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Ensaio sobre a Expansão da Igreja Universal do Reino de Deus no Brasil

Essays on the Expansion of Universal Church of the Kingdom of God in Brazil

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*À minha família.*







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## RESUMO

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O crescimento do pentecostalismo no mundo constitui uma das principais mudanças religiosas do Século XX e a América Latina possui um papel importante nessa expansão. Naquela região, houve uma acelerada redução na proporção de católicos e crescimento dos protestantes nas últimas décadas, com forte participação de igrejas pentecostais. Os pentecostais brasileiros diferem dos católicos em várias dimensões em relação às suas atitudes e visões do mundo, sendo no geral religiosamente mais ativos e mais conservadores em questões sociais como aborto, casamento entre pessoas do mesmo sexo, meios contraceptivos artificiais, sexo fora do casamento, divórcio e consumo de álcool; eles também são mais propensos a acreditar que os líderes religiosos devem ter influência na política. Nesta tese, contribuimos para o entendimento da expansão pentecostal no Brasil focando em uma das maiores denominações pentecostais, a Igreja Universal do Reino de Deus (IURD). Examinamos, em dois estudos, o impacto de duas estratégias principais de expansão da IURD, cobrindo um ramo ainda pouco explorado na literatura econômica sobre religião e procurando entender como cada uma delas contribuiu para a expansão dessa igreja desde sua fundação. No primeiro estudo, examinamos os impactos das redes de rádio e televisão ligadas à IURD (a Rede Aleluia e Record TV) sobre suas afiliações, explorando uma variação possivelmente exógena na qualidade do sinal daquelas redes devido aos acidentes geográficos entre as antenas transmissora e as áreas receptoras. Com dados da Anatel e modelos técnicos de densidade de sinal, analisamos os efeitos da cobertura das mídias nas áreas de ponderação do Censo Demográfico de 2010 (IBGE). Nossos resultados de *benchmark* mostram que a Rede Aleluia tem um impacto de cerca de 13% do número médio de afiliações no interior dos estados (fora das capitais e Regiões Metropolitanas), enquanto a Record TV tem um impacto geral de 26%. Esses efeitos são mais fortes para grupos que são descritos na literatura como mais propensos a frequentar a igreja. A robustez dos resultados é verificada com teste de placebo com uma rede de rádio não religiosa. Encontramos evidências de que a competição entre veículos de mídia pode ter um papel importante nos efeitos da mídia religiosa e da existência de complementaridade entre templos e mídias religiosas em áreas rurais. Além disso, encontramos efeito positivo da Rede Aleluia sobre empreendedorismo, impacto negativo da mídia religiosa sobre a fertilidade, o que é consistente com a posição da IURD sobre o aborto e o uso de métodos contraceptivos, e impacto positivo na proporção de votos para o Partido Republicano Brasileiro, com o qual a IURD possui uma forte ligação. No segundo estudo, estimamos o efeito da presença de templos da IURD sobre as afiliações. Exploramos a diferença no tempo de entrada e nos anos de permanência dos templos nos municípios brasileiros entre 1991 e 2010, com uma especificação de diferenças-em-diferenças e dados do CNPJ (Receita Federal) e dos Censos Demográficos (IBGE). A presença de templos da IURD aumenta

os adeptos dessa denominação em 15%, comparando com a média da amostra, e esse efeito é devido ao interior dos estados. Nossos resultados também mostram que leva alguns anos para os templos da IURD começarem a ter impacto positivo depois que entram. Testamos a robustez de nossos resultados usando dados de outra fonte, a Relação Anual de Informações Sociais, e com um teste de falsificação no momento da entrada da IURD no município.

**Palavras-chave:** Mídia, Religiões, Igreja Universal do Reino de Deus, Escolha Racional

**JEL:** Z12, L82, O15, D72, J13

## ABSTRACT

KOMATSU, Bruno Kawaoka. *Essays on the Expansion of Universal Church of the Kingdom of God in Brazil*. 2019. 100f. Manual – Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo, São Paulo, 2019.

The growth of Pentecostalism in the world is one of the major religious changes of the 20th Century and Latin America plays an important role in this expansion. In that region, there has been an accelerated reduction in the proportion of Catholics and a Protestant growth in the last decades, with strong participation of Pentecostal churches. Brazilian Pentecostals differ from Catholics in various dimensions regarding their attitudes and views of the world, being generally more religiously observant and more conservative on social issues such as abortion, same-sex marriage, artificial contraceptive methods, sex outside marriage, divorce and alcohol consumption; they are also more likely to believe that religious leaders should have influence in politics. In this thesis, we contribute to the understanding of the Pentecostal expansion in Brazil focusing on one of the largest Pentecostal denominations, the Universal Church of the Kingdom of God (UCKG). We have examined the impact of two major strategies of expansion of the UCKG, covering a branch still little explored in the economic literature on religion and trying to understand how each of them contributed to the expansion of this church since its foundation, in two studies. In the first study, we examined the impacts of the radio and television networks linked to UCKG (Aleluia Network and Record TV) on its affiliations, exploring a possibly exogenous variation in the signal quality of those networks due to geographical accidents between the transmitting antennas and the receiving areas. With data from Anatel and technical models of signal density, we analyzed the effects of media coverage on the weighting areas of the 2010 Demographic Census (IBGE). Our benchmark results show that Aleluia Network has an impact of about 13% of the average number of affiliations on the countryside (outside state capitals and Metropolitan Regions), while Record TV has an overall impact of 26%. These effects are stronger for groups who are described in the literature as more likely to attend church. The robustness of the results is verified with placebo test with a non-religious radio network. We find evidence that competition among media vehicles can play a significant role in the effects of religious media and evidence of complementarity between temples and religious media in rural areas. In addition, we find a positive effect of Aleluia Network on entrepreneurship, a negative impact of religious media on fertility, which is consistent with UCKG's position on abortion and the use of contraceptive methods, and a positive impact on the vote share of the Brazilian Republican Party, with which UCKG has a strong connection. In the second study, we estimated the effect of the presence of UCKG temples on affiliations. We explored the difference in time of entry and in the years of residence of UCKG temples in Brazilian municipalities between 1991 and 2010, with a specification of differences-in-differences on CNPJ (Federal Revenue Office) and Demographic Censuses (IBGE) data. The presence of temples of UCKG increases the adepts of this denomination by 15%, compared to the average of the sample, and this effect



is due to the countryside. Our results also show that it takes a few years for the UCKG temples to start having a positive impact after their entry. We tested the robustness of our results using data from another source, the Annual Social Information Report, and with a falsification test at the time of UCKG's entry into the municipality.

**Keywords:** Media, Religions, Universal Church of the Kingdom of God, Rational Choice

**JEL:** Z12, L82, O15, D72, J13

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<sup>1</sup> In this section, we follow the descriptions of Lingenthal (2012), Mariano (2004), Campos (2006) and Reis (2006).

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## 1 INTRODUCTION

“The Evangelicals will eventually elect a president of the republic who will work for our churches to fulfill the mission of bringing the gospel to all the nations of the earth.”

*Marcelo Crivella (NEVES, 2016)*

The growth of Pentecostalism in the world constitutes one of the major religious changes of the 20th Century (CAMPOS, 2005). Overall estimates show that Pentecostal and charismatic churches followers have grown from about one million believers in the early twentieth century to over 500 million in 2000 (BARRET; JOHNSON, 2004). This growth has led Pentecostals and charismatics to move from 0.2% of Christians to 26%, in just 100 years.

Pentecostals form a branch of Protestant Christianity, which originated in the early 20th Century in the United States. They are followers of denominations that emphasize the gifts of the Holy Spirit, represented by physical evidences, such as the speaking in tongues, divine healing and exorcisms. These denominations are named after the feast of Pentecost, described in the Bible, when the apostles and followers of Jesus were filled with the Holy Spirit and suddenly began to speak in unknown tongues. There is a great diversity of Pentecostal churches, which can be roughly divided into the historical churches created in the wake of the early movements and new independent churches, sometimes called Neo-Pentecostal (PEW, 2014; PEW, 2013).

Latin America seem to have an important role in the Pentecostal expansion. While the long-term world trend for the total share of Catholics among all religions is a small reduction (34.5% in 1900 and 33% in 2000 (Cf. BARRET; JOHNSON, 2004)), in Latin America, the share of the Catholic Church has been reducing strongly, especially since the 1970s. In 1910, the share of Catholics in population was 94%, with a small reduction until 1970, when it reached 92%. Thereafter, it declined sharply to 69% in 2014 (PEW, 2014). At the same time, the share of Protestants rose from 1% in 1900 to 4% in 1970 and 19% in 2014. As roughly 65% of Protestants in that region identified themselves as Pentecostal or belonged to Pentecostal churches in 2014, these denominations might have expanded from the decline of the Catholic majority.

The growth of Pentecostalism is not limited to developing countries. In the United States, despite only 9% of all Protestants belonged to a Pentecostal denomination in 2014, among the US Hispanics, 45% of all Protestants identified themselves or belonged to a Pentecostal denomination. Moreover, while Protestants share of the US population declined between 2014 to 2017, Pentecostal share increased (PEW, 2014; PEW, 2015).

The decline of Catholicism in Latin America is a matter of competition among denomination and exchanging religions, not a simply vegetative growth of Protestants and not-religious people. In Brazil, 54% of the adults who identified themselves as Protestants were raised as Catholics. Among Hispanics in the United States, this percentage is 47% and in other Latin American countries, it varies from 15% to 74% (in Panama and Colombia). In contrast, among

those who identify themselves as Catholics, 95% were raised as Catholics, which means that the flow of other religions into Catholicism is relatively low.

