim | Rural Christian | Urban Pooled | Urban Muslim | Urban Christian |
|------------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
|                  | (1)          | (2)          | (3)             | (4)          | (5)          | (6)             |
| Muslim           | -.065***     | -.006        | -.046***        | -.006        | -.046***     | -.043***        |
|                  | (.003)       | (.004)       | (.004)          | (.004)       | (.004)       | (.004)          |
| Single           | -.39***      | -.042***     | -.034***        | -.043***     | -.042***     | -.043***        |
|                  | (.004)       | (.008)       | (.005)          | (.009)       | (.011)       | (.018)          |
| Married, previous widow | -.001 | -.003 | -.002 | .011 | .015 | .004 |
|                  | (.006)       | (.007)       | (.009)          | (.012)       | (.016)       | (.018)          |
| Married, previous divorcee | -.002 | .000 | -.002 | .010* | .002 | .26** |
|                  | (.003)       | (.004)       | (.006)          | (.005)       | (.007)       | (.009)          |
| Widow            | -.10         | .024*        | -.23***         | -.08         | .16         | -.14            |
|                  | (.006)       | (.013)       | (.007)          | (.009)       | (.017)       | (.010)          |
| Divorcee         | .11          | .031***      | .000            | -.003        | .009         | -.08            |
|                  | (.007)       | (.012)       | (.008)          | (.009)       | (.019)       | (.012)          |
| Age              | .11***       | .10***       | .12***          | .012***      | .012***      | .015***         |
|                  | (.001)       | (.001)       | (.001)          | (.001)       | (.002)       | (.001)          |
| Age$^2$          | -.00***      | -.00***      | -.00***         | -.00***      | -.00***      | -.00***         |
|                  | (.000)       | (.000)       | (.000)          | (.000)       | (.000)       | (.000)          |
| Education (years)| .003***      | .002***      | .004***         | .003***      | .002***      | .004***         |
|                  | (.000)       | (.000)       | (.000)          | (.000)       | (.000)       | (.000)          |
| Pregnant         | .049***      | .052***      | .044***         | .049***      | .051***      | .049***         |
|                  | (.002)       | (.003)       | (.004)          | (.004)       | (.006)       | (.006)          |
| Household size   | -.00         | .000         | -.001           | -.000        | -.001        | .001            |
|                  | (.000)       | (.000)       | (.001)          | (.001)       | (.001)       | (.001)          |
| Share aged 0–5, female | -.48** | -.30 | -.56** | .008 | .06 | -.05 |
|                  | (.22)        | (.35)        | (.27)           | (.31)        | (.57)        | (.37)           |
| Share aged 0–5, male | -.51** | -.26 | -.69** | .20  | .29  | .01  |
|                  | (.22)        | (.35)        | (.28)           | (.31)        | (.57)        | (.37)           |
| Share aged 6–14, female | -.17  | -.03 | -.27  | .43  | .54  | .23  |
|                  | (.22)        | (.36)        | (.28)           | (.30)        | (.57)        | (.35)           |
| Share aged 6–14, male | -.39* | -.24 | -.47* | .046 | .64  | .25  |
|                  | (.22)        | (.35)        | (.28)           | (.31)        | (.59)        | (.37)           |
| Share aged 15–64, female | -.30  | -.23 | -.46* | .049 | .75  | .026 |
|                  | (.22)        | (.34)        | (.28)           | (.31)        | (.57)        | (.36)           |
|                          |     |     |     |     |     |     |     |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|
| Share aged 15–64, male   | -.014 | .017 | -.038 | .025 | .041 | .003 |
|                         | (.020) | (.023) | (.025) | (.028) | (.054) | (.033) |
| Share aged 65+, female   | -.029 | .021 | -.054* | -.018 | .017 | .015 |
|                         | (.026) | (.047) | (.031) | (.031) | (.062) | (.035) |
| Female headed            | .006 | .003 | .008* | .003 | -.002 | .007 |
|                         | (.004) | (.009) | (.005) | (.005) | (.011) | (.005) |
| Head                    | .017*** | .033*** | .006 | .025*** | .048*** | .020** |
|                         | (.005) | (.010) | (.006) | (.007) | (.014) | (.008) |
| Spouse of head           | .011*** | .017*** | .006 | .021*** | .030*** | .022*** |
|                         | (.004) | (.007) | (.005) | (.006) | (.011) | (.007) |
| Age of head              | .000 | .000 | .000 | .000 | .002 | -.000 |
|                         | (.000) | (.001) | (.001) | (.001) | (.001) | (.001) |
| Age of head\(^2\)        | -.000 | .000 | -.000 | .000 | -.000 | .000 |
|                         | (.000) | (.000) | (.000) | (.000) | (.000) | (.000) |
| Head’s education (years) | .001*** | .001** | .000 | -.052*** | -.045*** | -.115*** |
|                         | (.000) | (.000) | (.000) | (.000) | (.000) | (.000) |
| Log wealth               | .003*** | .003*** | .003*** | .004*** | .003*** | .005*** |
|                         | (.000) | (.000) | (.000) | (.000) | (.000) | (.000) |
| Fulani                  | -.037*** | -.034*** | .006 | -.052*** | -.045*** | -.115*** |
|                         | (.007) | (.008) | (.028) | (.011) | (.012) | (.037) |
| Hausa                   | -.020*** | -.014** | .004 | .004 | .013* | -.004 |
|                         | (.006) | (.007) | (.019) | (.006) | (.007) | (.021) |
| Igbo                    | .029*** | .001 | .014* | .001 | .063 | -.000 |
|                         | (.008) | (.036) | (.008) | (.005) | (.059) | (.006) |
| Yoruba                  | .016** | .042*** | .000 | -.020*** | -.011 | -.027*** |
|                         | (.007) | (.011) | (.007) | (.005) | (.011) | (.006) |
| Igala                   | .037*** | .024 | .043*** | -.000 | .016 | -.014 |
|                         | (.015) | (.023) | (.17) | (.011) | (.018) | (.014) |
| Year 2013               | .020*** | .029*** | .009*** | .022*** | .026*** | .018*** |
|                         | (.003) | (.004) | (.003) | (.003) | (.005) | (.004) |
| State fixed effects     | No | Yes | Yes | Yes | No | Yes |
| Constant                | 3.123*** | 2.157*** | 2.154*** | 2.162*** | 3.170*** | 1.780*** |
|                         | (.002) | (.049) | (.074) | (.066) | (.003) | (.059) |
| Observations            | 42,189 | 42,189 | 22,229 | 19,960 | 24,131 | 9,361 |
| R\(^2\)                | .038 | .186 | .140 | .181 | .013 | .255 |

**Source.** Authors’ calculations using Nigeria Demographic and Health Survey 2008 and 2013.

**Note.** Robust standard errors are clustered at the village level. The share of male members aged 65 and older is the omitted household composition group.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.
Among the Yoruba, a mixed ethnic group, Muslim women enjoy a higher BMI ($t = 3.32$ on the difference). The difference in the joint effects of the state-of-residence coefficients is statistically significant ($F_{35,1131} = 11.86$).

