The Price of Faith: Economic Costs and Religious Adaptation in Sub-Saharan Africa*

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Abstract

How do religious groups adapt when the economic cost of adherence rises? We provide causal evidence that they adapt along three margins simultaneously: contracting in membership, softening enforced strictness, and expanding compensatory services. We study the Seventh-day Adventist (SDA) Church in sub-Saharan Africa, which prohibits production of tobacco, coffee, and tea. The interaction of agro-ecological suitability with global export prices generates exogenous variation in the opportunity cost of SDA membership across nearly 200 sub-national localities from 1991 to 2022. When these costs rise, SDA membership contracts; local churches expand educational and health institutions; and survey evidence shows reduced emphasis on healthy-living prescriptions alongside higher member consumption of prohibited goods. Among stayers, satisfaction and commitment fall, against predictions of strict-church models. These findings identify simultaneous behavioral and institutional adaptations to rising costs of adherence – the joint pattern invoked in historical accounts of religious reform – with implications for understanding how religious groups adapt as they encounter new economic environments.

JEL codes: D71, L31, O12, Z12
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1. Introduction

Many of religious history's most consequential reforms occurred in periods when adherence to religious precepts had become more economically costly. The Reform movement in nineteenth-century European Judaism softened Sabbath restrictions and dietary law as Jewish emancipation under Napoleonic and post-Napoleonic legal reforms sharply raised the opportunity cost of strict observance (Meyer, 1988; Carvalho and Koyama, 2016). The Mormon abandonment of polygamy in 1890 followed federal anti-polygamy statutes and asset seizures that had made the institutional costs of strict adherence prohibitively high (Gordon, 2002). The strictness softening of US mainline Protestant denominations through the mid-twentieth century – ordination of women, liberalization of sexual ethics, doctrinal softening – coincided with the rising opportunity cost of strict observance in an increasingly secular society (Kelley, 1972; Iannaccone, 1994; Finke and Stark, 2005). Religious-economy scholarship has long invoked rising costs of adherence as a driver of such episodes (Iannaccone, 1992; Ekelund et al., 2006).[1]

However, these historical episodes are not directly informative about causality. Existing causal work has examined religious adaptation along single margins in disparate settings: how religious participation responds to economic shocks (Chen, 2010; Bentzen, 2019; Dube et al., 2024); how religious proscriptions and costly behaviors enhance member commitment through positive selection in club-good models (Iannaccone, 1992; Berman, 2000; Hungerman, 2014; Campante and Yanagizawa-Drott, 2015); and how religious supply adjusts to denominational and secular competition (Finke and Stark, 2005; Corbi and Sanches, 2025). To date, no setting has supported causal identification of all three margins jointly. We provide such evidence in a contemporary setting. When the economic cost of religious adherence rises, religious groups adapt on three margins simultaneously: membership contracts, enforced strictness softens, and compensatory services expand. Each margin has been invoked separately in scholarly accounts of historical religious reform; we identify them jointly and causally for the first time.

We study the Seventh-day Adventist (SDA) Church in Sub-Saharan Africa, which prohibits production of tobacco, coffee, and tea. Because crop-specific agro-ecological suitability is fixed by climate and soil while global export prices vary year to year, we construct a locality-year measure of the opportunity cost of SDA membership: the per-hectare agricultural revenue forgone by following SDA production prohibitions. This construction rules out reverse causality, since neither geography nor world prices can be affected by SDA membership decisions in any one locality. We observe outcomes at the

[1] A parallel case in Catholic Christianity is the relaxation of liturgical and disciplinary rules under Vatican II (1962–1965). The religious-economy literature reads this case both as adaptation to rising secular alternatives and as a trigger of subsequent decline (Iannaccone, 1994; Stark and Finke, 2000).

level of nearly 200 sub-national SDA administrative units from 1991 to 2022, drawing on SDA administrative data on membership and institutional output and on surveys of SDA members covering religious attitudes and behaviors. The main threat to identification is that crop suitability and prices generate income variation broadly, not just opportunity costs of SDA membership; we address this by controlling for unconstrained agricultural revenue, which absorbs general crop-income shocks, and by showing that placebo opportunity costs of economically similar but non-prohibited cash crops produces no comparable effects across our outcomes.

We find that religious groups adapt along all three margins simultaneously. First, SDA membership contracts where opportunity costs rise: net membership growth falls by 12.9 percentage points on average in periods of non-zero opportunity costs. Second, where opportunity costs rise, local SDA churches expand service provision through new educational and health institutions. Effects on both margins are concentrated in localities where more land is cultivated, consistent with the cost shock operating through the production side of the prohibition rather than the consumption side. Third, country-level survey evidence converges: when opportunity costs rise, SDA members report less messaging on healthy-living prescriptions and greater consumption of the prohibited goods. These responses are attenuated in localities where SDA is more deeply embedded, proxied by a higher local SDA population share. Notably, even committed members who remain experience reduced satisfaction with and commitment to the church when opportunity costs rise.

Our findings adjudicate among ex-ante predictions from the religion-economics literature that pull in opposite directions, and highlight a supply-side twist the existing literature does not fully anticipate. The strict-church and costly-signaling traditions in club-good models predict that costly religious prohibitions enhance member commitment through positive selection: marginal adherents leave, and those who remain are more committed and more satisfied (Iannaccone, 1992, 1994; Berman, 2000). Sacred-values theory predicts that religious commitments are treated as incommensurable with material gains, limiting cost-driven adjustment (Atran et al., 2007). Religious-markets theory, by contrast, predicts sorting toward lower-cost denominational alternatives when costs rise (Stark and Finke, 2000; Finke and Stark, 2005). Our evidence supports the sorting view: membership contracts when costs rise, and – against strict-church predictions of positive selection – even committed members who remain experience reduced satisfaction. Yet, sorting alone does not capture the full response: religious institutions actively adapt as well, expanding compensatory services and softening enforced strictness in response to the same exogenous cost shocks. The attenuation of these responses in localities with a higher local SDA population share connects to the Polanyi-Granovetter tradition in economic sociology (Polanyi, 1944; Granovetter, 1985): denser social networks raise the

value of embedded membership, dampening the cost-shock response.

Relative to existing empirical work in the economics of religion, we bring within-country sub-national variation, annual panel data, and a design that observes both demand and supply sides of religious adaptation within a single causal framework. The cross-country empirical literature on religion and economic outcomes (Barro and McCleary, 2003; McCleary and Barro, 2019) identifies broad associations but not micro-level adaptive responses. Historical studies of religious change in Europe (Becker and Woessmann, 2009; Cantoni et al., 2018; Squicciarini, 2020) provide causal evidence at the macro-historical scale but do not observe how religious groups adjust in real time at fine spatial resolution. Single-margin natural experiments (Chen, 2010; Bentzen, 2019; Campante and Yanagizawa-Drott, 2015; Hungerman, 2014) causally identify specific responses, but each operates in a different setting and on a single margin. Our setting combines exogenous variation in the cost of adherence with annual-frequency panel data on membership, institutional output, and member-reported doctrinal emphasis, allowing direct observation of how religious groups adapt on all three margins – a joint pattern the existing literature has had to reconstruct from singular historical episodes.[2]

The opportunity costs we study are not unique to SDA; religious precepts widely impose economic costs on adherents. Sabbath and festival-day labor restrictions (Stifel et al., 2011; Montero and Yang, 2022), dietary rules in Islamic *halal* (El-Zibdeh, 2009) and Jewish *kashrut* (Forst, 1993), the prohibition on usury in the early Christian church (Ihssen, 2012; Visser and McIntosh, 1998), and Hindu caste-based occupational prescriptions (Goghari and Kusi, 2023) all impose costs that may vary with local economic conditions. The joint three-margin response we identify is a candidate mechanism for the historical reforms with which we opened: Reform Judaism, the Mormon abandonment of polygamy, and US mainline Protestant softening. Each can be read as religious institutions re-equilibrating in response to cultural mismatch – the misalignment between persistent religious practices and changing economic environments (Giuliano and Nunn, 2020; Nunn, 2022). The SDA case in sub-Saharan Africa is one instance of a broader dynamic in which cultural-institutional equilibria respond to economic conditions (Acemoglu and Robinson, 2025).

This paper is organized as follows. The next section provides background on religion in Sub-Saharan Africa and on the Seventh-day Adventist Church. Section 3 describes the data, and Section 4 presents the empirical strategy and conceptual framework. Section 5 presents our main results on membership, on the establishment of new educational and

[2]Our setting also relates to a literature in development economics on the prevalence and welfare costs of temptation goods such as tobacco and alcohol among poor households (Banerjee and Duflo, 2007; Schilbach, 2019); we study a distinct margin: the economic cost borne by adherents of a religion that proscribes producing and consuming some temptation goods.

health institutions, and on heterogeneity by local religious-market structure. Section 6 draws on SDA member surveys to examine how rising opportunity costs affect doctrinal emphasis, member-reported consumption of prohibited goods, and member satisfaction. Section 7 concludes.

2. Background

2.1. Religion in Sub-Saharan Africa

The religious landscape of Africa has undergone significant transformations in recent decades, characterized by rapid growth and shifting denominational allegiances. Christianity and Islam, in particular, have seen substantial expansion across the continent, often outpacing population growth (Zurlo, 2024). This religious boom has been especially pronounced in Sub-Saharan Africa, where Christianity has experienced remarkable growth since the mid-20th century (Jenkins, 2011). By 2020, nearly two-thirds of sub-Saharan Africans identified as Christian, making it one of the most Christian-populous regions in the world (Zurlo, 2024).[3]

Religious expansion has gone hand in hand with increasing denominational diversity. Across the region, Pentecostal and Charismatic churches have grown rapidly, often blending traditional African spiritual practices with Christian theology (Anderson, 2013). Mainline Protestant denominations and the Catholic Church have also expanded, albeit more slowly (Jenkins, 2016), and Islam has likewise grown in certain areas, particularly in West and East Africa (Hill, 2009). Recent survey evidence highlights that switching between Christian denominations is relatively common over the life course, and that competition is primarily *within* Christianity rather than between Christianity and non-affiliation (Alfonsi et al., 2024).[4] The dynamic religious environment has had profound implications for social, economic, and political spheres across the continent, influencing everything from voting patterns to economic behaviors and social norms (Ellis and Haar, 2007).

[3] In most countries, this expansion has not taken the form of Christianity replacing traditional beliefs, but rather of a crowded and fluid religious marketplace in which households choose among multiple Christian denominations, Islam, and a variety of independent and syncretic churches while often maintaining traditional beliefs (Le Rossignol et al., 2025)

[4] Alfonsi et al. (2024) use panel data from Kenya and illustrate this pattern clearly: 38% of respondents report switching between traditional Christian churches (Catholic/mainline Protestantism) and Pentecostal churches over a 20-year period, with additional switching within these broad categories (about 7% between Catholic and mainline Protestantism and 25% among different Pentecostal churches). At the same time, only around 6% of respondents ever report a non-Christian affiliation, the share with no religion remains close to 1%, and 95% say religion is very important in their lives, implying that mobility largely reallocates believers across Christian denominations rather than into or out of religion.

Within this dynamic religious landscape, the Seventh-day Adventist (SDA) Church has emerged as one of the fastest-growing Christian denominations in Africa (Adogame et al., 2008; Llywelyn, 2022). From its initial footholds established in the early 20th century, the SDA Church has expanded rapidly across the continent, with particularly strong growth in Eastern and Southern Africa (Höschele, 2007). This growth has occurred despite, or perhaps partly because of, the church's distinctive doctrines and lifestyle practices, which set it apart from many other Christian denominations in the region.

2.2. The Seventh-day Adventist Church

The Seventh-day Adventist Church, founded in 1863 in the United States, is a Protestant Christian denomination known for its emphasis on the Second Coming ("Advent") of Christ and observance of the Sabbath on Saturday (Land, 2005). Since its inception, the SDA Church has experienced significant global growth, becoming one of the fastest-growing Christian denominations worldwide. As of 2023, the church reports a global membership of 22.8 million, with Sub-Saharan Africa accounting for nearly half (46.2%) of global membership (Office of Archives, Statistics, and Research, 2024).[5]

Central to SDA doctrine is the concept of holistic health and wellness, rooted in the belief that the human body is the temple of the Holy Spirit (General Conference of Seventh-day Adventists, 2024). This theology underpins a distinctive set of lifestyle practices and prohibitions. Among the most notable of these are strong discouragement of or prohibitions on the consumption and production of tobacco, coffee, and tea (General Conference of Seventh-day Adventists, 2022a).[6] These restrictions differentiate SDAs from many other Christian denominations in the region.[7]

The SDA prohibition on tobacco is the most explicit, and it extends well beyond personal use. The baptismal vow in the *Seventh-day Adventist Church Manual* requires candidates to abstain from the "use, manufacture, or sale of tobacco in any of its forms," and the same conduct is listed in the discipline chapter as grounds for church action (General Conference of Seventh-day Adventists, 2022b). This codifies long-standing counsel: an 1868 statement by James and Ellen White urged Adventists to "plant no

[5]Appendix Table C1 reports membership by world division, and Appendix Figure C1 maps Adventist membership per million inhabitants by country, showing that the church's presence is concentrated in Sub-Saharan Africa, Latin America, and the Pacific rather than in North America or Europe.

[6]In addition to abstaining from tobacco, alcohol, tea, and coffee, SDA teaching encourages simple diets, often vegetarian or heavily plant-based, and in some cases adherence to Old Testament distinctions between "clean" and "unclean" meats (General Conference of Seventh-day Adventists, 2022a).

[7]Some other Christian groups in Sub-Saharan Africa, particularly Pentecostal churches and the Church of Jesus Christ of Latter-day Saints (LDS), also discourage or prohibit alcohol and sometimes tobacco; discouragement of both coffee and tea is rare outside SDA and LDS groups. By contrast, Catholic and mainline Protestant churches generally place no doctrinal restrictions on cultivating or consuming tobacco, coffee, and tea beyond norms against excess or addiction.

more … tobacco fields" and to get any existing such enterprise "off your hands as soon as possible" (White and White, 1868), guidance the church continues to apply directly to tobacco farming, trading, and manufacturing employment (Wilson, 2016). In Sub-Saharan Africa, this boundary has repeatedly been understood and enforced as a restriction on cultivation rather than on consumption alone: reporting from Zimbabwe notes that the church "is on record disapproving tobacco farming" and that "its members are not allowed to grow the golden leaf," with violators facing "censure or de-fellowship" (The Herald, 2011).[8]

The church's treatment of coffee and tea is similar in spirit but less formally codified. Adventist health teaching strongly discourages caffeinated beverages, citing their addictive properties and health effects (Wilson, 2017), and Ellen White's counsel is categorical ("Tea is poisonous to the system"; "Tea, coffee, and tobacco are all stimulating, and contain poisons") (White, 1923, 1949). Unlike tobacco, however, coffee and tea are not named in the current discipline chapter; official policy classifies them as "discouraged" rather than as required abstentions (Trans-European Division of Seventh-day Adventists, 2013). Even so, in several African mission settings the discouragement has extended to production: official church history attributes slow growth in eastern Kenya to "preaching against planting or using tobacco, coffee, tea, and miraa" (Marambi, 2021), and Maxon (1994) identifies the church's "hostile attitude towards coffee growing" as a factor stifling Gusii coffee cultivation in the 1930s. The anti-profit logic is also institutionalized in church finance: official SDA investment screens exclude from denominational portfolios firms whose primary business is the manufacture or sale of tobacco and of caffeinated beverages alike (General Conference of Seventh-day Adventists, Investment Office, 2017; General Conference of Seventh-day Adventists, Treasury Department, 2017), and Adventist food factories historically built an alternative economy of cereal-based "coffee" and other substitutes for caffeine (Rønne, 2021; Maranhão et al., 2022; Darius, 2021). We therefore describe SDA teaching as one that prohibits or strongly discourages the production of tobacco, coffee, and tea – a boundary that is firmest and most uniformly enforced for tobacco, and strong but less fixed for coffee and tea.

These prohibitions have significant economic implications, especially in regions where tobacco, coffee, or tea are important cash crops (Prowse, 2013). In parts of Sub-Saharan Africa, where these crops are often crucial to local economies, the decision to join the SDA Church may represent a substantial economic sacrifice for individuals and communities. Despite these economic challenges, the SDA Church has seen rapid

[8]Other accounts point the same way. In Kuria District, Kenya, oral interviews report that full SDA membership required adherents to "abandon their tobacco farms" (Chacha, 2000). In Cameroon, a convert was refused baptism because he worked making cigarettes (Andrew McChesney, 2023), and in Rwanda an Adventist household uprooted an already-planted tobacco crop on moral grounds (McChesney, 2019).

growth in Sub-Saharan Africa (Office of Archives, Statistics, and Research, 2019), and has developed a sizeable institutional footprint across the region. Local congregations are linked to networks of schools, hospitals, and clinics that are formally affiliated with the church. Adventist primary and secondary schools, teacher-training colleges, and, in some settings, universities provide formal education that is attractive to households seeking upward mobility and access to white-collar employment. SDA hospitals and clinics similarly serve both Adventists and non-Adventists, and public-facing health programs are often explicitly connected to the church's evangelistic mission. Membership in the church thus often comes bundled with access to organizational resources and social networks that extend beyond purely spiritual activities.

3. Data

We study the impact of opportunity costs of membership in the SDA Church on new memberships and on church actions in response. We are also interested in the impacts on existing members' attitudes and adherence to religious tenets. Studying these questions requires assembling a range of datasets, many of which have not previously been used for research in economics.

3.1. Membership and Church Actions

We obtained data on membership in the SDA church from the SDA Office of Archives, Statistics, and Research (ASTR). The ASTR's public website offers a wealth of information, including official church publications and detailed datasets on the church's global presence, with data starting as early as 1863 for each available geographical area. Using the website's structure – which follows the church's organizational structure – we extracted yearly membership information at the lowest level of the SDA church's administrative divisions for each country.[9] For the remainder of this paper, we will refer to these sub-national divisions of varying sizes as SDA *localities*. For each locality, the data contains counts of the stock and flow of membership, including the number of baptisms, new membership gains, transfers, and member deaths, among others, for each year. Appendix Section A.1 provides definitions for each variable in the ASTR dataset.

The primary church membership outcome variables in our analyses below are 1) gains, 2) losses, and 3) net gains. Gains are defined as the total number of members added by all methods, including baptisms, former member baptisms, or professions of faith. Losses are defined as the total number of members removed from membership rolls, either by

[9]Appendix A.1.2 presents a detailed description of the SDA administrative structure.

dropping membership or by being recorded as missing. Net gains are defined as gains minus losses.

The primary church response outcome variables in our analyses are the number of 1) churches and 2) health or education institutions. We obtained the first variable directly from the ASTR yearly statistics. Churches represent the total number of registered churches or "companies" (newer churches) for the locality in a given year.[10]

To obtain the counts of health and education institutions, we systematically digitized the SDA Yearbooks – a yearly publication of the central branch of the SDA that serves as a directory of the SDA's organizational units and institutions (General Conference of Seventh-day Adventists, Archives, Statistics, and Research, 2023) – to extract the list of SDA institutions available year by year, using the listed addresses to geo-reference each institution and assign them to localities.

We focus on localities from 1991 onwards (through 2022 inclusive) due to completeness of data and widespread availability of data at the level of sub-national localities in Sub-Saharan Africa. To map each of these localities to countries' administrative divisions, we use information from the SDA Yearbooks on the geographic areas encompassed by each SDA organizational unit. Localities have slowly reorganized as their membership grows, usually splitting into smaller localities. This process naturally leads to an unbalanced panel. We follow each locality for as many years as it exists, with the same geographical boundaries as indicated in the SDA Yearbooks. We use this information to construct unique shapefiles identifying these localities across time by combining the data with the GADM shapefiles from the Global Administrative Areas database (Global Administrative Areas, 2022).[11] Figure 1 provides a map of the 195 SDA localities for 2020.[12] Figure 2 presents maps on the population size of Adventist membership across SDA sub-national localities for 1995 (a), 2011 (b), and 2020 (c).

3.2. Opportunity Cost of Religious Membership

We aim to create a measure of the opportunity cost of adhering to SDA prohibitions on the production of tobacco, coffee, and tea that varies both over time and at the locality level. To do so, we use data on (time-invariant) locality-specific potential crop yields and (time-varying) global crop prices.

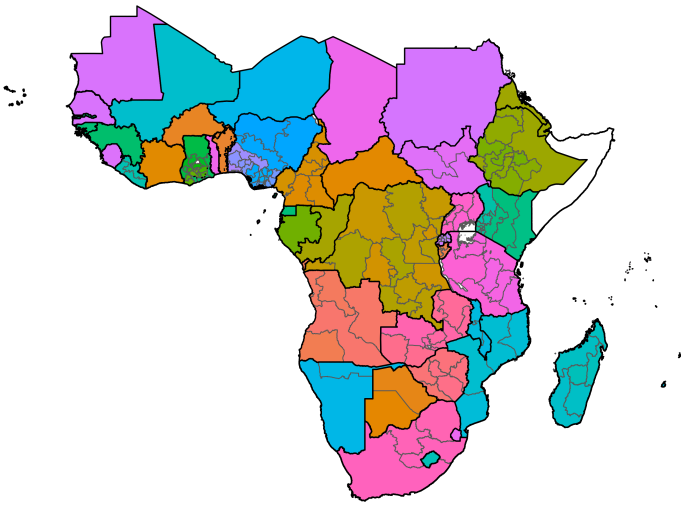
First, we use information that details at a very granular level – 9 km by 9 km grid cells – the time-invariant spatial variation in the suitability of the land for 38 different crops. These data come from the Global Agro-Ecological Zones (GAEZ v4) dataset of the

[10] See Appendix A.1 for variable details.

[11] Appendix A.2 contains a detailed description of the definition and construction of geographic definitions of SDA localities.

[12] Appendix Table C2 provides summary statistics for the religious membership data.

Figure 1: SDA Localities: 2020



Notes: Borders of the 2020 SDA sub-national localities used in our analyses. Borders determined using information from SDA Yearbooks (General Conference of Seventh-day Adventists, Archives, Statistics, and Research, 2023) in combination with GADM shapefiles from the Global Administrative Areas database (Global Administrative Areas, 2022). See Section 3.1 for details.

Food and Agriculture Organization (FAO) of the United Nations in cooperation with the International Institute for Applied Systems Analysis.[13] Crop yield data are in kilograms of production per hectare.

The second component needed to construct the opportunity cost measure is time-varying crop export prices from 1990 onward.[14] The prices are provided by the FAO's Food and Agricultural Trade Dataset (Food and Agriculture Organization of the United Nations, 2024), which includes export values and quantities at the country-year level. To mitigate the influence of country-specific economic shocks and capture broader regional trends, we use a weighted average of prices for Sub-Saharan Africa derived from export values and quantities.[15] Appendix Figure C3 presents a time series of average regional prices for prohibited crops (coffee, tea, and tobacco), and Appendix Figure C4 presents a time series of average regional prices for a subset of non-prohibited crops. These crop price data (and all data in money terms in this paper) are expressed in real 2010 US dollars.

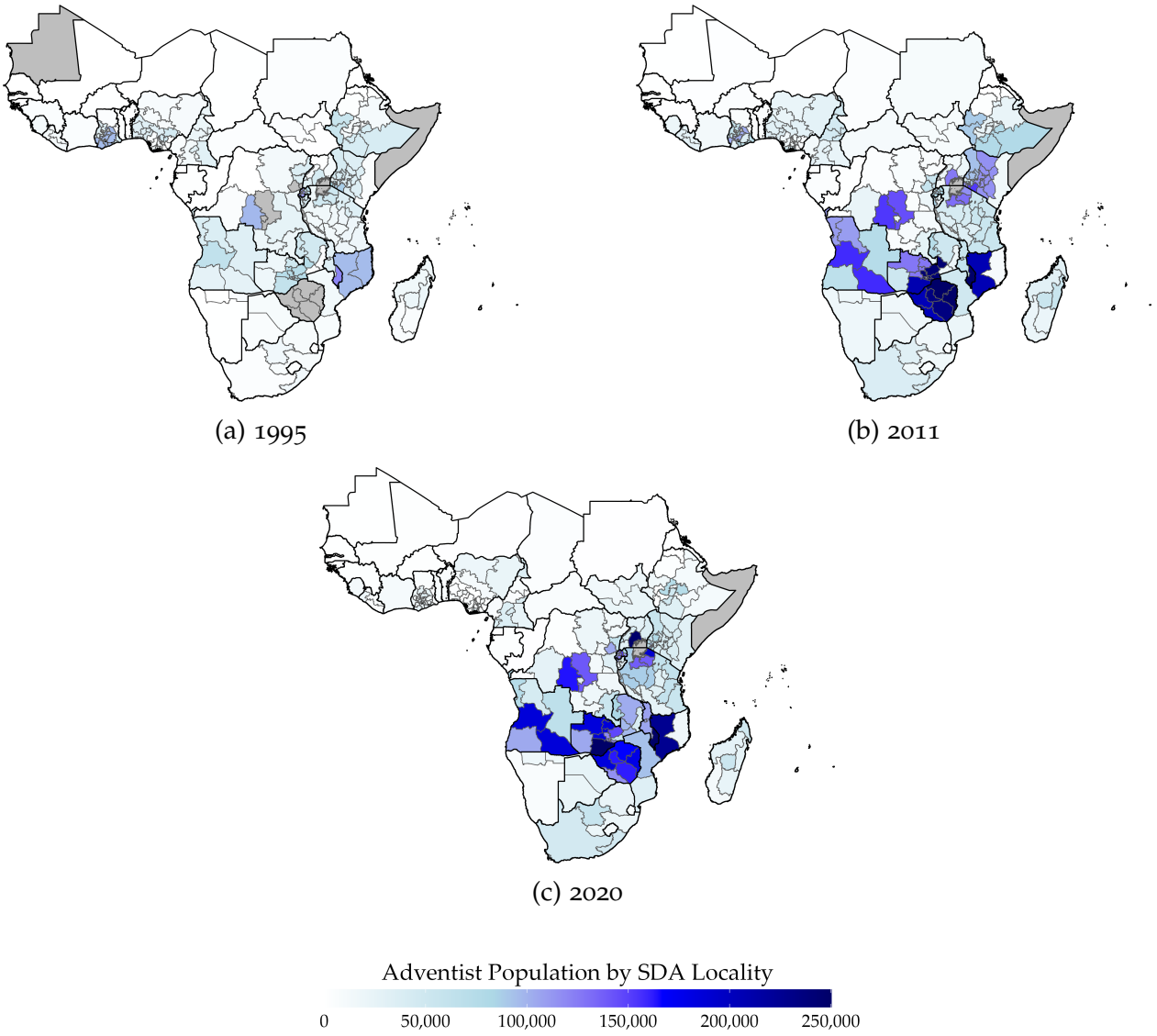
With these two components – the (time-invariant) potential crop yields measures and (time-varying) annual crop prices – we calculate the opportunity cost of adhering to SDA crop prohibitions. This opportunity cost measure is the revenue given up per hectare from avoiding the production of tobacco, coffee, and tea. Specifically, let p index

[13]GAEZ is a multi-stage model that combines geographic, soil, and climate data to produce estimates of potential yields for specific crops. See Appendix A.3 for details.