Religion impacts on economic outcomes and on a vast diversity of behaviors <sup>1</sup>. Protestantism, in particular, might have had an important historical role on the institutional development of countries and influenced the formation of democratic institutions around the world. Protestant missionary activity during colonial period spread several important catalysts that may have contributed to make democratic regimes more likely, including religious liberty, mass education, mass printing, newspaper, voluntary organizations and colonial reforms (WOODBERRY, 2012). It also has a relevant role on the capitalist development. As a side effect of the Protestant expansion, its emphasis on reading the bible generated an increase in human capital (BECKER; WOESSMANN, 2009). Protestantism also had an important role in the economic development of developing countries. In China, Protestant missionaries' activities are related to increase in urbanization, by the knowledge diffusion activities associated with schools and hospitals created by the missionaries (BAI; KUNG, 2015). There is also evidence that Protestantism favours entrepreneurship more than Catholicism (NUNZIATA; ROCCO, 2016).

Brazilian Protestants, and Pentecostal Protestants more specifically, differ from Catholics in many different dimensions regarding their attitudes and views of the world. Pentecostals are more religious observant (go to church, read scripture outside of religious services and pray more often), are more likely to tithe (giving a percentage of their income to their church or congregation),<sup>2</sup> fast and exhibit higher levels of involvement in congregational life than Catholics. Even though the Catholic Church opposes abortion and same-sex marriage, Catholics in Brazil tend to be less conservative than Protestants in these kinds of social issues. On average, Catholics are less morally opposed to abortion, homosexuality, artificial means of birth control, sex outside of marriage, divorce and drinking alcohol than Protestants.

Protestants are also more likely to believe that religious leaders should have influence in politics (see Pew (2014), Pew (2012)), and Brazilian Pentecostal attitudes toward politics also show that evangelical voters are more prone to vote for their peers (FERNANDES, 1998; BOHN, 2004). Pentecostal politicians have been gaining ground in the Brazilian Federal Chamber since the 1980s. In 1982, 12 evangelicals were elected as federal deputies, of whom only one was a Pentecostal (affiliated to the second oldest Pentecostal church in Brazil, the Assembly of God) and the remainder were Baptists, a traditional Protestant denomination. In 1986, 32 Protestant candidates were elected as federal deputies. This time, half of those elected were Pentecostal. Throughout the 2000s, the number of Pentecostal politicians from the main denominations who were elected to the House increased.

The entry of Pentecostals into politics in the elections of 1987 and 1992, furthermore, might have represented a way of expanding the presence of religious groups in media channels, es-

<sup>1</sup> See Iyer (2016) for an extensive review

<sup>2</sup> In Brazil in 2002, Pentecostal churches accounts for 44% of total tithing money, but represent only 12.5% of the population. Catholics, in contrast, account for 31% of total tithing money, while represented 74% of the population (NERI, 2007)

pecially through the commissions during the Constituent Assembly of 1988. Among the 49 Protestant federal representatives were elected in those two elections, 23 (18 constituencies) had some link to media groups, such as being radio owners, or having jobs related to religious programs on radio or television. Eight of them earned radio and television concessions during the Constituent Assembly and three bought radios or TVs while in office (FREESTON et al., 1993).

## **1.1 Literature on the Pentecostal Expansion in Brazil**

Explanations for the accelerated Pentecostal expansion in Brazil are organized in three different strands of the literature. Some studies emphasize the demand side of the religious market, studying how religion responds to economic conditions (NERI, 2007; COSTA; JUNIOR; CASTRO, 2018). Other papers take a more historical approach and describe the Pentecostal expansion as a long term consequence of the separation of religion and State in the end of the 19th Century and the transformation of the Brazilian religious market in the second half of the 20th Century, in which it turned into a free competitive market (ALVES; CAVENAGHI; BARROS, 2014; MARIANO, 2008). Related to this one, there is a sociological literature which study specific traits of the new Pentecostal Churches, focusing specially on these churches' media strategy.

### ***1.1.1 Economics of Religion***

Most of the sociological and economic studies on Pentecostal expansion in Brazil refer to the rational choice framework, developed by the economics of religion literature. Economics have a growing number of studies on religion that have been increasing recently: in the last decade, the number of studies multiplied six-fold, and it has even reached it's own JEL code (Z12) (IYER, 2016). The economics of religion is the strand of the literature that uses tools and methods of economics to study religion as a dependent variable or as an independent variable on other socioeconomic outcomes (IANNACCONE, 1998). Economic studies of religion have three main contributions to economics: they show how economics and statistical tools can be used to evaluate the role of religion in society and economy; they help to understand the role that norms, values, social capital and "spiritual capital" might play on human behaviour; and they show how religion and culture, in a broader sense, influence economic systems (IYER, 2016).

Economics of religion analyzes religion with rational choice, a broader and integrating conceptual framework to provide explanations for the observed empirical regularities (IANNACCONE, 1995). Its essential features are the hypothesis of maximizing behaviour, market equilibrium and stable preferences (BECKER, 1976). In this sense, one of the most important contributions of economics of religion is to treat religious groups as firms that compete for consumers in a market (IANNACCONE, 1994; BECKER; PFAFF; RUBIN, 2016). Individuals weight costs and benefits and act as to maximize their net benefits when deciding their religion. This way, maximizing individuals choose what religion they will adhere to, if any at all, and how extensively they will participate in that church. This decision can change over time, with fluctuations in the intensity of participation and even switching religions. Under the hypothesis of stable preferences, these changes are seen as optimal responses to variations in circumstances, as prices, income, skills, experiences, resource constrains and access to different technologies. The individuals' ability to choose constrains the producers of religion, the churches that provide religious good and services. In modern and pluralistic societies, they compete in the religious market for the adherents and depend on them for revenue, as tithes and contributions. Religion is an industry that has no barrier to entry, is highly competitive and has no intellectual property rights, and, therefore, a church must provide a religious commodity at least as attractive as its competitors' (IANNACCONE, 1992, 1994, 1995).

Besides the above-cited works on the effects and relevance of the Protestant Reformation, part of the economics of religion focus on the effects of religion on different outcomes. Recent studies examine the relationship of religion on economic development (BARRO; MCCLEARY, 2003; BASEDAU; GOBIEN; PREDIGER, 2018), family and fertility (LEHRER, 2008; BASSI; RASUL, 2017; MCKINNON; POTTER; GARRARD-BURNETT, 2008), health (MALLONEE, 2010; VALLA, 2002), education (ANUATTI-NETO; NARITA, 2004), politics (LACERDA, 2017c; LACERDA, 2017b; COSTA; JUNIOR; CASTRO, 2018), corruption (XU et al., 2017), labor market (HEINECK, 2004; CORNELISSEN; JIRJAHN, 2012) and risk aversion and financial behaviour (ADHIKARI; AGRAWAL, 2016; DÍEZ-ESTEBAN; FARINHA; GARCÍA-GÓMEZ, 2018).

### ***1.1.2 Income and Religion***

Economics studies of religion have been examining the relationship between income and religiousness since the first formal model of individual consumer choice of Azzi e Ehrenberg (1975). The authors set a model of church attendance as a multi-period time allocation model, in the tradition of Becker (1965), but it is particular in that individuals plan to have the stream of benefits for church-related activities at the time of their deaths. Individuals, then, might attend church-related activities because they see their expected consumption in the afterlife related

to the time they spend on church activities, what they call the “salvation motive”. Individuals might also attend church for the satisfaction from church membership and activities (which they refer to as “consumption motive”) or because, in a context of social pressures in the community, individuals attend church to increase their probability of succeeding in business (the “social-pressure motive”).

The model explicit the opportunity cost of participating in church activities. In the Azzi-Ehrenberg model, each household is composed by a husband and a wife, who extract utility from consumption in each period until their deaths and from the expected stream of benefits in the afterlife. Consumption of each time period is given by a household production function, which transforms a purchased composite market good and the time allocation of each member of the couple to household consumption. Husband and wife also spend time on labor activities to earn a wage, which they use to buy the market good. The expected afterlife consumption of the household is a function of the stream of time spent by each member in church-related activities during the lifetime. Assuming that husband and wife are equally efficient in producing household consumption units and the afterlife expected consumption, if the husband’s wage exceeds the wife’s, then the wife will devote more time to religious activities than the husband. Moreover, if both have the same wage over their lifetime, household members will allocate more time as they get older. As their expected returns for religious activities will be generated only in the end, it is optimal to concentrate the investment in latter stages. Alternatively, the faster the wage increase over time, the smaller will be the rate at which time devoted to church-related activities will increase with age. As males’ age-earnings profile is usually steeper than females’, the model predicts that females’ time devoted to church-related activities will increase faster than males’. The model is also extended to incorporate the “consumption motive”, including a consumption value of religious participation in the utility function. This way, factors that increases current satisfaction in church-related activities will increase participation. In rural areas with limited market consumption alternatives, as opposed to urban areas, the value of social interactions in religious activities is higher and therefore participation will be higher. Racial discrimination, similarly, will lead to higher religious participation, as it limits market consumption alternatives. Several papers bring empirical evidence about most of the predictions of the model, but the conclusions about few of those predictions are conflicting (IANNACCONE, 1998; OLIVEIRA; CORTES; NETO, 2013). Two economic studies tested the model with Brazil data and also find conflicting evidence on the income-participation correlation (OLIVEIRA; CORTES; NETO, 2013; IRFFI; CRUZ; CARVALHO, 2017).