In urban Nigeria, the unconditional average gap in BMI is lower at 4.6% but still favors Christian women (col. 5). As in rural areas, the gap is fully explained by the covariates (col. 6). The estimated coefficients are generally similar to those for the rural sample, with some exceptions for the ethnicity and the marital status dummies. Columns 7 and 8 show the models separately by religious group. The statistically different (Muslim minus Christian) coefficients are for women’s education ($t = -2.37$), being the head ($t = 1.78$), the head’s education ($t = 1.89$), the wealth index ($t = -2.54$), Fulani ethnicity ($t = 1.8$), the state fixed effects (jointly different $F_{31,649} = 16.71$), and being married and previously divorced ($t = -2.07$). The BMI advantage of married ex-divorcees among Christians requires further examination that considers the reasons for divorce and remarriage among them. Note also that although the estimated coefficients on current widow are not statistically significant, they are nonetheless quite large and qualitatively similar to those estimated for the rural sample: a positive 0.016 for Muslim widows and a negative $-0.014$ for Christian widows.

There are also signs of convergence in nutritional status in urban Nigeria, although the differential rise—a 2.6% increase for Muslims versus 1.8% for Christians—was considerably less pronounced than in rural areas.

### B. Regressions for the Incidence of Being Underweight

Table 4 presents the same series of regressions for the incidence of being underweight (which replaces the dependent variable in eq. [1]). Unconditionally and averaged over the two survey years, the probabilities of being underweight were 9.3% and 5.5% higher for Muslim women in rural and urban areas, respectively. Both differences are statistically significant at the 1% level. Once covariates are added, the average disparity drops considerably to a still significant 2.8% in rural Nigeria and a negligible and insignificant 0.5% in urban areas.

Allowing women’s attributes to vary by religion reveals patterns similar to those found for BMI. Here too, impressive improvements were concentrated in Muslims, with 4.7% and 2.3% reductions in the probabilities of being underweight in rural and urban areas, respectively, between 2008 and 2013. No change is revealed for Christian women. Encouragingly, these results indicate progress among the nutritionally worse-off Muslim women and here too point to convergence.
Single women as well as married and previously divorced women are found to have a significantly higher probability of being underweight than women married once among Muslims. For Christians, this is true of single women. The differences for widows are not statistically different relative to their own left out group. But the coefficients exhibit the same patterns as for BMI; those for Muslims (−0.012 in rural and −0.032 in urban areas) are substantial and negative, while those for Christians are also substantial but of the opposite sign (0.017 and 0.014, respectively). Across religious groups, the differences are statistically significant only in urban areas ($t = −1.92$).

C. Conditional Predicted Differences in Nutritional Status by Marital Status

We examined whether nutritional status moves differentially with marital status, comparing the two religions. We find that compared with being married once, widowhood is associated with a pronounced cost to BMI among rural Christian women and a similarly sized benefit among rural Muslim women, with the difference in the coefficients being highly significant. The question then arises of what differences we see for each marital status group when conditioning on the covariates. We estimate a model similar to the one used to produce figure 4, with the difference that predicted levels are now conditional on observables and evaluated at covariate sample mean values. Similar to figure 4, figure 5 shows log BMI levels, rates of being underweight, and their confidence intervals for each marital status by religious group and rural and urban area.

In rural Nigeria, Muslim women exhibit somewhat lower or equal predicted average BMI compared with Christians (fig. 5a). In urban areas, the mean differences marginally favor Muslims overall (fig. 5b). But these religious differentials are small and statistically significant in favor of Christians only for women married once and single women in rural areas. In contrast, Muslim current widows have a higher BMI in rural (statistically significant at the 10% level) and urban Nigeria (not statistically significant).

With respect to the probability of being underweight, only the difference for single women survives as significantly in favor of Christians in rural areas (fig. 5c). In urban Nigeria, Muslim widows are significantly better off than Christian widows (fig. 5d). No other predicted conditional differences are significantly different from zero.

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20 Specifically, differences in nutritional status are predicted on the basis of a fully interacted model of log BMI on a dummy variable for Muslim, all the covariates, and all the interactions between Muslim and the covariates.
### TABLE 4
DETERMINANTS OF BEING UNDERWEIGHT BY RELIGION, URBAN AND RURAL SECTOR