[14]Appendix Table A.4 describes the concordance between GAEZ crops and FAO products.

[15]Appendix Table A.5 provides a detailed description of the construction of export prices.

Figure 2: Number of SDA Members by Locality



(a) 1995

(b) 2011

(c) 2020

Notes: Number of SDA members by SDA locality for select years. Borders determined as described in Figure 1 and Section 3.1. Data on SDA membership are from the SDA Office of Archives, Statistics, and Research (ASTR).

pixels (grid cells), t index years, and k index crops from the set of 38 crops (K) for which we have both export prices ($p_{k,t}$) and crop suitability ($s_{k,p}$). We first define the "unconstrained" maximum revenue as:

$$R_{p,t}^{max} = \max_{k \in K} (p_{k,t} \cdot s_{k,p})$$

that is, the maximized revenue per hectare on a pixel (from selecting the revenue-maximizing crop from all possible crops for cultivation, given time-invariant crop yields and time-varying crop prices).[16] Figure 3 presents maps of the highest unconstrained revenue-yielding crop across pixels for various years.

We then define the "constrained" maximum revenue as:

$$R_{p,t}^{constrained} = \max_{k \in K \setminus \{\text{tobacco, coffee, tea}\}} (p_{k,t} \cdot s_{k,p})$$

that is, the maximized revenue per hectare if one follows SDA prohibitions and does not produce tobacco, coffee, or tea.[17]

We then calculate the opportunity cost of adhering to SDA production prohibitions for each pixel by taking the difference between the unconstrained and constrained maximized revenue variables. We define the opportunity cost of SDA membership (in 2010 US dollars per hectare per year) as:

$$\textit{SDA Cost}_{p,t} = R_{p,t}^{max} - R_{p,t}^{constrained}$$

where positive values of $\textit{SDA Cost}_{p,t}$ indicate higher opportunity costs of religious membership. For pixel-years where the maximum revenue-generating crop is not a prohibited crop, our measure is zero, implying that adhering to SDA prohibitions does not incur any opportunity cost in those cases.[18] Figure 4 presents maps of this opportunity cost measure ($\textit{SDA Cost}_{p,t}$) across pixels for various years.

We aggregate this measure to the SDA locality level for each year. We take the average of the opportunity cost measure across pixels in a locality (indexed by l), where the average is weighted by pixel-level population to avoid placing weight on areas with little to no population.[19] This is interpreted as the opportunity cost (in 2010 US dollars per

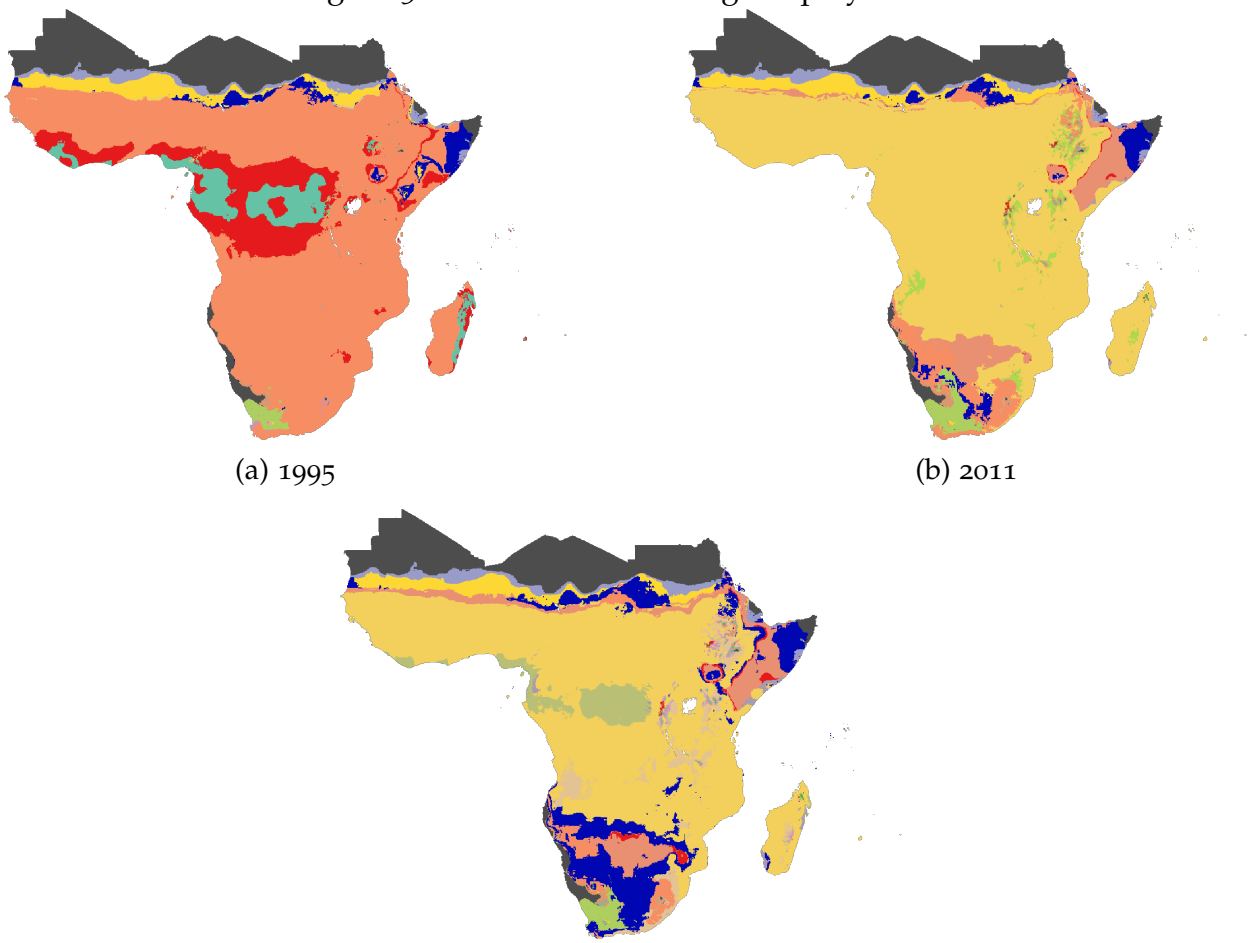
[16] A farmer could of course cultivate several crops rather than one; we summarize each pixel by its single revenue-maximizing crop as a simplification. Doing so is a simple and assumption-light approach (takes no stand on how households weight a portfolio of crops) and mirrors Galor and Özak (2016) and Costinot et al. (2016). It is also flexible: the maximum adapts to whichever crop is most profitable in a given pixel and year, and because near-optimal crops yield almost the same revenue, the measure is less sensitive to exactly which crop is selected.

[17] The non-prohibited crops comprise all 35 priced GAEZ crops other than the three prohibited ones; the full list and the GAEZ-FAO concordance are in Appendix Table A1.

[18] This also clarifies how we treat pixels with several near-optimal crops: we summarize each pixel by its single revenue-maximizing crop, the simplest and most assumption-light benchmark and the same approach used by Galor and Özak (2016) and Costinot et al. (2016). Because the measure nets out the best available non-prohibited crop, it records a positive cost only where a prohibited crop strictly dominates the permitted set, and is zero whenever an equally profitable permitted crop exists.

[19] We use 1980 pixel-level population data from HYDE version 3.2.1 (Klein Goldewijk et al., 2017) to calculate the population-weighted average cost for each locality.

Figure 3: Revenue-Maximizing Crop by Pixel



(a) 1995

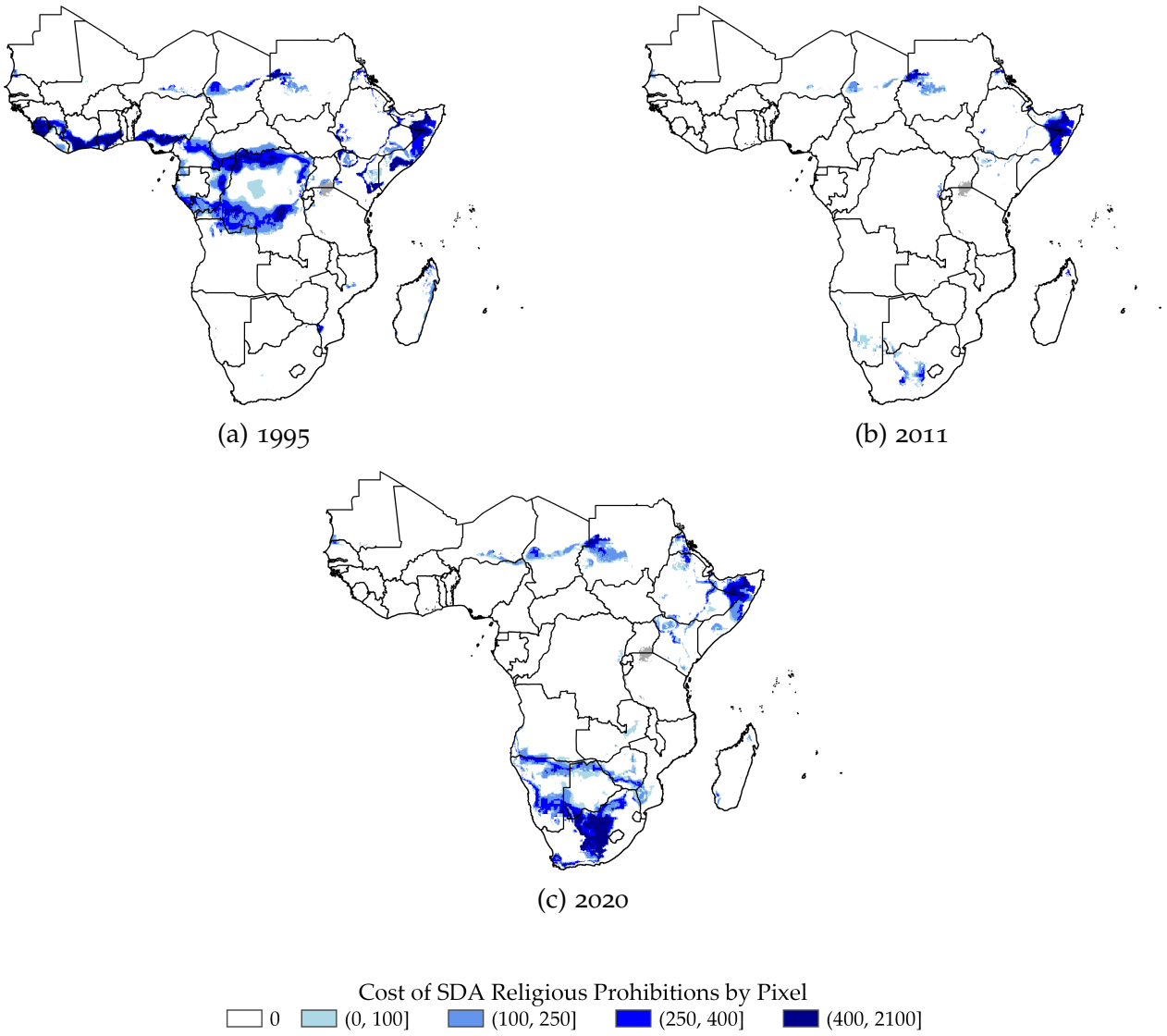
(b) 2011

(c) 2020

Notes: Colors identify the revenue-maximizing crop for each of the 795,236 (9 km by 9 km) pixels in Sub-Saharan Africa in select years. Revenue-maximizing crop is determined using data on pixel crop suitability (from the Global Agro-Ecological Zones (GAEZ v4) dataset) and crop export prices (Food and Agriculture Organization of the United Nations, 2024). See Section 3.2 for details.

hectare per year) of following SDA crop-production prohibitions in a given locality and year ($SDA\ Cost_{l,t}$). Figure 5 presents the opportunity cost measure across SDA localities for multiple years.[20]

Figure 4: Opportunity Cost of SDA Crop Prohibitions by Pixel

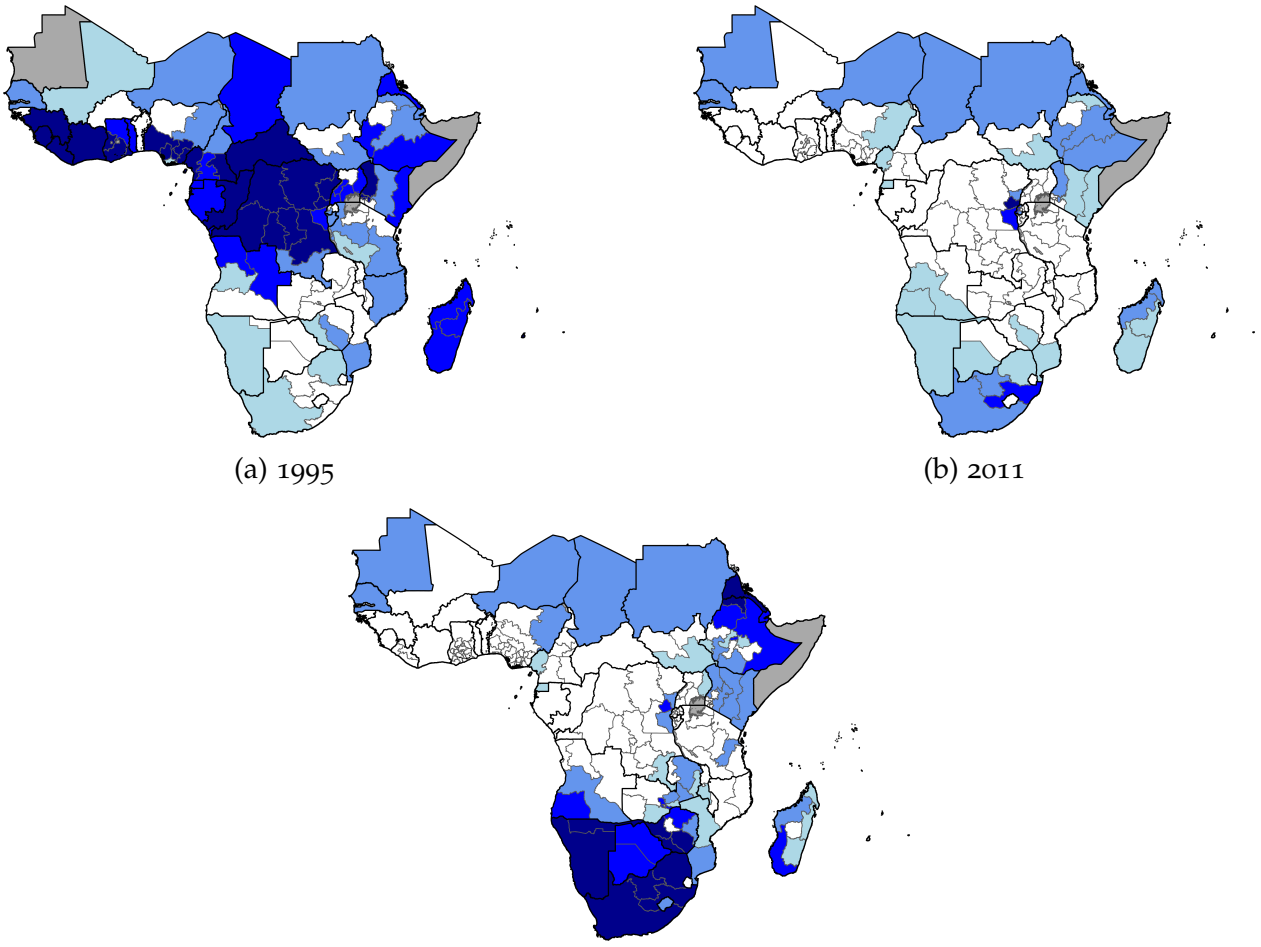


Notes: Shades of blue quantify opportunity cost (in 2010 US dollars per hectare per year) of adhering to SDA prohibitions on production of tobacco, coffee, and tea in select years. Data is displayed for roughly 250,000 (9-km square) pixels in Sub-Saharan Africa. Opportunity cost is zero (white pixels) if the revenue-maximizing crop (displayed in Figure 3) is not an SDA-prohibited crop (tobacco, coffee, or tea). When the revenue-maximizing crop is an SDA-prohibited crop, opportunity cost is positive (shades of blue; darker is higher) and is calculated as revenue from growing an SDA-prohibited crop minus revenue from growing the highest-revenue crop that is not SDA-prohibited. Pixels with no crop-suitability data (e.g., water bodies and unclassified terrain within country borders) carry no cost value and appear in gray. See Section 3.2 for details.

As a first descriptive pattern, Figure 6 plots cross-country variation in average opportunity costs of SDA prohibitions against long-run SDA membership growth and shows

[20] Appendix Table C2 reports summary statistics for the opportunity cost measure, and Appendix Figure C2 plots its distribution across locality-years.

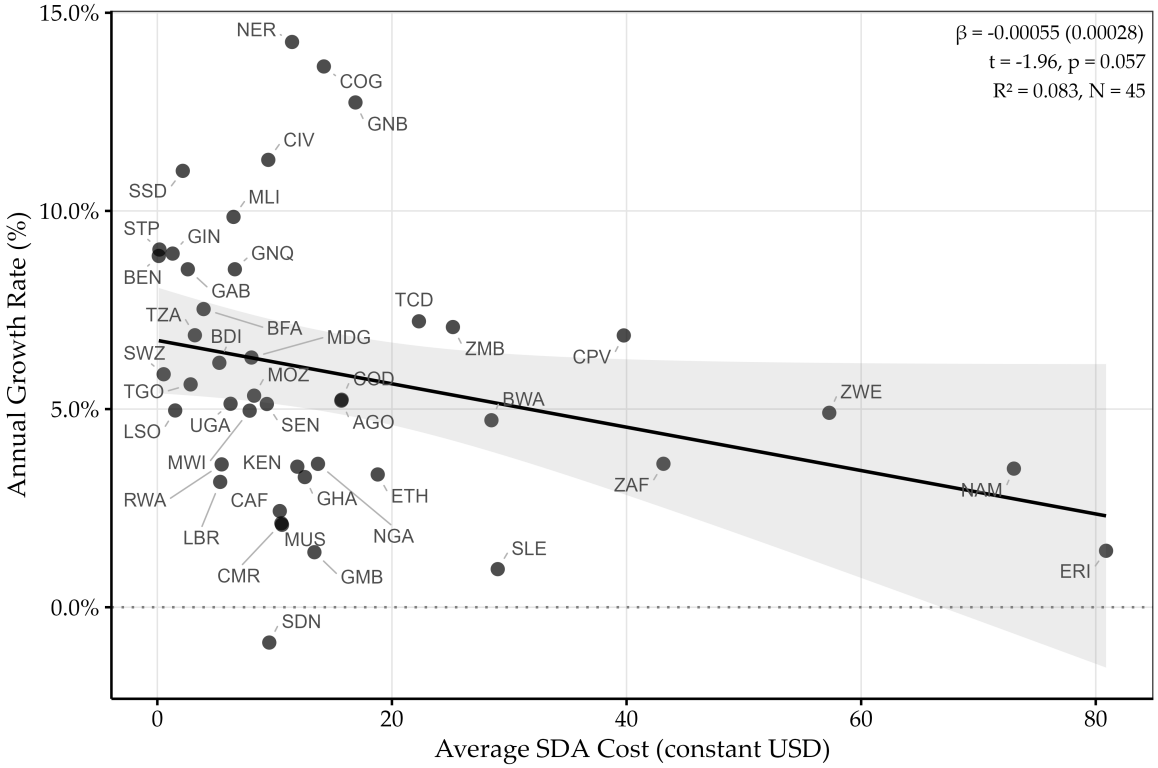
Figure 5: Opportunity Cost of SDA Crop Prohibitions by SDA Locality



Notes: Shades of blue quantify population-weighted mean opportunity cost (in 2010 US dollars per hectare per year) of adhering to SDA prohibitions on production of tobacco, coffee, and tea. Data is displayed for SDA localities in Sub-Saharan Africa in select years. Opportunity cost at pixel level (displayed in Figure 4) is averaged across all pixels in a locality; pixels weighted by 1980 population (from Klein Goldewijk et al. (2017)) when taking within-locality mean. See Section 3.2 for details.

a negative relationship across Sub-Saharan Africa: countries where the foregone revenue from prohibited crops is higher tend to exhibit slower SDA membership growth. While suggestive, this cross-sectional correlation is not causal and could reflect confounding country-level characteristics. This motivates our empirical strategy presented in Section 4, which leverages within-locality changes in opportunity costs over time to identify the membership response to shifts in the opportunity costs of adherence.

Figure 6: Opportunity Cost of SDA Crop Prohibitions and SDA Membership Growth Rate Across Countries



Notes: This figure plots the relationship between average SDA cost and SDA membership growth rates across countries in Sub-Saharan Africa. Each point represents one country (identified by ISO country code). The annual growth rate is calculated as the compound annual growth rate of SDA membership between the first and last year observed for each country. Average SDA Cost is the mean opportunity cost of abiding by SDA crop prohibitions (coffee, tea, and tobacco restrictions) over the observed period, measured in constant USD per hectare. The solid line represents the linear regression fit with 95% confidence interval (shaded area). The regression coefficient β represents the estimated effect of a one-unit increase in average SDA cost on the annual growth rate, with standard error in parentheses. The horizontal dotted line indicates zero growth. Sample includes all countries with available data between 1991 and 2022.

3.3. SDA Member Surveys

The SDA church conducts worldwide surveys of its members, collecting information on their individual and household demographic characteristics; religious behaviors, roles, attitudes, and experiences; beliefs; and health. We focus on variables reflecting church messages in sermons, member beliefs and attitudes, such as members' satisfaction with and commitment to the church, as well as their usage of alcohol and tobacco. We use two

rounds of the Global Church Member Survey (GCMS) conducted in 2017 and 2022. The lowest administrative division available in the GCMS that is comparable across multiple rounds is the respondent's country of residence, so our analyses of the GCMS data are conducted at that geographic level.

The primary outcome variables in our analyses from the GCMS survey are on whether holistic (healthy) living messages are emphasized in church services, the usage of alcohol and tobacco by members, and satisfaction with and commitment to the SDA church. We define "Holistic Message" as an indicator variable equal to one if the survey respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about holistic healthful living (the importance of health for the body, mind, spirit, and social relationships), and 0 otherwise.[21] Alcohol and tobacco usage are indicator variables equal to one if the SDA member has consumed tobacco or alcohol during the reference period of the survey. "Satisfaction" is an indicator variable equal to one if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. "Commitment with SDA Church" is an indicator variable equal to one if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. Appendix A.6 provides further details on the GCMS and the variables we use. Appendix Table C3 presents summary statistics.

4. Empirical Strategy

We seek to estimate the effect of changes in the local, time-varying opportunity cost of adhering to SDA crop-production prohibitions on outcomes such as new SDA memberships as well as church actions at the locality level. In this section, we discuss our main estimating equation. We also provide evidence to validate the opportunity cost measure by showing that it predicts changes in crop production within Sub-Saharan Africa. Finally, we provide an overview of a simple theoretical model, with predictions on how opportunity costs affect membership decisions and church responses.

4.1. Estimating Equation

We estimate the effects of changes in the opportunity cost of SDA crop-production prohibitions using the following regression equation:

$$y_{lt} = \beta f(SDA\ Cost_{l|t,t-k}) + \nu_l + \phi_t + X_l \times \phi_t + \epsilon_{lt} \quad (1)$$

[21] As this measure of doctrinal emphasis is based on reports by church members, it does not necessarily reflect official decisions to change church doctrine, or to officially condone doctrinal violations. In other words, this measure reflects church members' *perceptions* of doctrinal emphasis, not necessarily official changes in doctrine.

where l indexes SDA sub-national localities, and t indexes years. y_{lt} is our outcome variable of interest (e.g., new SDA members in locality l in year t). *SDA Cost*$_{l|t,t-k}$ measures the average opportunity cost of abiding by SDA crop prohibitions – the difference in potential revenue per hectare from following SDA restrictions on the production of tobacco, coffee, and tea, relative to the revenue per hectare from not being constrained by the prohibitions (as defined in Section 3.2) – in locality l between year $t-k$ and year t.[22] ν_l are locality fixed effects to account for all time-invariant differences across localities, such as geography or ecological factors that do not vary over time. ϕ_t represent year fixed effects to account for time-varying shocks that are common to all localities, such as global price shocks. X_l is a vector of baseline locality characteristics – population density in 1980, time-invariant agricultural land suitability, and the 1980 rural population share – each interacted with ϕ_t to flexibly control for differential trends by initial development, agricultural potential, and agricultural dependence. ϵ_{lt} represents the idiosyncratic error term, which we cluster at the country level to account for spatial correlation in shocks that could affect nearby localities similarly.

