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Abstract

This paper looks at whether or not there are differences in consumption, health, and education poverty and inequality among Catholics, Protestants, Muslims, and followers of indigenous religions in Malawi. Poverty dominance tests show that Catholics have the lowest levels of consumption and education poverty. Inequality dominance tests indicate that Muslims are more equal in terms of consumption than Catholics, however, Catholics are more health equal than Protestants. Protestants are found to be the largest contributors to national poverty and inequality in the three dimensions of well being. Within religious grouping inequalities (vertical inequalities) are the major driver of national consumption and health inequality. In contrast, most of the national education inequality is due to between religious grouping inequalities (horizontal inequalities).

Keywords: Stochastic dominance; vertical and horizontal inequalities; Malawi.

1 Introduction

The literature on poverty and inequality in Africa has generally looked at the various dimensions of poverty and inequality across areas and overtime. For instance, while focusing on rural and urban areas, Sahn and Stifel (2003) look at inequality in living standards in twenty four African countries. Booysen et al., (2008) compare poverty overtime within and between seven African countries. In Malawi, the few poverty (e.g. Murkhejee and Benson, 2003; Benson et al., 2005) and inequality (e.g. Mussa, 2010) studies have exclusively focused on a geographic disaggregation of well being indicators. Poverty and inequality studies focusing on religion at both the continental and country levels are few and far between. This dearth in literature provides the main motivation for

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this paper. In Malawi, like in many African countries, religious groups and location do not necessarily coincide. There are members of different religious groups spread across the country as such disaggregation by religion complements the geographically disaggregated studies.

Differences in poverty and inequality along religions can be a potential threat to peace, stability, and the sustainability of development of any country. As Østby (2008) shows, high inequality may be bad not just for the poverty reducing impact of economic growth but also for the growth rate itself in that it may heighten risks of conflict or may require more redistributive government spending. In the same vein, Bourguignon (2004 p.14) argues that 'the dominant view today is that inequality is not a final outcome of growth but plays a central role in determining the rate and pattern of growth.'

The analysis of poverty and inequality tends to be based on income or consumption expenditure as a measure of well being. This one dimensional look at poverty and inequality has been criticized by Sen (1985, 1987), who has argued that poverty and inequality should be viewed multidimensionally. He argues that the measurement of poverty should go beyond income or consumption and look at other dimensions of well being such as health, education, empowerment, freedom of association among others. Income and consumption expenditure are instrumentally important as a means of achieving the other dimensions of well being, but the other dimensions of well being are in and of themselves intrinsically significant. Thus, these dimensions are equally important and deserve recognition and measurement in their own right (Sahn and Younger, 2006).

The paper therefore not only focuses on monetary dimensions but also on two non-monetary dimensions of well being namely; health and education. While focusing on four religions in Malawi, and recognizing the multidimensional nature of both poverty and inequality, the paper has three objectives. First, using poverty and inequality stochastic dominance tests, the paper sets outs to conduct a robust ranking of Catholics, Protestants, Muslims, and indigenous religions. Second, the paper examines how much of the measured poverty and inequality can be attributed to the four religious groupings. Finally, the paper assesses how much of the measured inequality is due to within religious grouping inequalities (vertical inequalities) and how much is as a result of between religious grouping inequalities (horizontal inequalities).

The rest of the paper is organized as follows. Section 2 discusses religion in Malawi. Section 3 dwells on the methods of analysis as well as the data used in the study. Results are the focus of section 4. Finally, section 5 concludes.

2   Religion in Malawi

Christianity is the largest religion in Malawi. Both the 1998 and 2008 population censi indicate that about eighty per cent of the population is Christian (NSO, 2000; 2010). About eighteen per cent of Christians are Catholics, and fifty seven per cent are Protestants. There are quite a number of protestant denominations which include Baptists, Seventh Day Adventists, Anglicans, Church of Central African Presbyterians, Jehovah's Witnesses, and Pentecostals. Christianity in Malawi was introduced by various missionaries who entered the country after 1875. When missionaries entered Malawi they were not only interested in preaching the gospel but also in social-economic development. The church arrived in Malawi before the advent of British colonialism, and as such involved itself in all forms of development including agriculture, education, health, commerce, and communications (Msukwa, 1987).

Before Malawi attained independence in 1964, western education was dominated by Christian missions. The mission schools tended to be sectarian in character often refusing to admit children of other Christian denominations, far less Muslims (Jones, 1982; 1987). The recent past has seen a mushrooming of church affiliated universities, for example, the Catholic University owned by the Catholic Church, and the Malawi Adventist University run by the Seventh Day Adventist Church.

Islam is the second largest religion in Malawi, with Muslims making up about thirteen per cent of the population (NSO, 2000; 2010). Islam was initially brought to Malawi in the 1800s by traders from the Swahili coast of East Africa. They reached Malawi via Lake Malawi and converted tribes along the lakeshore. The Yao tribe forms the majority of Muslims. Islamic education conducted through madrasas started before western style education was introduced in Malawi by Christian missionaries. The 1990s and 2000s have seen an increasing number of Islamic non governmental organizations (NGOs) getting involved in the provision of education, health as well as relief services. Indigenous beliefs and other religions comprise about seven per cent of the population. Unlike Christianity and Islam, indigenous religions play no role in the provision of formal education and health services in Malawi.