|                | Rural Pooled (1) | Rural Muslim (2) | Rural Christian (3) | Urban Pooled (5) | Urban Muslim (6) | Urban Christian (7) | Pooled (8) |
|----------------|-----------------|-----------------|---------------------|-----------------|-----------------|---------------------|------------|
| Muslim         | .093*** (.005)  | .028*** (.007)  | .055*** (.005)      | .005 (.006)     | .048*** (.008)  | .043*** (.008)      |
| Single         | .022*** (.008)  | .061*** (.019)  | .034*** (.008)      | .038*** (.017)  | .005 (.025)     | .009 (.020)         |
| Married, previous widow | -.006 (.011) | -.005 (.017) | -.009 (.011) | -.007 (.017) | -.002 (.025) | -.009 (.020) |
| Married, previous divorcee | .017*** (.006) | .020*** (.008) | .010 (.008) | -.009 (.007) | .005 (.011) | .014 (.009) |
| Widow          | .009 (.011)     | -.012 (.026)    | .017 (.011)        | .004 (.010)     | -.032 (.022)    | .014 (.010)         |
| Divorcee       | -.013 (.011)    | -.043*** (.025) | .002 (.011)        | .019 (.012)     | .018 (.022)     | .012 (.014)         |
| Age            | -.018*** (.001) | -.019*** (.002) | -.014*** (.002)    | -.020*** (.002) | -.019*** (.003) | -.017*** (.002)    |
| Age$^2$        | .000*** (.000)  | .000*** (.000)  | .000*** (.000)     | .000*** (.000)  | .000*** (.000)  | .000*** (.000)     |
| Education (years) | -.003*** (.001) | -.003*** (.001) | -.004*** (.001)    | -.001*** (.001) | -.001*** (.001) | -.003*** (.001)    |
| Pregnant       | -.077*** (.004) | -.101*** (.006) | -.033*** (.005)    | -.040*** (.005) | -.059*** (.009) | -.022*** (.005)    |
| Household size | -.001 (.001)    | -.000 (.001)    | -.001 (.001)       | .001 (.001)     | .002 (.001)     | -.000 (.001)       |
| Share aged 0–5, female | .108*** (.041) | .065 (.075)    | .138*** (.046)     | .005 (.053)     | -.081 (.115)    | .051 (.059)         |
| Share aged 0–5, male | .106*** (.041) | .062 (.076)    | .139*** (.046)     | -.014 (.052)    | -.116 (.114)    | .043 (.058)         |
| Share aged 6–14, female | .121*** (.042) | .116 (.077)    | .123*** (.046)     | .014 (.053)     | -.050 (.112)    | .053 (.059)         |
| Share aged 6–14, male | .126*** (.041) | .114 (.074)    | .128*** (.046)     | -.012 (.053)    | -.093 (.109)    | .038 (.061)         |
| Share aged 15–64, female | .117*** (.041) | .101 (.076)    | .131*** (.046)     | -.023 (.052)    | -.077 (.111)    | .011 (.059)         |
| Variable                                      | Estimate 1  | Estimate 2  | Estimate 3  | Estimate 4  | Estimate 5  | Estimate 6  | Estimate 7  | Estimate 8  |
|-----------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Share aged 15–64, male                       | .087**      | .045        | .109**      | −.018       | −.091       | .022        |             |             |
|                                               | (.038)      | (.069)      | (.043)      | (.049)      | (.108)      | (.055)      |             |             |
| Share aged 65+, female                       | .180***     | .009        | .213***     | .000        | −.164       | .047        |             |             |
|                                               | (.050)      | (.101)      | (.057)      | (.062)      | (.137)      | (.068)      |             |             |
| Female headed                                 | −.024***    | −.031       | −.014       | −.001       | −.008       | .006        |             |             |
|                                               | (.009)      | (.23)       | (.009)      | (.010)      | (.23)       | (.10)       |             |             |
| Head                                          | −.006       | −.024       | .019*       | −.004       | −.046**     | .07         |             |             |
|                                               | (.010)      | (.25)       | (.10)       | (.11)       | (.22)       | (.13)       |             |             |
| Spouse of head                                | −.019**     | −.043***    | .001        | −.001       | −.030       | .15         |             |             |
|                                               | (.008)      | (.16)       | (.08)       | (.09)       | (.19)       | (.10)       |             |             |
| Age of head                                   | .000        | −.001       | .002*       | .004***     | .003        | .004***     |             |             |
|                                               | (.001)      | (.02)       | (.01)       | (.01)       | (.02)       | (.01)       |             |             |
| Age of head²                                  | −.000       | .000        | .000        | −.000***    | −.000**     | −.000***    |             |             |
|                                               | (.000)      | (.00)       | (.00)       | (.00)       | (.00)       | (.00)       |             |             |
| Head’s education (years)                      | −.000       | −.000       | .000        | −.001       | −.002***    | .01*        |             |             |
|                                               | (.000)      | (.00)       | (.00)       | (.00)       | (.00)       | (.00)       |             |             |
| Log wealth                                    | −.002***    | −.003***    | −.001***    | −.002***    | −.001***    | −.002***    |             |             |
|                                               | (.000)      | (.00)       | (.00)       | (.00)       | (.00)       | (.00)       |             |             |
| Fulani                                        | .086***     | .072***     | .079        | .075***     | .072***     | −.060**     |             |             |
|                                               | (.014)      | (.15)       | (.105)      | (.019)      | (.21)       | (.25)       |             |             |
| Hausa                                         | .034***     | .025**      | .008        | .11         | .008        | .0001       |             |             |
|                                               | (.011)      | (.13)       | (.036)      | (.009)      | (.01)       | (.025)      |             |             |
| Igbo                                          | −.020*      | −.016       | −.003       | −.010       | −.056***    | −.011*      |             |             |
|                                               | (.01)       | (.067)      | (.10)       | (.006)      | (.25)       | (.07)       |             |             |
| Yoruba                                        | −.011       | −.016       | −.012       | .024***     | .031**      | .021***     |             |             |
|                                               | (.011)      | (.019)      | (.14)       | (.007)      | (.16)       | (.008)      |             |             |
| Igala                                         | −.051***    | −.064***    | −.052*      | −.007       | −.037       | .012        |             |             |
|                                               | (.018)      | (.22)       | (.27)       | (.016)      | (.24)       | (.23)       |             |             |
| Year 2013                                      | −.020***    | −.047***    | .003        | −.008*      | −.023***    | .001        |             |             |
|                                               | (.009)      | (.008)      | (.004)      | (.009)      | (.008)      | (.005)      |             |             |
| State fixed effects                           | No          | Yes         | Yes         | No          | Yes         | Yes         |             |             |
| Constant                                      | .075***     | .730***     | 1.136***    | .456***     | .067***     | .832***     | .862***     | .823***     |
|                                               | (.002)      | (.084)      | (.146)      | (.091)      | (.003)      | (.089)      | (.161)      | (.106)      |
| Observations                                  | 42,189      | 42,189      | 22,229      | 19,960      | 24,131      | 24,131      | 9,361       | 14,770      |
| R²                                            | .20         | .67         | .60         | .043        | .009        | .076        | .076        | .070        |

**Source.** Authors' calculations using Nigeria Demographic and Health Survey 2008 and 2013.

**Note.** Robust standard errors are clustered at the village level.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.
D. Does Having a Child Alleviate Nutritional Hardship for Widows?

We now explore how having children may alter the association between nutritional status and widowhood by rerunning the same regressions on subsamples of women by religion and by whether they have a son, daughter, or child alive or not. Table 5 presents the estimated rural current widow coefficients from regressions for ln BMI.21 We see that for rural Muslim widows, the positive effect on BMI is more pronounced when they have a surviving child but that there is little difference with respect to the gender of that child. Muslim widows are otherwise no better or worse off than Muslim women married once. Among Christian current widows, the previous adverse effect is still found whether a child is a son or daughter but is significantly higher for widows who do not have a living child. Results for being underweight in rural areas are qualitatively

21 Given that the data do not allow us to know whether children or a lack of children is attributable to the previous or current union, we do not examine remarried widows here.
similar although very imprecisely estimated, as is also the case for both nutritional indicators in urban Nigeria, where sample sizes are small.