Conceptually, *SDA Cost*$_{l|t,t-k}$ should be interpreted as a short- to medium-run average of the economic incentives created by SDA crop prohibitions. In practice, the opportunity cost of membership can be borne along several margins: landowners' crop choices, but also the wages and employment probabilities of agricultural workers, and the profits of local traders and processors involved in prohibited crops. For workers and intermediaries, these margins can react within short time frames; for landowners growing annual crops such as tobacco, adjustment may also be relatively fast, whereas for perennial crops like coffee and tea, the relevant margin is entry or exit over a longer horizon.[23]

The coefficient of interest in Equation (1) is β, the effect of changes in SDA opportunity costs on our outcomes of interest (e.g., new SDA members). When examining impacts on net membership gains, we hypothesize that $\beta < 0$, that is increasing the opportunity cost of SDA membership decreases net membership gains. To interpret β as the percentage change in y_{lt} associated with changes in the opportunity cost measures, we estimate the regression using Poisson regressions. This approach is particularly suited for count or non-negative outcome variables, such as new church membership or the number of SDA

[22] Because agricultural decisions and their economic consequences often have lagged effects, we allow the effect of *SDA Cost*$_{l|t,t-k}$ to incorporate lags and measure average costs over time (e.g., between year $t-k$ and year t, where $k \in \{0,1,2\}$). We discuss the interpretation of this time-averaged measure in more detail in the following paragraph. Baseline results use $k = 2$, and we show that results are similar using alternative lag windows in Appendix C.5.

[23] Moreover, we also construct crop-specific opportunity cost indices to probe which crops drive the responses in Appendix C.5. Effects are most evident for tobacco opportunity costs, suggesting that those involved in tobacco farming are more on the margin of SDA membership (perhaps because they are better able to switch from tobacco to other income sources) than those reliant on income from perennial crops like coffee or tea.

institutions, instead of log transformations (Chen and Roth, 2024).

The function $f(x)$ in Equation (1) allows us to flexibly capture the relationship between the opportunity cost measure, *SDA Cost*$_{l|t,t-k}$, and the outcome y_{lt}. In our main specifications, $f(x)$ is either (i) an indicator function for positive opportunity costs, $\mathbb{1}(x > 0)$, or (ii) a set of indicator variables for quartiles of non-zero costs, $\mathbb{Q}_4^+(x)$. These functional forms enable us to estimate the impacts of SDA opportunity costs somewhat non-parametrically, without imposing linearity or other strong assumptions about the relationship between costs and outcomes. By allowing for differential effects across quartiles, we also examine whether the impacts of SDA costs are concentrated at higher or lower levels of opportunity costs, thereby providing additional insights into the response function.

The main identifying assumption is that $E[\epsilon_{lct} \mid \textit{SDA Cost}_{lc|t,t-k}] = E[\epsilon_{lct}] = 0$. That is, the opportunity cost of SDA prohibitions is uncorrelated with omitted variables that may also affect SDA membership at the locality level conditional on locality and time fixed effects.

To increase the plausibility of the identifying assumption, we make several analytical choices to increase confidence that the independent variable of interest (the measure of the opportunity cost of following SDA crop prohibitions) is plausibly exogenous. We also provide empirical tests supporting the validity of this identifying assumption.

First, we construct the measure using time-varying global prices instead of using local crop prices, which could influence both religious adherence and agricultural production. Second, we use cross-sectional ecological measures of potential crop yields from the FAO GAEZ that are based on geographic and climate characteristics instead of using observed crop production measures at the locality level. We then construct our opportunity cost measure as the difference between the *unconstrained* maximum potential revenue and the *constrained* maximum potential revenue if a locality follows SDA prohibitions and avoids producing tobacco, coffee, or tea. Taken together, these two choices imply that the opportunity cost measure we use is constructed using exogenous cross-sectional and time-varying measures.

Furthermore, an important concern when using shocks to potential agricultural revenues is that our opportunity cost measure will be highly correlated with local income in areas suitable for tobacco, coffee, or tea production. To address this concern, we also show results where we include the measure of *unconstrained* maximized revenue at the local level, whose variation is driven by crop suitability and crop prices across *all* crops. This allows us to study how SDA membership responds to general income shocks; it allows us to assess whether our opportunity cost measure is simply capturing the effects of general income shocks or whether it is capturing the impacts of the cost of crop prohibitions.

Note that our measure of the opportunity costs of SDA prohibitions primarily captures production-side effects, focusing on the revenue foregone from adhering to SDA crop restrictions. However, there are also potential consumption-side mechanisms that could influence SDA membership and bias our production-side estimates downwards. For instance, higher tobacco prices may reduce the attractiveness of smoking, making it easier for individuals to quit and align with SDA prohibitions, thereby facilitating church membership. These mechanisms would bias our estimates of the relationship between opportunity growth and membership growth in a positive direction and likely lead to attenuation of our coefficient estimates: shifts in a positive direction (toward zero) would be in the opposite direction of our hypothesized negative relationship between opportunity costs and membership growth.[24]

4.2. Validating the Opportunity Cost Measure

A natural first question is: does the opportunity cost measure reflect production realities on the ground? This is a novel measure, not previously used in the economics literature, so it is important to confirm that it is associated in a reasonable way with actual production of crops (across space and over time).

In conducting this validation exercise, first note another interpretation of the opportunity cost variable defined in Section 3.2. While we emphasize its interpretation as the opportunity cost of giving up the opportunity to produce tobacco, coffee, and tea, it can also be interpreted as simply the potential *revenue gain* from producing tobacco, coffee, and tea relative to all other crops. In other words, it quantifies the increase in potential revenue one could earn from devoting land to producing tobacco, coffee, and tea in a particular year, compared to devoting land to the production of any other crop. This measure naturally takes on only positive values (it is bounded at zero) because one can always forgo the production of tobacco, coffee, or tea if it does not produce any revenue gain. Looking at the opportunity cost measure in this way, we should expect it to be *positively* correlated with the production of tobacco, coffee, and tea.

We validate our opportunity cost measure by examining how changes in it are associated with country-level production of crops that are "prohibited" (tobacco, coffee, and tea) and "non-prohibited" (all other crops). We conduct regression analyses using annual, country-level agricultural production data from the FAO.[25] The results presented in Appendix Table C4 show that the opportunity cost variable does predict changes in agricultural production in the expected direction: a $10/ha increases in opportunity

[24]In Section 6, we use data from SDA member surveys to directly examine how smoking behavior actually changes when opportunity costs rise.

[25]We use annual country-level crop production measures because locality-level data on agricultural production are not available.

costs is associated with approximately a 2% increase in the amount of land used for the production of prohibited crops – tobacco, coffee, and tea – and a roughly 1% decrease for other crops. Thus, our measure predicts changes in the composition of production of prohibited vs. non-prohibited crops.

4.3. Conceptual Framework

To guide our empirical analysis, we develop a simple model of denominational choice in Appendix B. The model formalizes how economic costs of religious prohibitions affect individual participation and local church adaptation, and how these responses depend on local religious market structure. We summarize the key intuitions here.

Individual Participation (Prediction i): Households choosing between SDA and other Christian denominations weigh spiritual and social benefits against the economic costs imposed by crop prohibitions. When opportunity costs rise—for example, when tobacco or coffee prices increase in suitable areas—SDA membership becomes less attractive. Our first prediction is straightforward: *higher opportunity costs reduce SDA membership*. Households near the margin of joining are deterred by the increased economic sacrifice. We test this in Section 5.1.

Church Adaptation (Prediction ii): Local SDA leaders respond strategically to rising costs through two complementary adjustments. Leaders value maintaining doctrinal strictness (emphasis on prohibitions, frequent "holistic living" messaging) while attempting to grow membership. When opportunity costs rise, emphasizing the very prohibitions creating those costs becomes especially damaging to recruitment and retention. Churches therefore respond along two margins: they *reduce doctrinal strictness*—softening enforcement of costly prohibitions and decreasing messaging about abstinence from tobacco, coffee, and tea—while simultaneously *expanding service provision*—investing more in schools, clinics, and other institutions that provide material benefits. When members face higher economic costs from foregone crop income, reducing doctrinal strictness lowers the economic burden, while expanding services provides tangible benefits (education, healthcare) that don't compound the economic sacrifice. Thus, services become particularly valuable precisely when prohibitions are already costly: they help acquire or retain members without asking for additional behavioral sacrifice. We examine these responses in Section 5.2 (institution-building) and Section 6 (reduced holistic living messaging).

How Market Structure Shapes Responses (Prediction iii): The magnitude of membership responses depends on local religious market structure through an *embeddedness channel*: where SDA membership is already widespread, the benefits of belonging are higher through denser social networks and stronger community support. This raises the value of

membership, meaning fewer households are near the margin of indifference. When costs rise, there are fewer people to switch away; therefore, *membership responses are attenuated in high-SDA areas.* We explore this in Section 5.3.

Dissatisfaction Among Stayers (Prediction iv): Church adaptation creates a tension for high-commitment members who deeply value strict SDA identity. While reducing doctrinal strictness and expanding services helps retain cost-sensitive members, high-commitment members experience reduced satisfaction from both rising economic costs *and* the church's doctrinal softening. For these members, the spiritual benefits lost from reduced strictness can outweigh the material benefits gained from expanded services. Even among those who remain, *higher opportunity costs reduce satisfaction and commitment* among the most devoted. We test this using member surveys in Section 6.

Relation to club-goods models: Our framework relates to club-goods models (Iannaccone, 1992; Berman, 2000; Carvalho and Koyama, 2016; Carvalho, 2019), in which individuals choose whether to join a religious "club" that endogenously imposes costly requirements or remain in a cheaper outside option, and where those costs help screen out low-commitment members and can raise average commitment and satisfaction among stayers. Our setting differs in two key ways. First, the opportunity costs we study are exogenous—driven by agricultural conditions and crop prices rather than optimally chosen by the church—and are not directly controlled by local leaders. As a result, higher costs generate genuine income losses even for highly committed members, so we predict that rising costs will reduce satisfaction among stayers (rather than increase satisfaction) and prompt local churches to soften strictness and expand broadly accessible services. Second, canonical club-goods models typically analyze a single religious club holding the competitive environment fixed, whereas we allow local SDA density to shape who selects into SDA and how sensitive membership and doctrine are to cost shocks. In this sense, we use a club-goods-style lens to study how exogenous cost shocks interact with local church adaptation, rather than to characterize the optimal choice of costly requirements within a single group.

The full model, including formal derivations and graphical illustrations, is presented in Appendix B.

5. Results: Membership Decisions & Church Responses

We now present our empirical estimates of the impact of opportunity costs of SDA crop-production prohibitions on demand-side outcomes (new SDA memberships) and supply-side outcomes (church actions), and explore how these responses vary with the local religious environment.

5.1. Membership Decisions

We first examine the impacts of the SDA opportunity cost measure on membership in the SDA church. Table 1 presents the estimates for equation (1), with membership net gains (columns 1 and 2), gains (columns 3 and 4), and losses (columns 5 and 6) as the dependent variables. Columns 1, 3, and 5 include results using the binary indicator equal to one if the SDA opportunity cost is non-zero, while columns 2, 4, and 6 estimate the impacts across quartiles of the SDA opportunity cost measure.

Results reveal that increases in SDA opportunity costs lead to significant decreases in new SDA memberships. Focusing first on net gains in membership, column 1 indicates that positive opportunity costs are associated with a 12.9% reduction in net membership gains.[26] Figure 7(a) visualizes this relationship as an added value plot: net gains and the cost indicator are residualized on the fixed effects and controls. Examining the quartile estimates in column 2, we observe that the decline in net gains is largest in the highest quartile of opportunity costs (Q_4), with an estimated 17.4% reduction. These results suggest that net membership growth is most affected in areas where SDA opportunity costs are highest. Turning to gains in membership, columns 3 and 4 provide further evidence of significant impacts. Column 3 shows that a locality with positive opportunity costs experiences an 11.8% reduction in gains compared to a locality with zero costs. In column 4, the quartile-specific analysis reveals that, similar to net gains, the reduction in gains is most pronounced in the highest quartile of opportunity costs, with an estimated 17.3% decrease. Columns 5 and 6 examine the relationship between opportunity costs and losses of *existing* members. Coefficients in columns 5 and 6 are not statistically significantly different from zero, indicating no clear evidence of a relationship between opportunity costs and membership losses. Coefficients in columns 5 and 6 are generally not statistically significant different from zero, indicating no clear relationship between opportunity costs and membership losses.[27] This pattern suggests that opportunity costs operate primarily on the conversion margin, deterring prospective members rather than inducing exit among more embedded existing members; however, it may also partly

[26]This estimate implies that, for the average locality, where annual net membership gains are about 2,500 (Table C2), the 12.9% reduction implies roughly 330 fewer net new members per year. The closest benchmark on the same within-country membership margin is Ager and Ciccone (2018), who find that greater agricultural (rainfall) risk raised aggregate religious-community membership across U.S. counties by about 10% per standard deviation, a comparable magnitude, though for total rather than denomination-specific membership and through a mutual-insurance motive rather than the cost-of-adherence channel we study. Cross-country, Barro and McCleary (2024) find religious-conversion rates respond strongly to religious-market structure (a one-standard-deviation increase in pluralism raises conversion by roughly 87%). A related literature instead studies the intensity of religiosity and finds adversity raises it (e.g., earthquakes, Bentzen, 2019; economic crises, Chen, 2010), but doesn't measure membership responses.

[27]In the quartile specification (column 6), while estimates across quartiles are inconsistent, losses are significantly lower in the top opportunity-cost quartile (decrease by 32.3%), suggesting that where costs are highest existing members are, if anything, less likely to be lost.

reflect measurement: losses are likely recorded with more lag and error than gains, which are tied to discrete events such as baptisms and professions of faith.

Taken together, our findings suggest that the economic costs associated with religious prohibitions have a tangible impact on individuals' decisions to join religious groups. The decision to become a new member of the SDA church appears to be significantly influenced by the economic sacrifices required, highlighting the role of opportunity costs in decisions to affiliate with new religious groups.

Table 1: Impact of the Opportunity Cost of Religious Membership on Membership Decisions

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.129***		−0.118***		0.047	
	(0.040)		(0.033)		(0.138)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.098***		−0.085***		0.121
		(0.038)		(0.031)		(0.161)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.134*		−0.129**		−0.027
		(0.068)		(0.052)		(0.180)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.166***		−0.138***		0.127
		(0.055)		(0.051)		(0.161)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.174***		−0.173***		−0.323**
		(0.063)		(0.057)		(0.160)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.871	0.918	0.918	0.725	0.728
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To better understand what margins drive these patterns, we next (i) separate prohibition-specific costs from broader agricultural income shocks, (ii) examine placebo tests using non-prohibited cash crop opportunity costs, (iii) decompose the opportunity cost by crop, (iv) examine results using alternative time windows, (v) present results using alternative specifications and functional forms, and (vi) assess robustness to alternative aggregations of the pixel-level opportunity-cost measure.

Are results driven by broader agricultural income shocks? As discussed in Section 4, a potential concern with the estimates in Table 1 is that the opportunity cost measure might be picking up general changes in incomes via agricultural revenues. To explore this concern, Appendix Table C5 shows the results when we control for general changes in agricultural revenue that, unlike our opportunity cost measure, are not restricted to include non-prohibited crops – the $R_{p,t}^{max}$ variable defined in Section 3.2. The estimates of the SDA opportunity cost measure are robust to the inclusion of $R_{p,t}^{max}$ as a control,

suggesting that the SDA opportunity cost measure is not just picking up changes in local incomes. Instead, it specifically captures the economic trade-offs imposed by religious prohibitions.

Placebo test using non-prohibited cash crop opportunity costs: If our membership result reflected the general economic returns to cash cropping rather than the religious prohibition itself, it should appear for economically similar crops the church does *not* restrict. We therefore construct a placebo opportunity cost that mirrors *SDA Cost* but for non-prohibited cash crops – measuring the revenue forgone by not planting the best available non-prohibited cash crop – and include it alongside *SDA Cost* in the membership regressions. Appendix Table C6 shows that the *SDA Cost* estimates are essentially unchanged by its inclusion, while the placebo's own coefficients are small and, if anything, positive – the opposite sign to the deterrent effect of *SDA Cost*. The membership response is thus specific to the religiously prohibited crops.[28]

Which prohibited crops matter most? Our baseline *SDA Cost* aggregates foregone revenue across multiple prohibited crops. To shed light on mechanisms, we also construct crop-specific versions of *SDA Cost* that isolate foregone revenue from tobacco, coffee, and tea separately. For each prohibited crop $c \in \{\text{tobacco,coffee,tea}\}$, we recompute the revenue loss associated with excluding c from the feasible crop set, holding the set of alternative crops fixed. Appendix Table C8 shows that opportunity costs from tobacco consistently account for a membership response, though large opportunity costs from coffee and tea also reduce membership in the same way. This pattern is consistent with two complementary features of tobacco: it is the crop around which the prohibition is firmest and most explicitly enforced (Section 2), and, as an annual rather than perennial crop, it permits faster entry and exit. We cannot fully separate these channels, but both help explain why tobacco, of the three, responds most consistently

Are the effects concentrated among cultivating households? If the membership response operates through the production side of the prohibition, it should be larger where more of the local population is engaged in cultivation. We test this by interacting the opportunity-cost measure with the baseline share of cultivated land in a locality. Appendix Table C9 shows that the deterrent effect of opportunity costs is concentrated in localities with a higher cultivated-land share, consistent with the cost binding on households that actually farm. Together with the tobacco-concentrated pattern above, this points to the production margin – rather than broader local economic conditions – as the operative channel.

[28] As a second placebo, we use *leads* of the opportunity cost measure: if future opportunity costs predicted current membership, that would point to omitted trends or anticipatory behavior rather than the direct cost of the prohibition. Appendix Table C7 shows the coefficients on both the indicator for positive future costs and the future-cost quartiles are small and statistically insignificant.

Timing and adjustment horizons: Opportunity costs may affect membership with different lags depending on which economic margin responds: some channels (e.g., local labor demand, trading and processing activity) can adjust quickly, while production-side adjustments (especially for perennial crops) may unfold more slowly. For this reason, our baseline specification measures *SDA Cost*$_{t,t-k}$ as the average opportunity cost over the previous two years ($k = 2$). Appendix Tables C10, C11, C12, C13, and C14 show that the main pattern is not sensitive to this choice: estimated effects on net membership are similar when we instead measure costs over $k \in \{1,3,4,5\}$ years, and somewhat weaker using the contemporaneous cost ($k = 0$), consistent with membership responding to opportunity costs over more than a single year rather than instantaneously. The stability of the estimates across various lag windows suggests that the membership response are not driven by a particular lag choice.

Alternative specifications and estimators: We also show that the results are robust to alternative estimators that address treatment effect heterogeneity. Specifically, we re-estimate the relationship using the dynamic difference-in-differences approach of de Chaisemartin et al. (2024), which avoids negative-weight concerns in two-way fixed effects settings when treatment intensity varies over time. Results echo the baseline pattern: higher SDA opportunity costs reduce net gains in membership (Tables C15).

Alternative aggregation of the pixel-level measure: Our baseline aggregates the pixel-level opportunity cost to the locality using a population-weighted average, so that the measure reflects the incentives facing a locality's inhabitants rather than placing weight on uninhabited land (Section 3.2). Appendix Table C16 shows that the membership estimates are similar under alternative aggregations: an unweighted average across pixels, which places full weight on sparsely populated but suitable areas, a rural-population-weighted average, which up-weights the agricultural population most exposed to cultivation, and a cultivated-land-weighted average, which also places more weight on agricultural areas. We find that the results are not driven by the choice of aggregation approach.

5.2. Church Responses

We now turn to exploring church responses to changes in opportunity costs: how the SDA church responds to the economic incentives facing their members. Table 2 presents estimates of equation (1), with the number of churches (columns 1 and 2) and the number of health and education institutions (columns 3 and 4) as the dependent variables.

Columns 1 and 2 suggest limited evidence of supply-side responses in terms of churches. The coefficients on the indicator for positive opportunity costs (column 1) and the quartiles of the opportunity cost measure (column 2) are small in magnitude and not

statistically significant. Changes in the economic opportunity costs of SDA membership do not significantly influence the number of churches in an SDA locality.

In contrast, columns 3 and 4 reveal a significant response in the provision of education and health institutions. Positive opportunity costs are associated with an 8.0% increase in the number of such institutions (column 3, and Figure 7(b)). These results suggest that the church strategically enhances its provision of services, particularly in education and health, to offset the consequences of increased opportunity costs for members and potential members.

Interestingly, the quartile-specific analysis in column 4 shows a different pattern than the membership responses in Table 1: we find little evidence that the church's responses are larger in localities with the highest quartiles of opportunity costs. The increase in institutions is significant and of similar magnitude across the lower three quartiles of opportunity costs (between 7.5–8.6%), and is smaller and statistically insignificant in the top quartile. This pattern suggests that the SDA church's institutional response – establishing health and education institutions – is more limited when opportunity cost increases are relatively large. Because these health and education institutions are often accessible to non-members as well, they serve a dual role: offering additional benefits to existing members while also helping to attract potential new members. This dual function potentially contributes to the church's strategy for relatively small opportunity cost increases, where such investments can more effectively retain members and draw in new ones. When opportunity costs become too large, however, even these efforts may be insufficient to offset the economic barriers to membership.

Overall, the results in Table 2 highlight that the SDA church strategically adjusts its institutional presence in response to changes in the opportunity costs of membership. While the number of churches remains unaffected, the church increases its investment in health and education institutions, potentially as a strategy to provide new benefits that mitigate the economic challenges associated with membership. Increases in establishment of institutions may also reflect efforts to proselytize and attract members in regions where economic costs would otherwise deter participation.

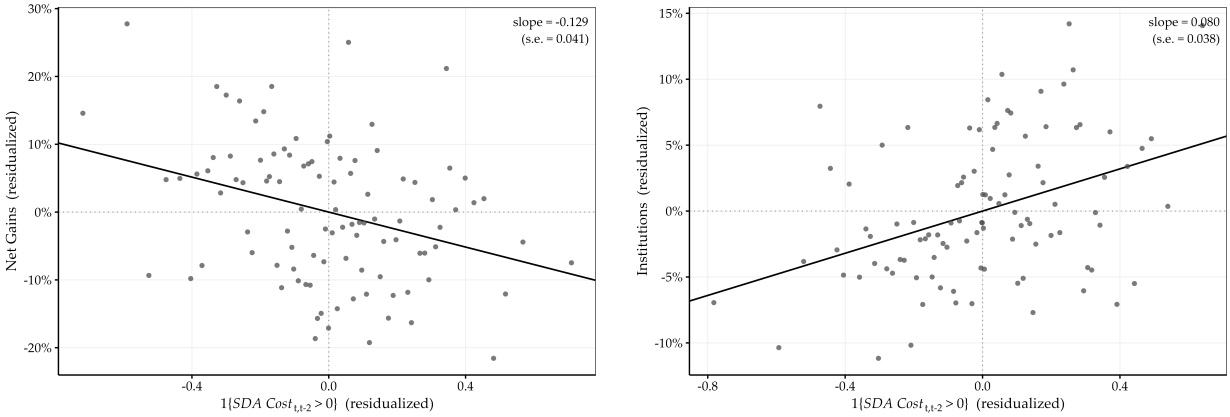
Separating opportunity costs from broader agricultural conditions: As with membership outcomes, we assess whether the supply-side patterns reflect SDA-specific trade-offs rather than broader changes in local agricultural profitability. Appendix Table C17 shows that the estimated increase in health and education institutions is stable when controlling for unconstrained maximized agricultural revenue, $R_{p,t}^{max}$. This suggests that the church's response is not simply a response to local income shocks, but is linked to the incremental opportunity costs created by the prohibitions.

Table 2: Impact of the Opportunity Cost of Religious Membership on Church Responses

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.001		0.080**	
	(0.015)		(0.037)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.006		0.085**
		(0.019)		(0.041)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.028		0.075*
		(0.017)		(0.040)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.035*		0.086**
		(0.019)		(0.040)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.023		0.054
		(0.021)		(0.052)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. $SDA\ Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 7: Opportunity Cost of SDA Crop Prohibitions, Membership, and Institutions: Added Value Plots



(a) Net Membership Gains

(b) Institutions

Notes: Added value plots for the binary specifications of column 1 of Table 1 (Panel (a)) and column 3 of Table 2 (Panel (b)). In each panel, the outcome and the indicator $\mathbb{1}\{SDA\ Cost_{l,t,t-2} > 0\}$ are residualized on locality and year fixed effects and the baseline controls interacted with year fixed effects, using the weights of the final iteration of the PPML estimation; the residualized treatment is grouped into 100 equal-sized bins and bin means are plotted. The fitted line's slope equals the corresponding PPML coefficient by construction (coefficient and country-clustered standard error reported on each panel). Observations are SDA localities in Sub-Saharan Africa, 1991–2022.

Placebo test using non-prohibited cash crop opportunity costs: We apply the same placebo used for the membership results, including the (non-prohibited) cash-crop opportunity cost – constructed exactly as *SDA Cost* but for cash crops the church does not restrict – alongside *SDA Cost* in the church-response regressions. Appendix Table C18 shows that the estimated increase in health and education institutions is essentially unchanged by its inclusion, while the cash-crop placebo has no comparable effect of its own. As with membership, the church's response is specific to the religiously prohibited crops rather than a general reaction to cash-crop profitability.

Which prohibited crops matter most? Next, we apply the same crop decomposition used for membership outcomes to examine whether church responses are concentrated in particular prohibited-crop incentives. Appendix Table C19 shows that the increase in health and education institutions is driven primarily by tobacco-related opportunity costs, with smaller and statistically weaker responses for coffee- and tea-specific costs.

Timing and adjustment horizons: Institutional investments plausibly respond with different timing than membership flows, since opening or expanding facilities may require planning, resources, and administrative approvals. Our baseline specification measures *SDA Cost*$_{t,t-k}$ using a two-year average ($k = 2$) to capture the relevant economic environment faced by members and church leaders. Appendix Tables C20, C21, C22, C23, and C24 show the estimates across lag windows of $k \in \{0,1,3,4,5\}$ years. We find that the core supply-side pattern – limited adjustment in the number of churches but increased investment in health and education institutions – is similar across various lag windows, though become less precise with longer lags (e.g., $k \geq 4$).

Alternative specifications and estimators: We also show that the church response results are robust to alternative estimators that address treatment effect heterogeneity. Specifically, we re-estimate the relationship using the dynamic difference-in-differences approach of de Chaisemartin et al. (2024), which addresses negative-weight concerns in two-way fixed effects settings when treatment intensity varies over time. Results confirm the baseline pattern: churches adjust along service-provision margins – expanding health and education institutions – rather than changing the number of churches when opportunity costs rise (Tables C25).