3   Methodology

3.1   Standard of Living Indicators

To capture monetary dimensions of well being the paper uses consumption expenditure. The height-for-age z-score (HAZ), and the years of schooling of the most educated household member are used to measure non monetary dimensions of well being. We briefly discuss the indicators.

3.1.1   Consumption Expenditure

The money-metric measurement of poverty and inequality is done using either household income or household consumption expenditure. In keeping with most poverty and inequality studies in Africa we use household consumption expenditure as an indicator of poverty and inequality rather than income. The household consumption expenditure in this study is annualised. To ensure that households are comparable, we generate per capita expenditure for each household. Using per capita expenditure raises two controversial issues. First, by using per capita expenditure we ignore the fact that different individuals have different needs. For example, a young child typically requires less food than an adult. Second, there are economies of scale in consumption for such items as housing, kitchen utensils, and utilities such as electricity. It costs less to house two people than to house two individuals separately. Thus, using per capita expenditure assumes these economies of scale away. We don't interrogate these issues further in this study, but follow an empirical precedent set by Murkhejee and Benson (2003) for Malawi. They use per capita expenditure as a money-metric indicator of household welfare.

3.1.2   Child Malnutrition

We use the height-for-age z-score (HAZ) for children aged between 6 to 60 months. These are pre-school children. We choose the HAZ over other anthropometric measures such as the weight-for-age z-score (WAZ) or weight-for-height z-score (WHZ) because it is a long-term indicator of child nutritional well-being or health. It is unaffected by acute episodes of stress occurring at or around the time of measurement (Sahn and Stifel, 2002). The HAZ measures how a child's height compares to the median of the World Health Organization (WHO) reference sample of healthy children. Until 2006, the WHO recommended the US National Centre for Health Statistics (NCHS) as the standard reference population.

In this study, we follow the WHO's current recommendation of using growth standards based on the Multi-Centre Growth Reference Study (MGRS). The z-scores standardize a child's height by age and gender, and are given as

$$z - \text{score} = \frac{x_j - x_{\text{median}}}{\sigma_x} \tag{1}$$

Where; x_j is height for child j , x_{median} is the median height for a healthy and well-nourished child from a reference population of the same age and gender, and σ_x is the standard deviation from the mean of the reference population. The z-scores follow the standard normal distribution, implying that a child who is below -2 z-scores has a 2.3% probability of being of normal height. Conventionally, children whose HAZ is below -2 are considered malnourished or stunted (WHO, 1983).

The measures of poverty and inequality used in the study are defined for nonnegative numbers only, and since z-scores can be negative we transform the z-scores into percentiles using the cumulative density function of the standard normal distribution. For instance, a z-score of +2 in percentile terms is 97.7%, and a z-score of -2 in percentile terms is 2.3%. This transformation is monotonic meaning that a child's ranking is maintained after the transformation.

3.1.3 Years of Schooling

In terms of education, we use the years of schooling of the most educated household member as an indicator of a household's education. This is motivated by the fact you would expect in a household where one person has some years of schooling to be relatively well off as compared to another household where everyone is illiterate. As argued by Basu and Foster (1998), there are positive externality effects - some kind of public good - to having a household member who is literate. They make a distinction between a proximate illiterate person and an isolated illiterate person. A proximate illiterate person stays in a household with at least one literate member, who is like a public good. The literate member of the household may help other members of the household who are not literate to for example read written brochures on modern farming techniques and better health care among other things. An isolated illiterate person on the other hand is defined as a person who lives in a household with no literate members. The person therefore has no access to the benefits offered by a literate household member. The extent of the spillover benefits would arguably depend on the years of schooling of the most educated household member i.e. the maximum number of years of schooling in a household.

3.2 Measures of Poverty

In keeping with most of the literature on poverty, we use a class of decomposable poverty measures proposed by Foster et al., (1984). Although there are other measures of poverty (e.g. the Sen index and the Watts index) which are distribution sensitive; the Foster-Greer-Thorbecke (FGT) measures have one extremely attractive property of being decomposable into sub groups. This allows us to look at the contribution of each religion to aggregate poverty. The FGT measures are given by

$$P(z, \alpha) = \frac{1}{N} \sum_{i=1}^{N} \left(\frac{z - y_i}{z} \right)^{\alpha} I(y_i < z) \tag{2}$$

Where; y_i is a living standard indicator (i.e. per capita consumption expenditure, transformed HAZ, and years of schooling) of household or individual i drawn from a sample of size N, z is a poverty line, α is a measure of poverty aversion, and $I(\cdot)$ is an indicator function equal to one if the condition $y_i < z$ holds, and zero otherwise. For $\alpha = 0$, we have the consumption, health, and education poverty headcount indices respectively. This gives the percentage of the population who are consumption, health, and education poor. For example, in the case of health this gives the percentage of children who are stunted or malnourished. When $\alpha = 1$, respectively we have the consumption, health, and education poverty gap indices. For $\alpha = 2$, we have the consumption, health, and education poverty severity indices respectively.

