THE
QUARTERLY JOURNAL
OF ECONOMICS

Vol. 135 2020 Issue 4

GOD INSURES THOSE WHO PAY? FORMAL INSURANCE AND RELIGIOUS OFFERINGS IN GHANA*

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This article provides experimental support for the hypothesis that insurance can be a motive for religious donations. We randomize enrollment of members of

* This project is the result of a collaboration between Central University in Accra, Ghana, and the Institute for Advanced Study in Toulouse, Toulouse School of Economics. We are immensely grateful to Anthony Panin for coordinating the collaboration. We thank our lead field assistants, Bernand Boakye, Davis Adu Larbi, Sylvester Sadekla, Faustina Bechaiyiri, and their teams; and Edward Asiedu for facilitating fieldwork. We thank Brian Dillon, Guido Friebel, Astrid Hopfensitz, Michael Kosfeld, Michael McBride, Josepa Miquel-Florensa, and participants at seminars in Georgetown, Harvard, Paris, Toulouse, and Oxford, at ASREC meetings, the 2018 SIOE conference, and the 2019 WGAPE meeting for their valuable feedback. Support is gratefully acknowledged from the ERC COGNITION Grant Agreement 249429. Emmanuelle Auriol, Eva Raiber, and Paul Seabright acknowledge IAST funding from the French National Research Agency (ANR) under the Investments for the Future (Investissements d'Avenir) program, grant ANR-17-EURE-0010. Eva Raiber also acknowledges funding from the ANR grant ANR-17-EURE-0020. Finally, we thank the editor, coeditor, and four anonymous referees for their suggestions and their comments on early versions of the article. They have helped us greatly improve the paper content and organization. All remaining errors are ours. The views expressed here are solely the responsibility of the authors and do not necessarily reflect those of the institutions they are or have been affiliated with, in particular the OECD and its Member countries.

The Quarterly Journal of Economics (2020), 1799–1848. doi:10.1093/qje/qjaa015.
Advance Access publication on July 6, 2020.

a Pentecostal church in Ghana into a commercial funeral insurance policy. Then church members allocate money between themselves and a set of religious goods in a series of dictator games with significant stakes. Members enrolled in insurance give significantly less money to their own church compared with members who only receive information about the insurance. Enrollment also reduces giving toward other spiritual goods. We set up a model exploring different channels of religiously based insurance. The implications of the model and the results from the dictator games suggest that adherents perceive the church as a source of insurance and that this insurance is derived from beliefs in an interventionist God. Survey results suggest that material insurance from the church community is also important and we hypothesize that these two insurance channels exist in parallel. *JEL* Codes: D14, G22, O12, O17, Z12.

I. Introduction

Do religious believers give money to churches in the hope of receiving insurance against economic shocks? If so, to what extent is this because they expect the church to look after them when shocks occur, and to what extent do they expect God to look after them by making such shocks less likely to happen? Many studies have emphasized the important economic functions that religious institutions fulfill across the world, of which the provision of informal insurance is one that has recently gained attention (Chen 2010; Ager and Ciccone 2016). Such insurance is likely to be particularly important in settings with weak formal institutions and where individuals are exposed to a variety of uninsured risks. In this article, we report a study examining the effect of providing formal market-based insurance on the demand for informal church-based insurance in Accra, Ghana.

We conduct a lab-in-the-field experiment with members of a Pentecostal church in Accra to test whether insurance is one motive behind religious participation. We do not claim it is the only or even the most important motive. We perform our experiment by randomly assigning free enrollment into a formal, commercially available funeral insurance policy and measuring how this affects willingness to contribute money in a dictator game to the church and two other charitable recipients.

The additional recipients—a secular charity and a nationwide prayer event—provide a means of differentiating between two possible mechanisms by which members might expect insurance to work. The first mechanism, consistent with a club good interpretation of church involvement, is one in which the church provides financial support to those who suffer economic hardship provided they have previously given money to the church.

The second mechanism is one where members expect God to intervene to reduce the risk of adverse economic shocks provided the individuals concerned have demonstrated spiritually meritorious actions. Giving money to a secular charity or to a nationwide prayer event might be considered meritorious actions, but they do not involve a contribution to the church.

Urban Ghana is a particularly interesting setting in which to study interactions between religious participation and insurance. First, as we describe below, Pentecostalist churches have a massive presence in Ghana, and many members of the population give very significant shares of their income to their church. This setting allows us to examine the motives for costly participation in church activities that are also present in many other countries in the world. In our model we envisage two broad motives for participation—both the consumption of spiritual activities as such and the purchase of insurance against various shocks, and our survey evidence indicates that both of these motives matter. Second, in our main sample of church members, we find that approximately 15% indicate that they hold any insurance other than the government-run National Health Insurance. Relatively low rates of insurance mean that enrollment in a formal policy is likely to be a meaningful and significant treatment for many of our participants. Overall, our results are likely to be relevant for other settings characterized by low penetration of formal insurance and the importance of religious institutions, including different sub-Saharan African countries but also other parts of the world such as Latin America.

We find that enrollment in the formal insurance policy causes church members to give less money to the church in a dictator game, compared with members who only receive information about the insurance. Interestingly, we find that formal insurance also causes church members to give less to the other recipients who are not directly linked to the church but are associated with church teachings on meritorious actions.

We set up a simple model to illustrate the conditions under which we can interpret these results as evidence for insurance. In the model, a church member derives utility from secular and religious consumption. We first show that if religious consumption does not have an insurance motivation, a reduction in perceived losses (through our enrollment treatment) should increase the amount allocated to religious consumption via an income effect. However, if religious consumption does have an insurance motivation, and if the insurance is perceived as sufficiently effective, the

substitution effect of a reduction in perceived losses will outweigh the income effect and lead to a reduction in the amount allocated to religious consumption. This is what we find in our experiment.

This insurance motive can work either through a reduction in perceived losses from negative shocks because of transfers from other church members or from the church organization, or through a reduction in perceived probabilities of adverse shocks because of belief in a divine response to religious giving.[1] Our experiment finds evidence for the latter mechanism: church members change donations to the church as well as to the nonchurch recipients in a manner that is consistent with interpreting giving as a demand for divine protection. Church members can see their donations to the church as a way to mitigate the risks they face. Formal insurance decreases the need to use donations as a risk-coping mechanism.

We undertook our experiment in two waves, the first in 2015 and the second in 2019. We implemented the second wave to verify the robustness of a heterogeneous treatment effect that can be explained by our model but that we had not expected to encounter in the field and that we had not preregistered. If there are differences in the degree of religiosity, either between individuals or for a given individual over time, our model predicts that the income effect outweighs the substitution effect for sufficiently high values of the religiosity parameter.

This is what we found for a subset of subjects in the first wave who had been involved in what are called "revival weeks," which are particularly intense periods of church-going and fund-raising during which congregations typically give substantially more to the church than normal. The treatment effect was of the opposite sign during revival weeks compared with its sign in normal weeks. This phenomenon was reproduced in a preregistered experiment in our second wave. In a direct replication of the original experiment on participants not in revival weeks, the original effect was also reproduced.[2]

As the process of explaining to subjects the nature of the insurance in which we proposed to enroll them could increase the

1. Strictly speaking, this mechanism is not insurance but a preventive measure to decrease the (subjective) likelihood of an economic shock. We use "insurance mechanism" and "insurance motive" broadly to encompass insurance contracts as well as risk-preventive or risk-mitigating behavior.

2. The second-wave experiment on revival week participants was not strictly speaking a replication because we sought to randomize allocation to revival weeks in a way that had not been done in the first wave.

salience of the insured risk, our control group consisted of subjects to whom we explained the insurance but who were not enrolled. To assess this potential salience effect, we added a treatment in which subjects were not informed about the content of the insurance. In our first wave, the fact of explaining the insurance without enrolling the subjects resulted in a higher level of donations to the church, suggesting a significant salience impact in the opposite direction to our main treatment effect. This finding is interesting because many of the churches' communications put a heavy emphasis on the ever-present risk of death, and it could be argued that the churches are aware of this link and use it to increase overall donations. In the second wave, we did not replicate this finding; this contrasts with our insurance treatment effect, which was replicated.

Although our model is an instance of standard microeconomic analysis applied to the allocation of resources between secular and religious consumption, our empirical study is methodologically innovative in two main ways. First, we have provided an experimental intervention that directly affects the demand for religious insurance by providing an institutional substitute. Second, we sought to distinguish carefully between different channels through which religious insurance might work—notably, through influencing the behavior of other members of the religious community as opposed to influencing the probabilities of adverse events themselves that are believed by subjects to be determined by God.

Our study experimentally links the religious practice of church giving to an insurance motive, and we find evidence that subjects believe that their donations can induce God to intervene causally in the world. A Pentecostal church is a particularly good setting to test this because participation costs and expected outcomes are made explicit, and "giving to God" has a clear doctrinal mandate.

I.A. Link with the Literature

The macroeconomic literature, in the wake of Weber (2002), has long recognized the potential importance of culture, and especially religion, for economic growth. However, most empirical studies in this literature face a challenge in surmounting endogeneity problems, and it is generally hard to rule out the possibility that confounding factors explain both the religiosity of a population and the growth of its economy. For instance

McCleary and Barro (2006a) find in their instrumental variable model that higher GDP per capita causes a reduction in average religiosity. They also find that the relationship between economic development and religiosity depends on the particular dimension of development. For example, education has different effects from those of urbanization (McCleary and Barro 2006b). Thus, even when it is possible to estimate the magnitude of aggregate causal effects, such large-scale studies have difficulty pinpointing the mechanisms involved. Experimental methods are therefore helpful in establishing causality and in identifying the likely mechanisms. Our article aims at understanding a specific economic function of religious organizations: their role as informal insurers.

In examining religious organizations as insurers, our work follows that of Chen (2010), who finds that religious intensity increased with the need for ex post insurance after financial shocks in Indonesia. Ager and Ciccone (2016) find a relationship between higher rainfall risk and religious participation and Bentzen (2019) finds that religiosity increases if an earthquake has recently struck nearby. However, each study is compatible with a number of possible causal mechanisms, which our experiment is designed to elucidate. In particular, although the findings of Chen (2010) suggest an insurance motive for religious participation, they are also compatible with other explanations for religious participation, such as that religion provides comfort in distress after shocks strike. The findings of Ager and Ciccone (2016) and Bentzen (2019) are compatible with interpretations where other characteristics associated with rainfall or earthquake risk are also the proximate cause of religious membership (such as the amount and type of education). Our experiment allows us to allocate insurance randomly to subjects to test the insurance mechanisms more directly.

In other studies, religious participation has also been shown to provide partial insurance against fluctuations in consumption and well-being (Dehejia, DeLeire, and Luttmer 2007). Other evidence from cross-country surveys and historical evidence from the Great Depression demonstrate a degree of substitution between access to social welfare and religious participation (Scheve and Stasavage 2006; Gruber and Hungerman 2007). We add experimental evidence to this literature, causally demonstrating that access to secular insurance can reduce religious involvement. More importantly, the experimental approach allows us to test for the

mechanism at hand and therefore acts as a complement to previous research done with observational data.

