

## Modelling Church Collections in Nigeria

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**Abstract:** The study adds to the literature on religion behaviour from economics perspective using a dataset from a typical church's treasury statement in Nigeria. Acknowledging the addictive characteristic of religion, we estimate reduced form equation for church collection. The outcome of the empirical findings from the estimated model depicts the importance of some days in certain months of the year as captured by the dummies like January, April and December. The dummies for these identified months appear significant for church collection of tithes and other loose-plate offerings. The reasons for this are not far-fetched. The exclusion of any of these variables in the model smoothens out the effects on other variables by increasing their levels of significance. Therefore, the sustenance of the Nigerian churches rests essentially on how well they can harness resources from their various church services particularly during the festive periods.

**Key words:** Church collections, time series model, hypothesis testing, after life benefits, emotional relationships, Nigeria

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### INTRODUCTION

The word religion has been defined by different people in different ways depending on the ways in which it is being conceptualized. Geertz (1993) sees religion as a system of symbols which acts to establish powerful, pervasive and long lasting moods and motivations in men by formulating exceptions of a general order of existence and clothing. These conceptions with such an aura of factuality that the moods and motivations seem uniquely realistic. Durkheim (1963) conceives the same word as a collective representation to things. Lannaccone (1998) defines it to mean any shared set of beliefs, activities and institutions based on faith in supernatural forces. Kirkpatrick (2005) perceives religion as psychological attachment, a powerful emotional relationship to things. In recent times, economists' focus is gradually shifting away from market to non-market issues. In spite of this, the importance of economics of religion is still being relegated to the background. Religious behaviour as a subject of scientific research remains largely an unexplored terrain for the reasons that this has to do with apparently widespread assumption that faith in a superior order is based on irrationality until Azzi and Ehrenberg (1975) later claim that religious behaviour was actually motivated by rational choice.

The recent developments in economics of religion have shown the relevance of economists in contributing

to this body of knowledge (Lannaccone, 1998). However, since the seminal research of Azzi and Ehrenberg (1975) in which participation in church activities were modelled based on the notion that the stream of benefits from such participation extends to the afterlife (which they refer to as salvation motive), the implicit belief surrounding after life benefits has subsequently stimulated the interest of the congregants toward contributing willingly to the course of these religious institutions notably among which are churches and mosques.

The situations became more obvious in virtually all worshipping centres coupled with the spiritual belief from the scriptural books like Bible, Quran, Torah, etc., in favour of these findings by Azzi and Ehrenberg (1975). In the light of this, willingly participation in the course of religion is a global trend with varying degrees depending on the level of spiritual convictions attained in respect of individuals in a country, continents and regions as the case may be.

Nigeria, being a multi-ethnic country where both Islam and Christianity have made considerable inroads over the last century with the share of the population to traditional animistic religions falling from a higher percent to a negligible percent today. In specific terms, it is not uncommon, however to observe the proliferation of churches spread all over places with each of the worshipping centres having its core adherents and loyalists. Churches have grown to the extent that households are constantly been converted to places of

worship while new sites are increasingly been developed with modern and sophisticated structures. The concerns, however are the long term sustainability of these churches. The big churches have grown such that they have extended their services to education and health, the maintenance of which is mostly dependent on the revenue raising ability of the church majorly from the congregation. The concerns however are the long term sustainability of these churches.

What is the hope of these churches in the future? Any threat to their continued existence will jeopardize the services being rendered and the presumed associated benefits to the society.

Contribution to churches is seen as an insurance contract to protect oneself against uncertainty about life after death. What is however, apparent in the practical world is that what is common among churches in Nigeria regardless of the variations in their denominational doctrines and tenets, be they Catholic, Protestantism and Pentecostalism has to do with the issue of contribution which they often receive from the congregants mostly in forms of tithes and other loose-plate offerings.

Though, it is clearly stipulated in the scripture for every church member to take 10% of whatever God has given unto him or her to place of worship (this unequivocally symbolizes God's house). This contribution is often displayed either covertly or overly depending on the individual idiosyncrasies. It is so because it is usually assumed to be a contractual agreement between God and the individual involved. Apart from this, other church collections could come in form of loose-plate offerings like contribution during sunday services, Easter periods, Christmas and new year periods as the case may be. The forms, composition and pattern of collections vary from one church to another. While some churches merely attach greater weight to

collection of tithes and pay lesser attentions to other loose-plate offerings. Others may attach importance to the collection of both. These collections of all sorts are commonly found in the Pentecostal churches. Table 1 shows a stylized fact on churches collection of a typical Nigerian Pentecostal church.