Alternative aggregation of the pixel-level measure: As with membership, local church response estimates are stable when we aggregate the pixel-level opportunity cost using an unweighted average, a rural-population-weighted average, or a cultivated-land-weighted average in place of the baseline population-weighted average (Appendix Table C26).

5.3. The Role of Religious Embeddedness

We now test a prediction from our conceptual framework about how local religious market structure shapes responses to opportunity cost shocks. The framework identifies an *embeddedness channel* through which market structure attenuates membership responses to rising costs: where SDA membership is widespread, denser social networks and better access to church services raise the value of membership, leaving fewer households near the margin of indifference. When opportunity costs rise, there are fewer people positioned to switch away.[29]

We test this mechanism by examining how the SDA membership share moderates the impact of opportunity costs on membership decisions. This mechanism helps explain why similar cost increases produce different membership responses across localities depending on SDA density.

Appendix Table D1 examines how the SDA membership share in a locality moderates the impact of opportunity costs. Each specification includes an interaction between the indicator for positive opportunity costs and the SDA share of the local population (ranging from 0 to 100%), measured in the first year we observe the locality.[30] The results support the embeddedness mechanism. The negative impact of opportunity costs on net gains is significantly attenuated in localities with higher SDA density (column 1). The interaction term indicates that the deterrent effect is fully offset when approximately 17% of the population is SDA – a level only reached in roughly the top 5% of localities in our sample. There is a similar pattern for gains: denser SDA networks substantially reduce the impact of rising costs on new memberships (column 2). Finally, in localities with denser SDA membership, higher opportunity costs are associated with fewer losses of existing members (column 3). The benefits of larger SDA networks appear to help retain members even when economic costs rise, either by reducing the burden of adherence or by increasing the relative value of remaining within the group.

These findings provide evidence that religious embeddedness alters the economics of participation. The same cost increase that substantially deters membership in areas with sparse SDA presence has minimal or no effect where SDA forms a significant portion of

[29]The direction of this moderation is not obvious a priori: belonging could be more valuable where co-religionists are dense (raising network benefits) or, alternatively, where SDA is rare and distinctive. We therefore treat the sign as an empirical question and ground our prediction in the embeddedness tradition (Polanyi, 1944; Granovetter, 1985); the estimates below favor the embeddedness direction.

[30]SDA share is right-skewed in our sample: the mean locality has an SDA share of roughly 3.1%, but the median is only about 0.9%, reflecting that a small number of heavily Adventist localities pull the average up. The 75th percentile is about 3.3%, and only the top decile exceeds 9%.

the community.[31]

6. Results: SDA Health Messaging and Member Satisfaction

We next examine the impacts of the SDA opportunity cost measure on messages emphasized in church services, usage of alcohol and tobacco, and satisfaction with the church. We use data from the SDA Global Church Member Survey (GCMS) on SDA members and examine two main sets of outcomes. First, we examine how changes in the cost of prohibitions impact the healthy living messages emphasized by the church and actual health behaviors by SDA members, specifically the usage of tobacco and alcohol. Second, we examine the impacts on members' satisfaction with and commitment to the SDA church.

6.1. Estimating Equation

The SDA Global Church Member Survey (GCMS) does not include information on respondents' sub-national localities, only their countries. We therefore conduct these analyses at the country level, and similarly aggregate our opportunity cost measure to the country level.

To examine the impacts of opportunity costs on outcomes in the SDA GCMS, we estimate the following modification of equation (1):

$$y_{ict} = \beta f(SDA\ Cost_{c|t,t-k}) + \nu_c + \phi_t + \mathbf{X}_{ict}\Gamma + \epsilon_{ict} \tag{2}$$

where i indexes individuals, c indexes countries, and t indexes years. y_{ict} is our outcome variable of interest (e.g., SDA member i's attitudes in country c in year t). $SDA\ Cost_{c|t,t-k}$ is the country-level measure of the average opportunity cost of abiding by SDA crop prohibitions in country c between year $t-k$ and year t. As in Section 4, $f(x)$ is either (i) an indicator function for positive opportunity costs, $\mathbb{1}(x > 0)$, or (ii) a set of indicator variables for quartiles of positive costs, $\mathbb{Q}_4(x > 0)$. ν_c represent country fixed effects to account for time-invariant differences across countries, such as geography or cultural factors that do not vary over time. ϕ_t represent survey-year fixed effects to account for time-varying shocks that are common to all countries, such as global price shocks. $\mathbf{X}_{ict}$ is a vector of individual-level covariates (age, age squared, gender, and educational attainment fixed effects). ϵ_{ict} is the error term. We present standard errors clustered

[31] We also explore how the broader Protestant environment moderates cost responses. Descriptively, Appendix Table D2 shows that the effect of opportunity costs on net gains is attenuated in localities with a higher Protestant share (net of SDA membership), with no analogous moderation by Catholic or Muslim shares. While our framework takes no strong stance here, this is suggestive that the relevant competitive margin lies *within* Protestant Christianity. Religious composition is measured using country-level Protestant, Catholic, and Muslim shares in 2000 from the World Religion Database (Zurlo, 2026).

at the country level. Because the GCMS outcomes are binary outcomes, we estimate equation (2) by OLS as a linear probability model, so that β is interpretable in percentage points (e.g., the change in the probability that a member reports tobacco use).

Appendix Table C3 presents summary statistics for outcomes in the SDA GCMS survey data.

6.2. SDA Emphasis on Healthy Living

We first examine the impacts of the opportunity cost of membership on the emphasis by the church on healthy living prescriptions and member adherence. These prescriptions include prohibitions on alcohol and tobacco consumption, as well as strong discouragement of consumption of caffeinated beverages such as coffee and tea. Table 3 presents estimates of equation (2) where the dependent variables include whether church sermons emphasize a holistic approach to health (columns 1-2), and members' self-reported usage of tobacco (columns 3-4) and alcohol (columns 5-6). (The SDA GCMS surveys do not ask about coffee or tea consumption, or production of any good.) The estimates suggest that higher opportunity costs are significantly associated with a reduced emphasis on holistic health messages in church services (columns 1 and 2). Additionally, columns 3-6 reveal that higher opportunity costs are significantly associated with more violations of the church's prescriptions on healthy living – namely, a higher likelihood of reporting alcohol and tobacco consumption. These findings suggest that as the economic costs of adhering to SDA prohibitions increase, the church reduces emphasis on holistic health messaging, and members are more likely to engage in health behaviors discouraged by the church.[32]

6.3. Member Satisfaction and Commitment

We next examine the impacts of opportunity costs on members' satisfaction with and commitment to the church. Table 4 presents estimates of equation (2) for these outcomes. The results show that higher opportunity costs significantly decrease both satisfaction with the SDA church (columns 1-2) and members' self-reported commitment to the church (columns 3-4). Specifically, the coefficient in column 1 indicates a 4.8% decline in satisfaction, while column 3 shows a 2.4% decline in commitment. These results

[32]Our opportunity-cost measure is a *producer* cost: it rises with the prices of tobacco, coffee, and tea. For a consumer, a higher own-price has the opposite sign—it makes consuming the good more expensive and, on its own, should *reduce* consumption. This consumption-side price effect works *against* the increase in tobacco and alcohol consumption we estimate here, so these coefficients are best read as a lower bound on the loosening of adherence: for consumption to rise despite a higher own-price, the relaxation of the prohibition must dominate the price disincentive. Consistent with a general rather than crop-specific loosening, alcohol consumption rises even though alcohol is not among the crops in *SDA Cost*.

Table 3: Impact of the Opportunity Cost of Religious Membership on Health Messaging

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.066**		0.017***		0.031***	
	(0.024)		(0.006)		(0.005)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.057		0.005		0.017
		(0.063)		(0.014)		(0.014)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.039		0.017***		0.025***
		(0.031)		(0.006)		(0.007)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.083***		0.014**		0.035***
		(0.023)		(0.005)		(0.005)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.036		0.013		0.030***
		(0.056)		(0.008)		(0.009)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.025	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

suggest that rising opportunity costs associated with SDA prohibitions erode members' attachment to the church.[33]

One important consideration when interpreting the results from the SDA Global Church Member Survey is that the sample is self-selected – it includes only individuals who remained members of the SDA church at the time of the survey. Since our prior findings demonstrate that higher opportunity costs reduce new church membership, it is likely that, in countries with higher opportunity costs, the surveyed population is smaller and more positively selected in terms of religious commitment. That is, those who remain in the church despite higher costs may be the most devout or committed members, potentially creating a bias against finding higher levels of dissatisfaction (in Table 4) or more violations of church prohibitions (in Table 3). If anything, this selection mechanism would lead us to underestimate the negative impacts of higher opportunity costs on satisfaction and adherence. Given this, it is striking that we observe significant increases in tobacco and alcohol use, as well as lower satisfaction and commitment, despite this likely positive selection. It is likely that if we had been able to conduct this analysis in a population of current *and* prior members, the estimated impacts of opportunity costs on

[33]Interestingly, this is in contrast to the predictions of club goods models of religions (e.g., Iannaccone, 1992), which suggest that increases in the costs of religious participation might actually increase satisfaction and commitment of remaining members.

satisfaction and commitment would have been even more negative.[34]

As with the membership and institution results, we verify that the survey patterns reflect the cost of the prohibition rather than broader agricultural economic shocks. First, controlling for unconstrained maximum agricultural revenue (R^{max}) leaves the results intact: higher opportunity costs remain associated with greater reported tobacco and alcohol use and with lower satisfaction and commitment (Appendix Tables C27 and C28). Second, including the placebo cost built from non-prohibited cash crops leaves the *SDA Cost* estimates essentially unchanged (Appendix Tables C29 and C30), further suggesting that the responses are specific to the prohibited crop opportunity costs. Third, the estimates are similar across alternative lag windows, $k \in \{0,1,3,4,5\}$ (Appendix Tables C31–C35 and C36–C40). Fourth, estimates are consistent under the alternative pixel-to-country aggregation approaches (Appendix Tables C41 and C42). [35]

Taken together, the results from SDA member surveys highlight the challenges the SDA church faces in retaining members when opportunity costs of adherence increase and how the church attempts to offset these costs by reducing its emphasis on its healthy living prescriptions. This strategy may reflect an effort to adapt its messaging and priorities in response to the rising economic burdens faced by its members, even as these efforts appear insufficient to fully counteract the decline in satisfaction and commitment.

[34] A second, related source of reporting bias would also point in the same direction: members may under-report prohibited-good consumption or overreport satisfaction and commitment due to social desirability bias; however, social-desirability bias should, if anything, lead members to under-report such consumption and over-report satisfaction and commitment, dampening the patterns we estimate. Thus, similar to the positive selection of current members, this likely attenuates our estimates toward zero, so the documented patterns are best read as a lower bound on the true effects.

[35] Unlike the membership and institutional outcomes, we are unable to decompose the survey outcomes by prohibited crop. The the crop-specific costs do not vary independently enough to identify separate tobacco, coffee, and tea effects consistently for all quartiles, so we report only the pooled *SDA Cost*.

Table 4: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.048***		−0.024***	
	(0.011)		(0.006)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.012		0.011
		(0.034)		(0.015)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.037*		−0.014*
		(0.022)		(0.007)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.042***		−0.024***
		(0.008)		(0.005)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.104***		−0.043***
		(0.016)		(0.009)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.043	0.032	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7. Conclusion

The evidence presented in this study reveals how economic incentives shape religious participation and institutional adaptation in Sub-Saharan Africa. Through our analysis of the Seventh-day Adventist church, we demonstrate that economic costs significantly influence both individual religious choices and institutional responses. When the opportunity costs of religious adherence rise – specifically, the foregone agricultural revenue from adhering to prohibitions on tobacco, coffee, and tea production – we find substantial declines in new membership and increased dissatisfaction among existing members.

However, religious institutions do not remain passive in the face of these economic pressures. Our findings reveal sophisticated adaptive responses by the SDA church: establishing new educational and health institutions (to enhance proselytization efforts and to provide offsetting benefits to members), and notably, reducing emphasis on the very religious prescriptions that generate these economic costs. This institutional flexibility – maintaining core religious identity while adapting to local economic conditions – may help explain the remarkable growth of religions like the Seventh-day Adventists in Sub-Saharan Africa.

Our findings have implications well beyond the specific context we study. First, they demonstrate how economic incentives can drive religious change through multiple channels: directly affecting individual choices about religious participation, and indirectly by inducing institutional adaptation. Second, they reveal religious institutions

as dynamic actors that strategically adjust their practices and messaging in response to local conditions, while maintaining their fundamental identity. This adaptability may be particularly important in developing regions where religious prescriptions can significantly impact economic livelihoods.

More broadly, our research illuminates mechanisms of institutional and cultural change. While much work emphasizes the persistence of cultural practices, we document how religious institutions can facilitate relatively rapid adaptation to economic conditions. This suggests that successful religious movements may act as mediators of cultural change, selectively relaxing certain prescriptions while maintaining their core identity and values. In an era of rapid economic transformation across the developing world, understanding these dynamics of religious and cultural adaptation becomes increasingly important.

Future research could extend our approach to other religious groups and contexts, examining how different types of economic costs affect religious participation and institutional responses. The interaction between economic development, religious practice, and institutional adaptation that we document may be especially relevant for understanding religious change in other developing regions experiencing rapid economic transformation. More broadly, our findings suggest the importance of studying how cultural and religious institutions adapt to changing economic conditions while maintaining their essential character and appeal to adherents.

These results ultimately contribute to our understanding of how religious organizations navigate the fundamental tension between maintaining traditional practices and adapting to economic realities. The sophisticated responses we document – offsetting costs through new benefits while selectively adapting religious emphasis – may represent a broader pattern of successful religious adaptation in the face of economic change. Understanding these dynamics is crucial as religious institutions continue to play vital roles in economic development and social transformation across the developing world.

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Online Appendix for

The Price of Faith: Economic Costs and Religious Adaptation in Sub-Saharan Africa

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Appendix A. Data Appendix

A.1. Office of Archives, Statistics, and Research (ASTR) Data

A.1.1. Variable Definitions

- Year: Year in which the statistical values were reported.
- Churches: Total number of registered churches for the specified year and field.[36]
- Companies: Total number of registered companies for the specified year and field.[37]
- Beginning Membership: Membership at the beginning of the year.
- Baptisms: Number of additions by baptism reported for the given year.
- Former Member Baptisms: Number of additions by baptisms of former members (previously removed by dropped or missing).
- Professions of Faith: Number of additions by profession of faith[38] reported for the given year.
- Transfers In: Number of additions by transfer of membership into this conference during the year.
- Transfers Out: Number of losses by transfer of membership out of this conference during the year.
- Deaths: Number of losses by death.
- Dropped: Number of memberships dropped by individual request.
- Missing: Number of members reported missing.
- Total Gains: Total number of members added by all methods. Total Gains = Baptisms + Former Member Baptism + Profession of Faith + Transfers In.
- Total Losses: Total number of members removed by all methods. Total Losses = Dropped + Missing + Death + Transfers Out.

[36] A local church is a mature congregation that has representation in conference sessions.

[37] A company is a congregation that has not yet achieved maturity and has not formally been organized as a local church.

[38] A profession of faith is an alternative to baptism for individuals to become members. It is reserved for people who previously belonged to another church and had already been baptized by immersion.

- Adjust: Used historically to note adjustments needed to ensure consistency because of reporting errors or subsequent corrections. 'Adjustments' can also be used by fields to report membership corrections that do not necessarily fit in other columns.
- Net Growth: Shows the net growth during the year. Formula: Net Growth = Ending Membership - Beginning Membership.
- Ending Membership: Membership reported at the end of the given year.

For our analyses, we define *Gains* as the sum of Baptisms, Former Member Baptisms, and Professions of Faith and exclude transfers in. We define *Losses* as the sum of Dropped and Missing, and again exclude transfers out (as transfers are likely more due to reorganizations in SDA structures). *Net gains* is defined as gains minus losses. In only a very small share of observations (3.5%) is net gains negative. To facilitate our primary estimation approach, Poisson pseudo-maximum likelihood (which does not accommodate negative values), we censor the small number of negative net gains values at zero (replacing negative values with zero).

A.1.2. SDA Organizational Structure

We conduct our analyses at the lowest geographical level of organization of the SDA Church. This corresponds to the public data available from the SDA's Office of Archives, Statistics, and Research (ASTR).

The organizational structure of the Seventh-day Adventist Church (North American Division of the Seventh-day Adventist Church, 2024) consists of four main elements that operate within a global framework.

- Local Church: The foundational unit of the Church, composed of individual members. A Local Church is officially recognized by the constituency session of a local Conference or Mission, which grants it status as a Seventh-day Adventist Church. (The SDA's ASTR does not provide data at the level of "local churches", but only at the next level above the local church level.)

- Local Conference/Mission: A group of Local Churches within a defined geographic area. A Local Conference is granted official status by the constituency session of a Union Conference or Mission. The term "Conference" indicates a high level of self-governance, whereas "Mission" denotes an organization that receives direct support from a supervisory body.

- Union Conference/Mission: This is a grouping of local Conferences and/or Missions within a specific geographic territory. A Union Conference/Mission is granted official status by the General Conference's constituency session. The Union's membership consists of local Conferences and Missions.

- General Conference: The highest organizational level, encompassing all Union Missions, Union Conferences, and other directly attached fields globally. The General Conference provides supervision and assistance to the Church's operations worldwide.

The General Conference (the SDA's highest organizational level) is divided into "divisions" or regional offices. The SDA divisions are the following: East-Central Africa Division (ECD), Euro-Asia Division (ESD), Inter-American Division (IAD), Inter-European Division (EUD), North American Division (NAD), Northern Asia-Pacific Division (NSD), South American Division (SAD), South Pacific Division (SPD), Southern Africa-Indian Ocean Division (SID), Southern Asia Division (SUD), Southern Asia-Pacific Division (SSD), Trans-European Division (TED), and West-Central Africa Division (WAD).

The countries in our sample come from WAD, ECD, SID, as well as the Middle East and North Africa Union Mission.

Administratively speaking, many Missions and Conferences are further subdivided into Fields (Seventh-Day Adventist Church, Monrovia Central, 2024; Adventist Statistics, 2024). As such, the lowest administrative level in each geographical can be a Mission, a Conference, or a Field. Our analyses always take the lowest administrative level available as our unit of analysis, because this is the lowest level at which the data are made available to the public.

A.2. Localities

To construct our unit of analysis, which we refer to as the *locality*, we gathered information from several sources. First, using the ASTR's website structure, we identified all the units at the lowest level of the organizational structure of the Seventh-day Adventist Church and scraped their membership tables for each one of them. Then, we compared the units available with the ones listed in the SDA Yearbooks, identifying the *geographical territory* of each locality. Figure A1 provides examples of territorial definitions in the 2015 SDA Yearbook.

Figure A1: 2015 SDA Yearbook



Notes: The figure presents the territories of four *localities*, as described in the 2015 SDA Yearbook: the East Association Mission of Angola, the North Botswana Conference, the Central Malawi Conference, and the South Kenya Conference.

Given the expansion of the SDA church, *localities* go through slight changes over the years, adapting to their growing membership by splitting Missions, Conferences, or Fields into smaller units over time. Instead of trying to modify these units to match across the entire sample period, we decided to respect their structure by identifying as a locality either a Mission, Conference, or Field that has the exact same boundaries over time, for as many years as the locality's geographical territory remains constant. This yields an unbalanced panel, with a varying number of localities across years (ranging from 93 in 1991 to 195 in 2020).

For most of these *localities*, the sub-national units described in the *territory* description in the corresponding SDA Yearbook are straightforward, as seen in Figure A1, describing the exact districts, states, or regions encompassed by the Mission, Conference, or Field. In a minority of cases, Yearbook territorial definitions were ambiguous, requiring us to make informed judgments about exact locality boundaries.

A.3. GAEZ

GAEZ is a seven-stage model that combines soil and climate data to produce estimates of potential yields under different assumptions. The calculated yield of each crop/land utilization type (LUT) is affected by water sources (e.g., rain-fed vs. irrigated) and by the assumed intensity of inputs and management (e.g., low vs. high).

For this study, we selected the rain-fed, low-level option of inputs for each crop to reduce potential concerns that the choice of (high) agricultural inputs or irrigation reflects endogenous decisions that could be potentially correlated with religious adherence.[39]

A.4. Concordance of GAEZ crops with Crops in FAO Production Data

Appendix Table A1 shows the concordance we use to match crops found in the GAEZ data with crops found in the FAO production database.

[39]According to the GAEZ documentation, under a low level of inputs, the farming system is largely subsistence-based. The production relies on traditional cultivars, labor-intensive techniques, no application of plant nutrients, no use of chemicals for pest and disease control, and minimum conservation measures (FAO and IIASA, 2021).

Table A1: Mapping between GAEZ crops and FAO Production names

Crop Name	**GAEZ Abbreviation**	**FAO Specification List**
banana	bana	Bananas
barley (best type)	barl	Barley
buckwheat	bckw	Buckwheat
phaseolous bean	bean	Beans, dry
cabbage	cabb	Cabbages
carrot	carr	Carrots and turnips
cassava	casv	Cassava, dry
chickpea	chck	Chick peas, dry
coconut	cocn	Coconuts, in shell
cacao (best type)	coco	Cocoa beans
coffee (best type)	coff	Coffee, green
cotton	cott	Cotton linters
cowpea	cowp	Cow peas, dry
dry peas	dpea	Peas, dry
flax fibre	flax	Flax, raw or retted
gram	gram	Chick peas, dry
groundnut	grnd	Groundnuts, excluding shelled
maize (best type)	maiz	Maize (corn)
millet (best type)	mllt	Millet
oat	oats	Oats
oil palm	oilp	Palm oil
olive	oliv	Olive oil
onion	onio	Onions and shallots, dry (excluding dehydrated)
pigeonpea	pigp	Pigeon peas, dry
rapeseed	rape	Rape or colza seed
dryland rice	ricd	Rice
rye (best type)	ryes	Rye
sorghum (best type)	sorg	Sorghum
soybean	soyb	Soya beans
sweet potato	spot	Sweet potatoes
sugar beet	sugb	Sugar beet
sugar cane	sugc	Sugar cane
sunflower	sunf	Sunflower seed
tea	teas	Tea leaves
tobacco	toba	Unmanufactured tobacco
tomato	toma	Tomatoes
wheat (best type)	whea	Wheat
yam (best type)	yams	Yams

A.5. FAO Export Prices

The Food and Agricultural Trade Dataset is collected, processed, and disseminated by FAO according to the standard International Merchandise Trade Statistics (IMTS) Methodology. The data is mainly provided by the United Nations Statistics Division, Eurostat, and other national authorities as needed. This source data is checked for outliers, trade partner data is used for non-reporting countries or missing cells, and data on food aid is added to take into account total cross-border trade flows (Food and Agriculture Organization of the United Nations, 2024). The data contains information on import and export quantities and values at a country-year level starting in 1961. Quantities are reported in thousands of animals or tonnes (only the latter being relevant for our analyses). Values are adjusted using US prices and reported in thousands of real 2010 US dollars. With this information, we construct a panel of time-varying trade prices at the country level, focusing on Sub-Saharan Africa (SSA). The dataset is first filtered to retain only observations corresponding to crops matching the FAO GAEZ crops as listed in Annex A.4, for which land suitability is measured. Export prices are calculated by dividing export value by export quantity when both values are different from zero, and assigning a missing value otherwise. Thus, prices correspond to thousands of US dollars per ton. To adjust for inflation – since the export values are reported in US dollars – prices are further deflated using the U.S. Consumer Price Index (CPI) from the The World Bank (2024). The data is filtered to include only SSA countries. Finally, missing country-crop-year combinations are filled in with the average of available prices for countries in the region for each crop-year combination, weighted by the export volume of each country.

A.6. Seventh-day Adventist Global Church Member Survey (GCMS)

The General Conference of the SDA church commissioned the Global Church Member Survey (GCMS) over three rounds: 2013, 2017, and 2022. The GCMS was fielded in each of these years in the church's global membership, at the individual level. The Meta-Analysis Research Team at Andrews University worked with the ASTR and the research teams from each Division during the development of the surveys. Each research team chooses the data collection format that fits their needs. The vast majority of them are self-completed in person on paper, with mail, electronic surveys in asynchronous mode, and electronic synchronous group settings being the second, third, and fourth most common (66%, 11%, 12%, and 11% respectively for the third GCMS round) (Bailey et al., 2024).[40] Participation is voluntary. The survey is administered at the individual level. There is no

[40]For a small portion of the data, they do not have registries of the collection method.

intentional individual-level panel dimension; while some individuals may be present in the panel for multiple years, no individually-identifying data is collected to connect these individuals over time.[41] We use the country-level geographic identifiers in the dataset to create a panel of cross-sections over time. To maintain comparable questions for our analysis, and due to lower sample sizes and more aggregation of units, we exclude the first round for our estimations.

The survey first asks for demographic characteristics such as gender, age, marital status, and education. Of greatest interest to us are questions on religious behavior and experiences. With these data, we construct five variables: *Holistic Message*, *Tobacco*, *Alcohol*, *Satisfaction*, and *Commitment with the SDA Church*.

Holistic Message In both the 2017 and 2022 rounds, members were asked "How often does the Sabbath speaker in your church preach on the following topics?", and included '*Holistic Healthful Living* — the importance of health for the body, mind, spirit, and social relationships' as one of the topics. The response options correspond to a Likert scale that includes the following options: I don't know, never, seldom, frequently, and very frequently. We construct a binary variable that takes a value of 1 if the person responds frequently or very frequently, 0 if seldom or never, and is missing if they report they don't know.

Alcohol and Tobacco The GCMS includes questions regarding the consumption of alcohol and tobacco. (There are no questions on the consumption of coffee or tea, and no questions on the production of any of these goods.) The 2017 round asks a yes or no question on whether the members have consumed tobacco or alcohol in the past 12 months. The 2022 round asks how often members have consumed alcohol or tobacco in the past 12 months, with the options being: never, once or twice, 3-10 times, or more than 10 times. To make the questions comparable, for the 2022 round we group all answers for which the members have consumed any amount of alcohol or tobacco as a yes. We then construct indicator variables for the 2017 and 2022 rounds indicating whether the individual has consumed these prohibited goods in the last 12 months (separately for alcohol and tobacco).