Addressing religious behavior focusing on the “consumption motive”, another classic model is that of “club goods” of Iannaccone (1992), one of the most influential papers of economics of religion (IYER, 2016). This model seeks to explain the success of religious groups that demand from their members seemingly irrational behaviors that challenge the logic of the market. For example, sacrifices of pleasure and opportunity in the labor market, risk of social stigma and even rituals of offerings to be burnt which are designed specifically to destroy valuable goods. The explanation is that the religious commodity can only be created and consumed collectively,



depending on the quality of the inputs of other members of the religious group (such as “how many others attend, how warmly they greet me, how well they sing, how enthusiastically they read”). (IANNACCONI, 1992, p. 274)), so that religious participation has a positive externality. The main problem in this situation is that members with low levels of attendance might free-ride in the participation of members who participate more, since, individuals are better off in groups whose participation is greater than their own. The optimal way of correcting the distortion would be monitoring participation in the church and subsidizing those who participate more, but it has a practical difficulty for implementation. Therefore, there remains the sub-optimal solution of penalizing activities alternative to the church, which is a way to screen out less committed members. Thus, restrictions on alternative activities and the demand for salient and stigmatizing behaviors act as ways to discourage participation in alternative activities, mitigating the problem of externality. If the less committed members fail to participate, the welfare of those who remain will increase. This way, individuals can optimally choose stricter sects that require behaviors that further limit participation in secular activities, while individuals with greater market opportunities will optimally choose mainstream churches. Sectarian groups which prohibit a broad range of secular commodities, therefore, are more likely to attract individuals with low wages and limited secular opportunities, as the cost of membership is relatively lower.

Some empirical studies of the “club goods” model analyse the effects of exogenous economic distress on religiosity. Chen (2010) shows that the response of religious groups to negative income and consumption shocks increases religious participation, as religious groups provide ex post insurance (insurance individuals do not need to commit beforehand). For the Brazilian case, Costa, Junior e Castro (2018) bring evidence that economic downturns increases conversions toward Pentecostal denomination, which are stricter Christian churches, compared to the Catholic Church. They explore the trade-induced shocks on local labor markets resulted from the reduction in import tariffs in the beginning of the 1990s. Regions relatively more exposed to the shocks experienced larger declines in wage and formal-sector employment. They found a impact of 21% of a standard deviation of the growth of Pentecostals per capita among Brazilian microregions. Costa, Junior e Castro (2018) also find that trade-related downturns increase the vote share of Pentecostal candidates in the short run and in the long run.

Neri (2007) describe Brazilian Pentecostalism expansion showing that it spreads among the losers of the economic crisis and labor market transformations occurred in Brazil during the 1980s and 1990s. In that economic stagnation context, Pentecostal Gospel was a way of coping with the private suffering caused by financial distress and changes in the way individuals entered the labour market (with high rates of unemployment and informality), specially in the periphery of big cities and Metropolitan Regions. This way, the long impoverished areas of the Brazilian Northeastern region remain catholic, while the new areas of urban poverty became Pentecostal.

### ***1.1.3 Government Regulation, Secularization and Religious Economies***

Besides analysis on the religious choice at the individual level, some economic studies of religion analyse a more aggregated level. Although the rational choice approach studies religion as a market like any other, the religious commodity has some unique characteristics, Iannaccone (2012) describes the religious markets as naturally competitive, since anyone can enter the market (the cost of opening a new religion is practically zero), can imitate products and large firms do not have a big advantage over small ones. In addition, the religious market offers a particularly great diversity of products, since there is no logical limit to the scope or quantity of the benefits in the afterlife. Finally, there are inherent problems of information and uncertainty in religious markets, since the effectiveness of technologies that associate church participation to post-life benefits can not be proven and is a matter of faith.

In this sense, religious monopolies, like the Catholic Church's in the Middle Age, are not a "natural" result of the market, but rather a situation only maintained by political force. Iannaccone (1991) describes different structures of religious markets: monopoly, regulated markets and free market situations. The religious monopoly, is no different from that of other commodities: it implies dead weight loss and inefficiency and leads to demands under-consumption. Regulated markets are situations in which the state heavily subsidize a dominant firm, which it runs or regulates. One example of this situation is that of the Sweden, where the Lutheran church has automatic membership of all newborn citizens, receives earnings from a special Church tax, and whose clergy work and is paid as civil servants (IANNACCONI; FINKE; STARK, 1997). Iannaccone (1991) argues that the public provision of religion will be inefficient, as quality adjusted production costs will be higher than those for private firms. This happens because of insulation from the clergy from competitive pressure and the needs of the demand. Clergy will also lobby their regulators and might engage in rent-seeking activities, as their pay is not earned from the adherents. Other predictions are that even though provided for free, the overall level of consumption will be low; government officials will influence public religion's content to maximize their own profits and political benefits; the public religion narrows the variety of religious opportunities available to individuals; religious regulation and monopolies have long-term effects.

This argument relates to one of the main debates in the economics of religion, on the relationship between religious pluralism and religious participation. On one side of the debate, the sociologist Peter Berger (2015), the first to use the analogy of firms and competition in modern religion studies, argues that the greater the diversity of religions (or religious pluralism), the less plausible are religions as a whole. The diversity of worldviews makes religion appear less divine and more a human product, so that individuals stop believing and participating. This argument is called "sacred canopy" and is part of the broader hypothesis of secularization. According to it, religion will inevitably decrease with the advancement of science and technology,

so that more educated individual, who are also more familiar with science, are more skeptical of religious claims. In addition, deviant religious cults are seen as the result of indoctrination with bizarre values or of psychological problems, such as trauma, neurosis, and unmet needs.<sup>3</sup> On the other side of the debate, studies propose the idea of “religious economies”, the situation in which religious pluralism increases vitality and religious participation. This debate is quite controversial and there are several empirical studies providing evidence in favor of either side (MCBRIDE, 2008; VOAS; CROCKETT; OLSON, 2002; MONTGOMERY, 2003a). McBride (2008) make a fundamental contribution to this debate. He uses a localization Hotelling model for product differentiation to represent religious competition and shows that market forces and regulation can generate plausible positive or negative correlations between pluralism and participation depending on supply and demand conditions from the market. The study concludes that in order to better understand the debate, one must take into account the level of analysis (between countries or local markets) and the different forms of market regulation.

Iannaccone, Finke e Stark (1997) bring historical examples of how regulation might affect the supply of religion and religious vitality. They argue that the most important factor in the study of changes in religious markets is the transformation in the supply of religious services. Regulation play an important role, by preventing entry or imposing entry costs to the religious market. The historical case brought by the authors most relevant to the study of Pentecostal expansion is the ascension of conservative-oriented televangelism in the United States during the 1970s and 1980s.<sup>4</sup> Demand-side explanations for the rise of conservatism in the United States interpret it as a response to economic frustration or reactionary sentiments. As opposed to that, the authors argue that a minor change in the Federal Communication Commission<sup>5</sup> guidelines in 1960, which removed a restriction in the supply side, set conditions to the sharp rise of conservative religious broadcasters and televangelists. In this context, “(...) contributions to religious broadcasters grew dramatically, the technical quality and expense associated with religious programming increased, and ‘televangelists’ became leaders and symbols of the so-called ‘fundamentalist phenomenon’” (IANNACCONI; FINKE; STARK, 1997, p. 360). Until this change of regulation, liberal churches had a better position in broadcasting. The Communication Act of 1934 authorized the grant of broadcasting licenses to broadcasting firms, and in return, these firms had to reserve part of its time to public service. One of FCC suggested categories for it was religion and its rules gave broadcasters no choice but to devote a considerable time to religion, free of charge. Demand for this religious time exceeded supply, and broadcasters were not able to ration through price. As a result, most of them turned to the Federal Council of Churches, an association of liberal Protestant denominations,<sup>6</sup> that acted to

<sup>3</sup> It is clear that the “club goods” model is a direct response of the economics of religion to this type of explanation.

<sup>4</sup> As will be described in session 2.2, American televangelism might have influenced Brazilian Pentecostals to overcome their initial skeptical posture against the use of television to spread their gospel.

<sup>5</sup> The FCC is the federal government agency that regulates the interstate and international communications by radio, TV, wire, satellite and cable.

<sup>6</sup> Federal Council of Churches included many Methodist Episcopalian denominations, Presbyterian churches, and mainline Baptist churches as the Northern Baptist Convention.

keep conservative denominations, as fundamentalist and Pentecostal denominations,<sup>7</sup> off air. Conservative denominations had to fight for their own broadcasting time. In 1944 they formed the National Religious Broadcasters to lobby FCC and in 1960, FCC ruled out the distinction between free and paid religious programming when evaluating broadcasters' licence renewal. This created an opportunity cost for free broadcast and it began to drop until be abandoned in the 1980s, while televangelists increased in popularity.

For the Brazilian Pentecostal case, sociological studies argue that the legal separation between the Catholic Church and the Brazilian state in the end of the 19th Century provided favorable conditions to the religious transformations observed in the 20th Century (MARIANO, 2003; MARIANO, 2008; ALVES; CAVENAGHI; BARROS, 2014).<sup>8</sup> For Mariano (2003), the end of the Catholic religious monopoly created conditions for new denominations enter the market, compete and flourish.

As a result, a free religious market was established in the second half of the 20th Century. In this context of greater competition, churches have changed the way they organize internally and the religious product they provide. The new Pentecostal churches, specially those founded in the 1970s and 1980s and sometimes called neo-Pentecostal, implement a professional and centralized management structure (with productivity goals for pastors, marketing strategy and new method for collecting the tithe), concentrate the power of decision and adapt their service responding to the needs of the followers (MARIANO, 2008). These elements are combined with the Pentecostal emphasis on social mobility, so that those churches put a positive meaning to work and wealth, which is called the Gospel of Prosperity (FERREIRA, 2017; BOHN, 2004; LINGENTHAL, 2012). Other studies describe the flexibility that Pentecostal churches have to adapt their religious product to the necessity of demand and enter new territories (ROBBINS, 2004; ABUMANSUR, 2011). Mariano (2008) argues that all of these characteristics make neo-Pentecostal churches more prepared for the conditions of the religious free market and might explain their success in the competition for adherents.

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<sup>7</sup> These denomination include the Southern Baptist Convention and Assemblies of God.