E. Decomposing the Nutritional Gap

To further understand the gap in nutritional status and better categorize the sources of the religion differential, a simple Blinder-Oaxaca decomposition is implemented focusing on BMI (Blinder 1973; Oaxaca 1973). The method, widely used to decompose wage disparities, helps to distinguish between the component of a difference between groups that is due to unequal attributes and that due to unequal returns to those attributes.22

The model for ln BMI, of women in either religious group is as follows:23

\[
\ln \text{BMI}_r = X'_r \beta_r + \varepsilon_r, \tag{2}
\]

with \( r = C, M \), where \( X'_r \) is a vector of observable individual characteristics (including a constant), \( \beta_r \) are the parameters (including the intercept), and \( \varepsilon_r \) is the error term with \( E(\varepsilon_r) = 0 \). We can thus write the mean BMI gap as

\[
\text{Gap} = E(X'_C)\beta_C - E(X'_M)\beta_M. \tag{3}
\]

22 Fortin, Lemieux, and Firpo (2011) review decomposition methods used in economics.
23 Powell et al. (2012) also use the technique to decompose differences in BMI.
To determine the contribution of the characteristics to the mean gap, a two-fold decomposition uses the vector of parameters $\beta^*$—obtained by estimating a pooled model of the data for both groups, including a dummy for the Muslim religion (Neumark 1988; Jann 2008)—to weigh the mean characteristics in the explained part of the decomposition. The mean gap can then be decomposed into the portion that is explained by differences in the characteristics of the groups and the portion that is unexplained and captures differences in the returns to characteristics as well as the effects of any unobservables. First, we have the nutrition gap attributed to different characteristics:

$$[E(X_C) - E(X_M)]'\beta^*.$$  

(4)

Next, we have the nutrition gap attributed to different returns to characteristics:

$$E(X_C)'(\beta_C - \beta^*) + E(X_M)'(\beta^* - \beta_M).$$  

(5)

Table 6 shows the results of the decompositions implemented for rural and urban areas.24

The bulk of the gap—90% in rural and 88% in urban Nigeria—is explained by differences in the observed characteristics of the two groups. In rural areas, the major contributors are divergences in household demographics, ethnicity, wealth, and women’s education. For example, differences in education raise the gap by about 31%, significant at the 1% level. Unsurprisingly, being single contributes negatively to the explained disparity: this is because single women have a lower BMI than women of other marital statuses and that there are fewer single Muslim women in the 15–49 age group.

The mean urban gap is likewise largely explained by differences in women’s attributes and similar ones to those found important in rural areas. However, ethnicity loses its salience, while location, as captured by the state of residence, plays a larger and statistically significant (at the 1% level) role. Although ethnic groups are geographically concentrated, ethnicity and customary norms appear to play a larger role in rural areas.

Only a small and statistically insignificant gap of 10% and 13% in rural and urban areas, respectively, is left unexplained by differences in the characteristics between the groups. As suggested by the regression results, the difference in returns to BMI of being a current widow translates into a negative and highly significant (only in rural areas) contribution to the unexplained share, in effect reducing the overall gap.

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24 The state fixed effects include only states in which both groups are found to ensure the same set of covariates necessary for the Blinder-Oaxaca decomposition.
|                     | Rural              |                     | Urban              |                     |
|---------------------|--------------------|--------------------|--------------------|--------------------|
|                     | Coefficient        | z-Statistic        | Coefficient        | z-Statistic        |
| Christian           | 3.12292            | 1,497.24           | 3.16963            | 1,175.51           |
| Muslim              | 3.05841            | 1,170.62           | 3.12384            | 926.94             |
| Cause:              |                    |                    |                    |                    |
| Different           | .05817             | 13.6               | .04009             | 8.92               |
| Different returns   | .00634             | 1.57               | .00571             | 1.42               |
| to characteristics:|                    |                    |                    |                    |
| Single              | −.00976            | −10.06             | −.00737            | −7.32              |
| Married, previous   | .00001             | .18                | −.00009            | −.87               |
| widow               | .00011             | .59                | −.00051            | −1.88              |
| Widow               | −.00031            | −1.63              | −.00012            | −.99               |
| Divorcee            | .00017             | 1.61               | .00001             | .31                |
| Age                 | −.00102            | −2.69              | .00321             | 3.99               |
| Education (years)   | .02005             | 10.81              | .01454             | 8.59               |
| Pregnant            | −.00258            | −11.6              | −.00217            | −7.69              |
| Head                | .00157             | 3.25               | .00201             | 3.64               |
| Spouse of head      | −.00386            | −2.64              | −.00456            | −3.48              |
| Head’s characteristics | .00333            | 2.95               | .00113             | 1.33               |
| Household demographic composition | .00285 | 3.31 | .00324 | 3.08 |
| Wealth              | .02116             | 12.5               | .01494             | 7.24               |
| Location            | .00458             | 1.06               | .01333             | 4.04               |
| Ethnicity           | .02289             | 5.54               | .00195             | .65                |
| Year 2013           | −.00101            | −1.72              | .00056             | .77                |
| Different returns   |                    |                    |                    |                    |
| to characteristics:|                    |                    |                    |                    |
| Single              | .00178             | 1.28               | −.00021            | −.06               |
| Married, previous   | −.00009            | −.45               | −.00010            | −.41               |
| widow               | −.00023            | −.54               | .00104             | 1.99               |
| Married, previous   | −.00080            | −3.27              | −.00062            | −1.39              |
| divorcee            | −.00055            | −2.23              | −.00040            | −.97               |
| Age                 | .05321             | 2.56               | .05253             | 1.65               |
| Education (years)   | .00704             | 2.9                | .01344             | 2.28               |
| Pregnant            | −.00093            | −1.68              | −.00027            | −.34               |
| Head                | −.00193            | −2.81              | −.00246            | −1.65              |
| Spouse of head      | −.00780            | −1.32              | −.00585            | −.75               |
| Head’s characteristics | −.01497           | −.8                | −.06189            | −2.12              |
| Household demographic composition | −.03877 | −.95 | −.02709 | −.43 |
| Wealth              | .06629             | .75                | .25935             | 2.54               |
| Location            | −.04434            | −2.55              | −.00836            | −.84               |
| Ethnicity           | −.00886            | −3.33              | −.00924            | −1.86              |
| Year 2013           | −.01035            | −3.92              | −.00490            | −1.38              |
| Constant            | .00764             | .08                | −.19926            | −1.69              |

**Source.** Authors’ calculations using Nigeria Demographic and Health Survey 2008 and 2013.

**Note.** Age includes age and age squared. Location refers to state fixed effects. Head’s characteristics include age, age squared, and years of schooling. The wealth index is logged. Ethnicity includes Fulani, Hausa, Igbo, Yoruba, and Igala. Household demographic structure includes head is female, household size, and composition.
V. Further Tests

Our results so far are consistent with the view that somewhat more favorable inheritance rules and social norms that more readily accept and encourage remarriage play a positive role in easing the shock of widowhood for Muslim relative to Christian women, at least as reflected in their nutritional status. In this section, we discuss several concerns that might still be raised about this conclusion.