Our finding that spiritual insurance is an economically important reaction to risk of those who are not formally insured has important implications for the interpretation of the previously mentioned studies. Indeed, the previous literature on the interplay between religion and insurance is not able to distinguish between those two channels and might overstate the role of religious institutions as a provider of community-based financial insurance and understate the importance of a spiritual or psychological response to risk that is reflected in increased religiosity. This problem of identification is vindicated by some recent studies showing that beliefs in divine intervention in the daily lives of individuals can be an important determinant of real and costly social decisions (see Hadnes and Schumacher 2012; Gershman 2016; Nunn and de la Sierra 2017).[3]

Our experiment contributes to the microinsurance literature by studying in a controlled environment how religious participation might affect demand for formal insurance. In recent years, microinsurance policies have been proposed and tested as poverty alleviation tools with limited success (Giesbert, Steiner, and Bendig 2011; Cole et al. 2013; Karlan et al. 2014; Giesbert and Steiner 2015). Consistently across studies, take-up has been lower than expected and this has been attributed to a variety of factors, including liquidity constraints (Cole et al. 2013), limited attention (Zwane et al. 2011), trust in the insurance mechanism (Karlan et al. 2014), and the existence of informal insurance substitutes (Mobarak and Rosenzweig 2013). Our results suggest that religious institutions, which are an important instance of informal networks in developing countries, already provide global spiritual insurance to their members (although we do not claim that this is the only motive for church participation), and this may partly explain the puzzle of the limited success of specific formal insurance in some contexts. Because our survey results suggest that churches are also important sources of financial assistance to their members, we hypothesize that an informal,

3. Gershman (2016) demonstrates a negative association between trust and the presence of witchcraft beliefs, whereas Hadnes and Schumacher (2012) experimentally find that priming voodoo beliefs increases trust and trustworthiness. Nunn and de la Sierra (2017) document the prevalence of beliefs in protective spells in Eastern Democratic Republic of Congo, arguing that these beliefs helped village residents coordinate a stronger resistance against enemy fighters.

community-based material insurance exists in parallel, further reducing the need for formal insurance.

In the following section, we describe the religious context of our study. In Section III, we present the experimental design. In Section IV, we use a simple model to derive our experimental hypotheses to identify an insurance effect and to distinguish between community-based insurance and spiritual insurance. In Section V, we discuss the experimental results and conclude in Section VI.

II. Context

II.A. Pentecostalism

Pentecostalism represents one of the fastest-growing segments of global Christianity. Approximately one quarter of the world's two billion Christians are members of churches that can be classified as Pentecostal or Charismatic. These are related movements of Protestant Christianity that emphasize the work of a Holy Spirit and claim that spiritual gifts, such as prophecy, divine healing, and speaking in tongues, are expected to be present in the lives of believers (Pew Research Center 2006). Although Pentecostal and Charismatic movements differ in some aspects, these aspects are marginal for our study, and we use the term Pentecostal broadly. This makes sense especially in Ghana and across Africa, where popular speech hardly draws a distinction between the two (Botha 2007; Okyerefo 2011).

The striking growth of this movement has largely taken place over the past three decades (Botha 2007; Thelen 2017). The speed with which Pentecostal congregations have grown is particularly remarkable as most typical definitions of the movement only date their beginnings to the early 1900s. This marked change has been so significant that a number of commentators refer to the Pentecostal explosion as a "new Reformation" (Jenkins 2011; Thelen 2017).[4] Sub-Saharan Africa has been an important center of

4. Comparing the reformation of sixteenth-century Europe with the "new reformation" of Pentecostal-charismatic Christianity, theologian Harvey Cox states that "today, Christianity is living through a reformation that will prove to be even more basic and more sweeping than the one that shook Europe during the sixteenth century. . . That earlier reformation. . . was confined to one small corner of the globe. The current reformation, however, is an earth-circling one. The present reformation is shaking the foundations more dramatically than its sixteenth century predecessor, and its results will be more far-reaching and radical" (Cox 2011).

this change. Estimates from 2015 suggest that almost 40% of the continent's Christians identify as Pentecostal or Charismatic.[5] This reflects the wider shift in the Pentecostal revival from the Global North to the Global South. Although many early Pentecostal churches in sub-Saharan Africa were planted and funded by US missionaries, much of the dramatic growth that has taken place since the 1980s has been fueled by indigenous developments in theology, teaching, and practice. Many scholars argue that preexisting belief systems and economic conditions made sub-Saharan Africa particularly receptive to Pentecostal teachings (see, for instance, Ukah 2005).

Participants in our experiment were recruited from different branches of the Assemblies of God (AoG), one of the oldest and most established Pentecostal denominations. Founded in 1914 in the United States, the denomination now has an international reach that covers approximately 360,000 churches in more than 250 countries (Assemblies of God World Missions 2017). National AoG bodies are largely autonomous, but are united by some shared beliefs and a common history. Taken together, AoG fellowships form the largest Pentecostal denomination.[6] About a third of the worldwide AoG adherents are found in sub-Saharan Africa. This represents approximately 22 million adherents (Assemblies of God World Missions 2017), about 2.5 million of whom are in Ghana.[7] In Ghana they represent just under 8% of the national population, attracting members from all social strata.

Many of these teachings that have taken root and been developed in sub-Saharan churches are shared by Pentecostal believers across the world in the transnational exchange of ideas and resources that characterises Pentecostalism today (Gifford 2004; Kalu 2008). There is, of course, considerable heterogeneity in beliefs and practices within individuals in a given church, across branches within a single denomination, and across denominations of the broader Pentecostal movement. However, the key features of Pentecostal belief and practice, which are important for interpreting our study design, are widely shared. By focusing recruitment from a popular and established denomination, we can draw out insights that should be applicable to this large and growing movement and to other religious practices that share certain features of these beliefs.

5. See Johnson and Zurlo (2007).
6. See www.ag.org.
7. See Johnson and Zurlo (2007).

II.B. The Role of the Church in Pentecostalism

In terms of practice, the church is an essential part of life for Pentecostal adherents. They go to church more regularly than other Christians and perform other religious practices more frequently. For example, compared with the general population, Pentecostals pray and read the Bible more often and more frequently watch or listen to religious programs on television and radio. They are more likely to share their beliefs with others to spread their faith (Pew Research Center 2006).

Members also enjoy nonspiritual benefits from their church. An essential function of Pentecostal churches in Ghana, in particular in urban areas, is to offer a place for social gathering. Online Appendix A, Tables 7 and 8 show descriptive statistics of selected answers from our study questionnaire about the social and financial role of churches. Over half the participants declare that they have a preference for close friends drawn from the church. Online Appendix Table 13 shows that around 40% of our study participants declare that they have found their spouse (or are most likely to find their future spouse if not already married) in church. Some church members even report that they favor other church members as business partners (42% of respondents in our study, in Online Appendix A, Table 8).

More fundamentally, people seem to be attracted to such churches because they feel like part of a broader community that looks after them, whether through other church members, church leaders, or God. When faced with any personal or family problems, 32% would go for help or advice to the church leadership and 26% to someone in the church community (Online Appendix A, Table 7). This is consistent with survey evidence from the Afrobarometer (Afrobarometer 2015. Data for Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Côte d'Ivoire, Egypt, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, and Zimbabwe, from Afrobarometer Data Round 6, 2014/2015, are available at http://www.afrobarometer.org.) showing that across Africa, religious leaders are considered among the most trustworthy members of civil society. They are expected to take responsibility for their members' welfare in the absence of government-led social interventions and urbanization enhances these expectations (McCauley 2013).

Pentecostal adherents are expected to support their church financially. Giving is often multilayered and different ways of transferring money might have different motivations. Tithing, the practice of giving away a tenth of all income, usually takes the form of a nonanonymous monthly payment to the church for which church members receive a receipt. This type of giving is akin to a membership fee to the church community. On the other hand, there is giving for specific purposes such as pledges, which are occasional nonanonymous donations involving large amounts of money, often for investment in church infrastructure. Finally, there are spontaneous offerings, made on a more regular basis, which are generally anonymous and the amounts given unobserved (though during collections in Sunday services the fact of going forward to give may be very visible to a member's friends and family). Opportunities for this form of giving are frequent and contributions are expected beyond the other regular or earmarked forms of giving. This includes, among others, seed offerings (the practice of giving money in anticipation of a future material benefit) or thanksgivings in gratitude for already materialized benefits (Maxwell 1998; Gifford 2004). The type of giving we observe in our experiment falls into this category of spontaneous giving.

II.C. Giving to God to Access Insurance

Giving to the church might interact with the use of the church as an insurer in a number of ways. First, individuals might give to the church in expectation that the church as an institution would reward this sign of commitment by disbursing funds in times of need. Second, individuals might use their public giving to send signals that they are good community members to other church members and expect that other church members then contribute to help them in times of need. The costs of religious participation can be seen as screening mechanisms to ensure that members are reliable and to prevent free-riding (Iannaccone 1992). In addition, the community structure of the group with repeated interactions reduces monitoring costs (Berman 2000). These two types of community-based insurance could be considered "material" insurance.

In addition to its role as a social network, the church is believed by its members to be a setting for encounters with the divine. The church therefore has a value as an insurer because it facilitates access to an interventionist god who can prevent negative shocks and favor positive ones. We call this type of

insurance "spiritual" insurance. Like the community-based material insurance, spiritual insurance is a potential response toward risk. However, it is a preventive measure to decrease the (subjective) likelihood of an economic shock and thus is not insurance in the strict sense. This form of insurance is interesting because it does not rely solely on giving to the church but on "giving to God," which can be interpreted as undertaking projects that will be blessed by God, or "sowing on any fertile ground" (Gifford 2004). This expansive interpretation of "giving to God" allows us to extend our experimental design to investigate how participants react to giving to recipients who are separate from the church but still fulfill the spiritual mandate. This allows us to make some distinctions about the different types of insurance experienced in the church. These mechanisms are formalized in the model in Section IV, and the doctrinal features are discussed here.

The first and most prominent feature is the forthright relationship between giving to God and material well-being. Pentecostal preachers across Africa speak of a God who does not want His people to be poor or to suffer.[8] This mandate is often described as a variant of the "prosperity gospel," the set of teachings that say that "Christianity has to do with success, wealth, and status" (Gifford 2004).[9] In contrast to other Christian groups, where rewards are generally given out in the afterlife, it is usually pointed out that the expected time frame of miracles is short and immediate.[10] The immediacy of the miraculous work is reflected in the structure of many church services that are themed around the material successes of its members proclaimed in lively

8. Enoch Adeboye, head of the Lagos-based international Pentecostal megachurch Redeemed Christian Church of God, teaches, "God is not poor at all by any standard. . . the closest friends of God [in the Bible] were wealthy people. . . Poverty is a curse and prosperity is not evil" (Ukah 2005, 260). Similarly Gifford (2004, 50) cites a pastor proclaiming "God is in the business of addition and multiplications; Satan is in the business of subtraction and division."

9. Although the term "prosperity gospel" has typically been used to describe teachings from some Evangelical churches in North America, some scholars of African Pentecostal theologies argue that the "African prosperity gospel" is more nuanced, certain aspects of it "are borrowed from external sources; others are home-grown. Still others are derived from external sources and adapted to fit local contexts" (Kalu 2008, 250).