It is shown from the Table 1 that during the 2003, general thanksgiving constitutes about 26.2% of the entire church collections: a case study of a typical Pentecostal church in Nigeria. Yearly thanksgiving has about 14.9% special collection claims as much as 12.7% and collection from sunday services having 11.5%. Also from the Table 1, it is discernable that collection from general thanks giving has a dominant percentage of the total collections from 2003 through 2009. This is directly followed by the church Upkeep except for 2007, 2008 and 2009 where yearly thanksgiving surpassingly overtook that of church upkeep.

For the church in consideration under the period of review, we observe that collection from sunday services was the highest in percent but not in value in 2009 with 12.85% with the least being 11.3% in 2004. Special thanks giving also reaches its peak in 2009 both in percent and value. Collection from general thanks giving attains its peak in 2006 in percent but not in value with 33.8% but the value got to the peak in the year 2007, 2008 with N 439,045, respectively. Almsgiving and Monthly Fundraising (M-F) are the least with highest percent of such collection obtained in 2008 which correlates with that of highest value in the same year. Generally, it is evident from Table 1 that the church collection is greatest in the year 2008 with N1, 429, 280. This study however, presents a caveat to show that the degree and level of importance attach to each and every form of collection may not necessarily follow the same pattern with the one in this study for other churches. The reasons for this

**Table 1: Collections of offerings in a typical Nigerian pentecostal church**

Years	Sunday collection Naira (%)	Special thanks giving Naira (%)	General thanks giving Naira (%)	Alms giving Naira (%)	Church upkeep Naira (%)	Yearly thanks giving Naira (%)	M-F Naira (%)	Easter offering Naira (%)	Special collection Naira (%)	Total collection Naira
2003	115270 (11.5%)	27465 (2.7%)	262920 (26.2%)	0 (0%)	205617 (20.5%)	149165 (14.9%)	49375 (4.9%)	66575 (6.6%)	127140 (12.7%)	1003527
2004	114600 (11.3%)	24200 (2.4%)	302520 (29.9%)	0 (0%)	240680 (23.8%)	155000 (15.3%)	0 (0%)	80330 (7.9%)	93665 (9.3%)	1010995
2005	135995 (12.0%)	47585 (4.2%)	284890 (25.1%)	6055 (0.5%)	282105 (24.9%)	179660 (15.8%)	24020 (2.1%)	76900 (6.8%)	97650 (8.6%)	1134860
2006	151525 (11.7%)	43060 (3.3%)	409795 (31.7%)	0 (0%)	298120 (23.1%)	218905 (16.9%)	0 (0%)	102940 (8.0%)	67390 (5.2%)	1291735
2007	163140 (11.7%)	48105 (3.5%)	439045 (33.8%)	14350 (1.0%)	214043 (15.4%)	218595 (15.7%)	12165 (0.9%)	122105 (8.8%)	128990 (9.3%)	1392033
2008	180085 (12.6%)	57400 (4.0%)	439045 (30.7%)	61310 (4.3%)	143360 (10.0%)	336635 (23.6%)	0 (0%)	108805 (7.6%)	102640 (7.2%)	1429280
2009	162705 (12.8%)	86020 (6.8%)	293880 (23.1%)	12300 (1.0%)	185065 (14.5%)	277615 (21.8%)	0 (0%)	122685 (9.6%)	133015 (10.4%)	1273285