A. Possible Confounding Ethnic- and Location-Related Factors

First, it could be argued that the revealed differences in nutritional status for current widows of the two religious groups are simply due to ethnic social norms or perhaps geographic factors related to a woman’s village of residence. To rule out the first possibility, we exploit the fact that some ethnic groups contain adherents to both religions. Among the largest are the Yoruba and Igala, mixed-religion ethnicities concentrated in the southwest and central regions of Nigeria. Restricting the sample to these groups arguably allows us to better isolate the purely religious factor, purged of ethnic- and location-related influences. Replacing state with village fixed effects to exploit variation within villages additionally helps address the second issue and flush out unobservable location-specific factors that may well affect differences between the groups. For this last specification, we limit the sample to the 711 villages (364 urban, 347 rural) where women of both faiths reside and identify the coefficients exclusively on within-village differences. This better allows us to zero in on how differences in norms associated with Nigeria’s two main religions affect the well-being of widows. The marital status coefficients from these regressions, where all covariates are allowed to vary by religion, are given in table 7.25

Columns 1, 2, 5, and 6 of table 7 show the estimates for the subsample of women belonging to mixed-religion ethnic groups for log BMI and the share of being underweight. There is no overall Muslim nutritional disadvantage. Among rural Christians, the BMI gap for current widows relative to women married once is now larger (−0.044; significant at the 10% level) than that reported in table 3 (−0.023). As expected, the disadvantage of widowhood among Muslims is more than offset with a positive significant coefficient of the interaction of 0.064. The results for being underweight mirror the ones for BMI. Compared with the results shown in table 4 for the full sample, current widows among rural Christians have a statistically significant and larger probability of being underweight than Christians married once (8 percentage

25 This is equivalent to the model estimated to produce fig. 5 (using the full sample). The Muslim coefficient is computed as the conditional marginal effect for married women (dy/dmuslim | married once = 1) evaluated at the mean value of the covariates. Standard errors are computed using the delta method.
points, significant at the 10% level). Similar to the BMI results, this is more than offset among Muslims. No such Muslim-Christian differences are apparent among the urban Yoruba and Igala ethnic groups.26

The regressions with village fixed effects on the subsample of rural villages with religious variation also confirm our findings for log BMI (cols. 3, 4). The coefficient on Christian widows is unchanged at $-0.023$ ($p = .102$), which, as expected and in accordance with table 3, is more than compensated for Muslims (the coefficient of the interaction term is in fact $0.050$, significant at the 5% level). In urban mixed-religion villages, no such disparities emerge.27 The results for being underweight (cols. 7, 8) are consistent with those for BMI and have higher statistical significance. This evidence goes some way to reassure us that our results are robust and likely driven by religion-specific factors.

B. Differential Selection into Current Widowhood?

The different marital patterns by religion, particularly the differential prevalence and acceptability of remarriage, raise a second concern. Given the pronounced tendency for Muslim widows under age 40 to remarry, one may conjecture that those who end up not doing so tend to be women who can afford to stay unmarried. There may then be a selection of the worse-off widows out of the current widow status among Muslims. Our analysis compares them with Christian widows, a group that contains both the well-off and the worse-off since a negligible number get remarried.

One straightforward test is to rerun the regressions controlling for being an ever-widowed woman rather than differentiating between current and ex-widow status. The results are less pronounced yet consistent with our prior results. For rural Christians, being an ever-widowed woman has a significant negative effect ($-0.016$, significant at the 1% level) on BMI, while the coefficient for Muslim widows is positive but not significant (0.007). For urban areas and the probability of being underweight, the magnitudes of the estimated coefficients are attenuated, but the signs point to the same conclusions as before.

We further investigate by running the regressions on the sample of women aged 40–49 in which it is plausible to assume that Muslim widows either chose not to remarry or find it difficult to do so because of their age. We also

26 The high negative coefficient on Muslim current divorcee (col. 1) is an anomaly due to outliers among the small number of observations (13). The results are also robust to omitting the Hausa-Fulani ethnic grouping (accounting for 63% of the Muslim sample) and so are not attributable to this particular group among Muslims in Nigeria.

27 In regressions with village fixed effects on the entire sample, widows are also found to be statistically significantly worse off than women married once among Christians ($-0.023$ in rural areas and $-0.018$ in urban areas) and significantly better off (interaction terms of 0.037 in rural areas and 0.033 in urban areas) among Muslims.
|                | Body Mass Index                  | Underweight                |
|----------------|---------------------------------|----------------------------|
|                | Mixed-Religion Yoruba and Igala | Villages with Variation     | Mixed-Religion Yoruba and Igala |
|                |       and Villages with Variation| by Religion                |       and Villages with Variation |
|                | Rural (1) | Urban (2) | Rural (3) | Urban (4) | Rural (5) | Urban (6) | Rural (7) | Urban (8) |
| Muslim         | .021     | .004     | .003     | .012     | -.024    | -.018    | -.014     | -.024*    |
| Single         | .037**   | -.042*** | -.043*** | -.031*** | .004     | .019     | .042***    | .043***    |
| Married, previous widow | .019 | .046     | .023     | .018     | -.034**  | -.032    | -.017     | -.047**    |
| Married, previous divorcee | -.018 | .038***  | -.000    | .037***  | .017     | -.033**  | .018      | -.034***    |
| Current widow  | -.044*   | .010     | -.023    | .001     | .080*    | -.008    | .044**    | .008       |
| Current divorcee | .018   | .012     | .009     | .000     | .002     | -.002    | .004      | .037*      |
| Muslim × single | -.036   | .022     | -.009    | -.006    | .033     | .011     | .003      | .004       |