<sup>8</sup> Despite possible controversies about the effective separation between the Catholic Church and the State, the Constitution of 1891 makes this formal separation with the following points: it prohibited the states and the federal governments from establishing or promoting religious services (art.11, n.2); prohibited religious men or men who are under a vote of obedience which imply renouncing individual liberty to be candidates for federal and state representatives (art. 70, n. 4); it ensured religious freedom to all individuals and denominations, who could publicly and freely exercise their worship (art.72, n.3); it recognized only the civil marriage, the celebration of which would be free (art.72, n.4); it determined that the cemeteries would be administered by the municipal authority, and that all religious cults would be free to practice their rites there (art.72, n.5); it ruled that the education in public establishments should be lay (art.72, n.6); it established that no worship or church would have official subsidies, nor dependency or alliance relationships with the federal or states government (art.72, n.7); it ensured that no Brazilian citizen could be deprived, because of religious belief or function, of his or her civil and political rights and not be exempted from performing any civic duty (art. 72, n. 28); it provided that those who claimed to exempt themselves from any burden imposed by the laws of the Republic upon citizens on the grounds of their belief would lose all political rights (art. 72, n. 29) (LEITE, 2011).

### 1.1.4 *Media and Religion*

The most salient and studied trait of the most successful Pentecostal churches is the use of media as radio and TV to reach potential adherents and spread their religious message (MARIANO, 2004; CAMPOS, 2004; CAMPOS, 2008; PIGNATARI, 2007; SILVA, 2012; LIMA, 2015; JUNIOR, 2012; REIS, 2006). Mariano (2004) describes the expansion of one of the biggest Pentecostal denominations in Brazil, which had the fastest expansion during the 1990s, the Universal Church of the Kingdom of God (UCKG). He argues that proselytism over TV and radio are the most powerful way used by UCKG to quickly attract a great number of individuals from different regions to the temples, reaching those who do not have personal relationships with UCKG adherents in their own homes. UCKG broadcasts real stories of religious conversions, religious messages and gospel music on their radio network. On its television channel, it also broadcasts stories of adherent as well as magical solutions to family and personal problems. Campos (2004) shows that Brazilian Protestant and Pentecostal churches started using broadcast media as an instrument to spread their message, following the practice of American Protestant churches. In Brazil, historical Protestant Churches were the first to use radio to broadcast religious message in the 1950s. Presbyterian pastor José Borges dos Santos broadcast a religious program in a commercial radio called *Rádio Tupi* in São Paulo from 1953 to the end of the 1970s. Seventh Day Adventists also used radio, combined with the post. For Mariano (2008), the use of broadcast media was successful in Brazil during the 20th Century, as large part of the population was still illiterate,<sup>9</sup>. Moreover, for that author, broadcasting media was better used by the Pentecostal churches, whose practices are by nature more focused on oral messages and emotions, as opposed to the more traditional Protestant churches' emphasis on written religious message. Pentecostal churches also started using radio in the 1950s. These churches were new kind of Pentecostal churches in Brazil, which practiced divine healing and spread their message going to different municipalities and installing tents in public spaces. The most successful churches in this way was the Pentecostal Church Brazil for Christ and the Pentecostal Church God is Love. Although many sociological and qualitative studies have been conducted, there is still no quantitative evidence on the effects of this strategy on conversions.

The economics literature on effects of media is broad and covers a variety of topics. A significant part of this literature investigate media effects on a setting in which demand for entertainment plays a crucial role, and economic impacts emerge as a by-product (DELLAVIGNA; FERRARA, 2015). In this sense, children watch television programs for fun and not aiming for the possible educational effects. Studies have shown that media has significant has important impacts in education (GENTZKOW; SHAPIRO, 2008), school delay (KEARNEY; LEVINE, 2015b), skill formation (FIORINI; KEANE, 2014), fertility (FERRARA; CHONG;

<sup>9</sup> Ferrara, Chong e Duryea (2012) also state the importance of media, especially TV, in areas with high rate of illiteracy.

DURYEA, 2012; KEARNEY; LEVINE, 2015a), divorce (FERRARA; CHONG, 2009), domestic violence (JENSEN; OSTER, 2009; CHEUNG et al., 2012), migration (BRAGA, 2007; FARRÉ; FASANI, 2013), labor market (BJORVATN et al., 2015), attitudes towards environment (JACOBSEN, 2011), health behaviour (BAUMAN et al., 1991; FARRELLY et al., 2009; KENNEDY et al., 2004), crime (JOSEPHSON, 1987), social capital (OLKEN, 2009), consumption and savings (BURSZTYN; CANTONI, 2016; HENNIGHAUSEN, 2015).

A major identification issue of studies on media effects is that individuals self-select to the exposure to media, and selection might be correlated to factors that also affect the outcome (DELLAVIGNA; FERRARA, 2015). Other possible endogeneity source is that media firms might choose their location, observing demands' trends that are also correlated to the outcome (YANAGIZAWA-DROTT, 2014). Some studies deal with this problem using natural experiments on the availability of media to individuals. The studies of Olken (2009) and Yanagizawa-Drott (2014)<sup>10</sup> are relevant to these thesis, as we use the same empirical strategy as theirs. Olken (2009) examines the impact of radio and TV on social capital in Indonesia. He exploits an exogenous variation in the number of TV channels and radios that a household receives using two different identification strategies. In the first, the author uses the difference in the timing of introduction of private TV during the 1990s and 2000s. In the second one, which is relevant for this thesis, he considers the variation of propagation of the broadcast signal due to topographical variation in the territory. To isolate the effect of this variation, he uses two technical models of signal propagation, one that takes into account the topographical variation to predict signal strength (call Irregular Terrain Model - ITM) and another, that predicts signal as if there were no physical barriers (the Free-Space Path Loss Model). Olken (2009) finds that the presence of TV and radio decreases social capital by reducing the participation in social groups and village developing meetings. Yanagizawa-Drott (2014) uses the same ITM model to identify the effect of anti-Tutsi propaganda broadcast by a radio station (the Radio Télévision Libre des Mille Collines - RTML) during the Rwanda genocide in 1994. He also exploits the variation in radio reception due to varying topography, controlling for transmitter and reception areas' characteristics, that is orthogonal to other determinants of violence. The author finds positive effects of broadcasts on violence with direct participation, and also with spillover effects to areas close to villages with better radio reception.

We have a special interest on studies of the impacts of media on family outcomes, this outcomes are a relevant theme for Pentecostal religions and might be influenced by religious media. Two studies have show that media can have effects on fertility by imitative behaviour of role models, or by showing the difficulties of being a mother. Ferrara, Chong e Duryea (2012) explore the difference in timing of entry of the biggest Brazilian TV channel (called Globo) in municipalities to identify the effects of soap operas on fertility behaviour, using a difference-in-differences specification. They find a decrease in the probability of giving birth of 0.5 percentage points (5% of the mean), which is the same magnitude as an increase of

<sup>10</sup> Despite having similar identification strategies, media broadcast in Yanagizawa-Drott's study can not be classified as entertainment, and is more related to the persuasion literature, we will refer to below.

1.6 years of the woman's schooling. They also bring direct evidence that this is a result of imitative behaviour of watching soap operas, by showing that areas covered by Globo have higher probability of naming their children after the novela characters. Additionally, the authors exploit variation in novela plots over time to show that fertility decreased more in years in which the plot showed positive social mobility or when the age of women were closer to that of the main character. Kearney e Levine (2015c) examine the impact of a MTV show called *16 and Pregnant*, which is aimed at teenagers in the United States and whose purpose is to show the difficulties of becoming a teen mother. They explore the geographical variation in measures of the show's viewership to evaluate whether different exposure to the show have effects on teen birth rates. To deal with possible endogeneity of that show's viewership, the authors instrument it with a broader measure of MTV rating before the show started being broadcast. They obtain positive effects of exposure to the show on the interest on the show (measured by Google searches), on the theme of birth control and abortion (also measured by Google searches and Twitter messages with the terms "birth control" and "abortion"). They also find a significant 5.7% reduction in teen births, which explains one third of the total birth reduction in the country over that period.

Another strand of the literature on media focus on persuasive communication. To be efficient, markets depend on the accuracy of individual's beliefs. Although some beliefs are formed by direct observation, a large part of the information based on which beliefs are formed is provided by agents who are potentially interested in changing the behaviour of the individual. For example, a consumer can form beliefs of the set of goods available in the market based on information delivered by sellers through advertisement. Studies on persuasion cover topics in which demand for entertainment might not be relevant, as the political and financial impacts of media. In these settings, the exposure to information often reflects the demand for political content or interest in financial advice (DELLAVIGNA; GENTZKOW, 2010; BASSI; RASUL, 2017). Demand for religion has the same characteristic: individuals exposed to religious information are usually those who demand religious redemption, the end of their suffering or life meaning.

Empirical studies on persuasion bring evidence of the importance of this kind of communication in many areas, including communication directed at consumers, at voters, at donors for charity institutions and at investors seeking financial advice (DELLAVIGNA; GENTZKOW, 2010). Two recent studies bring evidence of the effect of persuasive communication related to religion. Bassi e Rasul (2017) study the effects of persuasive messages given by Pope John Paul II in the occasion of his visit to Brazil in 1991 on fertility-related beliefs and behaviour. Messages related to fertility in Papal speeches during the visit did not bring new information, but they were salient through intense media coverage. The Catholic doctrine condemn contraceptive use, abortion and family planning and emphasize the importance of marriage to generate offspring. The authors use the variation between two editions of the Demographic Health Survey (DHS), 1991 and 1996, to identify the effects of the Papal messages. The first of these surveys, made in 1991, was in the few weeks before, during and after the Papal visit. They investigate persuasion through two channels, the desutility of contraception and the increase of

sexual intercourse. Bassi e Rasul (2017) find an impact of 12.8 percentage points (or 40% relative to pre-visit average) increase on the probability of reporting not using contraceptives and not planning to do so in the future, and a 30% increase of unprotected sex, which is the main channel linking fertility beliefs and fertility outcomes. They find a significant 1.6% positive impact on fertility relative to the aggregated birth cohort, driven by women whose number of children were below their ideal family size. These results, however, do not remain in the long run, measured between 1996 and 2006.