10. Some declarations made during a church service include: "Before the year comes to an end, there are people here who will be counting millions of dollars in their accounts," "This month, no accident, sickness, stagnation will affect you," or "Marriages don't collapse here, businesses don't collapse here, nobody fails here" (Gifford 2004, 50 and 58).

testimonies.[11] Pastors emphasize how behaving in a manner that unlocks God's blessing helps avoid the risks that get in the way of achieving these successes. Their preaching makes a particularly strong and explicit link between giving to God and insurance. For example, an excerpt from a sermon preached in Ghana states: "The Lord will remember your offering; it is comprehensive assurance" (Gifford 2004, 46).[12] Unlocking God's blessings is invariably achieved by "doing something special that will move God and cause him to bless you more than you intended," that is, giving money, preferably to the church (Ukah 2005).

III. Experiment

We conducted an experiment in Accra, Ghana, in two stages. The first wave was run in November and December 2015 with 576 participants. The main hypotheses that were preregistered and tested were the average differences between the treatment groups.

We ran the second wave in May and June 2019[13] with 494 participants because a subset of wave 1 participants attended the sessions during weeks in which their churches were hosting large revival events. This inadvertently violated our experiment protocol, under which sessions were held on weekdays to avoid conducting experiments with subjects who had been in church on the same day. However, revival week events are conducted all through the work week. We had not preregistered the exclusion of revival participants (or any church member visiting the church on the same day), and indeed their results yielded interesting insights consistent with our model. The second wave was an opportunity to prespecify and test a hypothesis about revival week attendance. We used an encouragement design to randomly assign some wave 2 participants to attend sessions during a revival week. We also use wave 2 to conduct a direct replication of our original experiment with nonrevival participants to verify

11. Gifford cites some testimony themes that include the following: "I am a millionaire today!," "Jobs started coming in!," "My own choice car!," "Now they pay me in dollars!," "A baby, two cars, and promotion."

12. Other examples include: "The preacher asked the congregation if they were putting aside for a rainy day, but promised: 'If you give, you won't have a rainy day' " (Gifford 2004, 50). "Every part of your destiny is assured by God, insured by God" (Gifford 2004, 58).

13. With encouragement from a referee and the editor, to whom we are grateful.

if the results are robust to inevitable changes in the environment (such as a different part of the city, different socioeconomic characteristics, inflation).[14] The resulting increased sample size allows higher precision and facilitates exploratory heterogeneity analysis.

Randomization was done at the session level. At the start of each session, one participant per group was invited to pick one out of three unmarked envelopes. Participants were told that the envelopes contained a piece of paper that would determine the type of session they would play. This information was shared with participants to prevent incorrect guesses about the different possibilities and to avoid that participants who heard from others about the insurance believed that they would receive it in the end. The pieces of paper were labeled "Insurance," which corresponded to our insurance enrollment treatment; "Insurance information," which corresponded to the control; and "No insurance," which corresponded to the no insurance information treatment (i.e., groups who were not enrolled in the policy and did not have any sort of discussion about insurance). The insurance was a funeral policy offered by a leading microinsurer active in the Ghanaian market. The outcomes we measured were allocations out of an endowment (which subjects were free to keep, all or in part) toward a participant's church and two other nonchurch recipients.

III.A. Enrollment Treatment: Funeral Insurance Policy

Funerals are large and costly events in many sub-Saharan African societies (Case et al. 2013; Berg 2018). Surviving family members are expected to honor the dead with lavish commemorations. The rising toll of funeral costs has received attention from the media, scholars, and political leaders.[15] More recently,

14. Between 2015 and 2019, Ghana experienced year-on-year inflation rates of 17.45%, 12.37%, 9.39%, and 9.50%, respectively (see https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG). Prices and purchasing power changed over this period, including the premium of the insurance. We adjust endowments and show-up fees of the experiment accordingly. However, because of rounding and pricing decisions of the insurance company, among other changes, the amounts used in wave 2 prevent this from being an exact replication.

15. See, for instance, Paula Newton, "The Long Goodbye: Why Funerals Are Big Deals in Ghana," available at http://edition.cnn.com/2014/03/11/world/africa/on-the-road-ghana-funerals/index.html, and "Bankruptcy and Burials: Can Ghanaians Afford such Splendid Funerals?," The Economist, May 24, 2007, http://www.economist.com/node/9234475, and "Death around the World:

private financial service providers have begun to offer savings and insurance products designed specifically to meet these costs.

In Ghana, guests and other members of the bereaved's community typically make contributions that help cover the funeral costs. It is important to note that community support is not just financial—churches also organize provision of food and moral and logistical support, so any formal insurance product will only be addressing a single aspect of the church contributions. The degree of formalization of this type of support varies across the churches in our sample. In interviews with church leaders, most confirmed that observed commitment from members was a prerequisite for church involvement in their funerals. Definitions of commitment always included attendance of church events and financial commitment to the church in terms of tithes and offerings.

We offered participants a microinsurance policy available on the Ghanaian market. The policy offered individual enrollment into a group policy. Pastors of each church branch acted as the coordinators of the policies. This meant that the insurance company would channel any group communications (e.g., new tariffs) through the pastor, but all financial and administrative aspects of the policy rested with the company. The policy covered the life of the participant and a member of his or her immediate family. If either of these parties were to pass away within a year, the policy would pay GHS 1,000 (US $265 in 2015; the payout was kept at GHS 1,000 in 2019, which because of inflation was worth roughly GHS 630 in 2015) to the surviving family members. This policy cost GHS 12.5 ($3 in 2015; the cost was adjusted for inflation at GHS 20 in 2019) for two family members a year.[16] Individuals in this treatment were enrolled on the spot after completing a demographic survey and before playing the dictator game.

III.B. Control Group and No Insurance Information Treatment

During pretests it became clear that discussions of death and planning around death would be sensitive topics. Reluctance to contemplate large unpleasant risks has been raised in the

Funerals and Fantasy Coffins in Ghana," Funeral Zone, February 17, 2017, https://www.funeralzone.co.uk/blog/death-around-the-world-funerals-in-ghana.

16. One main goal of the group microinsurance is to have a simplified scheme and low coordination costs. This implied that the tariff was independent of the gender, age, or other characteristics of the insured. The main insurance taker only had to be above the age of 18 and below the age of 75, and could then insure his or her children and other close family members under the age of 75.

literature, particularly in other developing country settings where people are severely limited in the steps they can take to address these risks (Case et al. 2013). Furthermore, findings in psychological research show that awareness of mortality can modify Christians' religiosity and beliefs in a supernatural entity (see Norenzayan and Hansen 2006; Jong, Halberstadt, and Bluemke 2012). As the insurance treatment was designed to isolate the effect of being enrolled in insurance, we offered the same information about the insurance policy to the control group, so that the same issues of death would be salient in both settings.

To see whether the greater salience of the risk of death that results from discussion of insurance was in itself affecting subjects' willingness to donate, we added a second treatment where people were not informed about the content of the insurance policy. Comparisons between this group that did not discuss death and the control group that received insurance information allow us to see how church members react to an increase of perceived risk in the absence of formal insurance.

III.C. Recruitment

We recruited 1,070 (576 in wave 1 and 494 in wave 2) study participants from 16 different church branches in one particular denomination.[17] We approached these churches using a snowball sampling strategy. Participants were informed of the experiment through announcements made on Sunday mornings during regular church services. To avoid confounds with normal Sunday offering, all sessions took place during the subsequent work week in a neutral location. In wave 1, a subset of 122 participants were inadvertently recruited during "revival weeks" when their churches were engaged in active fundraising services during the work week. We found interesting results for this subset. In the second wave, we therefore purposely sampled and randomized experiment participation during revival and standard church weeks. The results for this subset of subjects are discussed after presenting the main

17. For 5 of these 16 churches, fewer than 30 members participated in our experiment. In analysis, we group all participants from these churches into one of two categories called "Other church wave 1" and "Other church wave 2." We were able to conduct extended interviews with pastors from 10 of the 16 branches to learn more about the structure of their services, membership, and other church events. This information is summarized in Online Appendix Tables 9 and 10. The branches are heterogeneous in terms of age, size, members' characteristics, and geographical locations in the city. They represent the great diversity of AoG branches that can be found in Accra.

experimental results, which involve 849 participants in the two waves.[18]

III.D. Experimental Setup and Design

It was very important for the credibility of our study that, with the exception of recruitment, all interactions with participants took place off church premises and that participants were assured of anonymity so as to avoid any contamination of the results by perceived pressure from the church authorities. This involved a substantial effort to transport the recruited individuals to a study location at some distance from the church, as well as setting up a proper lab-in-the-field with laptops and room dividers between subjects so as to make the assurance of anonymity credible. All participants were compensated for transport to the neutral locations.

Interested participants were assigned to sessions; 77% of participants were in sessions of 6–12 people. The remaining sessions that were smaller or larger than this range occurred randomly across treatments, dates, churches, and revival and nonrevival weeks.[19] A session consisted of randomization as described above, an extended survey where each participant was interviewed by an enumerator who spoke the participant's local language, a set of dictator game decisions, and private payment.[20]

18. We were also interested in seeing how our hypothesized mechanisms operate within a secular organisation, so we recruited an additional 242 market sellers. Traders in this market are organized into an association that could provide financial assistance such as credit or insurance to dues-paying members. During the first round of data collection, we realized that the insurance treatment was not properly implemented in this sample. Indeed, the funeral insurance was coordinated by the head of the market association. Informal discussions with study participants and their answers to survey questions warned us that trust in the insurance coordinator might be low. It seemed likely to us that participants would not trust that the insurance would be actually implemented, thus discrediting the insurance treatment. Furthermore, questionnaire answers informed us that the market association is not a commonly used risk-sharing structure and is by no means similar to the church community in that respect. We stopped collecting data on market members after the first round of the study and the sample for this group is too small to detect treatment effects. Results from this smaller additional sample are available from the authors on request.

19. Sessions with fewer than four individuals were excluded as per our preanalysis plan.

20. The survey was done before the game. First, this had a logistical motivation as the survey was done with the enumerators who subsequently explained the game and then left so participants could play privately. Second, the survey was the component that we focused on most during recruitment and cooperation with

TABLE I
PAIRS OF DICTATOR GAME RECIPIENTS

Self	Church (anonymous)
Self	Street children
Self	Thanksgiving
Self	Church (nonanonymous)
Church (anonymous)	Street children
Church (anonymous)	Thanksgiving
Church (anonymous)	Church (nonanonymous)
Street children	Thanksgiving
Street children	Church (nonanonymous)
Thanksgiving	Church (nonanonymous)

Participants privately played 10 dictator games. Each game asked participants to allocate GHS 11 between two recipients (GHS 19 in 2019 to adjust for changes in purchasing power; both amounts represent a little less than average daily income). The set of recipients consisted of the participant's church, a secular charity, a national prayer organization, and the possibility of keeping the money. There were also two ways individuals would give to the church: the first being an anonymous donation, the second being a named donation. The pairs of recipients are listed in Table I. The order of the 10 dictator games was randomized by the computer program.[21]

The Street Children's Fund is a charity that takes care of the education needs of homeless and vulnerable children. The charity operates in a district of the city that is geographically and culturally distinct from where we recruited participants. Giving to this charity could largely be understood as an altruistic action. The thanksgiving offering is part of an annual interfaith prayer event. Leaders and members of various faiths join together in prayer for Ghana. Giving toward this event was meant to be interpreted as giving toward a largely spiritual interest. Pretests and focus groups during piloting confirmed that study participants would indeed see these two recipients of their donations in this manner.

the churches. This was done to avoid subjects feeling like they were "playing games."