Note: Significant levels are marked as follows: *p < 0.1, **p < 0.05, ***p < 0.01.
| Interaction                  | Estimate 1 | Estimate 2 | Estimate 3 | Estimate 4 | Estimate 5 | Estimate 6 | Estimate 7 | Estimate 8 |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Muslim × married, previous widow | -.060      | .004       | -.017      | .014       | .100       | .045       | .050       | .046       |
|                             | (.065)     | (.049)     | (.023)     | (.033)     | (.070)     | (.053)     | (.033)     | (.037)     |
| Muslim × married, previous divorcee | .025       | -.031      | .009       | -.023      | -.023      | .033       | -.016      | .006       |
|                             | (.027)     | (.019)     | (.012)     | (.016)     | (.042)     | (.027)     | (.022)     | (.018)     |
| Muslim × current widow      | .064*      | -.004      | .050**     | .020       | -.090*     | .026       | -.091***    | -.043      |
|                             | (.036)     | (.038)     | (.025)     | (.028)     | (.054)     | (.040)     | (.035)     | (.029)     |
| Muslim × current divorcee   | -.134***   | .031       | -.001      | .008       | .049       | -.033      | .005       | -.043      |
|                             | (.047)     | (.037)     | (.026)     | (.026)     | (.085)     | (.034)     | (.041)     | (.035)     |
| Constant                    | 1.904***   | 1.771***   | 2.162***   | 1.794***   | .773***    | 1.211***   | .758***    | .670***    |
|                             | (.191)     | (.167)     | (.136)     | (.137)     | (.293)     | (.260)     | (.219)     | (.230)     |
| Covariates as in table 3    | Yes        | Yes        | Yes        | Yes        | Yes        | Yes        | Yes        | Yes        |
| Fixed effects               | State      | State      | Village    | Village    | State      | State      | Village    | Village    |
| Observations                | 3,715      | 7,021      | 12,701     | 13,343     | 3,715      | 7,021      | 12,701     | 13,343     |
| $R^2$                       | .226       | .278       | .281       | .316       | .079       | .084       | .145       | .139       |

**Source.** Authors’ calculations using Nigeria Demographic and Health Survey 2008 and 2013.

**Note.** Robust standard errors are clustered at the village level. Interactions between the Muslim dummy and all other covariates and fixed effects are included (not shown). The coefficient for Muslim is the conditional marginal effect for women married once (dy/dmuslim | married once = 1) evaluated at average values of the covariates in the sample (using the Stata margins command); standard errors for Muslim are computed using the Delta method.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.
disaggregate by education and stature on the argument that those with low socioeconomic status, as proxied by a lack of education, and lower than average height are likely to be in greater need to remarry.\footnote{Height here is assumed to be a proxy for well-being during childhood and arguably predetermined to widowhood.} This allows us to see whether the results differ by socioeconomic strata. If the reversal in nutritional status is concentrated among the well-off (who are relatively more likely to have chosen not to remarry), this would be evidence against our conclusion and in favor of positive selection of current widows.

Table 8 shows the estimated marital status coefficients from the same fully interacted model as before, run on the subsamples of older women with no education and those who completed at least one year of schooling and of women with below- and above-average height. Once again, the results strongly confirm the nutritional disadvantage of widows among Christian women and that the detriment is larger for this group of older women than for the whole sample (table 3) and statistically significant in almost all subsamples. More importantly, the reversal of the Christian advantage in favor of Muslim widows is found to be significant only for arguably poorer women—those who are uneducated and those with lower than average height in rural areas. There appears to be a nutritional cost to Christian widows regardless of their socioeconomic background. For Muslims, it is the less well-off widows who appear to have a better BMI than other women, all else held constant. For better-off women, the estimated coefficients generally move in the same direction, but the differences are statistically insignificant.

The fact that we find our previous result among women who probably had lower margins of choice between remaining unmarried or not suggests that the gap reversal for widows is not simply driven by differential selection into widowhood. It would appear that poorer women, who are the most vulnerable following a widowhood shock, are better protected by the sociocultural and socio-religious norms that kick in among Muslims. It should also be noted that in all the regressions reviewed, remarried and previously widowed Muslim women are no worse-off than their Christian counterparts. Indeed, the estimated coefficients are often positive and larger for them, although they are never statistically different from those estimated for remarried Christian widows.

C. Selective Mortality?

Third, as discussed, Christian women are on average better off than Muslim women in terms of nutritional and other outcomes (see fig. 1; tables 1, 2). If far fewer Christian women become widows at any given age and it is only
the very poorest women who do, this might explain the larger differences between widowed and nonwidowed women among Christians. Relatedly, given the overall disadvantage for Muslims, there could be selective mortality among the most nutritionally deprived Muslim widows such that only the better-off survive; Muslim widows whose relative disadvantage is similar to that of Christian widows become so weak that they do not survive and are thus not in our data.

These two possible concerns hinge upon the argument that Muslim women are worse off than Christian women in the full sample. To check the possibility of selection from either source, we can exploit the fact that differences in nutritional status and other variables are much less pronounced in the subsample of mixed ethnic groups or villages in which women of both religions are found. This is shown in figure 6, which plots BMI against age using nonparametric regressions as in figure 1 but here only for women in the subsamples of mixed ethnic groups (fig. 6a) and mixed-religion villages (fig. 6b). Consistent with the selection argument, our results should be absent or much weaker in these subsamples. Yet in table 7, we have shown instead that our main result—a nutritional disadvantage (in terms of BMI and being underweight) of Christian widows that is offset among Muslim widows—is actually equal or larger than in the overall sample. This result suggests that selection is not driving the results.

There is a further reason to question the idea that our results are due to selective mortality among Muslim widows. If the mortality risk at low BMI is common to Muslims and Christians, then our finding that the observed conditional mean BMI is higher for Muslim widows would also imply that the same is true on allowing for the mortality. The error in inferring the true difference in mean BMI based on the BMI of survivors would be the same for Muslims and Christians and so cancel out. For selective mortality to explain our results, we would require that there is a higher probability of dying at low BMI for Muslims than for Christians. We would then expect to find a higher incidence of very low BMI for Muslim widows, conditional on the covariates, because more of them would be near death, though still in our data. This can be tested by tracing out conditional cumulative distribution functions for current widows by religion. We regress the probability of being below progressively higher cutoff points, starting from the low end of the BMI distribution, controlling for all the covariates. (The results are given in table A1 as well as plotted in fig. A1; table A1 and fig. A1 are available online.) We do not observe a higher incidence of very low BMI for Muslim widows compared with

29 This argument draws on the finding that poorer women may be more vulnerable to widowhood, given that they typically marry poorer and hence less healthy men (Sevak, Weir, and Willis 2003).
TABLE 8
ESTIMATED MARITAL STATUS COEFFICIENTS IN LOG BODY MASS INDEX REGRESSIONS BY RELIGION FOR SUBSAMPLE OF WOMEN AGED 40-49