Rubin (2014) investigate the effect of printing press spread on the Protestant Reformation spread. He uses city-level data of the 15th and 16th Century for central Europe, but most of the variation in data comes from the Holy Roman Empire. To deal with omitted variables endogeneity he instruments the presence of printing press by the distance to the city it was invented, Mainz. The author finds a positive effect of the press on Protestantism. Cities with press by 1500 were 52.1 percentage points more likely to accept the Reformation by 1530, 41.9 pp more likely to accept Reformation by 1560 and 29 pp more likely to do so by 1600. This paper relates to our in that it shows the role of a new information technology in the spread of a new religion. This is a supply-side argument that state that press reduced the costs to spread ideas. Our thesis contribute to this literature on the effects of persuasive communication related to religious behaviour, examining how religious media influence the Pentecostal expansion in Brazil.

Persuasion might also affect voting behaviour and recent studies have found significant effects. We detail some of these studies as religious media also might indirectly impact political outcomes, by making certain candidates more salient during pastors speeches or by religious voters' identification with similar ideas of religious candidates (BOAS; SMITH, 2015; LACERDA, 2017a; FRESTON et al., 1993).<sup>11</sup> Two studies use similar empirical strategies and show that media bias might affect voting decision for one or another party. DellaVigna e Kaplan (2007) exploits the idiosyncratic availability of Fox News channel in local cable markets to examine whether media bias influence voting behaviour between 1996 and 2000. The authors find that Fox News entry leads to significant increase on the Republican party vote share for President, between 0.4 pp and 0.7 pp, and increased voter share and turnout in elections for Senate. Enikolopov, Petrova e Zhuravskaya (2011) use a similar empirical strategy for the entry of in independent nation TV channel, the NTV, to evaluate its impact on the 1999 parliamentary elections. They find evidence of a 8.9 pp negative impact of vote shares for the government party, a aggregate 6.3 pp increase for the major oppositions parties and decreased turnout by 3.8 pp.

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<sup>11</sup> Direct political propaganda on radio and TV is highly regulated and have a series of restrictions on timing and content of propaganda, so that religious media cannot freely promote specific candidates.



## 1.2 Objectives and Main Results

In this thesis we aim to contribute to understand the Pentecostal expansion by examining the effects of changes in the supply side of equation, focusing on one of the most important Pentecostal denomination in Brazil, the Universal Church of the Kingdom of God (UCKG). Founded in 1977 in Rio de Janeiro, UCKG was the third biggest Pentecostal church in number of followers (2 million, according to 2010 Demographic Census) in 2010, only behind the two oldest Pentecostal churches in Brazil, the Assembly of God and the Christian Congregation. Its main pastor owns several communication firms, which was referred to as an corporate empire (LOBATO, 2007b), including the second most watched open TV channel in Brazil, Record TV, and one of the biggest Brazilian radio networks, Aleluia Network. In the last years, UCKG has earned even more media attention as it produced and released two movies, which have reached records of viewers.

We study the impact of UCKG's two main strategies of expansion, covering a branch still not explored in the economic literature on religion and that might help understand how each one of them contributed to UCKG expansion since its foundation. Our results also might bring insights to understand how those strategies interact with each other.

In chapter 2, we study the impacts of UCKG's radio and TV (Aleluia Network and Record TV) on UCKG affiliations. To do this, we explore an arguably exogenous variation in the quality of the signal of UCKG's radio and TV networks to identify the effect of this coverage on affiliations, following the identification strategy of Olken (2009) and Yanagizawa-Drott (2014). We use technical data from Anatel to predict the reception of the broadcast signal in the presence of geographical accidents and in the free-space. Conditional on the power and height of the transmitter antenna, reception depends of characteristics of the area receiving the broadcast signal and on the geographical accidents between them. Controlling for the characteristics of the receiving areas, the variation of the quality of the signal depends only on the exogenous variation of geographical accidents. We therefore analyze the effects Aleluia and Record in the weighting areas of the 2010 Demographic Census (from the Brazilian Institute of Geography and Statistics - IBGE). Our benchmark results for show that there are positive effects of Aleluia Network and Record TV signals on the UCKG affiliations. The Aleluia Network coverage has an impact of about 13% of the average number of affiliations in the countryside, while Record TV has an overall impact of 26%. These effects are stronger for some of the groups that are described in the literature as more prone to attend church (IANNACCONE, 1998): black or native people, the less schooled and with lower income. For Aleluia Network, the effect is also stronger in rural areas, and for Record TV, the impact on females is stronger. We tested the robustness of our benchmark result with placebo tests, which indicates that a non-religious radio network (Jovem Pan radio) have no effect on UCKG affiliations.

Record TV effect is also stronger in the countryside, reaching an effect of over 60% of the

sample average. This result suggests that competition between media might play an important role, as state capitals and big cities tend to have more media coverage. We provide further evidence that competition with other media can be important, as Aleluia Network effects vanishes in the presence of other radios.

We also detect complementary effects of temples and religious media in rural areas. This positive interaction is consistent with the mechanism described by the literature and present in adherents own personal experiences. According to it, the role of the media is to enter the households of people with no previous contact with the UCKG and to attract potential followers to the temples. Conversions occurs there, as potential followers are more prone convert with the personal contact of another followers.

We further investigate the impact of religious media on other types of behavior: entrepreneurship, fertility and political choice. UCKG is one of the churches that use the Gospel of Prosperity as an important element of its proselytism, and the entrepreneur attitude is the main way to actively seize success. Our results are positive and statistically significant for Aleluia Network, however they are not statistically significant for Record TV. Interestingly, in contrast with the average Pentecostal opinion towards contraceptive methods and abortion, UCKG is the only church which is openly in favor of these two practices. UCKG founder stated this position publicly in a big event in Minas Gerais in the occasion of a papal visit in 1997 and in several posts of his blog. UCKG also has programs of family planning and condom distribution in South Africa. Accordingly, we found negative effects of Aleluia Network and Record coverage on the number of children per female. Besides this, UCKG has a strong presence in politics nowadays, as their members founded the Brazilian Republican Party (PRB) in 2006. It still has members in other parties (as the Liberal Party), but PRB emerged from UCKG itself, as pastors helped to collect signatures in UCKG temples to found it (Revista *Época*, 2009).<sup>12</sup> Our results show that Aleluia Network has a positive impact on PRB vote share for state representative candidates and Record TV has a positive impact for state and federal representative candidates.

In chapter 3, we estimate the effect of UCKG temples presence on affiliations. Besides religious media, UCKG also uses temples to enter the Brazilian municipalities and spread their message. Temples are the most fundamental way of expanding the supply of a religion, providing the physical presence of preachers and the infrastructure to perform the religious ceremonies. We explore the difference in timing of entry and years of permanence in Brazilian municipalities to isolate the effect, in a difference-in-differences setting. To do this, we use data from the National Registry of Legal Entities (*Cadastro Nacional de Pessoas Jurídicas* - CNPJ - of the Federal Revenue Office) and Demographic Census data from 1991, 2000 and 2010 (IBGE). We find positive and significant effects of temple presence on conversions, especially in the countryside. The presence of UCKG temples increase adherents in 15%, comparing

<sup>12</sup> In Brazil, it is necessary to have 101 signatures of founders in at least 9 states to register a new political party in the Electoral Superior Court (*Tribunal Superior Eleitoral* - TSE). This is a temporary registry and it can only become permanent if the new party obtains a number of signatures of at least 0.5% of the valid votes obtained by all the federal representatives in the last election. This number would be roughly 530 thousand with the votes of 2018 elections.

with the sample average. We test the robustness of our results using data from another source, the Annual Relation of Social Information (*Relação Anual de Informações Sociais - RAIS*) to confirm our results. Our results also show that it takes few years for UCKG temples to start having positive impact after they enter a municipality. Our results are further confirmed by a falsification test on the timing of entry of UCKG in the municipality.

The effect of UCKG temples is stronger for the same groups in which we obtained the bigger impacts for religious media in chapter 2: females, black and native, the less schooled and with lower income. Interestingly, temples have stronger impact on urban areas, as opposed to religious media, that has stronger effects on rural areas. UCKG started its expansion entering the bigger cities firstly and entered most of the Metropolitan regions in the period before our analysis. In those areas, residents of one city commute to the other city, so that a new temple closer to home might not make a relevant difference for potential new followers.

The conclusions to this thesis are:

1) The strategy of using religious media has been successful for UCKG and might help explain part of the expansion of Pentecostal churches in Brazil and Latin America. It has further effects on individual behavior of entrepreneurship, fertility and political choice, which are consistent with the expected from UCKG followers. Religious media expansion can explain part of the political growth of UCKG presence among state and federal representatives. Furthermore, the effects are stronger among the socioeconomic groups that typically are more prone to frequent the church, according to the economics of religion literature.

2) Temples have an effect that is not dependent on media, however media and temples have complementary functions in the process of expansion. Moreover, the strategy of religious expansion using temples and media seems to function in such a way that temples and the religious radio have different roles regarding rural and urban areas. Temples were firstly introduced in the bigger cities and state capitals, while the religious radio reaches and has more influence on the sparse areas of the countryside.

3) Religious media compete for audience and this competition plays an important role on its effects. Religious media is relatively more important in areas with no other radios and in the countryside, which is less covered by communication technologies. As for temples, religious competition seems to postpone positive effects of temple entry in religious markets. Moreover, the variety of other religions, religious pluralism, is in fact an important factor to be considered as religions expand and temples enter new markets. This idea is consistent with the literature on religious pluralism and suggests neo-Pentecostal churches need a religious free competitive market to succeed.