Satisfaction and Commitment The survey also includes questions to gauge members' satisfaction with and commitment to the church. The first question asks "How satisfied are

[41]The instrument is self-administered rather than interviewer-administered, so respondents record their own answers rather than reporting them aloud to an enumerator. The third GCMS round was approved by the Andrews University Institutional Review Board (Protocol #18-108), and regional research teams followed human-subjects review procedures appropriate to their regions (Bailey et al., 2024).

you with your local church", with possible responses on a Likert scale that ranges from very dissatisfied to very satisfied. With this information, we construct the "Satisfaction" variable, an indicator variable equal to one if the respondent reports being satisfied or very satisfied with their local church and 0 otherwise. The question about commitment asks members "How likely is it that you will be attending a Seventh-day Adventist Church for the rest of your life?", with the responses on a Likert scale that ranges from very unlikely to very likely. "Commitment with SDA Church" is an indicator variable equal to one if the respondent reports being likely or very likely to attend an SDA Church for the rest of their lives and 0 otherwise.

See Table C3 for the GCMS data summary statistics. Once we restrict to the countries included in our sample, the final sample is around 35,000 across the two GCMS rounds. The average proportion of alcohol usage across the two survey rounds is 7%, and the proportion of tobacco usage is 3%. Around 75% of people across the two rounds report that the Sabbath speaker in their church preaches on "Holistic Living" frequently or very frequently, 80% of them report being satisfied or very satisfied with their local church, and 95% of them say that they are likely or very likely to attend an SDA church for the rest of their life. The average age of the respondents is around 40 years old, 40% of them are women, and the median of their education level is complete secondary education.

A.7. Additional Data

We construct the following variables from other data sources:

Population density: we calculate each SDA locality's 1980 population per square kilometer, computed as total 1980 population (HYDE version 3.2.1, Klein Goldewijk et al., 2017) divided by the locality's land area.

Rural population share: we construct the share of a locality's 1980 population living in grid cells classified as rural by also using population from HYDE version 3.2.1 (Klein Goldewijk et al., 2017). We classify a grid cell as *urban* if its population exceeds 5,000 inhabitants and *rural* otherwise; the rural population share is the total population in a locality's rural cells divided by its total 1980 population.

Cultivated-land share: we calculate the fraction of an SDA locality's land area that is coded as cropland in 1980, from the land-use layers of HYDE version 3.2.1 (Klein Goldewijk et al., 2017). For each grid cell we compute cropland area as a fraction of cell area, and aggregate to the locality as total cropland area divided by total land area.

Land suitability: we construct an SDA locality's mean agricultural land suitability (a 0-1 index of the climatic and soil suitability of land for rain-fed cultivation) from the SAGE global suitability-for-agriculture data (Ramankutty et al., 2002). Localities with no suitable-land coverage are assigned a value of zero.

Appendix B. Conceptual Framework

This appendix presents a simple model of denominational choice with club-like benefits to religious groups, and derives four key implications: (i) higher opportunity costs of SDA prohibitions reduce SDA membership; (ii) local SDA churches respond by reducing doctrinal strictness and expanding service provision; (iii) these membership responses are attenuated in places with higher SDA prevalence (an "embeddedness" channel); and (iv) doctrinal softening following cost shocks can reduce the welfare of some remaining members.

B.1. Setup and Household Choice

Localities are characterized by:

- An opportunity-cost index $x \in \mathbb{R}_+$ (higher x means relatively more profitable tobacco, coffee, and tea)
- A local SDA doctrinal strictness choice $\theta \in \mathbb{R}_+$, chosen by local SDA leaders
- A local SDA service provision choice $\sigma \in \mathbb{R}_+$ (e.g., schools, clinics, outreach), chosen by local SDA leaders
- An SDA embeddedness index $m \in \mathbb{R}_+$ (e.g., SDA prevalence)

We focus on the choice between SDA and a composite outside option (other Christian denominations and potentially non-affiliation) for the subset of households for whom SDA is a realistic alternative. For such a household i, let α_i denote its idiosyncratic taste for SDA relative to the outside option, drawn from a distribution $F(\cdot)$ with density $f(\cdot)$ on $\mathbb{R}$.

The utility difference between SDA and the outside option is

$$\Delta U_i(m,x,\theta,\sigma) \;=\; \alpha_i \;+\; B(m,\theta,\sigma) \;-\; C(x,\theta), \tag{A1}$$

where:

- $B(m,\theta,\sigma)$ captures the spiritual, social, and material benefits of SDA:
  - $B_m(m,\theta,\sigma) > 0$ (higher SDA prevalence raises benefits)
  - $B_\theta(m,\theta,\sigma) > 0$ (stricter doctrine provides spiritual benefits to members)
  - $B_\sigma(m,\theta,\sigma) > 0$ (more services provide material and social benefits)
- $C(x,\theta)$ captures the costs of SDA prohibitions:

- $C_x(x,\theta) > 0$ (higher opportunity costs increase burden of prohibitions)
- $C_\theta(x,\theta) > 0$ (stricter doctrinal enforcement makes prohibitions more costly)
- $C_{x\theta}(x,\theta) > 0$ (interaction: doctrinal strictness is especially costly when opportunity costs are high)

Household i chooses SDA if and only if $\Delta U_i(m,x,\theta,\sigma) \geq 0$, i.e.,

$$\alpha_i \;\geq\; z(m,x,\theta,\sigma) \equiv C(x,\theta) - B(m,\theta,\sigma).$$

Given (m,x,θ,σ), the SDA membership share in a locality is

$$s(m,x,\theta,\sigma) \;=\; \Pr\big(\alpha_i \geq z(m,x,\theta,\sigma)\big) \;=\; 1 - F\big(z(m,x,\theta,\sigma)\big). \tag{A2}$$

B.2. Prediction (i): Cost Shocks Reduce SDA Membership

Holding (m,θ,σ) fixed, differentiate (A2) with respect to x:

$$\frac{\partial s(m,x,\theta,\sigma)}{\partial x} = -f\big(z(m,x,\theta,\sigma)\big)\,\frac{\partial z(m,x,\theta,\sigma)}{\partial x} \tag{A3}$$

$$= -f\big(z(m,x,\theta,\sigma)\big)\,C_x(x,\theta) \;<\; 0, \tag{A4}$$

since $f > 0$ and $C_x > 0$. Thus, higher opportunity costs of SDA prohibitions reduce SDA membership, all else equal.

B.3. Prediction (ii): Local Church Adaptation

Consistent with the decentralized structure of SDA governance in Sub-Saharan Africa, we model the decisions of local church leaders who choose policy stances independently across localities, taking the broader denominational environment as given.

Local SDA pastors and church leaders choose two policy instruments:

- Doctrinal strictness $\theta \in \mathbb{R}_+$: the intensity of enforcement and messaging around SDA prohibitions on tobacco, coffee, and tea, and other aspects of "holistic living." A higher θ reflects greater emphasis (e.g., more frequent messaging from the pulpit) on strict adherence to these prohibitions.

- Service provision $\sigma \in \mathbb{R}_+$: the level of investment in and operation of schools, clinics, and outreach that provide material and social benefits to members and potential members, and may facilitate evangelization and retention. A higher σ reflects more resources devoted to these services.

These policy choices affect membership in distinct ways. Stricter doctrine (higher θ) may raise spiritual benefits for highly committed members ($B_\theta > 0$), but it increases the salience and enforcement of costly prohibitions ($C_\theta > 0$). Expanded services (higher σ) increase the material and social benefits of membership ($B_\sigma > 0$) without imposing additional marginal economic costs.

Local church leaders choose θ and σ to balance membership growth against the value they place on doctrinal adherence and the costs of service provision. We use a simple reduced-form objective:

$$\Omega(m,x,\theta,\sigma) \;=\; s(m,x,\theta,\sigma) + \eta\theta - \kappa\sigma, \quad \eta > 0,\ \kappa > 0, \tag{A5}$$

where η reflects the weight placed on maintaining strict SDA identity for a given membership level, and κ reflects the per-unit cost (financial and organizational) of service provision. The parameter η could reflect leaders' personal commitment to doctrine or the value of maintaining a distinctive religious brand.

The first-order conditions (FOCs) for interior optima $\theta^*(m,x)$ and $\sigma^*(m,x)$ are:

$$\frac{\partial \Omega}{\partial \theta}(m,x,\theta^*,\sigma^*) \;=\; s_\theta(m,x,\theta^*,\sigma^*) + \eta \;=\; 0, \tag{A6}$$

$$\frac{\partial \Omega}{\partial \sigma}(m,x,\theta^*,\sigma^*) \;=\; s_\sigma(m,x,\theta^*,\sigma^*) - \kappa \;=\; 0. \tag{A7}$$

From (A2),

$$s_\theta(m,x,\theta,\sigma) = -f\big(z(m,x,\theta,\sigma)\big)\, z_\theta(m,x,\theta,\sigma) = -f\big(z(m,x,\theta,\sigma)\big)\,[C_\theta(x,\theta) - B_\theta(m,\theta,\sigma)],$$

$$s_\sigma(m,x,\theta,\sigma) = -f\big(z(m,x,\theta,\sigma)\big)\, z_\sigma(m,x,\theta,\sigma) = f\big(z(m,x,\theta,\sigma)\big)\, B_\sigma(m,\theta,\sigma).$$

We assume $s_\theta(m,x,\theta^*,\sigma^*) < 0$ (tightening θ reduces membership at the margin), $s_\sigma(m,x,\theta^*,\sigma^*) > 0$ (expanding services increases membership at the margin), and that s is concave in both policy instruments, so $s_{\theta\theta}(m,x,\theta^*,\sigma^*) < 0$ and $s_{\sigma\sigma}(m,x,\theta^*,\sigma^*) < 0$. These conditions ensure that the church's optimization problem has a well-defined interior solution.

The key comparative statics are how θ^* and σ^* respond to opportunity costs:

Doctrinal Strictness: Totally differentiating (A6) with respect to x yields

$$s_{\theta x}(m,x,\theta^*,\sigma^*) + s_{\theta\theta}(m,x,\theta^*,\sigma^*)\,\frac{d\theta^*}{dx} + s_{\theta\sigma}(m,x,\theta^*,\sigma^*)\,\frac{d\sigma^*}{dx} = 0.$$

The cross-partial $s_{\theta x}$ captures how the marginal membership effect of strictness changes with opportunity costs:

$$\begin{aligned} s_{\theta x}(m,x,\theta,\sigma) &= -\frac{\partial}{\partial x}\left[f(z)\,[C_\theta(x,\theta) - B_\theta(m,\theta,\sigma)]\right] \\ &= -f'(z)\, z_x\,[C_\theta(x,\theta) - B_\theta(m,\theta,\sigma)] - f(z)\, C_{x\theta}(x,\theta). \end{aligned}$$

Under our assumptions, we have $s_{\theta x}(m,x,\theta^*,\sigma^*) < 0$.[42] This condition states that the marginal membership cost of doctrinal strictness rises with opportunity costs: when foregone crop income is high, emphasizing the very prohibitions that create those costs becomes particularly damaging to recruitment and retention. Thus, local churches face a steeper trade-off: each additional unit of doctrinal strictness drives away more marginal members when those prohibitions are already economically burdensome.

To derive the comparative static, we solve the system of equations from totally differentiating both FOCs. For intuition, consider first the case where the cross-effect $s_{\theta\sigma}$ is small or where services adjust slowly relative to strictness.[43] Then, approximately,

$$\frac{d\theta^*}{dx} \approx -\frac{s_{\theta x}(m,x,\theta^*,\sigma^*)}{s_{\theta\theta}(m,x,\theta^*,\sigma^*)}.$$

Given $s_{\theta x} < 0$ and $s_{\theta\theta} < 0$, we obtain

$$\frac{d\theta^*}{dx} < 0. \tag{A8}$$

Thus, as opportunity costs x rise, local SDA churches optimally *reduce* doctrinal strictness: they soften enforcement of costly prohibitions and reduce messaging from the pulpit about the importance of abstaining from tobacco, coffee, and tea.

Service Provision: Similarly, totally differentiating (A7) with respect to x,

$$s_{\sigma x}(m,x,\theta^*,\sigma^*) + s_{\sigma\theta}(m,x,\theta^*,\sigma^*)\,\frac{d\theta^*}{dx} + s_{\sigma\sigma}(m,x,\theta^*,\sigma^*)\,\frac{d\sigma^*}{dx} = 0.$$

The cross-partial $s_{\sigma x}$ captures how the marginal membership effect of services changes with opportunity costs. Under our assumptions, we have $s_{\sigma x} > 0$: services become more valuable at the margin when opportunity costs are high.[44] The intuition is straightforward: when opportunity costs rise, more households become marginal (closer to

[42] The key assumptions are: (i) $C_{x\theta} > 0$ (the interaction term: enforcement of prohibitions is especially costly when opportunity costs are high), which makes the second term negative; and (ii) $f'(z) < 0$ at the relevant threshold (the density is declining as we move into the tail of the taste distribution), which ensures the first term is also negative given that $z_x = C_x > 0$ and $C_\theta > B_\theta$ at the margin. The declining density assumption is standard for common distributions (normal, logistic) and means there are fewer households with very high intrinsic preference for SDA as we move further from the center of the distribution. Both terms reinforce each other, ensuring $s_{\theta x} < 0$.

[43] The approximation $\frac{d\theta^*}{dx} \approx -\frac{s_{\theta x}}{s_{\theta\theta}}$ holds exactly if $s_{\theta\sigma} = 0$ (doctrine and services affect membership independently) or if σ is fixed in the short run while θ adjusts. More generally, solving the full system using Cramer's rule shows that $\frac{d\theta^*}{dx} < 0$ (and, subsequently, $\frac{d\sigma^*}{dx} > 0$) holds under the stability condition $s_{\theta\theta} \cdot s_{\sigma\sigma} - s_{\theta\sigma}^2 > 0$ (ensuring the church's optimization problem is concave), together with our maintained assumptions $s_{\theta x} < 0$, $s_{\sigma\sigma} < 0$, and $s_{\sigma x} > 0$. These results hold regardless of whether $s_{\theta\sigma}$ is positive (complements) or negative (substitutes). In either case, the fundamental mechanism—that strictness becomes especially costly when opportunity costs are high—drives the reduction in θ.

[44] Formally, $s_{\sigma x} = -f'(z) \cdot z_x \cdot B_\sigma$. This is positive if the density f is declining at the threshold (a standard assumption for common distributions such as a normal or logistic distribution) since $z_x = C_x > 0$. The declining density means that as costs push the threshold higher, we move to a part of the distribution where small changes in benefits affect more households. Thus services become more effective at retention precisely when opportunity costs make strictness more damaging.

leaving SDA), and services provide a way to retain them without asking for additional behavioral sacrifices. Since services deliver tangible benefits (education, healthcare) that don't compound the economic burden of crop prohibitions, they become particularly effective when members are already stressed by foregone income.

Under standard concavity conditions ($s_{\sigma\sigma} < 0$) and this assumption, we obtain

$$\frac{d\sigma^*}{dx} > 0. \tag{A9}$$

Thus, as opportunity costs x rise, local SDA churches optimally *expand* service provision: they reallocate effort toward schools, clinics, and other institutions that help retain members or attract new ones without requiring costly behavioral sacrifices.

Intuitively, when x rises, the SDA threshold shifts upward (making SDA less attractive). Expanding services provides broadly accessible benefits that offset this shift without imposing additional behavioral costs. If the density $f(z)$ is relatively high at the new threshold (many households near indifference), adding services becomes particularly effective at preventing exits.

Together, (A8) and (A9) show that local SDA churches respond to higher opportunity costs through a dual adjustment: reducing doctrinal strictness and expanding service provision. The key economic mechanism is that the marginal membership cost of doctrinal strictness rises with opportunity costs ($s_{\theta x} < 0$), making it optimal for churches to reduce θ when x increases. The expansion of services follows from both the direct value of offsetting higher costs and the need to compensate for reduced spiritual benefits from doctrinal softening (lower θ). These adjustments are mutually reinforcing: both policies move in directions that mitigate membership losses from the opportunity cost shock.

B.4. Prediction (iii): Attenuated Responses in High-SDA Areas (Embeddedness)

Consider two localities with the same (x,θ,σ) but different SDA embeddedness, $m^H > m^L$. Since $B_m(m,\theta,\sigma) > 0$,

$$\begin{aligned} B(m^H,\theta,\sigma) > B(m^L,\theta,\sigma) \quad \Rightarrow \quad & z(m^H,x,\theta,\sigma) = C(x,\theta) - B(m^H,\theta,\sigma) \\ & < C(x,\theta) - B(m^L,\theta,\sigma) = z(m^L,x,\theta,\sigma). \end{aligned}$$

From (A4), the magnitude of the membership response to x at m is

$$\left| \frac{\partial s(m,x,\theta,\sigma)}{\partial x} \right| = f\big(z(m,x,\theta,\sigma)\big)\, C_x(x,\theta).$$

Assume that the density at the cutoff $f(z)$ is decreasing in z over the relevant range (so pushing z further into the tail reduces f). Since $z(m^H,x,\theta,\sigma) < z(m^L,x,\theta,\sigma)$, we have

$$f\big(z(m^H,x,\theta,\sigma)\big) < f\big(z(m^L,x,\theta,\sigma)\big),$$

and therefore

$$\left|\frac{\partial s(m^H,x,\theta,\sigma)}{\partial x}\right| < \left|\frac{\partial s(m^L,x,\theta,\sigma)}{\partial x}\right|.$$

Intuitively, when SDA is more embedded (higher m), SDA membership is more attractive ex ante, so the threshold $z(m,x,\theta,\sigma)$ is lower and there are fewer households close to indifference between SDA and the outside option. As a result, a given increase in opportunity costs induces less switching away from SDA.

Figure B1 illustrates this mechanism: for a given local church policy stance (θ,σ), higher SDA embeddedness m shifts the SDA cutoff $z(m,x,\theta,\sigma)$ leftward along the same taste distribution, so that the density at the margin is lower and a given increase in opportunity costs moves fewer households out of SDA.

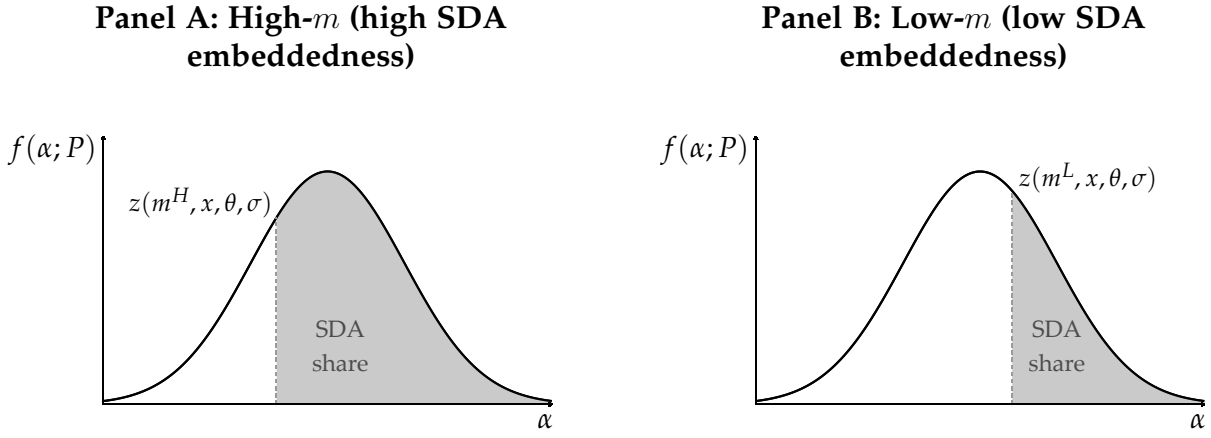


Figure B1: Embeddedness and the SDA threshold. For a given policy stance (θ,σ), higher SDA embeddedness m raises the benefit of SDA membership $B(m,\theta,\sigma)$ and lowers the cutoff $z(m,x,\theta,\sigma) = C(x,\theta) - B(m,\theta,\sigma)$ that separates SDA members from others. In high-SDA localities (m^H), the threshold $z(m^H,x,\theta,\sigma)$ lies further to the left than in low-SDA localities (m^L), and—under the assumption that the density $f(\alpha)$ is lower at this more favorable cutoff—fewer households lie close to indifference, so a given increase in opportunity costs induces less switching away from SDA.

B.5. Prediction (iv): Doctrinal Softening and Dissatisfaction of Stayers

Finally, we show how doctrinal softening in response to higher x can reduce the welfare of some remaining SDA members. While we initially model households as differing only in their idiosyncratic taste α_i for SDA, in this extension we enrich this to allow for hetero-

geneity in how households value doctrinal strictness, distinguishing high-commitment from low-commitment types.[45]

Suppose there are two types of households, $k \in \{H,L\}$:

- Type H ("high-commitment") members derive high spiritual benefits from strict SDA identity and discipline.
- Type L ("low-commitment") members derive weaker spiritual benefits from strictness and may be more sensitive to its costs.

For given (m,x,θ,σ), type k's utility from SDA relative to the outside option is

$$U_k(m,x,\theta,\sigma) = B_k(m,\theta,\sigma) - C(x,\theta),$$

with $B_{H,\theta}(m,\theta,\sigma) > B_{L,\theta}(m,\theta,\sigma) \geq 0$, $B_{k,\sigma} > 0$, and $C_x > 0$, $C_\theta > 0$. For each type k, there is a participation condition $U_k(m,x,\theta,\sigma) \geq \bar{U}$ relative to non-SDA options.

Let $\theta^*(m,x)$ and $\sigma^*(m,x)$ be the locally chosen policies (Section B.3), with $\frac{d\theta^*}{dx} < 0$ from (A8) and $\frac{d\sigma^*}{dx} > 0$ from (A9). Consider type k's utility along this policy path:

$$\tilde{U}_k(x) = U_k\big(m,x,\theta^*(m,x),\sigma^*(m,x)\big).$$

Totally differentiating with respect to x gives

$$\frac{d\tilde{U}_k}{dx} = B_{k,\theta}\big(m,\theta^*,\sigma^*\big)\,\frac{d\theta^*}{dx} + B_{k,\sigma}\big(m,\theta^*,\sigma^*\big)\,\frac{d\sigma^*}{dx} - \Big[C_x\big(x,\theta^*\big) + C_\theta\big(x,\theta^*\big)\,\frac{d\theta^*}{dx}\Big],$$

so

$$\frac{d\tilde{U}_k}{dx} = -\,C_x\big(x,\theta^*\big) + \big[B_{k,\theta}\big(m,\theta^*,\sigma^*\big) - C_\theta\big(x,\theta^*\big)\big]\frac{d\theta^*}{dx} + B_{k,\sigma}\big(m,\theta^*,\sigma^*\big)\,\frac{d\sigma^*}{dx}. \tag{A10}$$

Since $\frac{d\theta^*}{dx} < 0$ and $\frac{d\sigma^*}{dx} > 0$:

- For low-commitment members ($k = L$), it is natural to assume $B_{L,\theta}(m,\theta^*,\sigma^*) - C_\theta(x,\theta^*) < 0$, so doctrinal softening (a fall in θ) reduces the net cost of SDA and partially offsets the direct increase in opportunity costs. The expansion in services ($\frac{d\sigma^*}{dx} > 0$) provides additional offsetting benefits.
- For high-commitment members ($k = H$), who place a high value on strictness, we may have $B_{H,\theta}(m,\theta^*,\sigma^*) - C_\theta(x,\theta^*) \geq 0$. In this case, if the loss from reduced strictness is sufficiently large and services provide only partial compensation (i.e., $B_{H,\theta}\big|\frac{d\theta^*}{dx}\big| > B_{H,\sigma}\frac{d\sigma^*}{dx}$), then

$$\frac{d\tilde{U}_H}{dx} < 0.$$

[45] This type heterogeneity can be interpreted as variation in α_i that correlates with preferences over θ: high-commitment households have both higher baseline α_i (making them more likely to be SDA) and stronger preferences for doctrinal strictness, while low-commitment households have lower α_i and weaker attachment to strict doctrine.

Thus, even among households that remain in SDA after a rise in x, high-commitment members may experience lower utility due to both higher economic costs and doctrinal softening that outweighs the benefits of expanded services. This provides a simple rationale for our survey evidence that some remaining SDAs report weaker attachment and dissatisfaction in high-cost environments where local SDA churches have softened doctrine and shifted toward more broadly accessible services.

Appendix C. Additional Tables & Figures

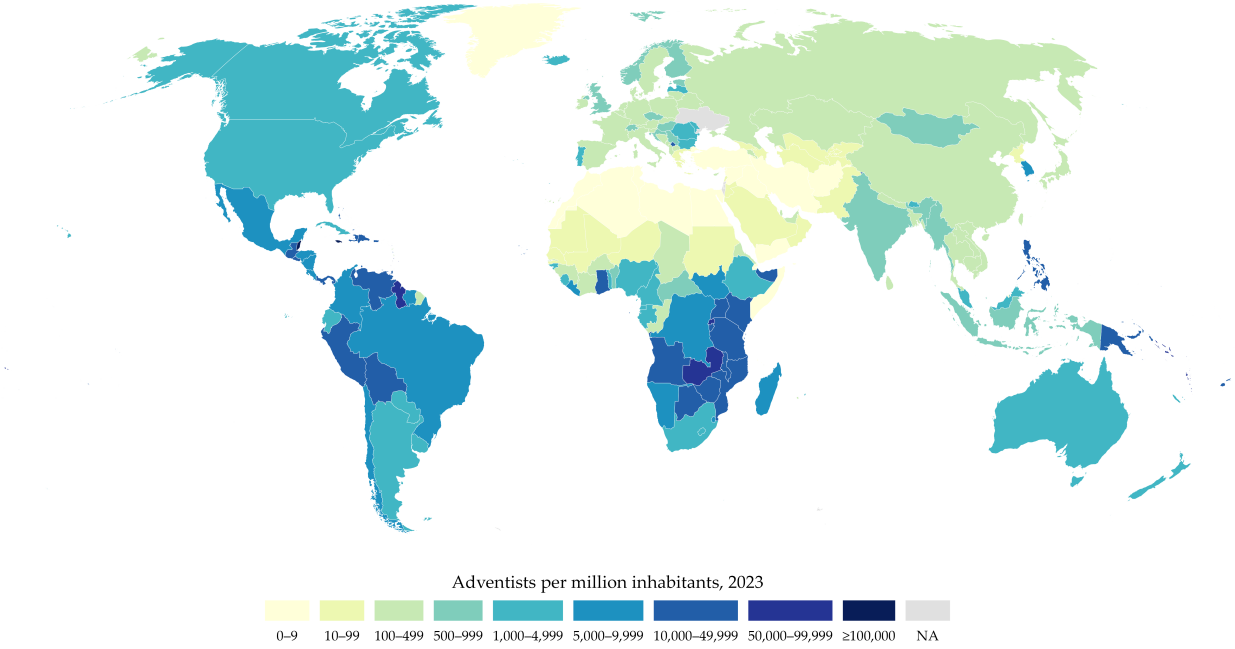
C.1. SDA Membership

Table C1: Seventh-day Adventist Membership by World Division

World division	Members	% of World
Sub-Saharan Africa		
East-Central Africa Division	5,307,907	23.3
Southern Africa–Indian Ocean Division	4,213,158	18.5
West-Central Africa Division	998,383	4.4
Sub-Saharan Africa subtotal	**10,519,448**	**46.2**
Rest of World		
Inter-American Division	3,705,040	16.3
South American Division	2,679,791	11.8
Southern Asia-Pacific Division	1,594,150	7.0
North American Division	1,257,884	5.5
Southern Asia Division	1,161,806	5.1
South Pacific Division	650,632	2.9
Northern Asia-Pacific Division	356,203	1.6
Inter-European Division	181,586	0.8
Trans-European Division	90,510	0.4
Euro-Asia Division	58,338	0.3
Attached to the General Conference[a]	529,807	2.3
World total	**22,785,195**	**100.0**

Notes: Membership by General Conference world division at year-end 2023, from Office of Archives, Statistics, and Research (2024). Shares are of the world total.