Equation 2 gives poverty measures which are normalized by a poverty line. This normalization renders the poverty measures unitless. Since the HAZ is already unitless (i.e. it is a standardized variable), we do not normalize the health poverty measures. Besides, the absolute gap $z - y_i$ has a meaningful interpretation in that it measures the number of standard deviations that a child's HAZ falls below the poverty line (Sahn and Younger, 2006). In the case of per capita consumption expenditure, we use 16165 Malawi Kwacha (US$145.50) per year as our poverty line. This poverty line was defined by the National Statistical Office of Malawi (NSO) for 2004/2005. With respect to our health indicator we use 2.3% as our health poverty line, implying that a child is considered to be suffering from health poverty if his/her transformed HAZ is below 2.3%. This poverty line corresponds to a HAZ of -2, and as per convention a child with HAZ of below -2 is considered malnourished or stunted. In the case of the education indicator, we use 12 years of schooling as our education poverty line. A household is thus defined as education poor if the maximum number of years of schooling in the household is less than 12. This poverty line corresponds to having a senior secondary school education in Malawi.

3.3 Measures of Inequality

In addition to measuring poverty in the three dimensions, we also measure economic, health, and education inequalities. There are two approaches to measuring inequality in non income or consumption dimensions such as health and education where the dimensions are looked at separately. The first, the gradient approach, makes comparisons in health or education outcomes across populations with different social economic characteristics (see for example Filmer and Pritchett (2001) and Wagstaff et al. (1991) for applications of this approach). The second, the univariate approach, focuses on the dispersion of the health or education outcome without regard to how they are correlated with social economic characteristics (see for example Sahn and Stifel (2003) and Sahn and Younger (2006) for applications of this approach). We use the univariate approach in this paper for two reasons. First, it better handles inequality in multiple dimensions in the sense that unlike the gradient approach it does not tie a health or education outcome to a social economic characteristic say income. Second, conventionally consumption inequality is measured by using the dispersion of consumption, and thus the univariate approach ensures health and education inequality measures which are comparable to consumption inequality.

Owing to their subgroup decomposability property, we use the generalized entropy class of inequality indices, $GE(\theta)$ to measure inequality. The generalized entropy class of inequality indices are defined as follows (Duclos and Araar, 2006);

$$
GE(\theta) = \begin{cases} \frac{\theta}{\theta(\theta-1)} \left[\frac{1}{n} \sum_{i=1}^{n} \left(\frac{y_i}{\mu} \right)^{\theta} - 1 \right], & \text{if } \theta \neq 1, 0 \\ \frac{1}{n} \sum_{i=1}^{n} \log \left(\frac{\mu}{y_i} \right), & \text{if } \theta = 0 \\ \frac{1}{n} \sum_{i=1}^{n} \frac{y_i}{\bar{y}} \log \left(\frac{y_i}{\mu} \right), & \text{if } \theta = 1 \end{cases} \tag{3}
$$

Where; μ is the mean of a living standard indicator y_i, and n is the number of households or individuals. The values of GE vary between 0 and 8, with zero representing an equal distribution and higher values representing a higher level of inequality. The parameter θ represents the weight given to distances between y_i at different parts of the y_i distribution, and can take any real value. For lower values of θ, GE is more sensitive to changes in the lower tail of the distribution of the welfare indicator, and for higher values GE is more sensitive to changes that affect the upper tail. If $\theta = 0$, $GE(\theta = 0)$ gives the Theil's L inequality index also known as the mean log deviation measure (MLD); if $\theta = 1$, $GE(\theta = 1)$ gives the Theil's T inequality index.

3.4 Stochastic Dominance Tests

In order to check whether or not the observed differences in levels of poverty and inequality among religions are robust to choice of poverty line, poverty measure, and inequality measure, we conduct stochastic dominance tests. Poverty and inequality dominance tests allow us to check whether two distributions can be ranked conclusively in terms of poverty and inequality respectively. We discuss how the rankings are estimated and then how these orderings are tested for statistical significance.

Consider two distributions A and B of a living standard indicator with respectively cumulative density functions (CDFs), F_A and F_B with support in the nonnegative number line. Let

$$D_A^1(y) = F_A(y) = \int_0^y dF(x) \tag{4}$$

and

$$D_A^s(y) = \int_0^y D_A^{s-1}(x)\, dx \tag{5}$$

for any integer $s \geq 2$, and let $D_B^1(y)$ and $D_B^s(y)$ be similarly defined. $D^s(y)$ for any order s can be rewritten as (Davidson and Duclos, 2000)

$$D^s(y) = \frac{1}{(s-1)!} \int_0^y (y-x)^{s-1}\, dF(x) \tag{6}$$

In terms of poverty, distribution B is said to (strictly) dominate distribution A stochastically at order s if $D_B^s(y) \leq (<) D_A^s(y)$ for all $y \in [0, z_{\max}]$, where, $z_{\max}$ is the maximum acceptable poverty line for each living standard indicator. Saying that distribution B first order stochastically dominates distribution A up to $z_{\max}$ is the same as saying that the headcount index is always (weakly) greater in A than in B, for any poverty line less than z. For any poverty line not exceeding z , a similar equivalence holds between second order stochastic dominance and the poverty gap index on the one hand, and third order stochastic dominance and the poverty severity index on the other.