## 2 GOSPEL ACCORDING TO MEDIA: RELIGIOUS MEDIA AND THE RISE OF PENTECOSTALISM IN BRAZIL

### 2.1 Introduction

Latin America is historically the most Catholic region in the world. It is home to more than 425 million Catholics (nearly 40% of the world's total) and the Roman Catholic Church now has a Latin American Pope for the first time in its history. However, Latin America has become significantly less Catholic in the last few decades. Historical data indicate that, while over 90% of Latin American adults identified themselves as Catholics in the 1960s, current estimates show that share decreased to approximately 69% (PEW, 2014).

The net losses experienced by the Catholic Church derives from both religious switching and the rejection of organized religion. Indeed, both Protestant churches and the religiously unaffiliated population in the region have gained members. While only 9% of Latin Americans were raised in households identified with Protestant churches and 4% without a religious affiliation, around 19% and 8% now describe themselves as Protestants or unaffiliated today, respectively. Interestingly, a similar trend can be found not only in nearly every country in the region but also among the Hispanic in the US. The U.S. Hispanics currently accounts for 17% of the American population, at approximately 54.1 million people, and is larger than the total population in all but two Latin American countries, except for Brazil (207 million) and Mexico (119 million).

In Brazil, there was a particularly sharp decrease in the share of Catholics, from around 90% in 1980 to 65% in 2010, and a simultaneous increase in the share of Protestants and unaffiliated from less than 10% and 0% to 22% and 7% in the same period, respectively.

Most Protestants in Latin America identify with Pentecostalism. In Brazil, roughly 80% of the Protestant population identify themselves as Pentecostal Christians.<sup>1</sup> In Brazil, Pentecostals belong to one of the historical denominations that originated in the religious revivals of the early 20th century (such as the Assemblies of God and the Christian Congregation), to the traditional denominations founded in the middle of the 20th century (as the Foursquare Gospel Church and Pentecostal Church God is Love), or to newer, largely independent churches, sometimes labeled as neo-Pentecostal churches (as the Universal Church of the Kingdom of God).

Brazilian Protestants, and Pentecostals more specifically, differ from Catholics in many different dimensions regarding their attitudes and views of the world. Pentecostals are more reli-

<sup>1</sup> Pentecostals take their name from the biblical feast of Pentecost (which was originally the Jewish festival of Shavuot and took place 50 days after Passover), when, according to Acts of the Apostles in the New Testament, the apostles and other followers of Jesus were filled with the Holy Spirit and suddenly “began to speak in other tongues”. Today, Pentecostal worship services often include experiences that believers consider to be gifts of the Holy Spirit, such as speaking in tongues, divine healing, exorcisms, receiving direct revelations from God and giving or interpreting prophecies. Catholics who engage in similar practices often call themselves charismatics, from the Greek word for gift or favor (PEW, 2014; PEW, 2013).

gious observant (go to church, read scripture outside of religious services and pray more often), are more likely to tithe (giving a percentage of their income to their church or congregation), fast and exhibit higher levels of involvement in congregational life than Catholics. Even though the Catholic Church opposes abortion and same-sex marriage, Catholics in Brazil tend to be less conservative than Protestants on these kinds of social issues. On average, Catholics are less morally opposed to abortion, homosexuality, artificial means of birth control, sex outside of marriage, divorce and drinking alcohol than Protestants. They also are more likely to believe that religious leaders should have influence in politics (see Pew (2014)).

The precise explanation behind such dramatic change in the religious landscape can be difficult to be accurately pinned down. Survey data collected by the Pew Research Center suggest two different sets of reasons for Catholic-to-Protestant conversions.<sup>2</sup> First, personal reasons such as health and family problems as well as church characteristics that meet preferences for a ‘more personal connection with God’, ‘different worship styles’ and ‘a church that places greater emphasis on morality and more actively helps its members’. Second, evangelizing efforts by Protestant churches seem to have had an important role as more than half of those who have switched from the Catholic Church to Protestantism say their new church reached out to them.

In the same period, it is observed a substantial expansion of Pentecostal media groups. Qualitative studies suggest that the growth of adherents of Protestant religions stems from the strategy of expanding Neo-Pentecostal denominations, from deliberately using aggressive dissemination through broadcasters (MARIANO, 2004; PIGNATARI, 2007; SILVA, 2012; LIMA, 2015; JUNIOR, 2012), although few Pentecostals use radio to spread their messages since the 1950s. In addition to evangelistic objectives, the use of the media by Pentecostal groups is also part of their insertion in politics, possibly contributing to the election of federal evangelical deputies since the beginning of the New Republic. Their entry into politics in the elections of 1987 and 1992, furthermore, represented a way of expanding the presence of religious groups in media channels, specially through the commissions during the Constituent Assembly of 1988. Among the 49 Protestant federal representatives elected in those two elections, 23 (18 constituencies) had some link to media groups, such as being radio owners, or having jobs related to religious programs on radio or television. Eight of them earned radio and television concessions during the Constituent Assembly and three bought radios or TVs while in office (FREESTON et al., 1993).

The quick expansion of Pentecostal groups presence in media channels during the 1980s reached an important point in 1990 (dashed line in Figure 1) when the founder of the Universal Church of the Kingdom of God (*Igreja Universal do Reino de Deus* - UCKG), one of the largest evangelical sects of Neo-Pentecostals, purchased the Record TV broadcast. Record is a television broadcast channel of historical importance and currently one of the largest television networks in Brazil.<sup>3</sup> In addition to this, other religious groups maintained their efforts to ac-

<sup>2</sup> For a more complete description of the survey data, see Pew (2014).

<sup>3</sup> Record started TV broadcasting in 1953 in the city of São Paulo. During the 1960s, Record reached the first

quired radio and cable television channels in the following years, which seems to indicate that these means of communication are important ways of spreading religious messages and at the same time reaching out to a greater number of potential followers. Despite this, there is still no quantitative evidence that religious broadcasting by radio influences religious behavior.

This article investigates the role of radio and TV in religious affiliations with a unique database of broadcast predictions. We work with the hypothesis that programs broadcast by religious groups radio networks increase the number of affiliations to these same groups, focusing on the radio and TV networks linked to UCKG, respectively, the Aleluia Network and the Record TV. Aleluia Network was the largest network of evangelical radio stations associated with a church in 2010. In that year, 54 radio stations broadcast the signal of the Aleluia Network in Frequency Modulation (FM) and another 10 in Amplitude Modulation (AM) (IURD, 2016).<sup>4</sup> Despite Aleluia Network program being composed mainly by popular and gospel music, it has also a 30 minutes program which is aired three times a day, with its founder religious message.

Record TV is essentially a commercial TV channel, but its broadcast include religious programs related to UCKG. Every day, Record broadcasts a program with its founder leader and other UCKG programs late in the night, and from 2015 on, it has started releasing soap operas about biblical stories, which has dominated Record's prime time.<sup>5</sup> Record TV was the second most watched open TV broadcasts in Brazil in 2017, and a close third place in 2015 and 2016 (Grupo de Mídia São Paulo, 2018).

To measure the effect of radio and TV reception on religious choice, we explore the variations in the relief that, being almost random, are not correlated with other determinants of religious adherence, following the empirical strategies proposed by Olken (2009) and Yanagizawa-Drott (2014). To do that, we constructed a database at the level of weighting areas (WA), the smallest geographic unit with statistically representative samples available in the Demographic Census data. We use technical data from radio and TV broadcasting stations of Aleluia Network and Record TV to predict the reception of the broadcast signal and areas covered by that signal. Our benchmark results show that there are positive effects of Aleluia Network and Record TV signals on the UCKG affiliations. The Aleluia Network coverage has an impact of about 13% of the average number of affiliations in the countryside, while Record TV has an overall impact of 26%. Record TV is also stringer in the countryside, reaching an effect of over 60% of the sample average. We tested the robustness of our benchmark result with placebo tests,

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place in audience in that city. With strong musical attractions, including some international artists such as Roy Hamilton and Louis Armstrong, that channel has broadcast important programs and music festivals of Brazilian popular music. After a series of fires from its auditoriums and equipment in the 1970s, Record fell into decay. Only in the early 1980s, with a change in the company's corporate structure, would Record expand its activities to Rio de Janeiro. (RIXA, 2000)

<sup>4</sup> As for comparison, in 2018, Aleluia Network increased its FM and AM broadcasting stations to 69, while the leader network in the same year (*Rede Gaúcha SAT*) had 143 stations and the vice leader (*Joven Pan*), 77 (Grupo de Mídia São Paulo, 2018).

<sup>5</sup> In most part of the 2000s, UCKG programs were broadcast on typical days from about 1AM to 7AM, which included the founder leader Edir Macedo's program. It is called *Palavra Amiga* (Friendly Word) and consists of religious advice and religious message from Macedo, aiming actual and potential adherents. On the TV, this program is one hour long and is broadcast once a day at 2AM.

which indicates that a non-religious radio network (Jovem Pan radio) have no effect on UCKG affiliations.

We also find that the Aleluia Network effect vanishes in the presence of any other radios, which might represent alternative sources of information and entertainment. Both Aleluia and Record TV show complementary effects with temples in rural areas. The media effect is stronger among the groups that, according to the economics of religion literature, are more likely to attend church (IANNACCONE, 1998): among black or native people, among less schooled and poorer people. For Aleluia, the effect is also stronger in rural areas, and for Record TV, the impact on females drive the overall effect. One would expect this result as populations with these characteristics are the main target of Pentecostal churches (NERI, 2007). Moreover, one would expect that the poorer, less schooled and living in rural areas might be less likely to have written sources of information (like newspaper or websites).

We further examine the effect of Aleluia Network on labor market choices, on fertility, and on voting behavior. UCKG strongly encourages their affiliates to have their own businesses, a choice that stems from their religious attitude towards wealth and material goods (FERREIRA, 2017). We find positive effects of Aleluia Network and Record TV on the share of employers and self-employed people among workers, however estimates for Record effects are not statistically significant.