Gathered from church treasury record while the percentages were computed

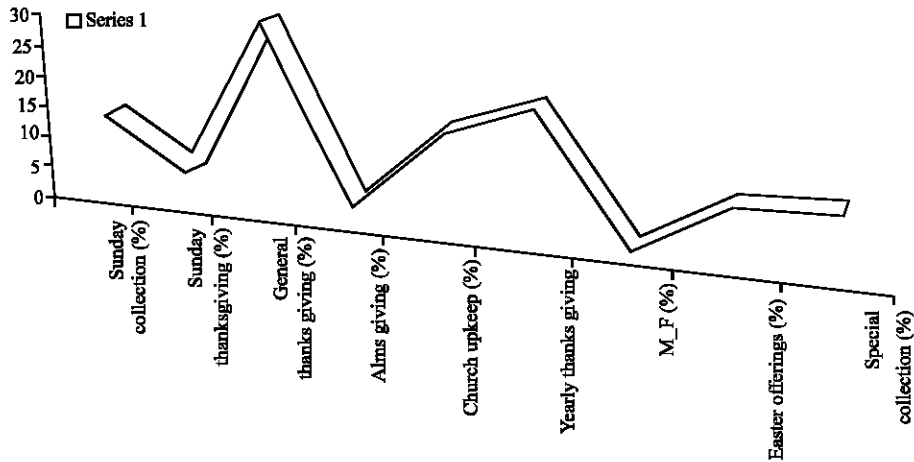


Fig. 1: Average collection of church collection in percentages (a case study of a typical church in Nigeria)

are not far-fetched because this may actually depend on the type, structure and spiritual ideological leanings of the church concerns (Fig. 1).

A plethora of empirical studies has been conducted on economics of religion but quite a large number of these studies were done for advanced countries. The seminal contribution of Azzi and Ehrenberg (1975) was the first major study to examine economics of religious participation. They examined church attendance in the USA, employing an allocation-of-time model. They modelled participation in church activities based on the idea that the stream of benefits from participation extends to the afterlife (the salvation motive) while they also allow that people derive enjoyment from church activities (the consumption motive) and that religious membership can increase the probability of succeeding in business (the social-pressure motive). Their model implies that participation in church activities will increase with age because individuals are investing in the after life.

Subsequent studies can be broadly classified into two groups. The first group focuses on the demand side. Examples of such studies are Ehrenberg (1977), Neumann (1986) and Sawkins *et al.* (1997). All these studies represent follow-on studies on attendance. Within this group are those studies that employed club-theory framework e.g., Wallis (1990) and Iannaccone (1990) who introduced the idea of religious human capital. Some in this same category also modelled churches as firms. Examples are Stark and Bainbridge (1992) and Ekelund *et al.* (1996). Second of address the supply side factors such as interdenominational competition and its application to the determination of financial contributions. Studies like Zaleski and Zech (1992, 1995) fall in this category. Sullivan (1985) modelled simultaneously the determination of financial contributions and church

attendance. What predominates in majority of these studies earlier highlighted is that there are higher levels of female participation in church-related activities. Heineck (2001) also investigates the determinants of church attendance and religious human capital in Germany. The result of their estimated model finds supports for the fact that religious participation is positively correlated with denominational affiliation and to some extent with educational attainment. The economic variables employed by the study however, show little evidence that time spent on religious activities has an opportunity cost.

Freeman (1986) finding shows that blacks that attend church are less likely to smoke, drinks or engage in drug use. Lamaccone (1998) also reviews models of religious participation including those of religious capital which can help to explain why religious participation increases later in life and why as wages increase religious participation will be reflected to a greater extent through contributions rather than through attendance. Using the Consumer Expenditure Survey (CES) and the General Social Survey, Gruber (2004) provides evidence for this hypothesis, finding an implied elasticity of attendance with respect to religious giving of -0.9.

More recent studies have focused on the consequences of religious participation. Gruber (2004) finds that increased religious participation leads to higher educational attainment and income, less dependence on social insurance programs and higher rates of marriage. To establish causality, he instruments an individual's own religious attendance by the local density of other ethnic groups sharing the same denomination. Using micro data, find that religious participation reduces the taste for revolution while based on macro data, Barro and McCleary (2003) argue that there is a causal link between religiosity and economic growth. There is also a large

literature examining the correlation between religious participation and subjective measures of wellbeing and distress (Diener *et al.*, 1999; Pargament, 2002; Smith *et al.*, 2003). Based on European data, Clark and Lelkes (2005) find that religiosity may dampen or exacerbate the happiness effect of a traumatic event depending on the denomination and the type of the event. Religious organizations may be one of many institutions that provide informal insurance. Families can help insure their members against shocks, though evidence suggests that in the U.S. insurance provided by families is far from perfect (Cox, 1987).