Figure C1: SDA Members Per Million Inhabitants by Country (2023)



Notes: The map shades countries by the number of SDA members per million inhabitants by country for 2023. Data on SDA membership are from the SDA Office of Archives, Statistics, and Research (ASTR). Membership and population data are from the 2024 Annual Statistical Report of the SDA Office of Archives, Statistics, and Research (ASTR), Global Mission Table 2 (Office of Archives, Statistics, and Research, 2024). Countries shaded grey have no membership data in the source (or no reported SDA presence).

C.2. Summary Statistics

Table C2: Summary Statistics: SDA Membership Data

	Mean	SD	p10	p25	p50	p75	p90	Min	Max	N
Costs:										
SDA Cost$_t$	14.36	56.14	0.00	0.00	0.00	0.46	24.30	0.00	652.93	4,238
SDA Cost$_{t-1}$	14.03	55.97	0.00	0.00	0.00	0.21	21.89	0.00	677.20	4,238
SDA Cost$_{t-2}$	14.80	58.57	0.00	0.00	0.00	0.21	23.30	0.00	677.20	4,238
SDA Cost$_{t-3}$	14.91	59.09	0.00	0.00	0.00	0.15	23.09	0.00	677.20	4,238
SDA Cost$_{t-4}$	14.71	58.28	0.00	0.00	0.00	0.13	21.88	0.00	642.91	4,238
SDA Cost$_{t-5}$	15.65	60.46	0.00	0.00	0.00	0.30	26.94	0.00	642.91	4,238
Average Costs:										
SDA Cost$_{t,t-1}$	14.20	45.13	0.00	0.00	0.00	4.37	36.91	0.00	645.51	4,238
SDA Cost$_{t,t-2}$	14.40	41.69	0.00	0.00	0.00	7.33	41.27	0.00	593.24	4,238
SDA Cost$_{t,t-3}$	14.53	39.71	0.00	0.00	0.01	9.73	44.07	0.00	457.48	4,238
SDA Cost$_{t,t-4}$	14.56	37.51	0.00	0.00	0.19	11.15	44.02	0.00	463.73	4,238
SDA Cost$_{t,t-5}$	14.74	35.40	0.00	0.00	0.77	13.22	43.61	0.00	386.44	4,238
Costs > 0:										
SDA Cost^+_t	46.26	93.17	0.06	0.91	7.85	45.29	142.38	0.00	652.93	1,316
SDA Cost$^+_{t-1}$	47.72	95.15	0.05	0.91	7.89	45.22	148.88	0.00	677.20	1,246
SDA Cost$^+_{t-2}$	50.88	99.80	0.07	1.00	8.66	48.38	166.33	0.00	677.20	1,233
SDA Cost$^+_{t-3}$	52.27	101.45	0.07	0.99	8.91	48.94	173.73	0.00	677.20	1,209
SDA Cost$^+_{t-4}$	51.91	100.29	0.07	0.96	8.34	48.72	175.01	0.00	642.91	1,201
SDA Cost$^+_{t-5}$	53.26	102.21	0.09	1.08	9.18	51.63	173.73	0.00	642.91	1,245
Average Costs > 0:										
SDA Cost$^+_{t,t-1}$	34.09	64.92	0.09	1.31	8.11	35.27	101.39	0.00	645.51	1,765
SDA Cost$^+_{t,t-2}$	30.35	56.39	0.11	1.46	8.84	32.36	83.06	0.00	593.24	2,011
SDA Cost$^+_{t,t-3}$	27.77	51.45	0.10	1.27	8.61	30.04	76.01	0.00	457.48	2,217
SDA Cost$^+_{t,t-4}$	25.56	46.79	0.11	1.22	8.21	27.92	68.16	0.00	463.73	2,415
SDA Cost$^+_{t,t-5}$	23.53	42.35	0.11	1.23	7.80	25.72	63.73	0.00	386.44	2,656
Dependent Variables: Membership Decisions										
Gains	3022.61	4253.70	100	379	1,255	4,162	8,133	0	47,397	4,238
Net Gains	2533.25	3804.67	50	287	1,016	3,323	6,997	0	44,651	4,238
Losses	628.00	2803.45	0	5	94	513	1,501	0	130,331	4,238
Dependent Variables: Church Responses										
Churches	319.13	366.58	23	69	190	442	776	0	2,735	4,238
Institutions	2.38	3.28	0	0	1	3	7	0	19	4,238

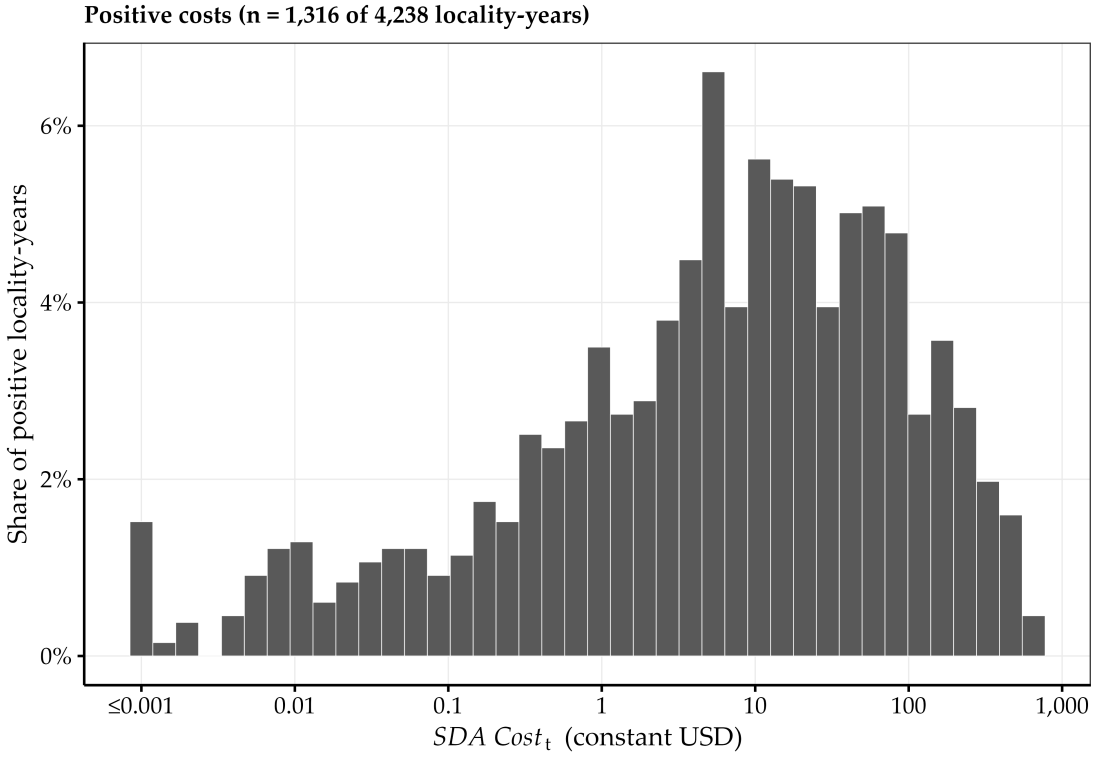
Notes: Data are at the locality-year level, for sub-national localities of the Seventh-day Adventist church. $SDACost_t$ and other opportunity cost variables calculated as described in Section 3.2. Data are an unbalanced panel from 1991 to 2022, for up to 202 localities per year. Data on membership and churches are from the SDA Office of Archives, Statistics, and Research (ASTR). Data on institutions are counts of health and education facilities which we digitized from SDA Yearbooks (General Conference of Seventh-day Adventists, Archives, Statistics, and Research, 2023), extracting SDA institutions using listed addresses to geo-reference institutions and assign them to localities. Gains are defined as the total number of members added by all methods, including baptisms, former member baptisms, or professions of faith. Losses are defined as the total number of members removed from membership rolls, either by dropping membership or by being recorded as missing. Net gains are gains minus losses.

Table C3: Summary Statistics: SDA Member Surveys

	Mean	SD	p10	p25	p75	p90	Min	Max	N
Prices:									
SDA Cost$_t$	3.14	5.84	0.00	0.00	1.46	10.28	0.00	80.85	34,360
SDA Cost$_{t-1}$	18.81	50.63	0.00	0.00	4.59	26.93	0.00	320.70	34,360
SDA Cost$_{t-2}$	4.18	13.67	0.00	0.00	2.74	3.43	0.00	168.50	34,360
SDA Cost$_{t-3}$	21.12	52.83	0.00	0.00	14.33	39.94	0.00	323.24	34,360
SDA Cost$_{t-4}$	31.43	70.30	0.00	0.00	35.75	83.01	0.00	401.46	34,360
SDA Cost$_{t-5}$	14.63	31.02	0.00	0.00	14.60	42.05	0.00	179.81	34,360
Prices > 0:									
SDA Cost$_t$	5.28	6.80	0.00	0.96	8.63	17.55	0.00	80.85	20,402
SDA Cost$_{t-1}$	7.35	14.68	0.01	0.52	4.59	23.81	0.00	128.11	14,723
SDA Cost$_{t-2}$	7.93	18.75	0.18	1.02	3.34	19.26	0.01	168.50	16,871
SDA Cost$_{t-3}$	11.89	25.08	0.00	0.73	6.21	36.15	0.00	230.22	16,542
SDA Cost$_{t-4}$	15.66	33.10	0.00	0.05	5.14	49.99	0.00	250.89	16,098
SDA Cost$_{t-5}$	14.05	25.92	0.00	1.21	27.58	42.05	0.00	179.81	11,163
Dependent Variables:									
Holistic Message	0.75	0.44	0.00	0.00	1.00	1.00	0.00	1.00	30,011
Commitment with SDA Church	0.95	0.21	1.00	1.00	1.00	1.00	0.00	1.00	32,035
Commitmend to Jesus Christ	0.91	0.29	1.00	1.00	1.00	1.00	0.00	1.00	31,698
Satisfaction	0.81	0.39	0.00	1.00	1.00	1.00	0.00	1.00	31,986
CO: Help others with religious struggles	0.79	0.41	0.00	1.00	1.00	1.00	0.00	1.00	31,887
CO: Responsibility to reduce pain	0.81	0.39	0.00	1.00	1.00	1.00	0.00	1.00	31,445
CO: Give time to help others	0.74	0.44	0.00	0.00	1.00	1.00	0.00	1.00	31,535
CO: Give money to help others	0.60	0.49	0.00	0.00	1.00	1.00	0.00	1.00	31,345
CO: Care about reducing poverty	0.64	0.48	0.00	0.00	1.00	1.00	0.00	1.00	31,216
CO: Apply faith to social issues	0.52	0.50	0.00	0.00	1.00	1.00	0.00	1.00	30,994
Commitment to Others (Mean)	3.89	0.88	2.67	3.33	4.50	5.00	1.00	5.00	32,507
Life filled with meaning	0.90	0.30	1.00	1.00	1.00	1.00	0.00	1.00	30,657
Spiritual Growth (Mean)	4.10	0.69	3.33	3.75	4.67	5.00	1.00	5.00	32,442
Spiritual Struggle (Mean)	2.87	1.07	1.00	2.33	3.67	4.00	1.00	5.00	32,198
God Wants me to Abstain	0.96	0.18	1.00	1.00	1.00	1.00	0.00	1.00	32,180
Should Abstain	0.94	0.24	1.00	1.00	1.00	1.00	0.00	1.00	31,364
Healthy Diet	0.96	0.19	1.00	1.00	1.00	1.00	0.00	1.00	31,529
Health Adherence	0.95	0.16	1.00	1.00	1.00	1.00	0.00	1.00	32,798
Alcohol	0.07	0.26	0.00	0.00	0.00	0.00	0.00	1.00	31,799
Tobacco	0.03	0.16	0.00	0.00	0.00	0.00	0.00	1.00	31,579
Alcohol isn't Safe to Use	0.77	0.42	0.00	1.00	1.00	1.00	0.00	1.00	30,094
Follows SDA Health Message	0.71	0.46	0.00	0.00	1.00	1.00	0.00	1.00	31,417
Following SDA Health Message ensures Salvation	0.63	0.48	0.00	0.00	1.00	1.00	0.00	1.00	30,972
Controls:									
Age	39.15	13.51	22.00	28.00	48.00	58.00	18.00	96.00	32,860
Women	0.39	0.49	0.00	0.00	1.00	1.00	0.00	1.00	33,582

Notes: Data are at the country-year level, for Sub-Saharan Africa. Data are a two-period panel of countries in 2017 and 2022. Opportunity cost variables calculated as described in Section 3.2. Dependent variables are from the Global Church Member Survey (GCMS) (2017 and 2022) and are defined as follows: *Holistic Message* is a binary variable that takes a value of 1 if the individual reports that the Sabbath speaker in their church preaches on Holistic Healthful Living (the importance of health for the body, mind, spirit, and social relationships) frequently or very frequently, and 0 if seldom or never; *Tobacco* is a binary variable that takes a value of 1 if the individual reports having used tobacco in the past 12 months, and 0 otherwise; *Alcohol* is a binary variable that takes a value of 1 if the individual reports having used alcohol in the past 12 months, and 0 otherwise; *Satisfaction* is a binary variable that takes a value of 1 if the individual reports being satisfied or very satisfied with their local church, and 0 if they report being neutral, dissatisfied, or very dissatisfied; *Commitment with SDA Church* is a binary variable that takes a value of 1 if the individual reports being likely or very likely to attend a SDA Church for the rest of their life, and 0 if they report being neutral, unlikely, or very unlikely. Control variables are defined as follows: *Age* is the age of the individuals in years; *Women* is a binary variable that takes a value of 1 if the individual reports being a woman and 0 otherwise; *Education Level* is a categorical variable that reports the highest schooling level of the respondent (the categories are No Education, Incomplete Primary, Complete Primary, Incomplete Secondary, Complete Secondary, Post-Secondary, and Graduate).

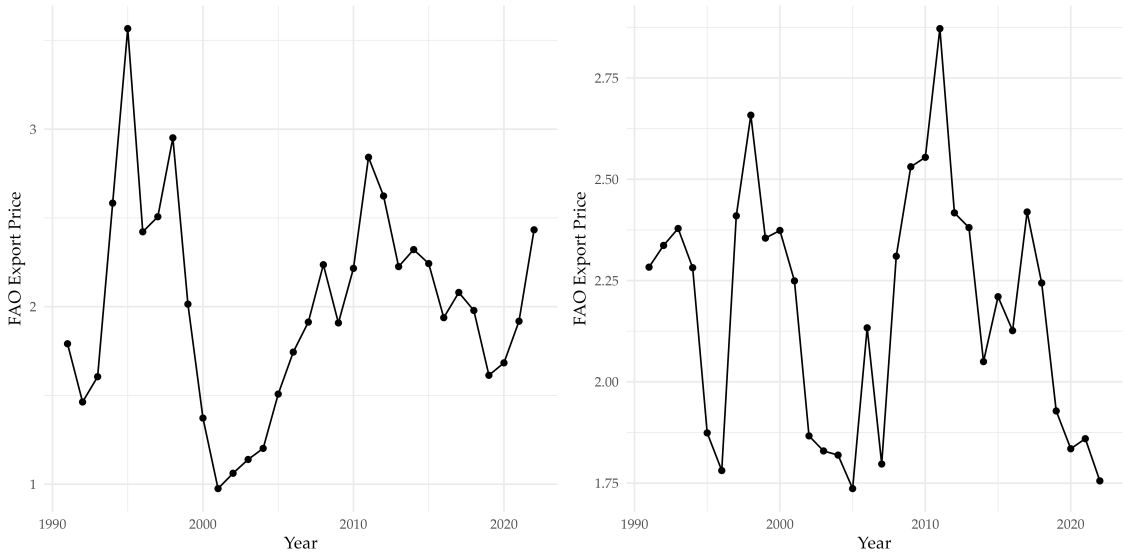
Figure C2: Distribution of the Opportunity Cost of SDA Crop Prohibitions



Notes: Distribution of the opportunity cost of adhering to SDA prohibitions on production of tobacco, coffee, and tea ($SDA\ Cost_{l,t}$, in 2010 US dollars per hectare per year) across SDA locality-years, 1991–2022. The measure is exactly zero for 68.9% of the 4,238 locality-years in the estimation sample – those in which the revenue-maximizing crop is not an SDA-prohibited crop; the figure shows the positive values only ($n = 1{,}316$) on a log scale. The small number of locality-years with positive but negligible costs below \$0.001 (the smallest is below $\$10^{-7}$) are accumulated in the leftmost bin, labeled ≤ 0.001. About a quarter of positive costs are below \$1 per hectare, which is why the binary indicator $\mathbb{1}\{SDA\ Cost > 0\}$ should be read as a conservative treatment definition.

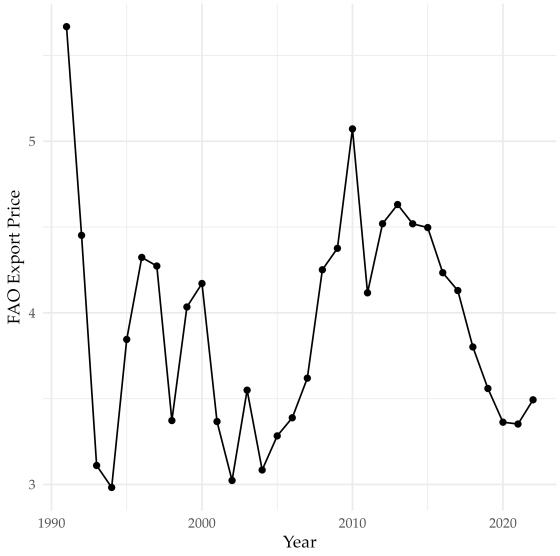
C.3. Price Time Series

Figure C3: Average FAO Export Prices: Prohibited Crops



(a) Coffee

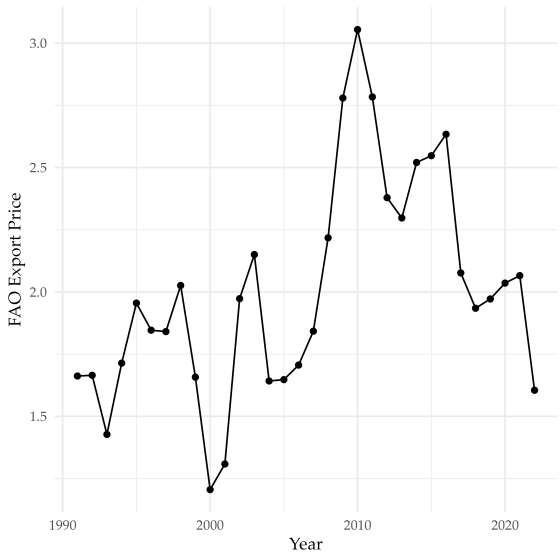
(b) Tea



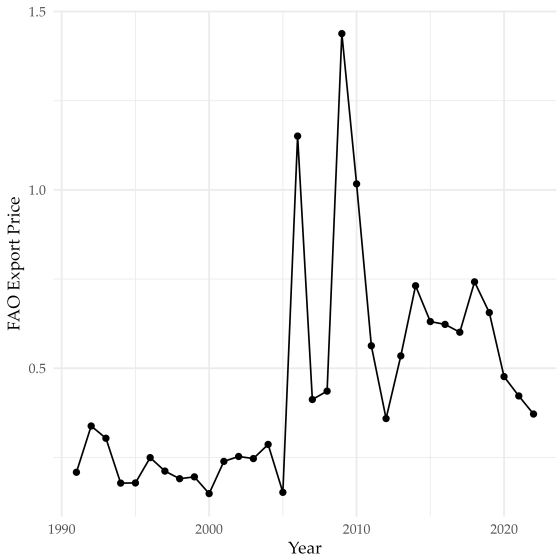
(c) Tobacco

Notes: The figures present the regional (Sub-Saharan Africa) average FAO Export prices over time for crops prohibited or discouraged by the SDA (Food and Agriculture Organization of the United Nations, 2024).

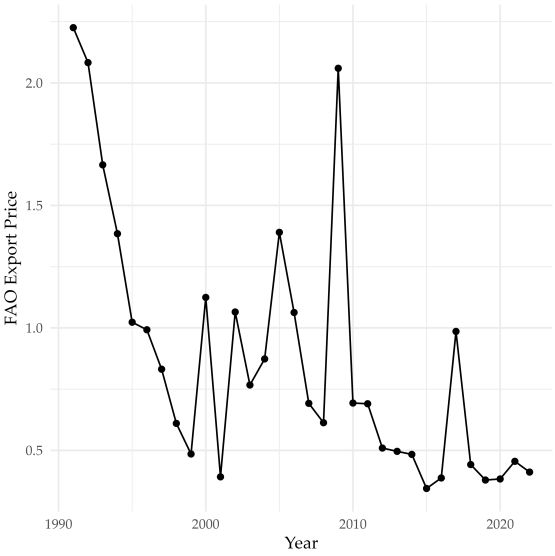
Figure C4: Average FAO Export Prices: Non-Prohibited Crops (Examples)



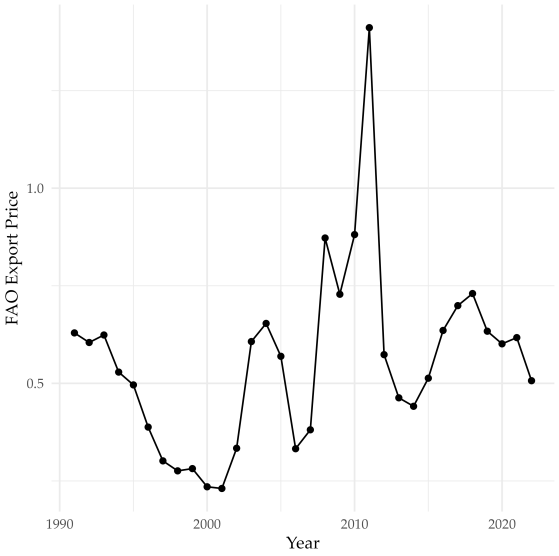
(a) Cacao



(b) Maize



(c) Carrot



(d) Sweet Potato

Notes: The figures present the regional (Sub-Saharan Africa) average FAO Export prices over time for a subset of crops that are neither prohibited nor discouraged by the SDA (Food and Agriculture Organization of the United Nations, 2024).