Besides that, UCKG is the only Pentecostal church which openly encourage the use of preservatives and birth control methods, including abortion in some cases. The founder of UCKG published regularly his own view on these themes on his blog in the end of the 2000s. This position was also expressed in the official UCKG newspaper, and was supported by Record TV, possibly reacting to the visit of Pope Benedict XVI to Brazil in 2007 (MATTOS, 2007).<sup>6</sup> Besides that, UCKG also distributes condoms and promotes family planning in its temples in Johannesburg and Soweto, South Africa (TEIXEIRA, 2014; MATTOS, 2007; CARVALHO, 2007). Religion, furthermore, can have impacts on fertility (LEHRER, 2008) and this kind of position and reaction should influence attitudes of followers and reflect in their fertility behavior. Coherent with these characterizations, we found positive effects of Aleluia broadcast on entrepreneurship and negative effects on women's fertility.

We also investigate the role of media in the results of state and federal congressional elections of 2010. Pentecostal politicians have been gaining ground in the Federal Chamber since the 1980s. In 1982, 12 evangelicals were elected as federal deputies, of whom only one was a Pentecostal (affiliated to the Assembly of God) and the remainder were Baptists, a traditional evangelical denomination. In 1986, 32 evangelical candidates for the federal deputy were elected. This time, half of these elected were Pentecostal (13 affiliated to the Assembly of God, two members of the Foursquare Church and one to the UCKG). Throughout the 2000s, the

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<sup>6</sup> A similar reaction of UCKG might have occurred in the occasion of another papal visit to Brazil in 1997, period when the UCKG newspaper released more articles about abortion (MACHADO, 1998). In that moment, UCKG also promoted a public event gathering more than 114 thousand people in a soccer stadium, in which bishop Macedo clearly stated his position on the theme (PEIXOTO, 1997).

number of Pentecostal politicians from the main denominations who were elected to the House increased, especially the candidates attached to the Assembly of God. The number of federal representatives linked to UCKG, on the other hand, fluctuated in the 2000s, possibly due to the connection to major political scandals.<sup>7</sup> Despite this, the UCKG maintained the highest rate of election among its candidates (LACERDA, 2017a).

One explanation for the electoral success of the Pentecostals is the adoption of an institutional promotion strategy for candidates by some denominations (FRESTON et al., 1993; LACERDA, 2017a), associated with the high rate of support of the followers of these churches to their candidatures.<sup>8</sup> Thus, an increase in conversion to UCKG and attendance to its temples promoted by media may have also increased voter exposure to the political promotion of candidates. In fact, we find positive effects of media exposure on voting in political party candidates linked to UCKG.

This paper contributes to two main strands of the literature. Firstly, it contributes to the literature of the economics of religion, aiming to examine the effects of changes one of the determinants of religious behavior on the supply side. There are studies that stress the importance of religion for the economic behavior in Brazil which provide evidence that religious options are correlated with specific preferences for consumption, schooling of children (ANUATTI-NETO; NARITA, 2004), opinions on aspects of civil life (such as same-sex marriage and legal practice of abortion) (PEW, 2014) and, possibly, with electoral options (FERNANDES, 1998; FRESTON et al., 1993; LACERDA, 2017a). In this sense, a consequence of the transformations in the religious panorama is the growth of the electoral importance of politicians with platforms explicitly linked to the religious values of evangelical groups at national level (LACERDA, 2017a). Platforms as these might generate consequences regarding the Brazilian institutional context. An important example which relates directly to the regulation of religious institutions is House Bill n. 160 of 2009<sup>9</sup>, which regulates norms on religious teaching, marriage, tax immunity of religious institutions, the provision of religious assistance in hospitals and prisons, and the guarantee of secrecy in the work of priests. In addition, the expansion of the representation of the evangelical electorate may have an influence on policies not directly related to religion. One example is the recent political dispute over the specification of the legal concept of family defined in the Federal Constitution, more specifically whether it should include same-sex couples. Following a judgment by the Federal Supreme Court (STF) in 2011, recognizing same-sex civil unions,<sup>10</sup> a bill (PL n. 6583/2013) intends to define the concept in such a way as to exclude homosexual couples. This bill is authored by a member of a coalition of politi-

<sup>7</sup> In 2005, federal representative and UCKG bishop Carlos Rodrigues was involved in a vote-buying scheme (called the "Mensalão" scheme) and in 2006, in a ambulance overpricing purchase scheme (called the "landleechers" scheme). In total, 14 parliamentarians linked to UCKG were accused of involvement in the "landleechers" scheme.

<sup>8</sup> 87% among Assembleia de Deus followers and 95% among UCKG followers in Rio de Janeiro Cf. FERNANDES, 1998. See also Bohn (2004).

<sup>9</sup> called of "General Law Project of Religions"

<sup>10</sup> The trial of Direct Action of Unconstitutionality n. 4277 and Arguing of Non-Compliance with Basic Precept 132, May 4, 2011.



cians called the “Evangelical Bench”. Definitions of this kind determine the legal coverage of individual civil rights and duties and the welfare of a portion of the population.

This paper also contributes to the empirical literature on the effects of media broadcasts on individual behavior (DELLAVIGNA; FERRARA, 2015). This literature is broad and there are evidence that radio broadcast affects the violent behavior of individuals (YANAGIZAWA-DROTT, 2014), the associative behavior and social capital (OLKEN, 2009), fertility behavior (FERRARA; CHONG; DURYEA, 2012; KEARNEY; LEVINE, 2015c), and voting behavior (GENTZKOW, 2006; DELLAVIGNA; KAPLAN, 2007; ENIKOLOPOV; PETROVA; ZHURAVSKAYA, 2011). However, there is still not any evidence of effects of media on religious behavior.

## **2.2 Historical Background and Religion in Brazil**

Brazilian Pentecostalism has its origins related to the American Pentecostal movement started in 1906, by pastor William Joseph Seymour. It is broadly characterized as a dynamic religion of popular appeal, which values oral tradition and physical expressions of the religious experience. Seymour incorporated elements of Catholicism, Protestantism and African culture to the Pentecostal practices (CAMPOS, 2005).

Today, Pentecostal worship services frequently include experiences that believers consider to be gifts of the Holy Spirit, such as speaking in tongues, divine healing, exorcisms, receiving direct revelations from God and giving or interpreting prophecies. Despite these common general traits, Brazilian Pentecostals churches are very different between themselves.

The spread of Pentecostalism in Brazil can be divided into three distinct phases, each of which was accompanied by significant changes to the Pentecostal Church’s behavior and strategic mission (FRESTON et al., 1993; FRESTON, 1995; LINGENTHAL, 2012).

### **2.2.1 *Beginning of the 1900s***

Pentecostalism originated in the United States in the early 20th Century, with doctrinal changes mainly from Methodism denominations which might have facilitated its diffusion among people with lower income and less schooling. The followers of this new Christian denomination believe in salvation by the Holy Spirit in the tradition of Pentecost. They also introduced an important feature which differentiated them from the Catholic Church, that simple people with little training could become preachers, making room for entrepreneurs and

religious producers (ALVES; BARROS; CAVENAGHI, 2012).

In Brazil, the first Pentecostal church was founded in 1910 by missionaries which came from the United States. The Christian Congregation in Brazil (Congregação Cristã no Brasil) was founded in the south part of Parana State by the Italian migrants Luigi Francescon, G. Lombardi and Lucia Menna, who aimed to preach the gospel among other Italian migrants in Brazil and Argentina. Another church of this first generation was founded in 1911 by the Swedish missionaries Gunnar Vingren and Daniel Berg in the city of Belém, in the northern state of Pará, and became the Pentecostal church with the largest number of believers, the Mission of the Apostolic Faith, which was later called the Assembly of God (Assembléia de Deus) (LIMA, 2007).

Despite being the oldest Pentecostal denomination, in 2010 the Christian Congregation in Brazil was the second with the largest number of followers. It is an ascetic religion that tries to distance itself from the world, maintaining a way of life of austerity in relation to leisure and mass media. In this sense, it presents various behavioral requirements of the adherents, including prohibition of alcohol consumption, watching TV or listening to radio (restrictions that are relatively relaxed nowadays). It currently presents few modifications of its traditions, which are transmitted predominantly orally, with few written documents. This denomination also has a decentralized organization, and yet its development took place without internal divisions. Its expansion occurs predominantly through personal contacts or worship ceremony itself. There is no use of pamphlets or electronic media. In addition, there is an explicit prohibition on the involvement of its religious leaders with politics (MONTEIRO, 2010; FOERSTER, 2006).

The Assembly of God is broadly characterized by the ethical line of its Swedish founders who were initially modest and relatively indifferent to social mobility (in contrast to the “Prosperity Theology” of some neo-Pentecostal denominations). Its expansion occurred rapidly, so that by 1930 the denomination was already present in all states. The Assembly of God does not have a centralized organization, being constituted as a complex network of mother-churches and dependent churches. It has an oligarchic structure of government, organized around lineages of bishops (called “presidents-pastors”), with a relatively weak national body (called the National Convention). As a probable consequence of this organization, there was a schism between one of its most popular lineages (called the Ministry of Madureira) and the National Convention (FRESTON, 1995).