If we have a random sample of N independent observations of the living standard indicator y_i, from a population, then an estimator of $D^s(y)$ (equation 6) is given as

$$\hat{D}^s(y) = \frac{1}{(s-1)!} \int_0^y (y-x)^{s-1} \, d\hat{F}(x) \tag{7}$$

$$= \frac{1}{(s-1)!} \sum_{i=1}^N (y-x)^{s-1} I(x \le y)$$

where; $\hat{F}(x)$ is the empirical CDF of the sample, and $I(\cdot)$ is an indicator function as explained earlier. Since we use this estimator on two independent samples of living standard indicators from two groups, the estimator of the variance between two groups (distributions) is given as

$$Var\left(\hat{D}_A^s(y) - \hat{D}_B^s(y)\right) = Var\left(\hat{D}_A^s(y)\right) + Var\left(\hat{D}_B^s(y)\right) \tag{8}$$

Simple t-statistics are used to test the null hypothesis of nondominance, against the alternative of dominance i.e. $H_0 : \hat{D}_A^s(y) - \hat{D}_B^s(y) = 0$ against $H_1 : \hat{D}_A^s(y) - \hat{D}_B^s(y) > 0$. The tests are done for a series of test points up to an arbitrarily chosen reasonable maximum poverty line. Dominance of order s is declared if the null hypothesis is rejected for each test point, and there is no reversal in the signs of all the t-statistics. We follow the convention of testing up to $s = 3$, after which no dominance is declared (see e.g. Sahn and Stifel, 2000; Sahn and Stifel, 2002). Our discussion of poverty dominance is based on CDFs which are not normalized by poverty lines, as indicated earlier, only health poverty indices are not normalized by the poverty line, and to be consistent, we normalize the CDFs for consumption expenditure and years of schooling by their respective poverty lines. The stochastic dominance test conditions remain unchanged if the poverty lines are common (Davidson and Duclos, 2000).

When distributions A and B have different means, given as μ_A and μ_B , inequality dominance can be tested by comparing the mean-normalized CDFs $D_A^s(\mu_A y)$ and $D_B^s(\mu_B y)$. Distribution B is said to (strictly) dominate distribution A in inequality at order s if $D_B^s(\mu_B y) \le (<) D_A^s(\mu_A y)$ for all $y \in [0, y_{\max}]$. $y_{\max}$ is a critical common proportion of the respective means up to which inequality dominance is met at a given order s for each living standard indicator. The null of no inequality dominance is tested in a similar way to that for poverty nondominance discussed earlier (Davidson and Duclos, 2000).

3.5   Sub group Decomposition of Poverty

In addition to measuring poverty levels as well as conducting poverty dominance tests, the levels of consumption, health, and education poverty are decomposed to see the contribution of each religion to poverty. As mentioned earlier, we are using the FGT measures owing to their decomposability property. If we let the population be divided into K mutually exclusive population sub groups, the sub group decomposition of the FGT indices $P(z, \alpha)$ is given as;

$$P(z, \alpha) = \sum_{k=1}^{K} \phi(k) P(k, z, \alpha) \tag{9}$$

Where; $P(k, z, \alpha)$ is the FGT poverty index of subgroup k, and $\phi(k)$ is the share of the population found in sub group k.

3.6   Sub group Decomposition of Inequality

Besides looking at consumption, health, and education inequalities, we go further and decompose the same into within and between religion inequalities. The decompositions enable us to assess how much of the inequality in the monetary and non-monetary dimensions of welfare can be attributed to differences among the religions i.e. horizontal inequality, and how much of the inequality is due to differences within each religion i.e. vertical inequality. Assuming the population can be divided into K mutually exclusive population sub groups, $k = 1...K$, the generalized entropy class of indices (equation 3) can then be decomposed as follows (Duclos and Araar, 2006);

$$GE(\theta) = \sum_{k=1}^{K} \varphi(k) \phi(k) GE(k, \theta) + \overline{GE(\theta)} \tag{10}$$

Where; $\phi(k)$ is the population share of group k, $\varphi(k) = \frac{\mu_k}{\mu}$ is the share of the mean of the welfare indicator of group k, and $GE(k, \theta)$ is inequality within group k, as given in equation 3 for the total population. The terms $GE(k, \theta > 0)$ are weighted by the product of population share of each group and the share of the mean of the welfare indicator of each group in the total mean. The terms $GE(k, \theta = 0)$ are strictly population-weighted. The first term in equation 10 therefore represents the weighted sum of the within-group inequalities. $\overline{GE(\theta)}$ captures total population inequality when each household or individual in group k is given the mean value of the welfare indicator μ_k of

its or his subgroup, i.e. when within sub group inequality has been eliminated. The last term in equation 10 thus measures the contribution of between-group inequality to total inequality. When $\varphi(k) = 1$ and $\overline{GE(\theta)} = 0$, equations 10 gives the contribution of each group to the generalized entropy class of indices (equation 3).

3.7 Data

The data for this analysis come from the Second Malawi Integrated Household Survey (IHS2). This is a nationally representative sample survey designed to provide information on the various aspects of household welfare in Malawi. The survey was conducted by the National Statistical Office from March 2004 to April 2005. The survey collected information from a nationally representative sample of 11280 households. It collected information on among other things; household consumption expenditure, education levels of household members, the religion of household members, and anthropometrics for children aged between 6 to 60 months. In this paper, we use the religion of the household head as the household's religion. We focus on four religious groups namely; Catholics, Protestants, Muslims, and indigenous groups. The Protestant group comprises all non Catholic Christian groups. The indigenous group is made up of African indigenous religions, and non believers. Out of the total sample of 11280 households, about 18 per cent are Catholic, 57 per cent are Protestant, 15 per cent are Muslim, and members of indigenous religions make about 10 per cent of the sample. These figures are consistent with those from the population censi discussed earlier.