In developing countries, there is considerable evidence of households partially sharing income risk (Deaton, 1992; Townsend, 1994). This has spawned a large literature on self-enforcing risk-sharing agreements and other informal insurance schemes such as group lending or mutual credit (Foster and Rosenzweig, 2001; Gertler and Gruber, 2002; Genicot and Ray, 2003). Religion has received relatively little attention in this context with the notable exception of Chen (2004) who shows that individuals particularly affected by the Asian financial crisis were more likely to increase their religious participation and interprets this as religious organizations providing ex-post insurance for individuals hit by negative shocks. From the literature search conducted so far and a brief review on economics of religious studies above what is however, clear is that studies on modelling of church collections is either sparse or none existence to the best of our knowledge thus providing a basis for undertaking this study.

## MATERIALS AND METHODS

The researchers develop a method for forecasting a church's monthly collections for the purpose of establishing the church's yearly budget. Church collections as measured by tithe and the special and loose-plate offerings actually received are dependent upon a number of factors: the principal factors are the number of members in the church congregation; the attendance of members and non members at weekly church services In addition, other factors include the number of sundays within a month (either 4 or 5); the month in which Easter occurs and (3) other seasonal patterns of giving associated with each month of the year. Factors such as number of sundays in a month, the occurrence of Easter sunday and monthly seasonal factors are not directly quantifiable. Thus, the researchers use dummy variables to capture these factors. A simple model for church collections can be specified as:

$$\begin{aligned} \text{COLL}_t = & \alpha_0 + \alpha_1 \text{Time} + \alpha_2 \text{Deaster} + \\ & \alpha_3 \text{Attendance} + \alpha_4 D_{\text{Sunday5},t} + \\ & \alpha_5 D_{\text{Jan},t} + \alpha_6 D_{\text{Feb},t} + \alpha_7 D_{\text{Mar},t} + \\ & \alpha_8 D_{\text{Apr},t} + \alpha_9 D_{\text{May},t} + \alpha_{10} D_{\text{June},t} + \\ & \alpha_{11} D_{\text{July},t} + \alpha_{12} D_{\text{Aug},t} + \alpha_{13} D_{\text{Sep},t} + \\ & \alpha_{14} D_{\text{Oct},t} + \alpha_{15} D_{\text{Dec},t} + \varepsilon_t \end{aligned} \quad (1)$$

Where:

- COLL<sub>t</sub> = Total weekly collections from all sources donated for the general budget
- Time = Time trend, t = 1, ..., n
- Attendance = Members in attendance at weekly church programmes
- D<sub>Easter,t</sub> = Dummy variable for month in which Easter occurs
- D<sub>sunday 5,t</sub> = Dummy variable for month in which 5 sundays occur
- D<sub>month,t</sub> = Monthly dummy variable
- ε<sub>t</sub> = Error term which is expected to follow a normal distribution with zero mean and constant variance

In order to avoid the problem of dummy trap (i.e., a case of perfect collinearity), a dummy variable was dropped in the estimation depending on the nature of the scenario being considered in the model. Essentially, the researchers considered the following testable research hypotheses:

- H<sub>0</sub><sup>a</sup> : β<sub>i</sub> = 0; H<sub>1</sub><sup>a</sup> : β<sub>i</sub> ≠ 0; ∀ i = 0,1,...,14

Under this hypothesis, deaster is omitted from the model. The intention here is to assess the relative significance of omitting this variable in the model as the church is expected to record substantial contributions from members during the Easter festive period captured by Deaster. The estimated Eq. 2 is given:

$$\begin{aligned} \text{COLL}_t = & \beta_0 + \beta_1 \text{Time} + \beta_2 \text{Attendance} + \beta_3 D_{\text{Sunday5},t} + \\ & \beta_4 D_{\text{Jan},t} + \beta_5 D_{\text{Feb},t} + \beta_6 D_{\text{Mar},t} + \\ & \beta_7 D_{\text{Apr},t} + \beta_8 D_{\text{May},t} + \beta_9 D_{\text{June},t} + \beta_{10} D_{\text{July},t} + \\ & \beta_{11} D_{\text{Aug},t} + \beta_{12} D_{\text{Sep},t} + \beta_{13} D_{\text{Oct},t} + \\ & \beta_{14} D_{\text{Dec},t} + \varepsilon_t \end{aligned} \quad (2)$$

- H<sub>0</sub><sup>b</sup> : δ<sub>j</sub> = 0; H<sub>1</sub><sup>b</sup> : δ<sub>j</sub> ≠ 0; ∀ j = 0,1,...,14.