21. Regarding anonymous and nonanonymous donations, one concern is that participants who see named donations before anonymous choices may think about the latter in a different way. We randomize the order of the dictator games precisely to address this type of concern. However, we also checked whether seeing named donations before anonymous ones affected later choices to give to the church anonymously and we find that this is not the case.

Participants were paid a flat show-up fee of GHS 20 in 2015 (GHS 30 in 2019). After all decisions had been made in the dictator games, one game was selected at random individually for each participant, and further payments were made according to the decision taken for that game. This meant that participants had the opportunity to earn up to GHS 31 (GHS 49 in 2019). Average overall earnings from the experiment were GHS 22.50 (GHS 38.00 in 2019), which were paid privately to participants.

The experiment protocol and the questionnaire can be found in the Online Appendix. This experiment was preregistered in the AEA registry.[22] The second wave was preregistered with a detailed preanalysis plan. There were two deviations from the protocol in wave 1. First, we stopped the experiment with a market sample because the sellers did not trust their market leaders, as explained in note 18. Second, we did not anticipate the revival weeks, therefore we did not preregister that we would exclude revival participants or analyze their effects separately.

Wave 2 allowed us to address the revival week concern by running a new experiment. There were three unavoidable changes to the main protocol between wave 1 and wave 2. First, we adjusted outcomes in 2019 for inflation, which meant that participants faced GHS 19 instead of GHS 11 allocation choices. Second, the insurance company maintained the payout at GHS 1,000 despite adjusting the premium for inflation. This meant that wave 2 participants were treated with a smaller dose than wave 1 participants. Finally, due to the timing of fieldwork, the national thanksgiving offering was one month in the future during wave 1, while it had just taken place during wave 2. This implies that the next national thanksgiving event we asked our subjects to contribute to was going to be in one year. This likely affected its perception as a relevant spiritual good.

Table 11 in Online Appendix A shows the numbers of subjects by wave and by treatment.

IV. Model

We develop a simple model to formalize the types of behavior we expect our experiment to capture and use results from the model to motivate the experimental hypotheses. First we establish how church members who derive utility from secular and

22. AEA RCT Registry ID AEARCTR-0000558 for the first wave and AEARCTR-0003989 for the second wave.

spiritual consumption would behave given the risk of an exogenous income shock in a bad state of the world if there is no insurance offered by the church. We then consider two church-based insurance channels. Community-based insurance is modeled as a payment given to a church member in the case of a loss where the size of the payment depends on how much the church member gives to their church. Spiritual insurance is modeled as a belief that the subjective probability of a loss is reduced by giving to the church and other goods used for religious signaling, such as the spiritual and secular charities. Spiritual insurance is therefore not an insurance contract in the narrow sense.[23]

The mechanisms of our experiment are captured in the model as changes to the size of the loss. The insurance scheme into which we enrolled individuals paid out in the event of their own death or the death of a relative. The loss we model is a financial loss and is not intended to cover all of the aspects of the distress suffered by an individual facing the death of a loved one, let alone the adverse emotional and other consequences to them of their own death. As in any life insurance decision, the individual does not expect to be compensated for their own death, but intends to offset in part the financial consequences of a death to those still left alive. Individuals are capable of anticipating the benefit of that payout and considering it a (possibly vicarious) benefit in anticipation of which they are willing to pay a premium, even if they do not expect to be alive when the payout occurs.

There are two ways our insurance treatments may affect the size of the loss. The first is when insurance information is provided to participants. The process necessitates a discussion about death both of the participating individual and his or her loved ones. This discussion brings home to participants the reality of a risk they had perhaps been inclined not to think about, and thereby makes death more salient. We represent this as an increase in the perceived size of the loss, compared with the situation before they had received this information. However, this interpretation of the provision of information is necessarily tentative; we return to the question in discussing the results below.

23. Divine intervention can also take the form of reducing the severity of shocks rather than reducing their probability of occurrence. This type of insurance mechanism would be observationally indistinguishable from belief in a divine intervention that reduces the probability of shocks. However, based on the narrative propagated by Pentecostal churches described in Section II, we model spiritual insurance as a belief that donation behavior affects the probability of occurrence of shocks.

The second way our insurance treatment affects the size of the loss is when individuals are actually enrolled. We represent this as a reduction in the perceived size of the loss.

We show how in the presence of an insurance motive in the church, the main insurance treatment can lead to a decrease in giving, and the provision of only insurance information can lead to an increase in giving.

IV.A. Setup

We assume that a church member has an income of Y and chooses to give an amount g to the church. The church member enjoys utility $u(Y - g)$ from consuming $Y - g \geqslant 0$ secular goods, and utility $\theta f(g)$ from contributing $g \geqslant 0$ to church goods. Thus a church member who gives g to the church enjoys a total utility of $u(Y - g) + \theta f(g)$. The parameter θ reflects the relative weight the individual puts on church activities compared with secular consumption. This weight might differ from one individual to the next (there may be individual heterogeneity). More important for our empirical analysis, it might also differ in time (for instance, in revival weeks individuals go to church every day and are focused on spiritual activities). Both utility functions u and f are increasing and concave in their arguments. We therefore make the assumption that religious consumption is a normal good.[24]

In each period, church members face a probability π of an income loss of size D. Under the assumption that insurance is offered through the church, giving an amount g also has the impact of reducing the size of the loss by an amount $l(g)$, thus the total loss would be $D - l(g)$. Under the assumption that church members believe in spiritual insurance, the probability of a loss is decomposed into a basic probability of loss $\tilde{\pi}$, and a reduction in the probability of loss that can be mitigated by giving money to spiritual goods. Therefore, the total subjective probability of loss is $\pi = \tilde{\pi} - p(g)$.

The following subsections set up the maximization problems and show how optimal giving varies with the perceived size of loss. We assume that church members choose a particular level of

24. This assumption contradicts the secularization hypothesis that higher income leads to lower religiosity. However, it is in line with new studies using panel or micro data (Becker and Woessmann 2013; Buser 2015). A theoretical rationale for the positive association of income with religious consumption can be found in club good models of religion (Iannaccone 1992; Berman 2000; Berman and Laitin 2008).

giving g to maximize their total expected utility. All proofs are in the Online Appendix.

IV.B. Optimal Giving to the Church in the Absence of Any Insurance

In this section there is no insurance offered through the church. We label this hypothesis H0. The optimization is:

$$\max_{g} (1-\pi)u(Y-g) + \pi u(Y-g-D) + \theta f(g). \tag{1}$$

Solving for the first-order conditions and taking optimal giving g^* as a function of D allows us to show that giving is decreasing with the size of the loss D:

$$\frac{\partial g^*}{\partial D} < 0. \tag{2}$$

This classical result of consumption smoothing comes from the standard concavity assumptions of the utilities derived from secular and religious consumption. When faced with an increase in the potential loss D, church members shift spending from religious consumption to secular consumption to ensure a higher level of secular consumption in case of loss. We call this result the income effect.

Therefore, this subsection predicts that if there is no insurance mechanism in the church (neither community-based nor spiritual), the information about the funeral policy in the control group, by increasing the perceived loss D, would lead individuals to decrease church giving g^*. We summarize this empirical prediction of hypothesis H0 in the following form.

Empirical prediction H0a: Compared with no information, insurance information decreases giving to the church.

Correspondingly, compared with the control group, the enrollment treatment reduces the perceived risk of loss, thereby decreasing D, and thus would increase giving to the church. The second empirical prediction of hypothesis H0 is therefore:

Empirical prediction H0b: Compared to insurance information, insurance enrollment increases giving to the church.

IV.C. Community Insurance: Optimal Giving When Giving Reduces the Size of a Loss

In this section we assume that the church community provides material insurance such that church giving reduces the size of the loss. We call this hypothesis H1, and we write $L = D - l(g)$,

where l is an increasing and concave function with $l(0) = 0$ and $l'(0) > 1$ (this last condition means that the community insurance in the bad state more than offsets the amount previously donated by the individual). In this case, church giving can be seen as payment of the premium of an informal insurance that covers part of the possible loss. As it is offered by the church community, only giving to the church—and not giving to other religious goods—provides access to this type of insurance. The utility maximization problem is as follows:

$$\max_{g} (1-\pi)u(Y-g) + \pi u(Y-g-D+l(g)) + \theta f(g). \tag{3}$$

We solve for the first-order conditions and express optimal giving g^* as a function of the loss D. We find that:

$$\frac{\partial g^*}{\partial D} > 0 \Leftrightarrow l'(g^*) > 1. \tag{4}$$

When there is an insurance motive behind church donations, an increase in the potential loss D triggers two opposite effects: the substitution effect, whereby church members try to mitigate the increase in loss by buying more informal insurance; and the income effect, described in Section IV.B, where church members reduce giving to the church to have more money available for secular consumption smoothing.

Condition (4) shows that as long as community-based insurance is effective enough in decreasing the loss, which is the case for low enough g^*, the consumption-smoothing effect from the baseline model (income effect) is outweighed by the increased demand for church insurance (substitution effect). Therefore, the overall effect of an increase in D is an increase in the optimal giving.

This subsection therefore predicts that if there exists an effective community insurance that reduces the size of a loss in case of a shock, the information about insurance should increase church giving (compared to no insurance information), while the enrollment treatment would decrease church giving (compared to the control group). These effects are the opposite of the predicted effects discussed in the previous section, when there is no insurance motive for giving to the church. There should be no impact of either treatment on giving to other recipients. The three empirical predictions of hypothesis H1 are as follows.

Empirical prediction H1a: Compared with no information, insurance information increases giving to the church.

Empirical prediction H1b: Compared to insurance information, insurance enrolment decreases giving to the church.

Empirical prediction H1c: There is no effect of either insurance information or enrolment on giving to the other recipients (the thanksgiving offering and the street children's fund).