4   Results and Discussion

Before we talk about the poverty and inequality results we first take a look at the profile of each religion with respect to consumption, health, and education. The results are displayed in Table 1. The results indicate that about 18 per cent of Catholics and Protestants belong to the poorest quintile, while 26 per cent of Muslims belong to the poorest quintile. Using the Pearson's test of independence, we reject the null that there is no relationship between religion and consumption. Muslims have the lowest percentage of children who are either moderately or severely stunted.

<div align="center">TABLE 1 ABOUT HERE</div>

At 52 per cent and 29 per cent, indigenous religions register the highest percentage of children who are moderately and severely stunted respectively. The Pearson's test

suggests that there is a relationship between religion and stunting. The majority of Muslims and members of indigenous religions, 68 per cent and 72 per cent respectively, have less than five years of schooling as compared to 53 per cent of Catholics, and 54 per cent of Protestants.

4.1   Poverty and Poverty Dominance

Levels of consumption, health, and education poverty as measured by the poverty head-count, poverty gap, and poverty severity indices are reported in Table 2. The table also displays rankings of the four religions from the least poor to the most poor. The results show that the ranking of the religious groups depends on the welfare indicator used. The results also show that the levels of the three poverty indices for education are higher than those for consumption and health.

When consumption is used we find that Catholics have the lowest (rank 1) levels of poverty as measured by the three indices. On the other hand, Muslims are the poorest in terms of consumption poverty. The ranking of the religions is reversed when one looks at health poverty, with Muslims registering the lowest levels of health poverty for the three poverty indices. Looking at education, the ranking of the religions is sensitive to the poverty index used. For instance, Protestants have the lowest percentage (headcount) of people who are poor, but they are ranked second with respect to the poverty gap and the poverty severity indices.

<div align="center">TABLE 2 ABOUT HERE</div>

The above discussion suggests that the ranking of the religions depends on the well being indicator and poverty index used. In addition, the preceding ranking of the religions is specific to the poverty lines chosen, and one can have rank reversals with a different set of poverty lines. In view of this, is it possible to come up with a ranking of the religions which is robust to choice of both poverty index and poverty line? Stochastic poverty dominance test results in Table 3 help us answer this question. As mentioned earlier, the tests are done up to an arbitrarily chosen reasonable maximum poverty line. We use MK25000, 15.9% (or HAZ= -1) and 15 years of schooling, as maximum poverty lines for consumption, health, and education respectively. As a robustness check, we experimented with other maximum poverty lines but this did not significantly affect our conclusions.

<div align="center">TABLE 3 ABOUT HERE</div>

The number of dominant relationships varies depending on the living standard indicator employed. There are 2 dominant relationships for consumption poverty, 3 dominant relationships for health poverty, and 6 dominant relationships for education poverty. These differences among the indicators reinforce the need go beyond consumption or income in the analysis of poverty. In terms of consumption, Catholics dominate Muslims and indigenous religions at order 2, and there is no dominant relationship between Catholics and Protestants. This means we can conclusively say that Catholics have lower levels of consumption poverty compared to Muslims and indigenous religions. Further to that, the test results imply that the earlier finding that Catholics have lower levels of consumption poverty than Protestants does not hold for all possible poverty lines. No dominant relationship is declared between Protestants and Muslims, and Protestants and indigenous religions. This entails that we cannot come up with a robust ranking of the three religious groups, and that the foregoing result which showed a clear ordering of the three religions only holds for the poverty line used.

Looking at health, a different picture emerges; we fail to reject the null of poverty non-dominance between Catholics and Protestants, and that between Catholics and Muslims. Furthermore, these three religious groups dominate indigenous religions at order 2. Interestingly, when we look at education poverty, a clear ranking of the four religious groups emerges; with Catholics dominating Protestants, and Protestants dominating Muslims, and Muslims dominating people of indigenous religions.

4.2 Inequality and Inequality Dominance

Table 4 reports the Theil L and Theil T inequality measures for consumption, health, and education. The table also contains rankings of the four religions from the most equal to the least equal. The Theil L and Theil T for consumption inequality are the lowest (rank 1) for indigenous religions; this suggests that indigenous religions are more equal in terms of consumption. For both measures of inequality, Catholics come second; however, the ranking of Protestants and Muslims depends on the inequality measure used.

TABLE 4 ABOUT HERE

When one looks at health, indigenous religions which are the most consumption equal are found to be the most health unequal of the four groups. When one attaches more weight to the upper tail of the health distribution by using the Theil T, Muslims are the most health equal (rank 1). The Theil L and Theil T education inequality measures similar to those for consumption inequality show that indigenous religions are the most education

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equal of the four religious groups

The inequality results seem to be sensitive to the inequality measure one chooses (Theil L vs. Theil T), and this leads to the question whether or not one can come up with an ordering of the religions which is not sensitive to an inequality measure used? We answer this question by using inequality dominance test results in Table 5. As indicated earlier, the inequality dominance tests are based on an arbitrarily chosen critical common proportion of the respective means up to which inequality dominance is met at a given order. The results are based on a critical common proportion of 0.5 for the three indicators of well being. A sensitivity analysis of this choice is done with common proportions ranging from 0.25 to 1.75. Our conclusions remain unchanged.