Under this hypothesis, attendance is omitted from the model. As it is expected that the larger the congregation, the larger the contributions (ceteris

paribus), omitting this variable, therefore should affect the outcome of the estimation. The estimated Eq. 3 is given:

$$\begin{aligned}
 COLL_t = & \delta_0 + \delta_1 Time + \delta_2 Deaster + \\
 & \delta_3 D_{Sunday5,t} + \delta_4 D_{Jan,t} + \delta_5 D_{Feb,t} + \\
 & \delta_6 D_{Mar,t} + \delta_7 D_{Apr,t} + \delta_8 D_{May,t} + \\
 & \delta_9 D_{June,t} + \delta_{10} D_{July,t} + \delta_{11} D_{Aug,t} + \\
 & \delta_{12} D_{Sep,t} + \delta_{13} D_{Oct,t} + \delta_{14} D_{Dec,t} + \varepsilon_t
 \end{aligned} \tag{3}$$

- $H_0^c : \phi_k = 0; H_1^c : \phi_k \neq 0; \forall k = 0, 1, \dots, 14$

Under this hypothesis,  $D_{sunday5}$  is omitted from the model. Months with 5 sundays are expected to generate more contributions than those with 4 sundays. Thus, omitting such an important variable in the church's collections model is expected to impact on the outcome of the estimation. The estimated Eq. 4 is given:

- $H_0^d : \eta_m = 0; H_1^d : \eta_m \neq 0; \forall m = 0, 1, \dots, 15$

$$\begin{aligned}
 COLL_t = & \phi_0 + \phi_1 Time + \phi_2 Deaster + \phi_3 D_{Sunday5,t} + \phi_4 D_{Jan,t} + \\
 & \phi_5 D_{Feb,t} + \phi_6 D_{Mar,t} + \phi_7 D_{Apr,t} + \phi_8 D_{May,t} + \\
 & \phi_9 D_{June,t} + \phi_{10} D_{July,t} + \phi_{11} D_{Aug,t} + \phi_{12} D_{Sep,t} + \\
 & \phi_{13} D_{Oct,t} + \phi_{14} D_{Dec,t} + \varepsilon_t
 \end{aligned} \tag{4}$$

Under this hypothesis,  $D_{jan}$  is omitted from the model. One should expect that the contribution in January marked with new year festival, to be very high as it has become the tradition of most churches in Nigeria to organize special church services during this period. If this is true then omitting this period captured by  $D_{jan}$  should affect the estimation results. The estimated equation is given:

$$\begin{aligned}
 COLL_t = & \eta_0 + \eta_1 Time + \eta_2 Deaster + \\
 & \eta_3 Attendance + \eta_4 D_{Sunday5,t} + \\
 & \eta_5 D_{Feb,t} + \eta_6 D_{Mar,t} + \eta_7 D_{Apr,t} + \\
 & \eta_8 D_{May,t} + \eta_9 D_{June,t} + \eta_{10} D_{July,t} + \\
 & \eta_{11} D_{Aug,t} + \eta_{12} D_{Sep,t} + \eta_{13} D_{Oct,t} + \\
 & \eta_{14} D_{Nov,t} + \eta_{15} D_{Dec,t} + \varepsilon_t
 \end{aligned} \tag{5}$$

- $H_0^e : \gamma_n = 0; H_1^e : \gamma_n \neq 0; \forall n = 0, 1, \dots, 15$

Under this hypothesis,  $D_{dec}$  is omitted from the model. One should also expect that the contribution in December

with Christmas and Boxing day festivals to be very high the reason as pointed in the fourth scenario. If this is also true then omitting this variable too should affect the outcome of the estimation. The estimated equation is given as:

$$\begin{aligned}
 COLL_t = & \gamma_0 + \gamma_1 Time + \gamma_2 Deaster + \gamma_3 D_{Sunday5,t} + \\
 & \gamma_4 D_{Jan,t} + \gamma_5 D_{Feb,t} + \gamma_6 D_{Mar,t} + \\
 & \gamma_7 D_{Apr,t} + \gamma_8 D_{May,t} + \gamma_9 D_{June,t} + \gamma_{10} D_{July,t} + \\
 & \gamma_{11} D_{Aug,t} + \gamma_{12} D_{Sep,t} + \gamma_{13} D_{Oct,t} + \\
 & \gamma_{14} D_{Dec,t} + \varepsilon_t
 \end{aligned} \tag{6}$$

- $H_0^f : \alpha_p = 0; H_1^f : \alpha_p \neq 0 \forall p = 0, 1, \dots, 16$

Under this hypothesis, we consider all the explanatory variables. The intention here is to compare results obtained from the estimation of the complete model with the above hypotheses. Equation 1 is estimated in this case. For the estimation of these equations we used weekly data collected from a typical Nigerian Pentecostal church covering the period 2003-2009. The ordinary least square technique was employed to estimate the equations having observed satisfactory results from the diagnostic tests.