IV.D. Spiritual Insurance: Optimal Giving When Giving Reduces the Subjective Probability of a Loss

In this section we assume that there is a spiritual insurance motive such that giving reduces the subjective probability of the loss $\pi = \tilde{\pi} - p(g)$. It is important to stress that giving can be to the church or to any other charitable or spiritual organizations that can be used for religious signaling. The mechanism here works through God: being a good Christian reduces the subjective probability of a negative shock. We call this hypothesis H2. Utility can now be written as:

$$(5)\quad \max_{g}(1-\tilde{\pi}+p(g))u(Y-g)+(\tilde{\pi}-p(g))u(Y-g-D)+\theta f(g).$$

We can show that:

$$(6)\quad \frac{\partial g^*}{\partial D}>0 \Leftrightarrow p'(g^*)u'(Y-g^*-D)>(\tilde{\pi}-p(g^*))u''(Y-g^*-D).$$

This condition is harder to interpret intuitively in the nonparameterized form, and for the second-order condition to hold requires that the second derivative of the utility function not increase too fast in the size of the loss, which means that the income effect must not be large. So we defer the discussion to the Online Appendix, where we investigate it using a CARA utility function. In short, we find that optimal giving g^* is increasing in the size of loss D when the spiritual insurance is effective enough. Indeed, when this is the case, individuals prefer to invest in decreasing the subjective probability of loss by increasing their religious giving rather than smoothing consumption (in other words, the substitution effect of the loss dominates the income effect).

Therefore, this subsection predicts that providing participants with insurance information would increase giving to any charitable or spiritual organization (compared with no insurance information) while enrolling them in the insurance treatment would decrease giving to any charitable or spiritual organization

(compared to the information treatment). The three empirical predictions of hypothesis H2 are as follows.

Empirical prediction H2a: Compared with no information, insurance information increases giving to the church.

Empirical prediction H2b: Compared with insurance information, insurance enrollment decreases giving to the church.

Empirical prediction H2c: The effects on giving to the thanksgiving offering or the street children's fund are similar to the effects on giving to the church.

IV.E. Experimental Hypotheses

We collect all the empirical predictions of the three different insurance hypotheses so that they can be compared and tested against one another.

H0 There is no insurance provided through the church (Section IV.B).
H0a Compared with no information, insurance information decreases giving to the church.
H0b Compared with insurance information, insurance enrollment increases giving to the church.

H1 Community insurance is provided through the church (Section IV.C).
H1a Compared with no information, insurance information increases giving to the church.
H1b Compared with insurance information, insurance enrollment decreases giving to the church.
H1c There is no effect on giving to the thanksgiving offering or the street children's fund.

H2 Spiritual insurance is provided through God (Section IV.D).
H2a Compared with no information, insurance information increases giving to the church.
H2b Compared with insurance information, insurance enrollment decreases giving to the church.
H2c The effects on giving to the thanksgiving offering or the street children's fund are similar to the effects on giving to the church.

Our experimental design allows us to test for an insurance mechanism in giving (test for H0a against H1a/H2a and H0b against H1b/H2b) and then test the two insurance channels of

spiritual and community-based insurance against each other (H1c against H2c). Spiritual insurance effects should be similar across recipients. However they might be different in magnitude since, for instance, church members could see church donations as the most effective tool to decrease the probability of a loss.

Our model and experimental design do not allow us to make a clear prediction of the result if we compared the group that received no insurance information to the group that received insurance. This is because, as described in the model setup, the insurance treatment is composed of both the actual insurance effect we are interested in and a salience effect. The model demonstrates how these effects work in opposing directions. Although we are unable to formulate an ex ante hypothesis about the overall comparison between receiving insurance and not receiving any information, we discuss the results in Section V.C, where we suggest some interpretations about the relative magnitudes we observe and discuss what they might further tell us about the potential mechanisms of church-based insurance.

Finally, our experiment allows us to test for the average behavior within the church. This average potentially captures heterogeneity in different parameters: church members can vary in how much they value donations to the church relative to secular consumption (variation in θ) and if they see an insurance motive in their donations (if g enters in the probability function or the payoff function). In Section V.E we discuss potential heterogeneity in the average treatment effect.

V. Experimental Results

V.A. *Descriptive Statistics*

Our main results include 849 church members recruited during regular service weeks from 16 different church branches; we have complete sociodemographic information for 804 of these.[25] Table II summarizes preregistered variables of these participants. The groups were balanced across treatments for all key variables except gender (women tend to be overrepresented in the insurance information and no insurance groups). An F-test cannot reject the null hypothesis that these main demographic

25. The questionnaire software malfunctioned during the first few sessions, so some survey data were not saved. There were no problems with data from the dictator games.

TABLE II

PREREGISTERED COVARIATES COMPARED ACROSS TREATMENTS

				Differences (p-value)	
Variable	Insurance	Insurance information	No insurance	Insurance − info	Info − no
Age	36.90	37.69	36.68	0.79 (.45)	−1.01 (.33)
Female	0.64	0.65	0.71	0.01 (.77)	0.06 (.09)
Monthly income, GHS	312.09	310.63	302.94	−1.46 (.95)	−7.69 (.72)
Employed	0.62	0.58	0.63	−0.03 (.35)	0.05 (.18)
More than secondary school	0.22	0.23	0.21	0.01 (.66)	−0.02 (.49)
Akan ethnicity	0.34	0.31	0.30	−0.02 (.50)	−0.01 (.74)
Ewe ethnicity	0.20	0.25	0.17	0.05 (.10)	−0.08 (.01)
Ga ethnicity	0.13	0.10	0.16	−0.03 (.16)	0.06 (.02)
Attends church daily	0.05	0.05	0.05	0.00 (.93)	0.00 (.97)
Prays multiple times per day	0.87	0.90	0.85	0.02 (.35)	−0.04 (.10)
Attended during revival week	0.21	0.27	0.15	0.07 (.04)	−0.13 (.00)
Wave 2	0.46	0.48	0.44	0.01 (.71)	−0.03 (.36)
F-tests for joint significance					
F-stat				0.35	1.73
p-value				0.97	0.07

Note. p-values in parentheses are from a t-test of equality of means.

variables do not jointly explain assignment to any of the treatments. In more tables, we report results of regressions with and without control variables for individuals' demographics (gender, age, education, income, employment status, ethnicity) and measures of religious behavior (church attendance and prayer frequency), as well as church fixed effects. The treatment effects remain similar, with respect to magnitude and statistical significance.

Compared with the national population, our participants had lower incomes and were less likely to be employed (Online Appendix A, Table 12). We believe that this selection is not a threat to external validity: we are interested in the attitudes toward insurance in precisely this significant subgroup of the general population who are likely to be particularly vulnerable and face a greater number of formally uninsured risks.

We can also compare some key demographic variables across waves of the experiment. Online Appendix A Table 12 shows preregistered covariates, many of which differed across waves. Table 13 shows demographic variables that were not preregistered. These are not included as controls in any regressions. Thirty-three percent (85% in wave 2) had registered for the National Health Insurance scheme, and only 18% (10% in wave 2) held any other sort of insurance prior to participating in the study. None of the participants in wave 1 had spent their whole lives in their current church; 44% of wave 2 participants had done so.

The time elapsed and the constraint to move the study to a different part of the city to work with church branches that were not contacted for the first wave explain the differences between the two sample populations. These differences should certainly be kept in mind when interpreting our results. Nevertheless, we believe it reinforces the validity of our results that they should be broadly robust to such differences across waves; this indicates that we are observing features of their shared religious practice rather than idiosyncratic features of particular sociodemographic groups.

V.B. Summary of the Allocation Decisions

In this subsection and the following, we focus on the 3 dictator games among the 10 played where anonymous donations to the three recipients were paired with the possibility of keeping the

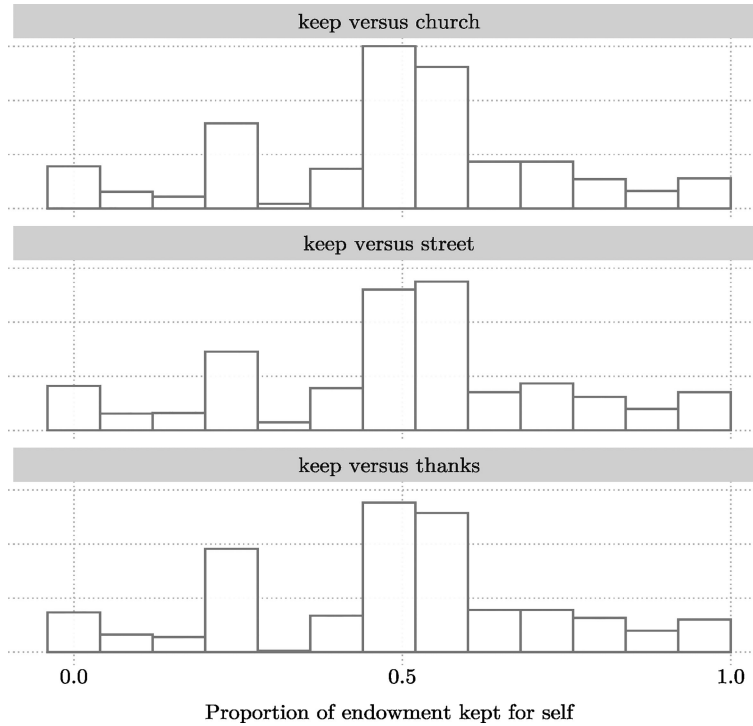

FIGURE I

Distributions of Giving among Participants

Data from 849 participants from weeks with no revival events, pooled across both waves. Participants chose how much of an endowment to allocate between themselves and different recipients. The endowment in wave 1 was 11 GHS in 2015, and the endowment in wave 2 was 19 GHS in 2019.

money. Results from the other games are discussed in Section V.E. The histograms in Figure I plot the distributions of giving to the three different recipients. On average, participants chose to keep 51% of their endowment (5.64 GHS in wave 1 and 9.75 GHS in wave 2) and give away 49% of the endowment.

Among participants, 44% selected an allocation close to the equal split of either 5 or 6 GHS in wave 1 (9 GHS or 10 GHS in wave 2). Across recipients, roughly 5% of participants gave nothing, and 6% of participants gave everything away. These spikes at the extreme values highlight that allocations to the recipients may have been censored. To account for this, we report all experimental results using a Tobit regression.

Giving to the three recipients is significantly correlated, with the correlation coefficients between the pairs of choices ranging from 0.52 to 0.59. If the experimental design induced any order effects, these high degrees of correlation could be problematic for interpretations across recipients. However, the order of dictator decisions was randomized across participants, mitigating the concern that any order effects could interact with treatment effects.

We turn to the discussion of the results. Section V.C focuses on the pooled analysis. The question of the comparison of the two waves and the degree of confidence we can reasonably have in the results is discussed in Section V.D.

V.C. Treatment Effects

1. Compared to Insurance Information, Insurance Enrollment Decreases Giving to the Church and to the Other Recipients. We first examine the main ways donation behavior is affected by enrollment into insurance as opposed to the mere provision of insurance information.[26] Figure II shows the treatment effects of the three main dictator games of interest. The figure shows separate effects from wave 1 and wave 2 and two ways of aggregating the estimates, either by estimating a single effect on the pooled sample or by taking a precision-weighted mean of the separate effects as is common in meta-analytic studies (Christensen, Freese, and Miguel 2019). Table III presents the regression coefficients for the two separate waves as well as for the pooled analysis. Table III shows results of Tobit regressions with and without individual controls and dummies for individual churches—for the reasons of representativity just mentioned, the results with controls are to be preferred for hypothesis testing.[27]

We find that enrollment into the insurance policy decreases giving to all three recipients compared with those who only receive the information about the insurance but are not enrolled. The treatment effects are similar for the different recipients. All pooled treatment effects are significant at the 1% or 5% level. A decrease in the amount of donations is predicted by the hypothesis that giving has some element of an insurance motivation. In addition, the fact that amounts given to all recipients are similarly affected means that the expected insurance is through

26. This is listed as Test 1 in our preanalysis plan.

27. Tables 19 to 22 in Online Appendix B show results scaled by standardized outcomes and outcomes in local currency (cedis).