Just like the poverty dominance tests, the number of dominant relationships varies depending on the living standard indicator employed. There are 3 dominant pairs for consumption, 3 for health, and 2 for education. In terms of consumption inequality, the dominance results indicate that Muslims and members of indigenous religious dominate Catholics at order 2 but no dominant relationship exists between Muslims and members of indigenous religious. This finding implies that Muslims and indigenous religions are more equal with respect to consumption for all inequality measures one can use. A comparison between the poverty and inequality dominance test results with respect to consumption shows some differences. For instance, poverty dominance tests show that Catholics have lower levels of consumption poverty compared to Muslims and members of indigenous religions, while an opposite relationship holds in terms of consumption inequality. This is interesting as it suggests that even though Catholics have lower levels of consumption poverty, the variance of consumption among Muslims and members of indigenous religions is lower.

The inequality dominance tests with respect to health show a clear ordering of three religions; Catholics dominate Protestants, and Protestants dominate indigenous religions. We however fail to reject the null of nondominance between Muslims and any one of the three religious groups. This implies that that in terms of health inequality, Muslims are not significantly better or worse than members of the other three religions.

TABLE 5 ABOUT HERE

Looking at education inequality, the tests show that Protestants and Muslims dominate indigenous religions, but there is no dominant relationship between Catholics and the other three religions.

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4.3 Poverty and Inequality Decomposition

In this section, we dwell on the contribution of each one of the four religions to the observed national poverty and inequality levels. We also discuss the contribution of between religion (horizontal inequalities) and within religion (vertical inequalities) inequalities to national inequality. Table 6 reports results of the sub group decomposition of consumption, health, and education poverty. Owing to their largest population share, Protestants are the largest contributor to national poverty, with contributions ranging from 52 per cent to 55 per cent for the three dimensions of well being and the three indices.

TABLE 6 ABOUT HERE

For all the three welfare indicators and the three indices, about 10 to 13 per cent of poverty in Malawi comes from indigenous religions. This means that indigenous religions are the smallest contributor to national consumption, health, and education poverty. Catholics and Muslims come second and third respectively.

TABLE 7 ABOUT HERE

In Table 7 we present results of the sub group decomposition of inequality. Similar to the poverty results, most of the consumption, health, and education inequality can be attributed to Protestants, with Catholics and Muslims coming second and third respectively. Indigenous religions are the smallest contributor to national consumption, health, and education inequality.

TABLE 8 ABOUT HERE

Results presented in Table 8 show that within religion inequalities (vertical inequalities) as opposed to between religion inequalities (horizontal inequalities) are the major driver of consumption and health inequality in Malawi. The contribution of vertical inequalities is about 99 per cent. Interestingly, most of the national education inequality is due to between religious grouping inequalities (horizontal inequalities). The contribution of horizontal inequalities is 65 per cent for the Theil L and 58 per cent for the Theil T. Policy interventions such as affirmative action which deliberately aim to close gaps in enrolment and attainment of education among the four religious groups would go a long way in reducing education inequality.

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4.4 Why the Observed Differences?

This paper is essentially a descriptive exercise as it does not look at the factors behind the observed differences in poverty and inequality across the four religious groups. A more rigorous and thorough analysis of the reasons behind the observed differences is left for future research; however we offer some speculative explanations.

There are two issues which might explain the differences. The first is that inter-religious differences in poverty and inequality might arise from differences in characteristics or attributes considered to be poverty and inequality reducing. Call this an 'endowment effect'. As mentioned earlier, historically, in Malawi access to education was along religious lines. This denominationalism in access to education meant that some children could not attend schools belonging to a different denomination. Before Malawi attained independence, various Christian missions dominated the education system. All western education was mission education until 1926. It was the practice of some mission schools to educate only pupils of their own denomination, thus excluding professing Muslims. Even where Muslims were admitted, parents feared, with some justification, that they would lose their children to Christianity and discouraged them from attending (Jones, 1982; 1987). Mumisa (2002) notes that the training of Muslim youth conducted in Islamic schools (madrasas) did not produce a literate population and so Muslims were relegated to menial jobs with little influence in the Malawian society.

Although post independence governments in Malawi have abolished this discrimination, its legacy is still evident with some religious groups lagging behind. Suspicions of western secular education still remain today among some religious quarters including Muslims, especially in rural areas, and this means that they continue to lag behind in terms of education attributes. Just as there are social networks along ethnic lines, one cannot rule out the possibility of social networks formed along religious lines. Those belonging to a religious group with strong social networks may find it easier to find jobs and access social services, and this endowment can put them at an advantage which in turn may have an effect on their well being.

Even if the four religious groups had the same endowment of attributes, differences in poverty and inequality could be due to differences in the content of religious belief governing such things as norms and behavior. That is, religious belief may be a cause of poverty and inequality. Call this the 'belief effect'. The content of religious belief may vary on issues such as; health, education, work ethics, honesty, and thrift. Religious beliefs may have different effects on health, through their teachings on such activities as drugs, overeating, gambling, and alcohol. For example, alcohol, drugs, and gambling are strictly forbidden in Islam, but alcohol is permitted among Catholics. Even more directly,

some religions prohibit seeking medical help when sick, and this may have an adverse effect on the health outcomes of its members, and by implication their productivity as well as income earning potential.