|                  | Rural Education = 0 | Urban Education > 0 | Rural Education = 0 | Urban Education > 0 | Rural Height < Average | Urban Height ≥ Average | Rural Height < Average | Urban Height ≥ Average |
|------------------|---------------------|---------------------|---------------------|---------------------|------------------------|------------------------|------------------------|------------------------|
| Muslim           | -.002               | .042*               | .035                | .017                | -.021                  | .006                   | .011                   | -.004                  |
|                  | (.020)              | (.024)              | (.034)              | (.020)              | (.025)                 | (.017)                 | (.027)                 | (.019)                 |
| Single           | -.047               | -.068**             | ...                 | ...                 | -.067*                 | -.061                  | ...                    | ...                    |
|                  | (.071)              | (.030)              |                    |                     | (.037)                 | (.045)                 |                        |                        |
| Married, previous widow | -.012              | -.003               | .041                | -.034               | .014                   | -.034                  | -.035                  | .009                   |
|                  | (.024)              | (.017)              | (.070)              | (.026)              | (.017)                 | (.022)                 | (.034)                 | (.036)                 |
| Married, previous divorcee | -.006              | .015                | .045                | .041**              | .010                   | .003                   | .029                   | .053**                 |
|                  | (.016)              | (.012)              | (.043)              | (.018)              | (.013)                 | (.015)                 | (.028)                 | (.024)                 |
| Widow            | -.039**             | -.037***            | -.040               | -.035**             | -.060***               | -.008                  | -.042*                 | -.037*                 |
|                  | (.018)              | (.013)              | (.032)              | (.017)              | (.014)                 | (.017)                 | (.022)                 | (.021)                 |
| Divorcee         | -.021               | -.016               | -.057               | -.030               | -.013                  | -.032                  | -.042                  | -.032                  |
|                  | (.028)              | (.018)              | (.057)              | (.024)              | (.023)                 | (.021)                 | (.028)                 | (.032)                 |
| Muslim × single  | .066                | -.008               | ...                 | ...                 | .144*                  | .071                   | ...                    | ...                    |
|                  | (.098)              | (.065)              |                     |                     | (.081)                 | (.064)                 |                        |                        |
| Muslim × married, previous widow | .026                | .014                | -.026               | .044                | -.012                  | .070**                 | .030                   | .007                   |
|                  | (.027)              | (.047)              | (.075)              | (.046)              | (.022)                 | (.029)                 | (.048)                 | (.049)                 |
| Covariates          | Fixed effects | Observations | \( R^2 \) |
|---------------------|---------------|--------------|-----------|
|                      |               |              | .102      |
|                      |               |              | .155      |
|                      |               |              | .184      |
|                      |               |              | .147      |
|                      |               |              | .164      |
|                      |               |              | .213      |
|                      |               |              | .240      |
|                      |               |              | .189      |

**Source.** Authors’ calculations using Nigeria Demographic and Health Survey 2008 and 2013.

**Note.** Robust standard errors are clustered at the village level. The mean height for women aged 40 and older is 159.26 cm. Education refers to completed years of schooling. Interactions between the Muslim dummy and all other covariates and fixed effects are included (but not shown). The coefficient for Muslim is the conditional marginal effect for women married once (dy/dmuslim | married once = 1) evaluated at average values of the covariates in the sample (using the Stata margins command); standard errors for Muslim are computed using the Delta method.

* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.
Christians; indeed, the conditional cumulative distribution functions are virtually indistinguishable between the two groups at very low levels. The Muslim advantage emerges beyond the lowest levels. While we cannot dismiss the possibility of selective mortality, we do not see a pattern in the data suggesting that selective mortality explains our results.

What we see in the data is consistent with Muslim widows in Nigeria being better protected by institutions, but as we cannot fully resolve all the issues, we concede that it may not be the only explanation. While selection issues cannot be conclusively dismissed, these checks increase our confidence about our interpretation of the results.

D. Suggestive Corroborative Factors

Relative to other Christian women, widows have lower nutritional status. This is not found for widows among Muslim women. These patterns appear to reflect distinct cultural norms in which widows are treated very differently. Furthermore, the results suggest that those who are poor and most vulnerable to the downside consequences of a husband’s loss are on average far better protected under Muslim sociocultural and socioreligious norms and processes.

The evidence in the DHS on violence perpetrated by in-laws and reported suffered by widows is consistent with these findings. Table 9 shows that the least common form of violence is the request to carry out rituals as a proof of innocence. This is considerably more often experienced by Christian widows (7% and 14% in rural and urban areas, respectively) compared with Muslim widows (1% and 2%). The most frequent is maltreatment. Again, Muslim widows recount less than half the incidence of such brutality (11% and 12% in rural and urban locations, respectively) compared with Christian widows (23% and 27%). Remarkably, all forms of violence are more often

![Figure 6. Body mass index (BMI) by age and religion: subsamples of ethnicities and villages containing both religions. a, Subsample of mixed ethnic groups (Yoruba and Igala). b, Subsample of mixed-religion villages. Data are based on kernel-weighted local polynomial regressions. Source: Nigeria Demographic and Health Survey 2008 and 2013.](image-url)
endured by Christian widows whether in rural or urban areas. A caveat here is that since the majority of widowed Muslims remarry and given that information on violence by in-laws was collected only for current widows, we cannot conclusively say that violence is higher among Christian ever-widowed women.30

As noted earlier, differences also arise with respect to inheritance practices. Christian widows customarily have few rights to inherit a deceased husband’s property. Often, they can retain the right to live in the matrimonial home only if they have a son. Inheritance rights are more established and protected under Islamic law.

We explore what this means in practice using data from the 2008 and 2013 DHS that asked ever-widowed women to indicate who received most of their late husband’s property. Table 10 shows the summary statistics separately for remarried and current widows by religious group and location. Christian ever-widowed women are much more likely to be dispossessed than their Muslim counterparts: 31% (27%) of Muslim and 79% (42%) of Christian remarried (current) widows did not receive any of their late husband’s assets or valuables in rural areas. Another marked difference is that while the husband’s family is the most likely recipient among Christian women (54% for remarried women and 26% for currently widowed women), the spouse’s children are the most common recipient for Muslim rural women (44% for remarried women and 40% for currently widowed women). For dispossessed Muslim (Christian) women, the bulk of the property is inherited by the husband’s family in

|                | Rural    | Urban   |
|----------------|----------|---------|
|                | Muslim   | Christian | Muslim | Christian |
| Blamed for death | .09 (.04) | .10 (.02) | .00 (.00) | .15 (.03) |
| Physically abused | .07 (.03) | .19 (.03) | .13 (.05) | .20 (.03) |
| Maltreated      | .11 (.04) | .23 (.03) | .12 (.05) | .27 (.03) |
| Her children are maltreated | .07 (.03) | .17 (.03) | .03 (.03) | .20 (.03) |
| Must prove her innocence | .01 (.02) | .07 (.02) | .02 (.02) | .14 (.02) |

Source. Nigeria Demographic and Health Survey 2008 and 2013.
Note. Values are the share of widows who answer yes. Questions were asked only in the Demographic and Health Survey 2013. About 500 current widows answered these questions (rural: 58 Muslims, 212 Christians; urban: 40 Muslims, 192 Christians). Standard errors of the mean are in parentheses.