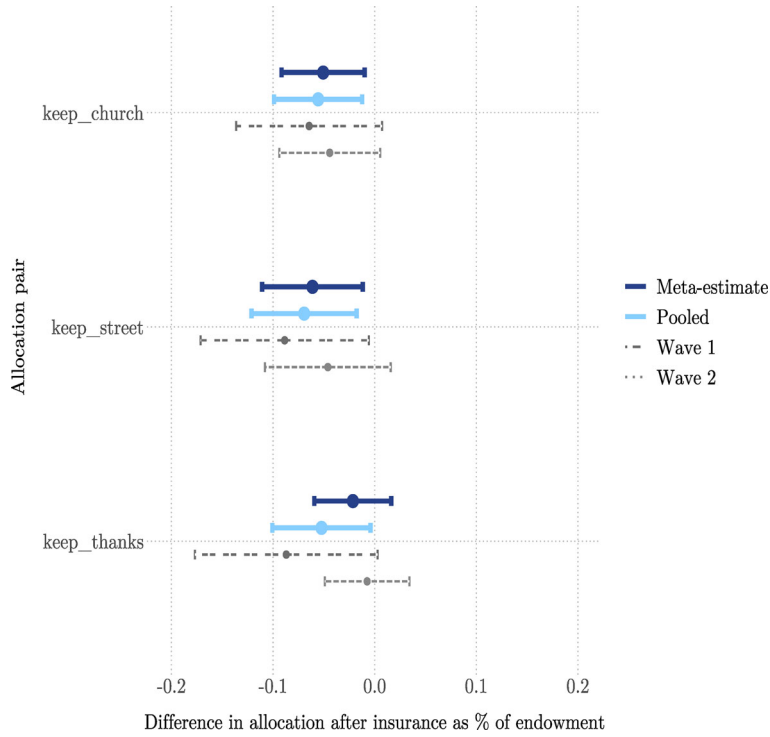

FIGURE II

Treatment Effects of Insurance Enrollment

Treatment effects are estimated from a comparison between insurance enrollment and insurance information. Estimates are from Tobit regressions including preregistered covariates as controls. 95% confidence intervals are shown.

meritorious behavior in the eyes of God and not through paying in to a community insurance fund administered solely by the church. This does not constitute evidence against the existence of such community insurance mechanisms, but we do not find positive evidence of their existence here.

Finally, it is worth noting that the treatment effect is no stronger, and even somewhat weaker, for named (nonanonymous) donations to the church, as can be seen in Online Appendix B, Table 16. If community insurance were the main motivation, we would expect to see stronger treatment effects for named than for anonymous donations.

TABLE III

EFFECTS OF INSURANCE ENROLLMENT COMPARED WITH INSURANCE INFORMATION FOR WEEKS WITH NO REVIVAL EVENTS

	Dependent variable					
	Giving to the church		Giving to the street		Giving to thanksgiving	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Pooled sample						
Insurance enrollment	−0.064**	−0.056**	−0.064**	−0.069***	−0.055*	−0.052**
	(0.030)	(0.022)	(0.027)	(0.026)	(0.030)	(0.025)
Constant	0.554***	0.648***	0.548***	0.588***	0.544***	0.550***
	(0.022)	(0.078)	(0.021)	(0.079)	(0.022)	(0.083)
N	538	504	538	504	538	504
Panel B: Wave 1						
Insurance enrollment	−0.083*	−0.064*	−0.084**	−0.089**	−0.085*	−0.087*
	(0.043)	(0.037)	(0.039)	(0.042)	(0.046)	(0.046)
Constant	0.531***	0.573***	0.566***	0.561***	0.518***	0.697***
	(0.035)	(0.130)	(0.034)	(0.138)	(0.037)	(0.140)
N	285	251	285	251	285	251
Panel C: Wave 2						
Insurance enrollment	−0.039	−0.044*	−0.045	−0.046	−0.018	−0.007
	(0.037)	(0.025)	(0.040)	(0.032)	(0.032)	(0.021)
Constant	0.581***	0.483***	0.534***	0.313***	0.573***	0.333***
	(0.025)	(0.091)	(0.027)	(0.109)	(0.022)	(0.098)
N	253	253	253	253	253	253
Individual controls	No	Yes	No	Yes	No	Yes
Church dummies	No	Yes	No	Yes	No	Yes

Notes. This table corresponds to Main Test 1 and Main Test 2.1 in the preanalysis plan and reports Tobit regressions censored at 0 and 1. Standard errors are in parentheses below the estimates and are clustered at the session level. The dependent variable is the fraction of the endowment that a participant allocated to either their own church (columns (1) and (2)), a nonprofit charity working with street children (columns (3) and (4)), or a countrywide prayer event called the national day of thanksgiving (columns (5) and (6)). The endowment in wave 1 was 11 GHS in 2015, and the endowment in wave 2 was 19 GHS in 2019. Individual controls include age, gender, ethnicity, employment, log(income), an indicator for daily church attendance, an indicator for praying multiple times a day, church fixed effects, and a dummy for the experimental wave. The size of the sample changes across columns because a computer error led to some missing demographic variables in wave 1. Constant terms cannot be compared across waves in even-numbered columns due to the use of church fixed effects. *$p < .1$; **$p < .05$; ***$p < .01$.

The treatment effects are therefore consistent with hypothesis 2 (spiritual insurance) and inconsistent with hypothesis 0 (no insurance) and hypothesis 1 (community insurance). More precisely, the results are consistent with hypotheses H2b and H2c, which predict that enrollment decreases giving to the church and other recipients, respectively. They are inconsistent with hypothesis H0b, which predicts that enrollment increases giving to the church. Although they are consistent with hypothesis H1b (that enrollment decreases giving to the church), they are inconsistent with hypothesis H1c (that there is no effect on the other recipients).

2. The Salience Effect of Insurance Information Is Weakly Positive but Statistically Insignificant. We report the effect on donation behavior of a more salient threat of death.[28] Discussing the insurance details could render the risk of death more salient and potentially increase donations. Table IV, Panel A presents the results of providing insurance information on giving relative to the no insurance information treatment. Participants who received no information on the insurance donated on average 58.2% of their endowment to the church (column (1)). Providing insurance information changes this amount by 3.3 percentage points, which is not significant. Giving to the street children's fund and to the thanksgiving event are equally not significantly affected. In Panels B and C, the two waves are presented separately. In the first wave, we find a significant salience effect on all recipients, but this is absent in the second wave.

We interpret these results with reference to our model. We model the idea that death becomes more salient with an increase in income loss D. Hypotheses H1a and H2a propose that if insurance is offered through the church (either community-based or spiritual), and D is increased, then giving to the church and other recipients should increase. We find that insurance information does not increase giving compared with no insurance. This would be consistent with H0 (no insurance offered through the church) if it were not for our results on enrollment. Alternatively, this is consistent with an incorrect assumption that discussions about death have the same effect as an increase in the size of D.

It is indeed likely that the discussion about death in wave 2 did not translate to a perceived increase in the size of D. The

28. This was listed as Main Test 2 in our preanalysis plan.

TABLE IV

EFFECTS OF INSURANCE INFORMATION COMPARED WITH NO INSURANCE FOR PARTICIPANTS IN WEEKS WITH NO REVIVAL EVENTS

	Dependent variable					
	Giving to the church		Giving to the street		Giving to thanksgiving	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Pooled						
Insurance information	0.038	0.032	0.039	0.033	0.016	0.009
	(0.028)	(0.022)	(0.026)	(0.025)	(0.028)	(0.021)
Constant	0.516***	0.627***	0.509***	0.609***	0.527***	0.679***
	(0.018)	(0.080)	(0.015)	(0.083)	(0.018)	(0.080)
N	548	519	548	519	548	519
Panel B: Wave 1						
Insurance information	0.071*	0.068*	0.091**	0.095**	0.068*	0.061
	(0.041)	(0.037)	(0.042)	(0.043)	(0.041)	(0.037)
Constant	0.459***	0.546***	0.475***	0.467***	0.449***	0.597***
	(0.023)	(0.136)	(0.024)	(0.144)	(0.019)	(0.138)
N	289	260	289	260	289	260
Panel C: Wave 2						
Insurance information	−0.001	0.009	−0.014	−0.015	−0.045*	−0.034*
	(0.029)	(0.022)	(0.031)	(0.028)	(0.027)	(0.020)
Constant	0.582***	0.664***	0.548***	0.586***	0.618***	0.623***
	(0.014)	(0.120)	(0.016)	(0.113)	(0.015)	(0.114)
N	259	259	259	259	259	259
Individual controls	No	Yes	No	Yes	No	Yes
Church dummies	No	Yes	No	Yes	No	Yes

Notes. This table corresponds to Main Test 1 and Main Test 2.1 in the preanalysis plan and reports Tobit regressions censored at 0 and 1. Standard errors are in parentheses below the estimates and are clustered at the session level. The dependent variable is the fraction of the endowment that a participant allocated to either their own church (columns (1) and (2)), a nonprofit charity working with street children (columns (3) and (4)), or a countrywide prayer event called the national day of thanksgiving (columns (5) and (6)). The endowment in wave 1 was 11 GHS in 2015, and the endowment in wave 2 was 19 GHS in 2019. Individual controls include age, gender, ethnicity, employment, log(income), an indicator for daily church attendance, an indicator for praying multiple times a day, church fixed effects, and a dummy for the experimental wave. The size of the sample changes across columns because a computer error led to some missing demographic variables in wave 1. $^{*}p < .1$; $^{**}p < .05$; $^{***}p < .01$.

enrollment effects discussed in Section V.C are based on a measurable and economically relevant decrease in D (free enrollment into an insurance policy) and provide strong evidence against H0. Furthermore, variability in how insurance information makes D salient is consistent with a growing literature that shows salience effects to be context-dependent (Bordalo, Gennaioli, and Shleifer 2012).

Understanding which attributes of a decision problem become salient, and under which conditions, is an active area of study. Recent contributions in the economics literature have suggested that this is influenced by an individual's memory and experiences (Mullainathan 2002; Bordalo, Gennaioli, and Shleifer 2020), that salience also tracks the usefulness of an attribute for predicting future behavior (Schwartzstein 2014), and that the relative sizes of different outcomes influence their salience (Bordalo, Gennaioli, and Shleifer 2012). These channels highlight how the framing and context in which information is presented matter for the salience of attributes of a decision problem. Small differences in the sample population or unavoidable changes in procedure between waves 1 and 2 (e.g., different enumerators presenting the description of insurance) might have affected how participants perceived the importance of the risk of death.

This does not imply that the effects of salience are of low scientific interest. In their sermons, pastors frequently try to make salient various life risks (such as the risk of death, joblessness, or marital failure), while suggesting donations as a means of coping with these risks. An interesting avenue for research would be to investigate which conditions need to be fulfilled to find a salience effect that increases donations. Presumably, some pastors are better at it than others.