C.4. Production

Table C4: Impact of the Opportunity Cost of Religious Membership on Agricultural Production

	Dependent Variable: *Area Harvested*							
	Prohibited Crops				*Non-Prohibited Crops*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SDA Cost$_t$	0.001***				−0.001**			
	(0.000)				(0.000)			
SDA Cost$_{t,t-1}$		0.002***				−0.001***		
		(0.001)				(0.000)		
SDA Cost$_{t,t-2}$			0.002***				−0.002***	
			(0.001)				(0.000)	
SDA Cost$_{t,t-3}$				0.002***				−0.002***
				(0.001)				(0.000)
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,089	1,089	1,089	1,089	1,353	1,353	1,353	1,353
Num Countries	35	35	35	35	44	44	44	44
Adjusted R2	0.926	0.927	0.926	0.926	0.990	0.991	0.991	0.991
Outcome Mean	99,299	99,299	99,299	99,299	3,590,415	3,590,415	3,590,415	3,590,415
Outcome SD	177,411	177,411	177,411	177,411	6,099,240	6,099,240	6,099,240	6,099,240

Notes: Observations are countries in Sub-Saharan Africa between 1994 and 2022. Standard errors clustered at the country level are presented in parentheses. *Area Harvested* is the total area harvested in each country-year for the given crops, measured in hectares. *Amount Produced* is the total production in each country-year for the given crops, measured in kilograms of dry weight. *Prohibited Crops* are coffee, tobacco, and tea. *Non-Prohibited Crops* are banana, barley, buckwheat, phaseolous bean, cabbage, cacao, carrot, cassava, chickpea, coconut, cotton, cow pea, dry peas, flax fiber, groundnuts, maize, millet, oat, palm oil, olive oil, onion, pigeon pea, rape seed, rice, rye, sorghum, soybean, sweet potato, sugar beet, sugar cane, sunflower, tomato, wheat, yam. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the revenue per hectare agricultural revenue given up per hectare due to abiding by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for country population density in 1980, rural population in 1980, and land suitability, all interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.5. *Alternative Specifications*

Table C5: Impact of the Opportunity Cost of Religious Membership on Member Decisions: Controlling for Maximum Potential Revenue

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Linear R^{max}					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.132***		−0.121***		0.049	
	(0.041)		(0.034)		(0.138)	
$\mathbf{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.099***		−0.086***		0.124
		(0.038)		(0.031)		(0.162)
$\mathbf{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.137**		−0.131**		−0.024
		(0.069)		(0.053)		(0.180)
$\mathbf{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.173***		−0.144***		0.131
		(0.058)		(0.053)		(0.159)
$\mathbf{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.182***		−0.181***		−0.335**
		(0.064)		(0.058)		(0.164)
$R^{max,l}_{t,t-2}$ (per 1,000)	0.013	0.015	0.012	0.014	0.021	0.035
	(0.010)	(0.010)	(0.010)	(0.010)	(0.026)	(0.027)
	Panel B: Quartiles of R^{max}					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.131***		−0.117***		0.041	
	(0.037)		(0.030)		(0.130)	
$\mathbf{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.100***		−0.085***		0.112
		(0.036)		(0.030)		(0.156)
$\mathbf{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.135**		−0.127**		−0.038
		(0.066)		(0.050)		(0.175)
$\mathbf{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.170***		−0.139***		0.121
		(0.052)		(0.048)		(0.151)
$\mathbf{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.178***		−0.173***		−0.320**
		(0.057)		(0.053)		(0.148)
$\mathbf{Q}_2\{R^{max,l}_{t,t-2}\}$	−0.119*	−0.125**	−0.091*	−0.097*	0.190	0.155
	(0.063)	(0.063)	(0.053)	(0.053)	(0.202)	(0.197)
$\mathbf{Q}_3\{R^{max,l}_{t,t-2}\}$	−0.025	−0.036	−0.012	−0.023	0.087	0.047
	(0.068)	(0.069)	(0.058)	(0.058)	(0.242)	(0.231)
$\mathbf{Q}_4\{R^{max,l}_{t,t-2}\}$	−0.017	−0.032	0.021	0.005	0.094	0.032
	(0.080)	(0.080)	(0.064)	(0.062)	(0.311)	(0.301)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.872	0.872	0.918	0.918	0.726	0.728
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $R^{max}{}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a SDA locality. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbf{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C6: Impact of the Opportunity Cost of Religious Membership on Membership Decisions: Including Cash Crop Opportunity Cost Placebo

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.127***		−0.117***		0.039	
	(0.041)		(0.034)		(0.132)	
$\mathbb{1}\{\text{Cash Crop Cost}_{t,t-2} > 0\}$	0.091		0.067		−0.378	
	(0.057)		(0.049)		(0.271)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.100***		−0.087***		0.079
		(0.038)		(0.031)		(0.152)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.135**		−0.130**		−0.040
		(0.068)		(0.052)		(0.177)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.173***		−0.142***		0.145
		(0.055)		(0.051)		(0.157)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.176***		−0.176***		−0.336**
		(0.062)		(0.057)		(0.153)
$\mathbb{Q}_1^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.141*		0.107*		−0.572**
		(0.076)		(0.065)		(0.267)
$\mathbb{Q}_2^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.031		0.002		−0.451
		(0.055)		(0.039)		(0.274)
$\mathbb{Q}_3^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.107		0.102*		0.010
		(0.066)		(0.054)		(0.334)
$\mathbb{Q}_4^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.013		−0.014		−0.016
		(0.073)		(0.053)		(0.365)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.872	0.918	0.918	0.727	0.731
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. *Cash Crop Cost*$_{t,t-k}$ is a placebo measure constructed exactly as *SDA Cost* but for non-prohibited cash crops rather than the prohibited crops: the per-hectare agricultural revenue forgone by not producing cash crops, computed as the maximum potential revenue across all (non-prohibited) cash crops minus the maximum potential revenue across all (non-prohibited) non-cash crops, averaged between years t and $t-k$. Cash crops comprise cacao, cotton, flax fiber, groundnuts, palm oil, rape seed, soybean, sugar beet, sugar cane, and sunflower. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C7: Impact of the Opportunity Cost of Religious Membership on Member Decisions: Placebo Test using Leads of the Opportunity Cost Measure

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{SDA\ Cost_{t+1,t+2} > 0\}$	−0.057		−0.033		0.077	
	(0.061)		(0.042)		(0.160)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t+1,t+2}\}$		−0.097		−0.028		0.329*
		(0.070)		(0.052)		(0.193)
$\mathbb{Q}_2^+\{SDA\ Cost_{t+1,t+2}\}$		−0.064		−0.044		−0.019
		(0.057)		(0.045)		(0.172)
$\mathbb{Q}_3^+\{SDA\ Cost_{t+1,t+2}\}$		−0.015		−0.031		−0.245
		(0.069)		(0.043)		(0.212)
$\mathbb{Q}_4^+\{SDA\ Cost_{t+1,t+2}\}$		−0.011		−0.025		−0.095
		(0.078)		(0.047)		(0.259)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	3,272	3,272	3,272	3,272	3,240	3,240
Num SDA Localities	335	335	335	335	327	327
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.879	0.880	0.923	0.923	0.703	0.707
Outcome Mean	2,570.8	2,570.8	3,092.5	3,092.5	619.6	619.6
Outcome SD	3,802.1	3,802.1	4,294.7	4,294.7	1,775.7	1,775.7

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA Cost*$_{t+1,t+k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years $t+1$ and $t+k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C8: Impact of the Opportunity Cost of Religious Membership on Member Decisions: Impacts by Prohibited Crop

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Tobacco Cost}_{t,t-2} > 0\}$	−0.097***		−0.078***		0.190	
	(0.034)		(0.030)		(0.148)	
$\mathbb{1}\{\text{SDA Coffee Cost}_{t,t-2} > 0\}$	−0.036		−0.045		−0.140	
	(0.052)		(0.044)		(0.224)	
$\mathbb{1}\{\text{SDA Tea Cost}_{t,t-2} > 0\}$	−0.072		−0.071		−0.141	
	(0.096)		(0.076)		(0.143)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		−0.071		−0.050		0.301
		(0.044)		(0.034)		(0.183)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		−0.128***		−0.113***		0.049
		(0.047)		(0.041)		(0.165)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		−0.206***		−0.152***		0.360
		(0.069)		(0.055)		(0.269)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		−0.100		−0.102*		−0.339*
		(0.072)		(0.060)		(0.192)
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.018		−0.037		−0.323
		(0.054)		(0.037)		(0.233)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.051		−0.044		0.105
		(0.081)		(0.067)		(0.265)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.048		−0.060		−0.176
		(0.076)		(0.068)		(0.236)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.190*		−0.169*		−0.042
		(0.101)		(0.098)		(0.296)
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		0.020		0.008		−0.273**
		(0.104)		(0.081)		(0.138)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.207**		−0.166**		0.130
		(0.089)		(0.080)		(0.256)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.432***		−0.298**		0.219
		(0.160)		(0.122)		(0.161)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.394***		−0.444***		−0.473***
		(0.106)		(0.090)		(0.166)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.872	0.917	0.918	0.726	0.732
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. $SDA\ Cost_{t,t-k}^{c}$ measures the average opportunity cost of abiding by the SDA crop prohibitions for crop c: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on tobacco, coffee, and tea, respectively –between years $t+1$ and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of $SDA\ Cost_{t,t-k}$ and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C9: Impact of the Opportunity Cost of Religious Membership on Membership Decisions: Impacts by Share of Baseline Cultivated Land in a Locality

	Dependent Variable:		
	Net Gains	Gains	Losses
	(1)	(2)	(3)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.065	−0.070	0.147
	(0.054)	(0.044)	(0.184)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * Cropland_{Share}$	−0.369***	−0.281***	−0.642
	(0.141)	(0.083)	(0.647)
Locality Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Observations	4,238	4,238	4,175
Num SDA Localities	424	424	412
Num Countries	44	44	44
Pseudo R^2	0.871	0.918	0.725
Outcome Mean	2,533.3	3,022.6	637.5
Outcome SD	3,804.7	4,253.7	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. $Cropland_{share}$ is the share of the locality that was cultivated agricultural land in 1980. $SDA\ Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C10: Impact of the Opportunity Cost of Religious Membership on Membership Decisions
Alternative with No Lag: $SDA\ \ Cost_t$

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{SDA\ Cost_t > 0\}$	−0.054		−0.049*		0.178	
	(0.036)		(0.030)		(0.191)	
$\mathbf{Q}_1^+\{SDA\ Cost_t\}$		−0.092		−0.061		0.560*
		(0.059)		(0.043)		(0.292)
$\mathbf{Q}_2^+\{SDA\ Cost_t\}$		−0.041		−0.029		0.017
		(0.027)		(0.026)		(0.154)
$\mathbf{Q}_3^+\{SDA\ Cost_t\}$		−0.055		−0.049		0.038
		(0.060)		(0.045)		(0.255)
$\mathbf{Q}_4^+\{SDA\ Cost_t\}$		−0.012		−0.057		−0.424**
		(0.044)		(0.036)		(0.180)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.870	0.871	0.917	0.917	0.726	0.732
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA* $Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbf{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C11: Impact of the Opportunity Cost of Religious Membership on Membership Decisions
Alternative Lag: $SDA\ \ Cost_{t,t-1}$

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-1} > 0\}$	−0.072***		−0.053**		0.087	
	(0.026)		(0.023)		(0.188)	
$\mathbf{Q}_1^+\{SDA\ Cost_{t,t-1}\}$		−0.056		−0.022		0.240
		(0.042)		(0.029)		(0.216)
$\mathbf{Q}_2^+\{SDA\ Cost_{t,t-1}\}$		−0.084***		−0.057*		0.084
		(0.030)		(0.029)		(0.191)
$\mathbf{Q}_3^+\{SDA\ Cost_{t,t-1}\}$		−0.088*		−0.083**		−0.072
		(0.049)		(0.041)		(0.247)
$\mathbf{Q}_4^+\{SDA\ Cost_{t,t-1}\}$		−0.064		−0.085**		−0.498**
		(0.041)		(0.037)		(0.213)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.871	0.917	0.917	0.725	0.730
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA* $Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbf{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C12: Impact of the Opportunity Cost of Religious Membership on Membership Decisions
Alternative Lag: $SDA\ Cost_{t,t-3}$

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-3} > 0\}$	−0.053		−0.055		0.075	
	(0.042)		(0.038)		(0.134)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-3}\}$		−0.055		−0.053		0.124
		(0.058)		(0.051)		(0.159)
$\text{Q}_2^+\{SDA\ Cost_{t,t-3}\}$		−0.039		−0.044		0.007
		(0.064)		(0.054)		(0.179)
$\text{Q}_3^+\{SDA\ Cost_{t,t-3}\}$		−0.092**		−0.082*		0.141
		(0.042)		(0.043)		(0.161)
$\text{Q}_4^+\{SDA\ Cost_{t,t-3}\}$		−0.061		−0.083		−0.302*
		(0.058)		(0.052)		(0.182)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.870	0.870	0.917	0.917	0.725	0.727
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. $SDA\ Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C13: Impact of the Opportunity Cost of Religious Membership on Membership Decisions
Alternative Lag: $SDA\ Cost_{t,t-4}$

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-4} > 0\}$	−0.066*		−0.074*		−0.274	
	(0.038)		(0.038)		(0.192)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-4}\}$		−0.045		−0.061		−0.427*
		(0.057)		(0.053)		(0.238)
$\text{Q}_2^+\{SDA\ Cost_{t,t-4}\}$		−0.080		−0.078*		−0.131
		(0.059)		(0.047)		(0.189)
$\text{Q}_3^+\{SDA\ Cost_{t,t-4}\}$		−0.087		−0.091		−0.112
		(0.057)		(0.056)		(0.189)
$\text{Q}_4^+\{SDA\ Cost_{t,t-4}\}$		−0.123*		−0.132*		−0.240
		(0.073)		(0.071)		(0.238)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.870	0.871	0.917	0.917	0.726	0.728
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. $SDA\ Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C14: Impact of the Opportunity Cost of Religious Membership on Membership Decisions Alternative Lag: $SDA\ Cost_{t,t-5}$

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-5} > 0\}$	−0.097**		−0.083*		−0.000	
	(0.042)		(0.043)		(0.150)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-5}\}$		−0.092*		−0.086*		−0.114
		(0.048)		(0.045)		(0.186)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-5}\}$		−0.089		−0.065		0.116
		(0.059)		(0.050)		(0.154)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-5}\}$		−0.141**		−0.120**		0.139
		(0.063)		(0.058)		(0.160)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-5}\}$		−0.151**		−0.145*		0.017
		(0.076)		(0.074)		(0.149)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.871	0.917	0.917	0.725	0.726
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C15: Impact of the Opportunity Cost of Religious Membership on Member Decisions: Alternative specification using de Chaisemartin et al. (2024)

	Dependent Variable:														
	Net Gains					Gains					Losses				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−580.3**					−407.0					609.4*				
	(259.7)					(268.1)					(324.0)				
$\mathbb{Q}_1^+\{\text{SDA Cost}_{t,t-2}\}$		−923.7*					−598.3*					1889.2			
		(473.8)					(359.1)					(1438.7)			
$\mathbb{Q}_2^+\{\text{SDA Cost}_{t,t-2}\}$			−708.7					−530.4					863.1		
			(441.8)					(445.6)					(555.7)		
$\mathbb{Q}_3^+\{\text{SDA Cost}_{t,t-2}\}$				−402.0					−361.7					1080.0	
				(464.5)					(392.7)					(753.0)	
$\mathbb{Q}_4^+\{\text{SDA Cost}_{t,t-2}\}$					−60.3					−340.3**					−340.6**
					(180.4)					(164.5)					(159.6)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Outcome Mean	2533.3	2375.7	2491.8	2437.4	2499.7	3022.6	2838.5	2984.1	2918.7	2982.5	628.0	592.4	607.9	598.2	573.7
Observations	4238	2720	2731	2674	2573	4238	2720	2731	2674	2573	4238	2720	2731	2674	2573
# of rSDAs	424	382	384	379	383	424	382	384	379	383	424	382	384	379	383
# Switchers-Out	785	146	110	70	62	785	146	110	70	62	785	146	110	70	62
# Never-Switchers	1100	1726	1776	2071	2212	1100	1726	1776	2071	2212	1100	1726	1776	2071	2212
# Switchers-In	2353	848	845	533	299	2353	848	845	533	299	2353	848	845	533	299

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Net Gains* is reported baptisms, professions of faith, and former member baptisms minus dropped and missing members in the SDA locality in a given year. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms. *Losses* is the number of reported dropped and missing members. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions between years t and $t-k$: the agricultural revenue per hectare given up if *constrained* by SDA crop restrictions on coffee, tea, and tobacco. $\mathbb{1}\{x>0\}$ is an indicator function equal to 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}_j^+\{x\}$ are indicator variables equal to 1 if x is in the jth quartile of non-zero values of x and 0 otherwise. Estimated using the staggered difference-in-differences estimator of de Chaisemartin et al. (2024). Each quartile estimate is obtained from a separate estimation comparing localities whose cost enters quartile j with localities whose cost remains zero. Because treatment intensity is persistent, localities reaching the upper cost quartiles are concentrated in persistently high-cost environments for which few comparable never-treated (zero-cost) localities exist, so the $\mathbb{Q}_3^+$ and $\mathbb{Q}_4^+$ contrasts rest on a small and selected comparison group. The binary specification, which compares all positive-cost localities with the full zero-cost group, is not subject to this limitation and is our preferred specification. Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C16: Impact of the Opportunity Cost of Religious Membership on Membership Decisions: Alternative Aggregation Approaches (*SDA Cost* from Pixels to Localities)

	Dependent Variable:					
	Net Gains		Gains		Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Unweighted					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.127***		−0.118***		0.036	
	(0.041)		(0.033)		(0.139)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.086*		−0.091**		0.007
		(0.051)		(0.044)		(0.160)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.157***		−0.119***		0.120
		(0.051)		(0.039)		(0.207)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.158***		−0.164***		−0.129
		(0.053)		(0.051)		(0.119)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.160**		−0.167***		−0.378**
		(0.066)		(0.060)		(0.187)
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.871	0.918	0.918	0.725	0.727
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5
	Panel B: Weighted by Baseline Rural-Population					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.107**		−0.101***		0.074	
	(0.044)		(0.038)		(0.136)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.065		−0.066		0.130
		(0.051)		(0.041)		(0.194)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.126***		−0.116***		−0.039
		(0.049)		(0.042)		(0.172)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.129**		−0.114**		0.149
		(0.059)		(0.057)		(0.137)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.166**		−0.168***		−0.301*
		(0.071)		(0.064)		(0.157)
Observations	4,040	4,040	4,040	4,040	3,977	3,977
Num SDA Localities	405	405	405	405	393	393
Num Countries	43	43	43	43	43	43
Pseudo R^2	0.875	0.875	0.920	0.920	0.726	0.729
Outcome Mean	2,495.5	2,495.5	2,965.9	2,965.9	620.0	620.0
Outcome SD	3,805.2	3,805.2	4,241.6	4,241.6	2,872.1	2,872.1
	Panel C: Weighted by Baseline Cultivated Land					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.128***		−0.116***		0.052	
	(0.041)		(0.033)		(0.138)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.106***		−0.094***		0.121
		(0.032)		(0.033)		(0.167)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.113*		−0.096*		0.014
		(0.067)		(0.051)		(0.168)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.161***		−0.155***		−0.014
		(0.062)		(0.057)		(0.147)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.196***		−0.196***		−0.281
		(0.070)		(0.065)		(0.174)
Observations	4,238	4,238	4,238	4,238	4,175	4,175
Num SDA Localities	424	424	424	424	412	412
Num Countries	44	44	44	44	44	44
Pseudo R^2	0.871	0.871	0.918	0.918	0.725	0.726
Outcome Mean	2,533.3	2,533.3	3,022.6	3,022.6	637.5	637.5
Outcome SD	3,804.7	3,804.7	4,253.7	4,253.7	2,823.5	2,823.5
Locality Fixed Effects	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. $SDA\ Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Panel A presents estimates where the $SDA\ Cost_l$ for a locality is the unweighted average $SDA\ Cost_p$ across all pixels in a locality. Panel B presents estimates where the $SDA\ Cost_l$ for a locality is a rural-population (1980) weighted average $SDA\ Cost_p$ across all pixels in a locality. Panel C presents estimates where the $SDA\ Cost_l$ for a locality is a cultivated-land (1980) weighted average $SDA\ Cost_p$ across all pixels in a locality. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C17: Impact of the Opportunity Cost on Church Responses: Controlling for Maximum Potential Revenue

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
	Panel A: Linear R^{max}			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.001		0.080**	
	(0.015)		(0.037)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.006		0.086**
		(0.019)		(0.041)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.028*		0.074*
		(0.017)		(0.039)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.035*		0.085**
		(0.019)		(0.039)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.022		0.051
		(0.021)		(0.051)
$R^{max,l}_{t,t-2}$ (per 1,000)	0.002	0.002	0.007	0.007
	(0.002)	(0.002)	(0.005)	(0.005)
	Panel B: Quartiles of R^{max}			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.003		0.076**	
	(0.015)		(0.037)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.004		0.084**
		(0.020)		(0.040)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.029*		0.068*
		(0.017)		(0.040)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.033*		0.075*
		(0.020)		(0.039)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.019		0.039
		(0.021)		(0.055)
$\mathbb{Q}_2\{R^{max,l}_{t,t-2}\}$	−0.037**	−0.034*	0.000	−0.005
	(0.018)	(0.018)	(0.032)	(0.034)
$\mathbb{Q}_3\{R^{max,l}_{t,t-2}\}$	−0.004	−0.000	−0.030	−0.039
	(0.025)	(0.028)	(0.041)	(0.042)
$\mathbb{Q}_4\{R^{max,l}_{t,t-2}\}$	−0.033	−0.028	−0.081	−0.095
	(0.024)	(0.021)	(0.064)	(0.064)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1994 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* the total number of education and health institutions in the SDA locality in a given year. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$ (see Appendix A). $R^{max}{}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a SDA locality. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C18: Impact of the Opportunity Cost of Religious Membership on Church Responses: Including Cash Crop Opportunity Cost Placebo

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.001		0.080**	
	(0.015)		(0.037)	
$\mathbb{1}\{\text{Cash Crop Cost}_{t,t-2} > 0\}$	−0.017		0.040	
	(0.015)		(0.051)	
$\mathbf{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.006		0.084**
		(0.019)		(0.040)
$\mathbf{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.029*		0.076*
		(0.018)		(0.039)
$\mathbf{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.035*		0.081**
		(0.021)		(0.040)
$\mathbf{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.022		0.054
		(0.021)		(0.051)
$\mathbf{Q}_1^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.035		0.077
		(0.026)		(0.064)
$\mathbf{Q}_2^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.008		0.003
		(0.018)		(0.048)
$\mathbf{Q}_3^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.020		−0.002
		(0.035)		(0.051)
$\mathbf{Q}_4^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.013		−0.050
		(0.035)		(0.058)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. textitCash Crop Cost$_{t,t-k}$ is a placebo measure constructed exactly as *SDA Cost* but for non-prohibited cash crops rather than the prohibited crops: the per-hectare agricultural revenue forgone by not producing cash crops, computed as the maximum potential revenue across all (non-prohibited) cash crops minus the maximum potential revenue across all (non-prohibited) non-cash crops, averaged between years t and $t-k$. Cash crops comprise cacao, cotton, flax fiber, groundnuts, palm oil, rape seed, soybean, sugar beet, sugar cane, and sunflower. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbf{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C19: Impact of the Opportunity Cost of Religious Membership on Church Responses: Impacts by Prohibited Crop

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Tobacco Cost}_{t,t-2} > 0\}$	0.017		0.107***	
	(0.016)		(0.040)	
$\mathbb{1}\{\text{SDA Coffee Cost}_{t,t-2} > 0\}$	−0.005		−0.006	
	(0.037)		(0.031)	
$\mathbb{1}\{\text{SDA Tea Cost}_{t,t-2} > 0\}$	−0.019		0.071*	
	(0.048)		(0.038)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		0.013		0.107**
		(0.019)		(0.047)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		−0.005		0.100***
		(0.018)		(0.037)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		0.065*		0.173***
		(0.038)		(0.052)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}^{toba,l}\}$		0.014		0.159
		(0.029)		(0.101)
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.018		0.022
		(0.037)		(0.026)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		0.008		−0.027
		(0.043)		(0.032)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		−0.020		−0.099
		(0.036)		(0.084)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}^{coff,l}\}$		0.109**		−0.162***
		(0.044)		(0.059)
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		0.018		0.064
		(0.050)		(0.039)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.089***		0.145
		(0.033)		(0.105)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.153**		0.170***
		(0.078)		(0.049)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}^{teas,l}\}$		−0.123		0.165***
		(0.110)		(0.058)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.948	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$^c_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions for crop c: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on tobacco, coffee, and tea, respectively –between years $t+1$ and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of *SDA Cost*$_{t,t-k}$ and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C20: Impact of the Opportunity Cost of Religious Membership on Church Responses
Alternative with no Lag: $SDA\ \ Cost_t$

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{SDA\ Cost_t > 0\}$	0.003		0.058**	
	(0.025)		(0.026)	
$\mathbb{Q}_1^+\{SDA\ Cost_t\}$		0.003		0.087**
		(0.031)		(0.035)
$\mathbb{Q}_2^+\{SDA\ Cost_t\}$		0.005		0.025
		(0.027)		(0.030)
$\mathbb{Q}_3^+\{SDA\ Cost_t\}$		−0.004		0.060**
		(0.026)		(0.026)
$\mathbb{Q}_4^+\{SDA\ Cost_t\}$		0.008		0.023
		(0.020)		(0.029)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.465	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C21: Impact of the Opportunity Cost of Religious Membership on Church Responses
Alternative Lag: $SDA\ \ Cost_{t,t-1}$

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-1} > 0\}$	0.005		0.071**	
	(0.018)		(0.035)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-1}\}$		0.016		0.083*
		(0.020)		(0.043)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-1}\}$		−0.017		0.053
		(0.024)		(0.033)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-1}\}$		0.010		0.071**
		(0.021)		(0.036)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-1}\}$		0.017		0.058
		(0.023)		(0.053)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.465	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C22: Impact of the Opportunity Cost of Religious Membership on Church Responses
Alternative Lag: $SDA\ Cost_{t,t-3}$

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-3} > 0\}$	0.001		0.049	
	(0.013)		(0.035)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-3}\}$		0.008		0.065*
		(0.019)		(0.036)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-3}\}$		−0.019		0.031
		(0.028)		(0.032)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-3}\}$		0.033		0.037
		(0.022)		(0.043)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-3}\}$		0.028		0.003
		(0.021)		(0.053)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.465	0.465
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C23: Impact of the Opportunity Cost of Religious Membership on Church Responses
Alternative Lag: $SDA\ Cost_{t,t-4}$

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-4} > 0\}$	0.004		0.021	
	(0.011)		(0.036)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-4}\}$		0.019*		0.024
		(0.011)		(0.036)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-4}\}$		−0.025		0.025
		(0.021)		(0.039)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-4}\}$		0.046		−0.015
		(0.028)		(0.051)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-4}\}$		0.018		−0.033
		(0.031)		(0.056)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.465	0.465
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C24: Impact of the Opportunity Cost of Religious Membership on Church Responses
Alternative Lag: $SDA\ \ Cost_{t,t-5}$

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-5} > 0\}$	0.005		−0.004	
	(0.013)		(0.036)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-5}\}$		0.014		0.003
		(0.013)		(0.036)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-5}\}$		−0.024		−0.007
		(0.020)		(0.038)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-5}\}$		0.057**		−0.030
		(0.025)		(0.048)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-5}\}$		0.024		−0.071
		(0.038)		(0.055)
Locality Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.465	0.465
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* is the number of reported health or education institutions in the SDA locality in a given year in the SDA annual yearbooks. *SDA* $Cost_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions: the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C25: Impact of the Opportunity Cost of Religious Membership on Church Responses: Alternative specification using de Chaisemartin et al. (2024)