## RESULTS AND DISCUSSION

The estimated regression equation for the church collections model is shown in Table 2. The model satisfies all the assumptions of multivariate regression. Durbin-watson test statistics for all the estimated equations suggest that the null hypothesis of no autocorrelation cannot be rejected. Although, the adjusted  $R^2$  is somewhat low, however the F-statistics obtained under the different scenarios considered show that the regressions are statistically significant. The behaviour of the explanatory variables under each scenario is explained in turn:

**Model 1:** This model excludes the Easter period in the estimation. Although, all the explanatory variables with the exception of  $D_{sunday5}$  were of the correct sign, however only  $D_{jan}$ ,  $D_{april}$ ,  $D_{dec}$  and time were statistically significant.  $D_{jan}$  which captures the significance of new year further confirms that contributions received this period cannot be overlooked when building a model for church collections. In other words, church services organized during the new year festive period contributes significantly to the church's collections.  $D_{dec}$  which captures at least the significance of Christmas and boxing day similarly gave

**Table 2: Estimation results**

Variable/Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Attendance	-31.36 (-1.05)	-	-33.43 (-1.12)	-34.33 (-1.14)	-33.87 (-1.13)	-33.70 (-1.12)
Deaster	-	19.57 (2.43)*	2.01 (2.47)*	20894.78 (2.57)*	20819.16 (2.57)*	20.77 (2.56)*
D <sub>sundays5</sub>	-17.16 (-0.48)	-22.77 (-0.63)	-	-28.30 (-0.78)	-25.99 (-0.73)	-24.54 (-0.69)
D <sub>jan</sub>	4.41 (2.64)*	4.49 (2.63)*	4.41 (2.63)*	-	2.69 (1.51)	4.39 (2.63)*
D <sub>feb</sub>	-7.81 (-0.23)	-1.13 (-0.35)	-4.20 (-0.13)	-4.40 (-2.71)*	-1.79 (-2.57)*	-9.24 (-0.27)
D <sub>march</sub>	5.21 (1.08)	-5.48 (-0.14)	-6.14 (-0.15)	-4.37 (-2.66)*	-1.766 (-2.44)*	-6.11 (-0.15)
D <sub>april</sub>	1.766 (2.42)*	1.63 (0.21)	1.952 (0.26)	-4.18 (-2.34)**	-1.57 (-1.60)	1.36 (0.18)
D <sub>may</sub>	-4.32 (-0.12)	-3.87 (-0.12)	-6.25 (-0.18)	-4.34 (-2.68)*	-1.73 (-2.49)*	-3.42 (-0.10)
D <sub>june</sub>	1.40 (0.35)	1.40 (0.36)	1.49 (0.38)	-4.17 (-2.53)*	-1.56 (-2.17)**	1.37 (0.34)
D <sub>july</sub>	3.01 (0.82)	3.58 (1.04)	2.82 (0.78)	-4.00 (-2.44)*	-1.39 (-1.99)**	3.06 (0.83)
D <sub>august</sub>	-1.33 (-0.39)	-1.84 (-0.57)	-1.66 (-0.49)	-4.41 (-2.74)*	-1.81 (-2.63)*	-1.10 (-0.32)
D <sub>sep</sub>	-1.45 (-0.39)	-3.59 (-0.10)	-1.16 (-0.32)	-4.49 (-2.66)*	-1.87 (-2.63)*	-1.68 (-0.45)
D <sub>oct</sub>	1.54 (0.39)	3.99 (0.11)	1.37 (0.35)	-4.12 (-2.56)*	-1.52 (-2.11)**	1.75 (0.44)
D <sub>nov</sub>	-	-	-	-4.38 (-2.68)*	-1.77 (-2.53)*	-
D <sub>dec</sub>	1.70 (2.36)**	1.70 (2.38)**	1.70 (2.35)**	-2.60 (-1.98)**	-	1.70 (2.35)**
Time	41.31 (2.26)**	43.22 (2.35)**	40.412 (2.21)**	41.40 (2.24)**	40.86 (2.23)**	40.43 (2.21)**
Constant	37.87 (1.47)	11.08 (2.97)*	39.13 (1.52)	83.92 (2.60)*	57.48 (2.18)**	40.30 (1.57)
D-W	2.38	2.35	2.43	2.43	2.42	2.42
F-stat	4.52*	4.54*	4.83*	4.50*	4.55*	4.52*
Adjusted R <sup>2</sup>	0.13	0.13	0.14	0.13	0.13	0.13
No. of observations	345	344	344	344	344	344