3. The Effect of Insurance (Salience Plus Enrollment) Compared to No Insurance Is Positive but Not Significant. Online Appendix B, Table 17 shows that the net effect of the two treatments (the salience effect plus the treatment effect of interest, which work in opposite directions) is to yield an effect of receiving insurance compared with being given no information that is negative but not significant at conventional levels. The model does not provide a clear prediction about this comparison as its sign depends on the size of the salience and the insurance effects. Panel A shows that the overall net effect is not significant. In wave 1 (Panel B), the enrollment and salient effects are of similar

magnitudes. In wave 2 (Panel C), where we do not find a significant salience effect, the net effect of insurance is negative although not consistently significant.

Church sermons themselves frequently combine the two effects (salience and insurance enrollment) by talking about certain risks and suggesting donations as a means of coping with these risks. The treatment effect of insurance enrollment is large enough (over 10% of the mean amount donated to the church) to explain why churches appear to invest significant resources in seeking to make this channel of activity credible. In wave 1, insurance enrollment decreased giving only in comparison with the higher donations induced by the salience effect of the insurance information treatment. However, this salience effect was not necessary to observe the enrollment effect in wave 2.

V.D. Replication and Robustness of Results

1. Replication of the Main Treatment Effect. As described in Section III.C, our study was conducted in two waves to verify a heterogeneous treatment effect that can be explained by our model but that we had not preregistered prior to wave 1. We discuss the heterogeneous treatment effect in Section V.E.2 below. Wave 2 also enabled us to conduct a replication of the treatment effects from wave 1 in normal (nonrevival) weeks. This allows us to put our results in context with the growing literature on replicability of experimental results in economics and other social sciences.

Camerer et al. (2016) look at 18 laboratory experiments published in leading economics journals between 2011 and 2014. They find that 13 (70%) successfully replicate according to one of four criteria: (i) effect sizes are in the same direction and pass the same level of statistical significance, (ii) the confidence interval of the new estimates includes the old estimates (Open Science Collaboration 2015), (iii) the two estimates lie in a prediction interval that accounts for sampling variation in both waves (Patil, Peng, and Leek 2016), and (iv) the combined meta-analytic estimate is significant and in the same direction (Braver, Thoemmes, and Rosenthal 2014; Christensen, Freese, and Miguel 2019).

We can therefore examine separately the results for wave 1 and wave 2 and see to what extent they fulfill the four criteria set out by Camerer et al. (2016) for successful replication. In our experiment (see Table III), the effect of insurance enrollment on giving to the church is replicated according to all four assessment

criteria, although the treatment effect is significant at 10% only when controls are included. The effect of insurance enrollment on giving to the street children's fund is successfully replicated according to three out of four measures. It does not meet the first criterion—although the wave 2 effect is in the right direction and large enough to be consistent with the results from wave 1, its p-value is greater than .1. The insurance benefits were not adjusted to inflation by the insurance company, and thus our treatment is 40% lower in wave 2, compared with wave 1. This might explain why point estimates in wave 2 are lower. This suggests that our replication, though of the same approximate size as the original experiment, has reduced power given the diminished magnitude of the treatment.

The effect on giving to the thanksgiving offering is not replicated according to any criterion. This is also the only outcome we were not able to implement in the same way as in wave 1 because the timing of the thanksgiving event was fixed (as described in Section III). The national event had already happened shortly beforehand, and our participants might have felt that paying (again) for something that would presumably occur a year later was too distant. Nevertheless, the pooled effect on giving to the thanksgiving offering is in the right direction and statistically significant at the 5% level. The meta-analytic effect is also in the right direction, although its confidence interval includes 0. Reassuringly, this point estimate is contained within the 95% confidence intervals of the meta-analytic estimates for the church and street children's fund outcomes. For the two outcomes that were successfully replicated (giving to the church and giving to the street children), the wave 2 effect sizes were 75% and 62% of the wave 1 effect sizes, respectively.

2. Robustness: Effect of Insurance Enrollment on Other Allocation Decisions. Online Appendix B, Table 18, Panel A presents the donation levels when participants had to make the choice between two recipient organizations, rather than between a single recipient and the option of keeping money for themselves. It therefore constitutes a robustness test of the previous finding that the treatment effects of salience and enrollment were similar in sign and magnitude across all three recipients, which is a prediction of the theory of spiritual insurance but not of the theory of community insurance. We do not find that church members in the insurance enrollment treatment split their endowment

significantly differently from church members who only received the information about the insurance. This therefore constitutes additional supporting evidence in favor of hypothesis 2 against hypothesis 1.

V.E. Discussion

1. How Does Insurance Work? These experimental results point to an interesting relationship between the type of benefits parishioners might believe they receive from belonging to a church and their willingness to make costly donations to that church. First, treatment effects of insurance enrollment are present across the three recipients. As discussed earlier, neither the street children's fund nor the national thanksgiving offering are linked to the participant's church; the configuration of our experimental laboratory, with physical partitions between the subjects, rules out any signaling motive to other participants or to church authorities. If the type of insurance the participant associates with their church membership were purely community-based, there should not be a treatment effect on giving to these external recipients.

Thus, the fact that the effects we find are similar for giving to the three different types of recipients—the participant' s own church, the thanksgiving association, and the street children fund—indicates that a substantial part of the insurance channel works through beliefs that encourage giving as an act of worship to an interventionist god. The questionnaire supports the idea that church members believe in an interventionist god: less than 2% state that they do not believe god to be involved in their financial situation, 38% have attended a prayer camp within the previous two years,[29] and 21% even believe that there was a spiritual dimension to the last death in their family.

Nevertheless, we cannot rule out the simultaneous existence of community-based motives. Indeed, our questionnaire also provides support for the existence of community-based church motives for many participants in ordinary circumstances. All of the church branches state that they have a welfare fund for church members in need, 22% of participants would ask the church community for financial help if they were in need, and 23% have already received financial assistance from the church in the past.

29. Events organized to pray for miracles, such as healing or finding a marriage partner (see Arias et al. 2016).

Our results therefore do not imply that spiritual insurance is the exclusive or even the main motive behind giving to the church and that community-based insurance does not exist. In ordinary life, church members are unlikely to think only about insurance against funeral expenses when giving donations to the church. They face many risks and challenges other than funeral expenses. Even if members think that the risks of death can be managed by undertaking actions that are meritorious in the eyes of God, they may still be attentive to the benefits that may come from direct assistance from the church when they need it.

2. Heterogeneous Treatment Effects: Church Members during Fundraising Events. Up to this point, we have discussed results for church members recruited during normal service weeks. In wave 1, after recruitment, we learned that two churches had hosted revival weeks during the course of our experiments. Some of their members who participated in the experiment were sampled during those revival weeks. Revival weeks are special periods of church activity where members are encouraged to attend church daily. The services consist of prayer, teaching, singing, and exhortation to give money to the church.[30] In wave 2, we purposely sampled churches that were holding revival weeks while we were collecting data. For two churches, we were able to randomize participation during revival and nonrevival weeks on an individual level.

In total, 221 church members across waves 1 and 2 participated in the experiment while they were in the middle of a revival week.[31] We do not find them to be different from members recruited during regular service weeks for most measures

30. Asamoah-Gyadu (2015) describes revival meetings as an essential feature of contemporary Pentecostal worship. Access to these material benefits is accomplished through religious activities including "massive revival meetings, summits and conferences, all-day prayer services and all-night prophetic vigils and mass evangelistic crusades" (Asamoah-Gyadu 2015, 110).

31. The number of church members sampled during revival weeks was lower than the number suggested by power calculations in the wave 2 preanalysis plan. We attempted to maximize the number of revival week participants by scheduling data collection in a period that overlapped with a number of churches' revival weeks. However, recruitment and randomization into revival weeks was ultimately limited because most churches only hold three to four revival events a year, some of which are ad hoc and need-based, and we did not have continuous access to the churches throughout the year. For one church, we recruited church members only during the revival week and were not able to randomize participation.

TABLE V

COMPARING DEMOGRAPHIC VARIABLES AND RELIGIOUS BEHAVIOR ACROSS PARTICIPANTS WHO TOOK PART IN REGULAR AND REVIVAL WEEKS

Variable	Revival = 0	Revival = 1	Difference (p-value)
Age	37.24	36.44	−0.80 (.44)
Attends church daily	0.04	0.06	0.02 (.24)
Employed	0.61	0.61	−0.01 (.84)
Akan ethnicity	0.30	0.41	0.11 (.00)
Ewe ethnicity	0.19	0.26	0.07 (.05)
Ga ethnicity	0.13	0.15	0.02 (.36)
Female	0.67	0.65	−0.02 (.61)
More than secondary school	0.21	0.26	0.05 (.12)
Wave 2	0.47	0.45	−0.02 (.65)
Monthly income, GHS	306.05	317.48	11.42 (.59)
Prays multiple times per day	0.86	0.91	0.05 (.02)
Top quartile church giving	0.21	0.26	0.05 (.14)
Church more than once a week	0.74	0.74	0.00 (.97)
Believes God involved in finances	0.94	0.96	0.02 (.24)
Travels more than one hour to church	0.09	0.08	−0.01 (.76)

Note. p-values reported in parentheses are from a t-test of equality of means. Comparisons of preregistered covariates and some additional variables describing church and spiritual behavior.

of religious behavior or demographics (see Table V). However, for this sample, we find important differences in treatment effects. In wave 1, wave 2, and the pooled results, we find that after being enrolled in insurance, they increased giving to the church. The coefficient on the interaction of the enrollment and the revival week is positive and large (around three to four times the main treatment effect in absolute value), and significant. These results for the total sample are displayed in Online Appendix C, Table 23.