Attitudes towards work, ownership of property, and inequality vary across religions. For instance, Guiso et al. (2003) using the World Values Survey data find that Protestants, Catholics, and Hindus tend to be favorably disposed toward private ownership, while Muslims want significantly less private ownership. They also find that Protestants and Hindus alone accept the trade-off of greater income inequality for more growth while Jews and Muslims are opposed. It is worth noting the possibility of reverse causation in the sense that poverty and inequality may make people more religious.

5 Concluding Comments

Using the Second Malawi Integrated Household Survey (IHS2) data the paper has looked at whether or not there are differences in consumption, health, and education poverty and inequality among Catholics, Protestants, Muslims, and followers of indigenous religions in Malawi. Poverty dominance tests have shown that Catholics have the lowest levels of consumption and education poverty. Inequality dominance tests have indicated that Muslims are more equal in terms of consumption than Catholics, however, Catholics are more health equal than Protestants.

Protestants have been found to be the largest contributors to national poverty and inequality in the three dimensions of well being. It has been shown that most of the national inequality in consumption and health is due to within religious grouping inequalities (vertical inequalities). On the other hand, most of the national education inequality has been found to be due to between religious grouping inequalities (horizontal inequalities).

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Table 1: Share (in percentage) of each religion across per capita consumption quintiles, stunting and years of schooling categories

Quintile	Catholic	Protestant	Muslim	Indigenous
Poorest	18.79	18.66	26.80	19.30
Second	17.87	19.29	22.88	23.65
Third	19.41	20.60	17.32	21.95
Fourth	21.66	20.58	16.62	18.83
Richest	22.27	20.88	16.37	16.27
Total	100	100	100	100
	Pearson chi2 (12) =111.71	P-value = 0.00		

Stunting		Catholic	Protestant	Muslim	Indigenous
Moderate	Yes	42.38	43.85	41.63	52.32
	No	57.62	56.15	58.37	47.68
Total		100	100	100	100
		Pearson chi2 (3) =19.77	P-value = 0.00		
Severe	Yes	20.54	19.81	16.33	29.16
	No	79.46	80.19	83.67	70.84
Total		100	100	100	100
		Pearson chi2 (3) = 38.53	P-value = 0.00		

Years of schooling	Catholic	Protestant	Muslim	Indigenous
0-5	53.12	54.47	68.15	72.69
6-8	19.23	16.91	11.05	12.27
9-12	23.09	22.73	12.88	9.02
12+	4.56	5.88	7.91	6.01
Total	100	100	100	100
	Pearson chi2 (9) = 1400	P-value = 0.00		

Notes: Moderate stunting is defined as height-for-age z-score (HAZ) $\leq$ -2, and severe stunting is defined as height-for-age z-score (HAZ) $\leq$ -3.

Table 2: Consumption, health, and education poverty indices

FGT Index	Malawi	Catholic	Protestant	Muslim	Indigenous
			Consumption		
Poverty Headcount Index	52.4	49.3	50.5	59.9	56.6
	(0.009)	(0.018)	(0.011)	(0.023)	(0.022)
Rank		1	2	4	3
Poverty Gap Index	0.178	0.167	0.169	0.220	0.180
	(0.004)	(0.008)	(0.005)	(0.013)	(0.010)
Rank		1	2	4	3
Poverty Severity Index	0.080	0.073	0.076	0.102	0.078
	(0.003)	(0.004)	(0.003)	(0.008)	(0.005)
Rank		1	2	4	3
			Health		
Poverty Headcount Index	44.1	41.9	43.6	41.8	53.0
	(0.008)	(0.021	(0.010)	(0.022)	(0.024)
Rank		2	3	1	4
Poverty Gap Index	0.008	0.008	0.007	0.007	0.010
	(0.000)	(0.000	(0.000)	(0.000)	(0.001)
Rank		3	1	1	4
Poverty Severity Index	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rank		1	1	1	1
			Education		
Poverty Headcount Index	87.4	87.7	86.1	88.5	91.4
	(0.006)	(0.010)	(0.008)	(0.010)	(0.010)
Rank		2	1	3	4
Poverty Gap Index	0.668	0.632	0.636	0.731	0.786
	(0.007)	(0.013)	(0.009)	(0.014)	(0.015)
Rank		1	2	3	4
Poverty Severity Index	0.617	0.571	0.581	0.693	0.751
	(0.008)	(0.014)	(0.010)	(0.016)	(0.018)
Rank		1	2	3	4

Notes: The poverty headcount index has been multiplied by 100. In parenthesis are standard errors.

Table 3: Dominance tests for consumption, health, and education poverty

	Catholic	Protestant	Muslim	Indigenous
		Consumption		
Catholic	..	ND	2	2
Protestant		..	ND	ND
Muslim			..	ND
Indigenous				..
		Health		
Catholic	..	ND	ND	2
Protestant		..	ND	2
Muslim			..	2
Indigenous				..
		Education		
Catholic	..	3	2	2
Protestant		..	2	2
Muslim			..	1
Indigenous				..