	Dependent Variable:									
	Churches					Institutions				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	0.5					0.1***				
	(5.3)					(0.0)				
$\mathbb{Q}_1^+\{\text{SDA Cost}_{t,t-2}\}$		−6.4					−0.0			
		(6.0)					(0.1)			
$\mathbb{Q}_2^+\{\text{SDA Cost}_{t,t-2}\}$			13.1					0.1		
			(13.9)					(0.1)		
$\mathbb{Q}_3^+\{\text{SDA Cost}_{t,t-2}\}$				−0.8					0.0	
				(4.6)					(0.1)	
$\mathbb{Q}_4^+\{\text{SDA Cost}_{t,t-2}\}$					26.6					0.3
					(25.8)					(0.2)
Locality Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Outcome Mean	319.1	291.5	301.2	296.1	291.0	2.4	2.2	2.2	2.1	2.1
Observations	4238	2720	2731	2674	2573	4238	2720	2731	2674	2573
# of rSDAs	424	382	384	379	383	424	382	384	379	383
# Switchers-Out	785	146	110	70	62	785	146	110	70	62
# Never-Switchers	1100	1726	1776	2071	2212	1100	1726	1776	2071	2212
# Switchers-In	2353	848	845	533	299	2353	848	845	533	299

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Net Gains* is reported baptisms, professions of faith, and former member baptisms minus dropped and missing members in the SDA locality in a given year. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms. *Losses* is the number of reported dropped and missing members. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions between years t and $t-k$: the agricultural revenue per hectare given up if *constrained* by SDA crop restrictions on coffee, tea, and tobacco. $\mathbb{1}\{x > 0\}$ is an indicator function equal to 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}_j^+\{x\}$ are indicator variables equal to 1 if x is in the jth quartile of non-zero values of x and 0 otherwise. Estimated using the staggered difference-in-differences estimator of de Chaisemartin et al. (2024). Each quartile estimate is obtained from a separate estimation comparing localities whose cost enters quartile j with localities whose cost remains zero. Because treatment intensity is persistent, localities reaching the upper cost quartiles are concentrated in persistently high-cost environments for which few comparable never-treated (zero-cost) localities exist, so the $\mathbb{Q}_3^+$ and $\mathbb{Q}_4^+$ contrasts rest on a small and selected comparison group. The binary specification, which compares all positive-cost localities with the full zero-cost group, is not subject to this limitation and is our preferred specification. Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C26: Impact of the Opportunity Cost on Church Responses: Alternative Aggregation Approaches (*SDA Cost* from Pixels to Localities)

	Dependent Variable:			
	Churches		Institutions	
	(1)	(2)	(3)	(4)
	Panel A: Unweighted			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	0.001		0.082**	
	(0.015)		(0.037)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.014		0.094**
		(0.013)		(0.040)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.011		0.078**
		(0.017)		(0.036)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.004		0.049
		(0.028)		(0.039)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.071**		0.084*
		(0.033)		(0.047)
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4
	Panel B: Weighted by Baseline Rural-Population			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	0.002		0.084**	
	(0.015)		(0.039)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.008		0.105**
		(0.018)		(0.044)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.024		0.057
		(0.024)		(0.038)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.039*		0.076*
		(0.022)		(0.039)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.044*		0.074
		(0.026)		(0.048)
Observations	4,040	4,040	2,546	2,546
Num SDA Localities	405	405	254	254
Num Countries	43	43	31	31
Pseudo R^2	0.947	0.948	0.468	0.468
Outcome Mean	321.4	321.4	3.8	3.8
Outcome SD	372.4	372.4	3.5	3.5
	Panel C: Weighted by Baseline Cultivated Land			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	0.001		0.083**	
	(0.014)		(0.037)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.013		0.071*
		(0.022)		(0.036)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		0.009		0.102**
		(0.020)		(0.042)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		0.014		0.084**
		(0.019)		(0.041)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.035		0.060
		(0.022)		(0.044)
Observations	4,238	4,238	2,700	2,700
Num SDA Localities	424	424	266	266
Num Countries	44	44	32	32
Pseudo R^2	0.947	0.947	0.466	0.466
Outcome Mean	319.1	319.1	3.7	3.7
Outcome SD	366.6	366.6	3.4	3.4

Notes: Observations are SDA localities in Sub-Saharan Africa between 1994 and 2022. Standard errors clustered at the country level are presented in parentheses. *Churches* is the number of reported churches and companies in the SDA locality in a given year. *Institutions* the total number of education and health institutions in the SDA locality in a given year. *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$ (see Appendix A). $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathrm{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Panel A presents estimates where the *SDA Cost*$_l$ for a locality is the unweighted average *SDA Cost*$_p$ across all pixels in a locality. Panel B presents estimates where the *SDA Cost*$_l$ for a locality is a rural-population (1980) weighted average *SDA Cost*$_p$ across all pixels in a locality. Panel C presents estimates where the *SDA Cost*$_l$ for a locality is a cultivated-land (1980) weighted average *SDA Cost*$_p$ across all pixels in a locality. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C27: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Controlling for Maximum Potential Revenue

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Linear R^{max}					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.074**		0.019***		0.029***	
	(0.033)		(0.007)		(0.008)	
$R^{max,l}_{t,t-2}$ (per 1,000)	0.003	0.003	−0.001	−0.002	0.001	0.001
	(0.009)	(0.006)	(0.001)	(0.001)	(0.003)	(0.004)
$\mathbb{Q}^+_1\{SDA\ Cost_{t,t-2}\}$		0.058		0.004		0.017
		(0.062)		(0.013)		(0.015)
$\mathbb{Q}^+_2\{SDA\ Cost_{t,t-2}\}$		−0.044		0.020***		0.023***
		(0.038)		(0.006)		(0.007)
$\mathbb{Q}^+_3\{SDA\ Cost_{t,t-2}\}$		−0.089***		0.017***		0.033***
		(0.024)		(0.006)		(0.010)
$\mathbb{Q}^+_4\{SDA\ Cost_{t,t-2}\}$		0.022		0.021*		0.025
		(0.050)		(0.010)		(0.022)
	Panel B: Quartiles of R^{max}					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.019		0.022**		0.019**	
	(0.053)		(0.009)		(0.009)	
$\mathbb{Q}^+_1\{SDA\ Cost_{t,t-2}\}$		0.068		0.003		0.016
		(0.067)		(0.011)		(0.014)
$\mathbb{Q}^+_2\{SDA\ Cost_{t,t-2}\}$		−0.020		0.024***		0.019**
		(0.058)		(0.007)		(0.008)
$\mathbb{Q}^+_3\{SDA\ Cost_{t,t-2}\}$		−0.042		0.020**		0.018
		(0.075)		(0.008)		(0.011)
$\mathbb{Q}^+_4\{SDA\ Cost_{t,t-2}\}$		0.083		0.023**		0.008
		(0.104)		(0.009)		(0.013)
$\mathbb{Q}_2\{R^{max,l}_{t,t-2}\}$	0.062	0.055	0.003	0.001	−0.021*	−0.023*
	(0.069)	(0.082)	(0.008)	(0.009)	(0.012)	(0.013)
$\mathbb{Q}_3\{R^{max,l}_{t,t-2}\}$	0.057	0.028	0.007	0.017*	−0.012	−0.013
	(0.063)	(0.071)	(0.007)	(0.009)	(0.010)	(0.012)
$\mathbb{Q}_4\{R^{max,l}_{t,t-2}\}$	0.008	−0.013	0.041***	0.044***	0.049***	0.051***
	(0.069)	(0.073)	(0.008)	(0.008)	(0.011)	(0.010)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.025	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $R^{max}{}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a country. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C28: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Controlling for Maximum Potential Revenue

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
	Panel A: Linear R^{max}			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.065***		−0.022**	
	(0.015)		(0.008)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.006		0.011
		(0.024)		(0.015)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.060***		−0.016*
		(0.014)		(0.008)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.072***		−0.026***
		(0.011)		(0.006)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.176***		−0.049***
		(0.023)		(0.010)
$R^{max,l}_{t,t-2}$ (per 1,000)	0.007	0.014***	−0.001	0.001
	(0.006)	(0.004)	(0.002)	(0.002)
	Panel B: Quartiles of R^{max}			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.081***		−0.017	
	(0.027)		(0.016)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.014		0.020
		(0.024)		(0.013)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.085***		−0.019
		(0.016)		(0.012)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.103***		−0.029**
		(0.022)		(0.012)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.193***		−0.057***
		(0.031)		(0.015)
$\mathbb{Q}_2\{R^{max,l}_{t,t-2}\}$	−0.028	−0.046*	0.015	0.007
	(0.037)	(0.024)	(0.020)	(0.015)
$\mathbb{Q}_3\{R^{max,l}_{t,t-2}\}$	−0.046	−0.105***	0.003	−0.025**
	(0.033)	(0.027)	(0.014)	(0.012)
$\mathbb{Q}_4\{R^{max,l}_{t,t-2}\}$	−0.214***	−0.209***	−0.026	−0.025
	(0.033)	(0.021)	(0.019)	(0.016)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.044	0.044	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. ${R^{max}}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a country. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C29: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Including Cash Crop Opportunity Cost Placebo

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.102***		0.021***		0.034***	
	(0.022)		(0.006)		(0.006)	
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.144***		0.015**		0.012	
	(0.030)		(0.006)		(0.009)	
$\text{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.014		0.006		0.010
		(0.039)		(0.014)		(0.016)
$\text{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.029		0.019**		0.012
		(0.037)		(0.009)		(0.012)
$\text{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.106**		0.015		0.017
		(0.042)		(0.010)		(0.013)
$\text{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.129**		0.027*		0.029
		(0.062)		(0.016)		(0.020)
$\text{Q}_1^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.107**		0.029***		0.036**
		(0.044)		(0.006)		(0.016)
$\text{Q}_2^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.220***		0.008		0.017
		(0.043)		(0.007)		(0.015)
$\text{Q}_3^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.104*		0.020**		0.004
		(0.053)		(0.010)		(0.017)
$\text{Q}_4^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.000		0.000		0.000
		(.)		(.)		(.)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.025	0.027	0.006	0.007	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. $\textit{SDA Cost}_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. ${R^{max}}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a country. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\text{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C30: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Including Cash Crop Opportunity Cost Placebo

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.051***		−0.025***	
	(0.013)		(0.007)	
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.014		−0.006	
	(0.027)		(0.008)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.057**		0.007
		(0.026)		(0.015)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.083***		−0.014
		(0.012)		(0.011)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.121***		−0.026*
		(0.024)		(0.014)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.248***		−0.063***
		(0.044)		(0.020)
$\mathbb{Q}_1^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.072***		−0.029***
		(0.026)		(0.010)
$\mathbb{Q}_2^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.071***		−0.019*
		(0.025)		(0.010)
$\mathbb{Q}_3^+\{Cash\ Crop\ Cost_{t,t-2}\}$		−0.134***		−0.021
		(0.025)		(0.013)
$\mathbb{Q}_4^+\{Cash\ Crop\ Cost_{t,t-2}\}$		0.000		0.000
		(.)		(.)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.044	0.032	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $R^{max}{}_{t,t-k}$ measures the average maximum potential *unconstrained* agricultural revenue–the agricultural revenue per hectare for producing the maximum potential revenue crop regardless of prohibitions–between years t and $t-k$ in a country. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathrm{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C31: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative with No Lag: $SDA\ Cost_t$

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{SDA\ Cost_t > 0\}$	−0.085*		0.008		0.008	
	(0.043)		(0.008)		(0.013)	
$\mathbb{Q}_1^+\{SDA\ Cost_t\}$		−0.070		0.004		−0.007
		(0.049)		(0.009)		(0.005)
$\mathbb{Q}_2^+\{SDA\ Cost_t\}$		0.063		−0.052***		0.002
		(0.092)		(0.013)		(0.017)
$\mathbb{Q}_3^+\{SDA\ Cost_t\}$		−0.104***		0.013		0.030**
		(0.036)		(0.008)		(0.012)
$\mathbb{Q}_4^+\{SDA\ Cost_t\}$		0.000		0.000		0.000
		(.)		(.)		(.)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.023	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C32: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative Lag: $SDA\ Cost_{t,t-1}$

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-1} > 0\}$	−0.050		0.006		0.012	
	(0.031)		(0.007)		(0.009)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-1}\}$		−0.034		0.003		0.006
		(0.054)		(0.011)		(0.017)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-1}\}$		−0.106***		0.014		0.011
		(0.039)		(0.009)		(0.019)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-1}\}$		−0.120***		0.013**		0.021**
		(0.031)		(0.006)		(0.008)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-1}\}$		0.053		−0.004		0.003
		(0.032)		(0.007)		(0.008)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.026	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C33: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative Lag: $SDA\ Cost_{t,t-3}$

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-3} > 0\}$	−0.077***		0.020***		0.037***	
	(0.020)		(0.004)		(0.006)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-3}\}$		0.007		0.015		0.038***
		(0.047)		(0.011)		(0.013)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-3}\}$		−0.025		0.020***		0.035***
		(0.035)		(0.006)		(0.010)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-3}\}$		−0.142***		0.018***		0.044***
		(0.035)		(0.006)		(0.009)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-3}\}$		−0.030		0.003		0.040***
		(0.045)		(0.008)		(0.010)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.026	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. $SDA\ Cost_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C34: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative Lag: $SDA\ Cost_{t,t-4}$

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-4} > 0\}$	−0.085**		0.018		0.050***	
	(0.042)		(0.013)		(0.011)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-4}\}$		−0.106*		0.011		0.039***
		(0.058)		(0.012)		(0.009)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-4}\}$		−0.115**		0.021*		0.052***
		(0.045)		(0.010)		(0.007)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-4}\}$		−0.242***		0.026*		0.057***
		(0.068)		(0.014)		(0.013)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-4}\}$		−0.153**		0.014		0.054***
		(0.073)		(0.015)		(0.015)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.022	0.025	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. $SDA\ Cost_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C35: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative Lag: $SDA\ Cost_{t,t-5}$

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}\{\text{SDA Cost}_{t,t-5} > 0\}$	−0.085**		0.018		0.050***	
	(0.042)		(0.013)		(0.011)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-5}\}$		−0.053		0.016		0.042***
		(0.050)		(0.015)		(0.011)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-5}\}$		−0.064		0.017		0.053***
		(0.053)		(0.015)		(0.012)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-5}\}$		−0.158**		0.025		0.067***
		(0.058)		(0.016)		(0.013)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-5}\}$		−0.120*		0.027		0.066***
		(0.063)		(0.018)		(0.014)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.022	0.023	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C36: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative with No Lag: $SDA\ Cost_t$

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{SDA\ Cost_t > 0\}$	−0.063***		−0.031***	
	(0.016)		(0.007)	
$\mathbb{Q}_1^+\{SDA\ Cost_t\}$		−0.081***		−0.026***
		(0.017)		(0.008)
$\mathbb{Q}_2^+\{SDA\ Cost_t\}$		−0.059		0.019
		(0.035)		(0.012)
$\mathbb{Q}_3^+\{SDA\ Cost_t\}$		−0.039**		−0.037***
		(0.017)		(0.007)
$\mathbb{Q}_4^+\{SDA\ Cost_t\}$		0.000		0.000
		(.)		(.)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.044	0.044	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table C37: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative Lag: $SDA\ Cost_{t,t-1}$

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-1} > 0\}$	−0.037***		−0.018***	
	(0.008)		(0.005)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-1}\}$		−0.077*		−0.010
		(0.039)		(0.014)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-1}\}$		−0.038		−0.015
		(0.033)		(0.016)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-1}\}$		−0.037***		−0.022***
		(0.010)		(0.006)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-1}\}$		−0.021		−0.016**
		(0.019)		(0.007)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.043	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C38: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative Lag: $SDA\ Cost_{t,t-3}$

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-3} > 0\}$	−0.053***		−0.031***	
	(0.007)		(0.007)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-3}\}$		−0.060*		−0.022
		(0.031)		(0.015)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-3}\}$		−0.052***		−0.025**
		(0.016)		(0.010)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-3}\}$		−0.056**		−0.035***
		(0.021)		(0.010)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-3}\}$		−0.067**		−0.033**
		(0.030)		(0.012)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.043	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C39: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative Lag: $SDA\ Cost_{t,t-4}$

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-4} > 0\}$	−0.061***		−0.039**	
	(0.017)		(0.016)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-4}\}$		−0.085**		−0.036*
		(0.034)		(0.020)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-4}\}$		−0.072***		−0.042***
		(0.024)		(0.015)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-4}\}$		−0.141***		−0.057**
		(0.042)		(0.022)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-4}\}$		−0.141***		−0.060**
		(0.045)		(0.022)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.044	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C40: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative Lag: $SDA\ Cost_{t,t-5}$

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
$\mathbb{1}\{\text{SDA Cost}_{t,t-5} > 0\}$	−0.061***		−0.039**	
	(0.017)		(0.016)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-5}\}$		−0.060*		−0.040*
		(0.031)		(0.022)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-5}\}$		−0.031		−0.035*
		(0.031)		(0.021)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-5}\}$		−0.111***		−0.053**
		(0.032)		(0.023)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-5}\}$		−0.129***		−0.067**
		(0.037)		(0.025)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.044	0.033	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C41: Impact of the Opportunity Cost of Religious Membership on Health Messaging: Alternative Aggregation Approaches (*SDA Cost* from Pixels to Countries)

	Dependent Variable:					
	Holistic Message		Tobacco		Alcohol	
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Unweighted					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.066**		0.017***		0.031***	
	(0.024)		(0.006)		(0.005)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.014		0.021		0.036***
		(0.057)		(0.013)		(0.012)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.098***		0.019**		0.028***
		(0.029)		(0.007)		(0.008)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.029		0.013		0.036***
		(0.059)		(0.010)		(0.011)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.071		0.013		0.044***
		(0.047)		(0.012)		(0.012)
	Panel B: Weighted by Baseline Rural-Population					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.111***		0.015***		0.018*	
	(0.029)		(0.005)		(0.010)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.019		0.022***		0.030***
		(0.052)		(0.006)		(0.008)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.117***		0.015***		0.019**
		(0.031)		(0.004)		(0.007)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.099*		0.025***		0.045***
		(0.049)		(0.007)		(0.009)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.048		0.018**		0.031**
		(0.047)		(0.007)		(0.012)
	Panel C: Weighted by Baseline Cultivated Land					
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.066**		0.017***		0.031***	
	(0.024)		(0.006)		(0.005)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		0.087		0.011		0.016
		(0.056)		(0.013)		(0.016)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		0.004		0.017*		0.018*
		(0.043)		(0.009)		(0.009)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.091***		0.017***		0.039***
		(0.024)		(0.005)		(0.005)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		0.100		−0.003		0.017*
		(0.061)		(0.011)		(0.009)
Country FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	30,011	30,011	31,579	31,579	31,799	31,799
Num Countries	34	34	34	34	34	34
Adjusted R^2	0.023	0.024	0.006	0.006	0.052	0.052
Outcome Mean	0.746	0.746	0.028	0.028	0.074	0.074
Outcome SD	0.435	0.435	0.164	0.164	0.261	0.261

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, gender, educational attainment fixed effects, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Holistic Message* is a binary variable that takes a value of one if the respondent answers that the Sabbath speaker in their church preaches frequently or very frequently about *holistic healthful living* (the importance of health for the body, mind, spirit, and social relationships), and 0 if seldom or never. *Tobacco* and *Alcohol* are binary variables that indicate whether the respondent has consumed alcohol or tobacco in the past 12 months. $\textit{SDA Cost}_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x>0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathrm{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Panel A presents estimates where the $\textit{SDA Cost}_l$ for a country is the unweighted average $\textit{SDA Cost}_p$ across all pixels in a country. Panel B presents estimates where the $\textit{SDA Cost}_l$ for a country is a rural-population (1980) weighted average $\textit{SDA Cost}_p$ across all pixels in a country. Panel C presents estimates where the $\textit{SDA Cost}_l$ for a country is a cultivated-land (1980) weighted average $\textit{SDA Cost}_p$ across all pixels in a country. Estimated using OLS regressions. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table C42: Impact of the Opportunity Cost of Religious Membership on Satisfaction and Commitment: Alternative Aggregation Approaches (*SDA Cost* from Pixels to Countries)

	Dependent Variable:			
	Satisfaction		Commitment with SDA Church	
	(1)	(2)	(3)	(4)
	Panel A: Unweighted			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.048***		−0.024***	
	(0.011)		(0.006)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.031		−0.005
		(0.027)		(0.012)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.030		−0.017**
		(0.020)		(0.007)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.031		−0.017*
		(0.024)		(0.009)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.071***		−0.027***
		(0.019)		(0.008)
	Panel B: Weighted by Baseline Rural-Population			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.034**		−0.020***	
	(0.013)		(0.007)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.060***		−0.017*
		(0.018)		(0.009)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.039***		−0.023***
		(0.011)		(0.006)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.072**		−0.036***
		(0.030)		(0.010)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.120***		−0.043***
		(0.020)		(0.010)
	Panel C: Weighted by Baseline Cultivated Land			
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.048***		−0.024***	
	(0.011)		(0.006)	
$\mathbb{Q}_1^+\{SDA\ Cost_{t,t-2}\}$		−0.008		0.008
		(0.043)		(0.017)
$\mathbb{Q}_2^+\{SDA\ Cost_{t,t-2}\}$		−0.038		−0.011
		(0.038)		(0.012)
$\mathbb{Q}_3^+\{SDA\ Cost_{t,t-2}\}$		−0.037***		−0.023***
		(0.012)		(0.006)
$\mathbb{Q}_4^+\{SDA\ Cost_{t,t-2}\}$		−0.073*		−0.015
		(0.039)		(0.013)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	31,986	31,986	32,035	32,035
Num Countries	34	34	34	34
Adjusted R^2	0.043	0.043	0.032	0.033
Outcome Mean	0.810	0.810	0.953	0.953
Outcome SD	0.393	0.393	0.212	0.212

Notes: Observations are individual respondents in the SDA Global Church Member Survey (GCMS) in Sub-Saharan Africa. Standard errors clustered at the country level are presented in parentheses. All regressions control for respondent age, age squared, educational attainment fixed effects, and gender, and an indicator variable equal to 1 if the respondent is missing age, education, or gender information. *Satisfaction* is a binary variable that takes a value of 1 if the respondent reports being satisfied or very satisfied with their local church, and 0 otherwise. *Commitment with SDA Church* is a binary variable that takes a value of 1 if the respondent reports being likely or very likely to attend a SDA Church for the rest of their lives and 0 otherwise. *SDA Cost*$_{t,t-k}$ measures the average country-level opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Panel A presents estimates where the *SDA Cost*$_l$ for a country is the unweighted average *SDA Cost*$_p$ across all pixels in a country. Panel B presents estimates where the *SDA Cost*$_l$ for a country is a rural-population (1980) weighted average *SDA Cost*$_p$ across all pixels in a country. Panel C presents estimates where the *SDA Cost*$_l$ for a country is a cultivated-land (1980) weighted average *SDA Cost*$_p$ across all pixels in a country. Estimated using OLS regressions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix D. Impacts by Local Religious Embeddedness

Table D1: Impact of the Opportunity Cost of Religious Membership on Membership Decisions: Impacts by Share of Population that is an SDA Member in a Locality

	Dependent Variable:		
	Net Gains	Gains	Losses
	(1)	(2)	(3)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.204***	−0.162***	0.256
	(0.039)	(0.036)	(0.163)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * SDA_{Share}$	0.013***	0.007***	−0.035***
	(0.004)	(0.002)	(0.013)
Locality Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Observations	4,238	4,238	4,175
Num SDA Localities	424	424	412
Num Countries	44	44	44
Pseudo R^2	0.872	0.918	0.727
Outcome Mean	2,533.3	3,022.6	637.5
Outcome SD	3,804.7	4,253.7	2,823.5

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. SDA_{share} is the share of the population that are SDA members in a locality in the first year a locality appears in the SDA records. The denominator is estimated population in 1980 per locality based on Klein Goldewijk et al. (2017). *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table D2: Impact of the Opportunity Cost of Religious Membership on Membership Decisions: Impacts by Share of Population of Various Religious Denominations

	Dependent Variable:		
	Net Gains	Gains	Losses
	(1)	(2)	(3)
$\mathbb{1}\{\text{SDA Cost}_{t,t-2} > 0\}$	−0.377**	−0.339**	0.644
	(0.163)	(0.142)	(0.604)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * Muslim_{Share}$	−0.003	−0.001	−0.004
	(0.003)	(0.002)	(0.011)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * Catholics_{Share}$	−0.002	−0.000	0.001
	(0.002)	(0.002)	(0.008)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * Protestants_{NetShare}$	0.011**	0.008**	−0.015
	(0.005)	(0.004)	(0.011)
$\mathbb{1}\{SDA\ Cost_{t,t-2} > 0\} * SDA_{Share}$	0.008*	0.004	−0.031***
	(0.004)	(0.003)	(0.011)
Locality Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Observations	4,181	4,181	4,118
Num SDA Localities	419	419	407
Num Countries	42	42	42
Pseudo R^2	0.873	0.918	0.726
Outcome Mean	2,555.6	3,051.3	646.0
Outcome SD	3,823.9	4,273.8	2,842.0

Notes: Observations are SDA localities in Sub-Saharan Africa between 1991 and 2022. Standard errors clustered at the country level are presented in parentheses. *Gains* is the number of reported baptisms, professions of faith, and former member baptisms in the SDA locality in a given year. *Losses* is the number of reported dropped and missing members in the SDA locality in a given year. *Net Gains* is reported gains minus losses. M, Ca, and P are the share of the population that are Muslim, Catholic, and Protestant (net of SDA), respectively, in a country in 2000 according to Zurlo (2024). SDA_{share} is the share of the population that are SDA members in a locality in the first year a locality appears in the SDA records; the denominator is estimated population in 1980 per locality based on Klein Goldewijk et al. (2017). *SDA Cost*$_{t,t-k}$ measures the average opportunity cost of abiding by the SDA crop prohibitions–the agricultural revenue per hectare given up per hectare if *constrained* by SDA crop restrictions on coffee, tea, and tobacco–between years t and $t-k$. $\mathbb{1}(x > 0)$ represents the indicator function that equals 1 when x is greater than zero and 0 otherwise. $\mathbb{Q}^+(x)$ represent indicator variables equal to 1 if x is in kth quartile of non-zero values of x and 0 otherwise. Estimated using Poisson regressions via pseudo-maximum likelihood; regressions exclude observations that are either singletons or separated by a fixed effect (Correia et al., 2020). Regressions control for baseline 1980 population density, agricultural land suitability, and 1980 rural population share, each interacted with year fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.