Figures in parentheses are the calculated t-values. \*1% level of significance; \*\*5% level of significance. It is important to note that the signs of the seasonal dummy variables are dependent upon the choice of the benchmark period. Thus, the coefficients can be either negative or positive

an indication that church's collections are likely to be higher and significant during these festivities. Apparently, Easter period more often than not falls within April and therefore, one should not be surprised why the variable D<sub>april</sub> is significant in the model.

One striking observation, however is that the researchers expected attendance to be statistically significant but the reverse was obtained. This is an indication that the number of members may not be a significant factor but rather the social/income class of the members.

That is large congregation dominated by low income class is likely to generate lower contributions compared with few congregation dominated by high income class. The estimated coefficient on D<sub>sundays5</sub> suggests that having 5 sundays in a month may not really matter for church's collection. Nonetheless, overall results obtained under this scenario reflect some of the traditional expectations about church collections.

**Model 2:** This model reintroduces Deaster, however excludes the attendance variable. Although, all the explanatory variables with the exception of D<sub>sundays5</sub> were of the correct sign. In terms of statistical significance of the explanatory variables, as anticipated, Deaster, D<sub>jan</sub> and D<sub>dec</sub> were found to be statistically significant. Similar reasons as explained in model 1 can be adduced for these results.

**Model 3:** This model excludes D<sub>sundays5</sub> from the overall model. The results obtained reinforce the earlier

observations on D<sub>sundays</sub> and other variables such as Deaster, D<sub>jan</sub> and D<sub>dec</sub> as pointed out in models 1 and 2. As expected Deaster, D<sub>jan</sub> and D<sub>dec</sub> were found to be statistically significant and similar reasons as explained in models 1 and 2 can be adduced for these results.

**Model 4:** This model excludes D<sub>jan</sub> from the overall model. The results obtained were very striking and in fact instructive. With the exception of attendance all the variables were statistically significant and were of the correct sign. This may suggest that D<sub>jan</sub> could be an outlier in the estimation.

This fact can be corroborated by the descriptive analyses carried out where it was observed that the spikes in the diagram result from the huge collections recorded during the festive periods including new year. Therefore, ignoring this irregular behaviour in the trend reduces the sharp variations in the trends and may therefore, smooth out the effects of other explanatory variables. Hence, the recorded improvements in the performance of the model.

**Model 5:** This model excludes D<sub>dec</sub> from the overall model. The results obtained were not different from the findings in Model 4. Therefore, similar conclusions can be adduced.

**Model 6:** This is the overall model comprising all the explanatory variables. As observed in models 1-3, only the variables capturing the festive periods (i.e., D<sub>jan</sub>, Deaster and D<sub>dec</sub>) were found to be statistically significant.

## CONCLUSION

The study adds to the literature on religion behaviour from economics perspective using a dataset from a typical church's treasury statement in Nigeria. Acknowledging the addictive characteristic of religion the researchers estimate reduced-forms equation for church collection. The outcome of the empirical findings from the estimated model depicts the importance of some days in certain months of the year as captured by the dummies like January, April and December.

The dummies for these identified months appear significant for church collection of tithes and other loose-plate offerings. The reasons for this are not far-fetched. The exclusion of any of these variables in the model smoothens out the effects on other variables by increasing their levels of significance.

Therefore, the sustenance of the Nigerian churches rests essentially on how well they can harness resources from their various church services particularly during the festive periods. As churches cannot be bailed out by the government when they are faced with financial crisis despite their involvement in key sectors of the economy namely education, health and services then concerted efforts in terms of collections should be sustained in order to guarantee their continued existence.

Having been able to model church monthly collections, future research efforts should focus on the impact of members' income and leadership traits on churches collections. Through this, one may be able to know if there are other important factors apart from those identified in this study.

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