1 means row first order dominates column; 2 row second order dominates column; 3 indicates row third order dominates column. ND indicates no dominance up to order 3.

Table 4: Consumption, health, and education inequality indices

Generalized Entropy Index	Malawi	Catholic	Protestant	Muslim	Indigenous
			Consumption		
Theil L Inequality Index	0.252	0.249	0.263	0.252	0.178
	(0.020)	(0.022)	(0.023)	(0.021)	(0.013)
Rank		2	4	3	1
Theil T Inequality Index	0.307	0.308	0.317	0.318	0.203
	(0.032)	(0.033)	(0.036)	(0.038)	(0.023)
Rank		2	3	4	1
			Health		
Theil L Inequality Index	2.411	2.213	2.336	2.252	3.174
	(0.050)	(0.118)	(0.055)	(0.116)	(0.182)
Rank		1	3	2	4
Theil T Inequality Index	0.966	0.947	0.955	0.870	1.183
	(0.017)	(0.039)	(0.019)	(0.045)	(0.051)
Rank		2	3	1	4
			Education		
Theil L Inequality Index	0.021	0.020	0.023	0.015	0.013
	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
Rank		3	4	2	1
Theil T Inequality Index	0.023	0.021	0.024	0.017	0.013
	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)
Rank		3	4	2	1

Notes: In parenthesis are standard errors.

Table 5: Dominance tests for consumption, health, and education inequality

	Catholic	Protestant	Muslim	Indigenous
		Consumption		
Catholic	..	ND	-2	-2
Protestant		..	ND	-3
Muslim			..	ND
Indigenous				..
		Health		
Catholic	..	3	ND	3
Protestant		..	ND	2
Muslim			..	ND
Indigenous				..
		Education		
Catholic	..	ND	ND	ND
Protestant		..	ND	2
Muslim			..	2
Indigenous				..

1 means row first order dominates column; 2 row second order dominates column; 3 indicates row third order dominates column. ND indicates no dominance up to order 3. (-) indicates column dominates row.

Table 6: Sub group decomposition (expressed in percentages) of consumption, health, and education poverty indices

FGT Index	Catholic	Protestant	Muslim	Indigenous
			Consumption	
Poverty Headcount Index	16.43	53.50	16.05	11.26
	(0.009)	(0.012)	(0.010)	(0.008)
Poverty Gap Index	16.37	52.80	17.38	10.58
	(0.010)	(0.013)	(0.012)	(0.008)
Poverty Severity Index	16.03	52.94	17.99	10.16
	(0.012)	(0.016)	(0.015)	(0.009)
Population Share (%)	17.47	55.57	14.06	10.43
			Health	
Poverty Headcount Index	16.08	55.36	14.28	10.79
	(0.011)	(0.014)	(0.010)	(0.008)
Poverty Gap Index	16.27	55.03	13.73	11.51
	(0.012)	(0.014)	(0.011)	(0.009)
Poverty Severity Index	16.30	54.81	13.47	11.92
	(0.012)	(0.014)	(0.011)	(0.009)
Population Share (%)	16.96	56.11	15.07	8.99
			Education	
Poverty Headcount Index	17.51	54.79	14.22	10.90
	(0.007)	(0.009)	(0.008)	(0.006)
Poverty Gap Index	16.52	52.98	15.37	12.25
	(0.008)	(0.010)	(0.008)	(0.007)
Poverty Severity Index	16.16	52.40	15.79	12.69
	(0.008)	(0.010)	(0.009)	(0.007)
Population Share (%)	17.46	55.59	14.05	10.42

Notes: In parenthesis are standard errors.

Table 7: Sub group decomposition (expressed in percentages) of consumption, health, and education inequality indices

FGT Index	Catholic	Protestant	Muslim	Indigenous
		Consumption		
Theil L Inequality Index	17.28	57.94	14.11	7.35
	(0.011)	(0.014)	(0.010)	(0.007)
Theil T Inequality Index	17.98	59.95	13.09	6.04
	(0.016)	(0.021)	(0.012)	(0.009)
Population Share (%)	17.47	55.57	14.06	10.43
		Health		
Theil L Inequality Index	15.57	54.37	14.07	11.84
	(0.011)	(0.014)	(0.010)	(0.010)
Theil T Inequality Index	16.00	53.72	17.20	9.28
	(0.010)	(0.015)	(0.012)	(0.009)
Population Share (%)	16.96	56.11	15.07	8.99
		Education		
Theil L Inequality Index	19.82	66.35	7.35	3.58
	(0.018)	(0.017)	(0.009)	(0.006)
Theil T Inequality Index	22.83	74.79	5.03	1.88
	(0.019)	(0.018)	(0.009)	(0.006)
Population Share (%)	17.46	55.59	14.05	10.42

Notes: In parenthesis are standard errors.

Table 8: Within and between consumption, health, and education inequalities (expressed in percentages)

Generalized Entropy Index	Within	Between
	Consumption	
Theil L Inequality Index	99.04	0.96
Theil T Inequality Index	99.23	0.77
	Health	
Theil L Inequality Index	99.72	0.28
Theil T Inequality Index	99.29	0.71
	Education	
Theil L Inequality Index	35.30	64.70
Theil T Inequality Index	42.02	57.98