Without random assignment for participation, we do not know if this effect is due to different types of church members showing up (a selection effect) or a change in behavior because of the revival week itself. In Table VI, we present the results of the experiment we conducted in wave 2 where we randomized assignment to participate in the study during revival weeks. At the time of recruitment, participants were assigned to attend the experiment in a fixed week. They were not given any further incentives to participate during their assigned week. There was low compliance, particularly among those who were assigned to revival weeks (see Online Appendix C, Table 24) although compliers do

TABLE VI

EFFECTS OF ATTENDING THE EXPERIMENT DURING A REVIVAL WEEK FOR THE SUBSET OF WAVE 2 PARTICIPANTS WHERE THE ASSIGNED PARTICIPATION DATE WAS RANDOMIZED WITH AN ENCOURAGEMENT DESIGN

	Dependent variable					
	Giving to the church		Giving to the street		Giving to thanksgiving	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Nonrandomized revival attendance						
Insurance enrollment	−0.047	−0.069***	−0.051	−0.067**	−0.017	−0.017
	(0.039)	(0.025)	(0.040)	(0.031)	(0.033)	(0.022)
Revival week	−0.080	−0.072*	−0.041	−0.013	−0.038	0.024
	(0.050)	(0.043)	(0.056)	(0.054)	(0.043)	(0.036)
Insurance enrollment x revival week	0.181***	0.243***	0.110	0.149***	0.131**	0.156***
	(0.063)	(0.059)	(0.068)	(0.056)	(0.055)	(0.053)
Constant	0.571***	0.666***	0.526***	0.433***	0.561***	0.416***
	(0.027)	(0.093)	(0.029)	(0.109)	(0.023)	(0.111)
N	241	241	242	242	241	241
Panel B: Intention-to-treat estimates of random assignment to participate during a revival week						
Insurance enrollment	−0.058	−0.069**	−0.073*	−0.084**	−0.024	−0.025
	(0.040)	(0.028)	(0.041)	(0.037)	(0.035)	(0.027)
Assigned to revival	−0.061	−0.052	−0.066	−0.048	−0.058	−0.048
	(0.038)	(0.034)	(0.046)	(0.047)	(0.040)	(0.039)
Insurance enrollment x assigned to revival	0.139**	0.137**	0.128*	0.137**	0.085*	0.099**
	(0.056)	(0.053)	(0.066)	(0.063)	(0.051)	(0.050)
Constant	0.581***	0.684***	0.546***	0.471***	0.578***	0.493***
	(0.028)	(0.102)	(0.029)	(0.111)	(0.025)	(0.117)
N	241	241	242	242	241	241

TABLE VI
CONTINUED

	Dependent variable					
	Giving to the church		Giving to the street		Giving to thanksgiving	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel C: Instrumental variables estimate of revival week using randomized assignment to a revival week as an instrument for attending during a revival week						
Insurance enrollment	−0.072**	−0.084**	−0.078*	−0.092**	−0.031	−0.035
	(0.036)	(0.035)	(0.041)	(0.042)	(0.038)	(0.039)
Revival week	−0.157*	−0.143	−0.157	−0.119	−0.149	−0.137
	(0.094)	(0.104)	(0.107)	(0.123)	(0.098)	(0.114)
Insurance enrollment x revival week	0.314**	0.322**	0.268*	0.297**	0.201	0.229
	(0.132)	(0.129)	(0.147)	(0.150)	(0.138)	(0.142)
Constant	0.587***	0.688***	0.551***	0.466***	0.583***	0.532***
	(0.027)	(0.113)	(0.030)	(0.134)	(0.028)	(0.124)
N	241	241	242	242	241	241
Individual controls	No	Yes	No	Yes	No	Yes
Church dummies	No	Yes	No	Yes	No	Yes

Notes. This table corresponds to Heterogenous Effect 2 in the preanalysis plan and presents Tobit regressions censored at 0 and 1. Standard errors are in parentheses below the estimates and are clustered at the session level. Dependent variable is the fraction of the endowment that a participant allocated to either their own church (columns (1) and (2)), a nonprofit charity working with street children (columns (3) and (4)), or a countrywide prayer event called the national day of thanksgiving (columns (5) and (6)). The endowment in wave 1 was 11 GHS in 2015, and the endowment in wave 2 was 19 GHS in 2019. Individual controls include age, gender, ethnicity, employment, log(income), an indicator for daily church attendance, an indicator for praying multiple times a day, church fixed effects, and a dummy for the experimental wave. The size of the sample changes across columns because a computer error led to some missing demographic variables in wave 1. $^{*}p < .1$; $^{**}p < .05$; $^{***}p < .01$.

not differ from noncompliers in terms of preregistered demographics (see Table V and Online Appendix C, Table 27). As a result, we report both intention-to-treat and instrumented estimates of the effect of randomized revival attendance.

In Table VI, we show results for wave 2 participants who were part of the revival experiment (i.e., their church held a revival week during data collection and they received a randomized assignment to attend the experiment during a fixed week). In Panel A, we present results for participants who attended the experiment during a revival week, regardless of when they were randomly assigned. Church members who participated in the experiment during the revival week gave significantly more to all recipients when they received the insurance than those who participated during normal church weeks. In Panel B, we use the random assignment to the revival week rather than actual participation and find the same significant and positive effects. Finally, in Panel C, participation during revival week is instrumented with assignment.[32] We find even stronger positive effects of the revival week. Indeed, in this specification, the treatment effect of insurance enrollment on donations to the church and the street children's fund in normal weeks is stronger and has higher statistical significance than the effect reported for wave 2 alone in Table III.

Referring back to the model, these results are consistent with interpreting the revival week as an upward shift of θ, the relative weight in our subjects' utility function of church activities compared with secular ones. As equation (38) in the Online Appendix demonstrates, when equilibrium giving is higher than a given threshold, even in the presence of spiritual insurance, church members respond to an exogenous shock increasing the size of a loss by a decrease in optimal giving. Intuitively, there is a point at which members have already given so much money to the church that when faced with the prospect of a negative income shock, they prefer to keep money to smooth secular consumption (i.e., when g^* is large, the income effect dominates the substitution effect).

This explanation of the revival week effect is consistent with the types of activities and benefits members are supposed to derive from revival weeks. The results highlight that the spiritual state of church members (captured by θ in the model) matters.

32. F-statistics from the first stage are reported in Online Appendix, Table 28.

Intensive religious participation seems to decrease the demand for spiritual insurance and one might derive that overall demand for insurance, formal or informal, is low during important religious events when individuals already "feel protected."

3. Exploratory Heterogeneity Analysis: Costly Participation and Different Uses of the Church. The previous section highlights that there can be important heterogeneity in the treatment effect due to a temporary shift in θ, the relative weight the individual puts on church activities compared with secular consumption, during revival weeks. However, there can be heterogeneity between individuals in how they value spiritual consumption over secular consumption for a number of other reasons. While measuring θ directly is difficult, our questionnaire includes questions that measure church involvement and religious beliefs. We can use them to explore alternative reasons that θ might differ between individuals and how these differences in θ interact with our main treatment effects.

To avoid selectively presenting interactions of different variables, we take all the survey questions that asked participants about their church participation to create an index that captures costly church behavior: questions that measure how much time and money participants give up to participate in the church (see Online Appendix A, Table IV for descriptive statistics of responses to these questions).[33] We code responses to the questions as dummy variables and then combine all the dummy variables into an index, taking the mean of all variables weighted by the inverse of their covariance matrix as proposed by Anderson (2008). Details of the construction of the index are provided in Online Appendix C. The variation of the index is pictured in Online Appendix Figure 3.

We expect the costly behavior index to have a similar effect as participation during a revival week. The intuition from our model is the same: a higher value of spiritual consumption relative to secular consumption (high θ) leads to higher levels of costly church participation. Such high values of spiritual consumption can reach a point where members feel sufficiently

33. The interaction between the treatment and an indicator for donating a lot, defined as being in the top 25% of givers relative to own income, was preregistered in wave 2. The results are displayed separately in Tables 32–34, column (2).

protected that the income effect of the insurance enrollment outweighs the substitution effect.

The interaction between the insurance enrollment treatment and the costly participation index is displayed in Online Appendix C, Table 29. In line with the previous section, we find that members that score highly on the religious participation index have treatment effects that are significantly different from those with lower participation levels. While lower levels of costly participation are associated with decreasing giving to the church after enrollment in insurance, this is not the case for members with higher levels of costly participation.

Another level of potential heterogeneity is that church members differ in the type of insurance they demand. The average treatment effect of the experiment does not imply that all church members are seeking spiritual insurance. Indeed, it is a weighted average of the effect of church members who are seeking spiritual insurance and church members who seek community or no insurance. Using the survey questionnaire, we try to disentangle different types of church members. As before, we use all questions in the questionnaire that asked about beliefs or uses of the church for financial purposes or as a social network (Table 8 in Online Appendix A) and questions that asked for beliefs or uses of the church as a center for spiritual activity (see Online Appendix A, Table 15 for summary statistics). We create the two indices with the same method as the costly participation index. Their variation and correlations are displayed in the same Figure 3 in the Online Appendix.

Figure 3 shows that most church members state spiritual reasons for going to church and there is little variation in the index (see Online Appendix C for a longer discussion of this). The index for using the church as a financial and social network has more variation and a majority of church members score relatively low on this measure. Online Appendix C, Tables 30 and 31 present results for the interactions between the insurance enrollment treatment and how participants report using the church.[34] We do not find that church members with high values in the spiritual motive index react differently to the treatment. On the contrary, those who score high on the network index give significantly less to their own church and the street children's fund after being enrolled

34. Tables 32 to 40 in Online Appendix C provide more detailed regressions with individual questionnaire answers as independent regressors.

in insurance. These results are consistent with both community-based insurance and spiritual insurance (represented by the decrease in giving to the street children's fund).

These results illustrate that although we can identify differences in the intensity of costly behavior (a proxy for the level of θ), we are not able to cleanly identify differences between church members in the type of insurance they seek. Indeed, the lack of variation in the spiritual index shows that most church members seek at least some spiritual or moral dimension in their churches.

VI. Conclusion

We conducted a lab-in-the-field experiment with church members from an established Pentecostal church in Accra, Ghana. We find evidence for religious and charitable giving being part of a church member's risk-coping strategy. This spiritual insurance channel does not contradict the possibility that other church community-based mechanisms exist in parallel. Indeed, survey responses from church members and leaders emphasize the important role the church plays as a financial contributor. However, our experimental findings add nuance to the literature on religious institutions as coordinating platforms by demonstrating that adherents might care at least as much about spiritual insurance (affecting outcomes through signaling to an interventionist god) as they do about material insurance (accessing transfers of goods and services from other church members).

The treatment effects obtained within the church population depend on three important factors. First, Pentecostal churches stress the involvement of God in terms of blessings in everyday life and teach about God rewarding religious and charitable giving. This particular religious discourse makes members of these churches more prone to see charitable behavior as a means to decrease the risk of bad events happening and to increase the occurrence of good events. Second, trust in the insurance is fundamental, especially in a context where formal institutions are generally weak. In our case, the church was used as a coordinator for the insurance scheme and participants seemed to trust the insurance because it was coordinated by their pastor.[35] Finally,

35. By contrast, when we tried to run a similar experiment with the market association, the insurance enrollment failed to yield any effect because market participants did not trust the head of the market association who was chosen to administrate the insurance scheme.

our results obviously depend on the absence (or limited presence) of other institutions to deal with risk. As long as these three conditions are met, we expect our results to hold. In particular we believe that our results would hold in other Pentecostal churches and settings where the development of formal insurance is low. Because beliefs in religious rituals that influence immediate events are common among a variety of religions and faiths in developing countries, it would be interesting to reproduce the experiment in a different religious setting.

The experiment stressed the importance of religion for economic decisions made by individuals in a setting with weak formal institutions. Although individuals might belong to religious institutions in those settings because they offer risk-mitigating strategies, we show that formal, private insurance can at least partially substitute for spiritual-based insurance mechanisms. Because the church was used as a credible coordinator for the insurance scheme, we are inclined to see religious institutions in this context as opportunities to spread formal insurance rather than as an obstacle to its development.

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SUPPLEMENTARY MATERIAL

An Online Appendix for this article can be found at *The Quarterly Journal of Economics* online.

DATA AVAILABILITY

Data and code replicating tables and figures in this article can be found in Auriol et al. (2020), in the Harvard Dataverse, doi: 10.7910/DVN/KVFRFO.

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