30 Questions on violence were asked only in 2013 and cover 500 widows.
40% (56%) of cases and by the children in 36% (18%) of cases. The literature supports the view that a widow’s children inheriting is typically a favorable outcome for widows. This outcome is clearly more common for Muslim widows. Within each religious group, remarried widows are more likely to have been dispossessed than current widows, suggesting that inheritance outcomes matter to a woman’s agency and choices. These shares are of a similar magnitude in urban areas.

A few factors will cloud intergroup comparisons. Monogamous couples, more common among Nigerian Christians, and urban couples are more likely to own a house that can be inherited by a surviving spouse. Clearly, wives of polygamous men need to share inheritance with cowives and possibly brothers-in-law and their families. The descriptive statistics shown in table 10 probably reflect differences in characteristics—such as location, ethnicity, and education levels—between the two religion groups. We estimated the probability of being dispossessed using a linear probability model in which the covariates are the ones included in the model presented in table 3, with the exception of log wealth (as it encompasses data on asset ownership). We use the sample of ever-widowed women and estimate a pooled model with a dummy for being Muslim. The results confirm that there are large differences even after controlling for covariates: relative to their Christian counterparts, Muslim ever-widowed women are 19 (11) percentage points less likely to be

TABLE 10

|                     | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Widow respondent    | .11   | .21   | .10   | .16   | .42   | .26   | .41   | .40   |
|                     | (.02) | (.02) | (.03) | (.03) | (.02) | (.03) | (.02) | (.04) |
| Other wife          | .05   | .03   | .01   | .02   | .03   | .04   | .03   | .01   |
|                     | (.01) | (.01) | (.01) | (.01) | (.01) | (.01) | (.01) | (.01) |
| Late husband’s children | .18   | .44   | .10   | .40   | .18   | .40   | .17   | .35   |
|                     | (.02) | (.02) | (.03) | (.04) | (.01) | (.01) | (.01) | (.01) |
| Late husband’s family | .54   | .24   | .56   | .28   | .26   | .18   | .26   | .12   |
|                     | (.03) | (.02) | (.05) | (.04) | (.02) | (.03) | (.02) | (.03) |
| Other               | .04   | .03   | .10   | .04   | .03   | .07   | .02   | .03   |
|                     | (.01) | (.01) | (.03) | (.02) | (.01) | (.02) | (.01) | (.01) |
| No property         | .09   | .05   | .13   | .09   | .07   | .05   | .12   | .09   |
|                     | (.02) | (.01) | (.04) | (.03) | (.01) | (.02) | (.01) | (.02) |
| Widow dispossessed  | .79   | .31   | .73   | .39   | .42   | .27   | .43   | .23   |
|                     | (.02) | (.02) | (.05) | (.04) | (.02) | (.03) | (.02) | (.04) |
| Observations        | 295   | 469   | 93    | 137   | 752   | 197   | 468   | 136   |

Source. Nigeria Demographic and Health Survey 2008 and 2013.
Note. The table records the answers by ever-widowed women to the question, “To whom did most of your late husband’s property go?” as shares. Standard errors of the mean are in parentheses.
VI. Conclusions

The paper has examined the pronounced and significant gap in nutritional status favoring Christian women over Muslim women in Nigeria. Using pooled DHS data for 2008 and 2013, we find that taking into account women’s individual- and household-level characteristics eliminates the gap on average. Indeed, a decomposition analysis shows that the bulk of the disparity—90% in rural and 87% in urban areas—is attributable to differences in women’s underlying attributes rather than to different returns to those attributes associated with religion. Women’s education, household wealth, and demographics are among the most important contributory factors, along with ethnicity in rural Nigeria and state of residence in urban Nigeria. Overall, Muslim women simply live in households and locations with worse endowments. Religion per se plays little or no role once one controls for these other factors. In other words, religion matters only via these characteristics, notably women’s education, household wealth, and demographics.

This is encouraging, as it suggests that development policies that successfully reduce poverty and promote human development can help reduce the nutritional disadvantages of Muslim women relative to Christian women in Nigeria. Consistent with this expectation, the paper documents improvements in nutritional status—measured by BMI and rates of being underweight—for both groups between 2008 and 2013. Furthermore, the results indicate that convergence in that progress disproportionately favored Muslim women. Thus, the nutritional gap significantly narrowed. The latter findings are particularly heartening with respect to being underweight, indicating that progress was concentrated on women at the lower end of the distribution.

Marital status is found to play a vital role in explaining cross-group differences in nutritional status. Remarkably, once covariates are taken into account, the direction of the gap reverses among widows. Widows exhibit a significant disadvantage relative to other women among Christians. In contrast, widows do rather better than other Muslim women, and their fellow remarried widows do no worse.

These findings are robust to various checks, including controlling for village fixed effects and limiting the sample to villages where both groups reside and to ethnic groups that contain adherents of both religions. We conclude that the revealed religious disparities for widows are not simply an artifact of unobservable factors related to ethnic social norms or localized geographic factors. Nor do the results appear to be the consequence of positive selection into current widowhood among ever-widowed Muslim women, whereby the
needier among them remarry. Instead, further checks suggest that those most vulnerable to hardship at a husband’s passing are on average far better protected under Muslim sociocultural and socioreligious norms and processes.

These findings echo a large Nigerian-based literature (largely outside economics) on the ill treatment of widows. The literature also reports corroboration and potential cause in distinct cultural norms in which widows are treated differently across the two religious institutions. We show that Christian widows report a higher incidence of cruelty and violence at the hands of in-laws and consistently inferior inheritance outcomes, including significantly higher rates of dispossession than do Muslim widows. The greater acceptability and ease of remarriage through the practice of polygamy also favors widowed Muslims. The revealed nutritional status differentials among widows may or may not be influenced by such practices. At a minimum, they are undoubtedly a reflection of the same sociocultural norms and processes that attend the shock of a husband’s loss.

Despite the voluminous literature on the indignities and economic consequences of widowhood, our paper is one of the first to show suggestive evidence that such practices have impacts on physical well-being. Worldwide, unmarried individuals are more prone to death and morbidity and, by extension, to poor nutritional status than their married counterparts. Recent research documents the presence of excessive deaths and undernutrition among widows in Africa. In this paper, we have argued that inheritance rules and social norms that more readily accept and encourage remarriage appear to considerably ease the shock of widowhood for Muslim women relative to Christian women in Nigeria. In this specific context, the sociocultural and socioreligious norms and processes that follow widowhood for Muslim women clearly go some way to protect their health and well-being. This suggests that public policy might play an important role in protecting young women who have the great misfortune to experience the shock of widowhood.

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