### **2.2.2 1950s and 1960s**

In the mid-20th Century the new Pentecostal churches began to use novel expansion strategies. In order to distinguish themselves from the older Pentecostal churches, new Pentecostal churches from religious movements called the National Crusade of Evangelizing (*Cruzada Na-*

*cional de Evangelização*) started using divine healing in their worship services and radio transmissions to call potential believers to their canvas tents. One of the most prominent churches in this period was the Church of Foursquare Gospel (*Igreja do Evangelho Quadrangular*), which came from the United States in 1951. It developed missions in tents with no fixed locations, making it easier to move between cities and drawing the attention of potential believers in the streets. One of the most important pastors of the Church of the Foursquare Gospel was Manoel de Mello, who had previously left the Assembly of God and began to use radio transmissions in his strategy of evangelizing, under the influence of the American missionary Harold Williams. After some unsuccessful attempts, Mello managed to establish the daily radio program *The Voice of Brazil for Christ (A Voz do Brasil para Cristo)* in São Paulo. In this program, he asked for donations and invited viewers to attend cults held in open public places, a solution for the absence of a fixed space of his own. The success of the program was transferred to his newly founded church, the first founded by a Brazilian in 1955, the Church Brazil for Christ. The program was later inserted in a space of 15 minutes rented in Radio Tupi programming, which had national broadcast by shortwaves (LIMA, 2007).

This pattern of successful pastors who later founded their own church was repeated by others in the following decades, which generated the wide variety of denominations with the use of media, which would also be followed by other churches (LIMA, 2007).

### **2.2.3 *From 1970s to present day: the rise of Neo-Pentecostalism and the Charismatic Renewal Movement***

In the late 1970s a new generation of Pentecostal churches emerged and some classify it as a completely new type of church (FREESTON et al., 1993). The Universal Church of the Kingdom of God (UCKG) was founded in 1977 and started an aggressive expansion strategy with intense use of media and a combination of typical show elements in its services, marketing strategies similar to those of firms, and a focus on revenue maximization. In addition to UCKG, other churches founded in this period are the International Church of the Grace of Christ (*Igreja Internacional da Graça de Cristo*, 1980, in Rio de Janeiro), the Christian Peace and Life Community (*Comunidade Cristã Paz e Vida*, 1982, in São Paulo), the Rebirth in Christ Church (*Igreja Apostólica Renascer em Cristo*, 1986, in São Paulo), the Sara Nossa Terra Community (*Comunidade Evangélica Sara Nossa Terra*, 1992, in Brasília) and the World Church of the Power of God (*Igreja Mundial do Poder de Deus*, 1998, in São Paulo).

These churches had few traces of sectarianism and did not required followers for adherence to strict rules of conduct that characterized the Pentecostalism of the first generation. They also spread a doctrine that preaches a positive attitude toward wealth and work, called Prosperity Theology, and which is related to the willingness of believers to give tithes. According to this

narrative, the world, God's creation, would be an inheritance for his children, who would have the right to enjoy it in life. Followers become worthy to take part of this inheritance as long as they contribute with tithing and follows the rules of the church. Tithing is always seen as the prerequisite for obtaining the material benefits available to the believers. The neo-Pentecostal churches also preach the existence of a spiritual warfare against the devil and his followers on Earth, who they would identify as the other religions, especially Afro-Brazilian religions (LINGENTHAL, 2012).

In addition, neo-Pentecostal churches also had no restrictions on engaging in politics. Instead, they started to nominate candidates in the late 1980s, who would participate in the Constituent Assembly, and be involved with radio and TV concession to religious groups (FRE-STON et al., 1993).

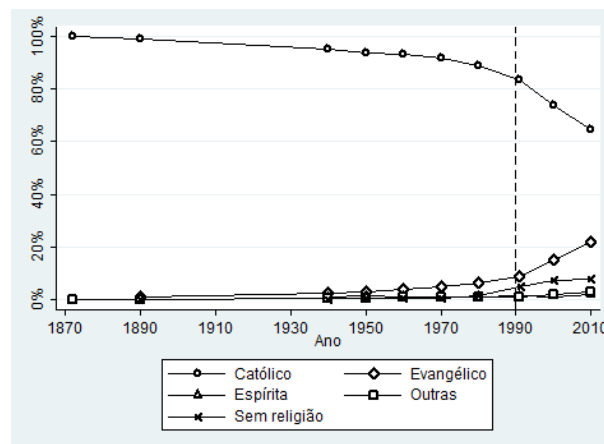
The followers of the Pentecostal churches founded until the 1970s resisted the use of TV sets, which was considered a perverse practice. Even today, some of these churches do not allow their followers to watch TV, such as the Christian Congregation in Brazil (of the first generation of churches) and the Pentecostal Church God is Love, which is part of the second generation. However, this resistance has reduced over time. Members of the Assembly of God, for example, banned the use of TVs in the 1957 Convention, but this rule came to be challenged from the 1990s. The main factor for the change of attitude towards TV is the influence of American shepherds. In 1974, the American pastor Billy Graham came to Brazil and his visit was anticipated by television programs aimed at Evangelicals and Pentecostals, encouraging them to participate in his campaign. Graham's visit had great repercussion, with an event that filled the Maracanã stadium. In addition, TV programs of American pastors began to be transmitted in Brazil at the same time (CAMPOS, 2008). Many of the new churches founded in the 1970s started using TV as a means of spreading their message as a central part of their expansion strategy and with no restrictions related to religious reasons (e.g. UCKG with Record TV and Pentecostal Church New Life with the program *Ponto de Contato* in TV Rio). This contrast with the use of TV among the American televangelists that inspired those churches, which was more centralized in individual pastors (LINGENTHAL, 2012).

#### ***2.2.4 Origins and Expansion of Pentecostalism in Brazil***

Brazil is the country with the largest number of Catholics in the world, about 123 million adherents (PEW, 2013), despite the major changes in religious landscape of the last decades. There is a long-term downward trend in the percentage of Catholics, which accelerated from the early 1980s to 74% in 2000 and 65% in 2010, as Figure 1 shows. Between 1970 and 2000 the number of Catholics still increased, despite decrease in its share. Between 2000 and 2010 there was an absolute decrease in the number of Catholics from 125 million to 123 million.

Almost complementary, it is possible to observe an astonishing growth in the proportion of Protestant people, whose share increased from 15.5% in 2000 to 22% in 2010. Protestants include a variety of denominations ranging from traditional ones (such as Lutherans, Calvinists, and Methodists) to Pentecostals and neo-Pentecostals such as the Assembly of God and UCKG. The absolute number and proportion of not religion people and other religions (such as Afro-Brazilian religions and Spiritists) have also increased.

Figure 1 – Distribution of Population by Religious Affiliation



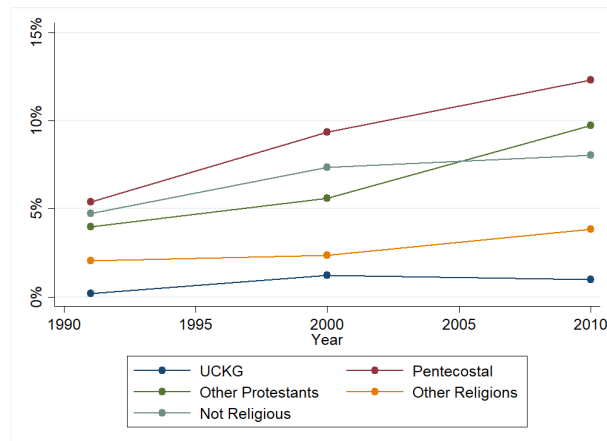
Source: Brazilian Census 1872-1920. General Directorate of Statistics (Diretoria Geral de Estatística); Demographic Census 1940-2010. IBGE. Elaborated by the author. 16.713 interviews in 1940 and 31.960 in 1950 were not computed, due to loss of the respective answer sheets. From 1970 a 2010, total population considered is the resident population.

Among Protestants, Pentecostalism growth was especially pronounced, from 6% in 1991 to 13% in 2010, while historical Protestants maintained a relatively constant proportion. Figure 2 shows that not UCKG Pentecostals represent an important share of the evangelicals, even greater than that of historical and other Protestants. UCKG showed a big expansion from 1991 to 2000, however remained stagnated in the last decade.<sup>11</sup> Despite that, UCKG represents the third biggest Pentecostal denomination in 2010, with around 2 million adherents.

As for Latin America, in Brazil the growth of Pentecostals is not due to differences in vegetative growth rate, which is similar among Protestant groups. The phenomenon is of converting believers, from other denominations, especially former Catholics, which represented about 45% of Protestants in 2006 (PEW, 2013). The increase of Protestants share occurred in all age and schooling categories, for both sexes and in urban and rural areas, but it was stronger among young people, and city dwellers. As Neri (2007) points out, the growth of Pentecostalism is a phenomenon related to the new urban poverty, which deepened in the 1980s and 1990s with economic recessions. These new losers in the labor market would face new and rapidly changing situations for which the forms of relief and the framework of the new Pentecostal religions would be more appropriate.

<sup>11</sup> Mafra (2013) describes a possible problem of the survey of the Demographic Census of 2010, which might have miss-classified UCKG followers into the residual “other protestants” category.

Figure 2 – Evolution of Population Shares of Evangelicals



Source: Brazilian Census 1991-2010. Elaborated by the author.

### 2.2.5 “Do not suffer anymore!”: UCKG and Media<sup>12</sup>

The Universal Church of the Kingdom of God (UCKG) is one of the largest Pentecostal denominations in Brazil in 2010 and its history constitutes a trajectory of accelerated growth, filled with conflicts with other religions and public scandals. Moreover, its development is inseparable from the strategy of mass communication by broadcasting vehicles.

UCKG was founded in 1977 in the city of Rio de Janeiro, at a time of deterioration in its quality of life as a possible consequence of the transfer of the federal capital and labor force to Brasilia in 1960. These transformations generated growth of crime and violence, with the reduction of tourism and its revenues, and might have connections to the increase of demand for new religious options. In this sense, UCKG places itself as a new space for contact, encouragement and mutual help, ways of channeling discontent and minimizing low esteem.

UCKG was founded from the association of a small group of people from some Pentecostal movements, such as Romildo Ribeiro Soares, Roberto Augusto Lopes and Edir Macedo. Macedo is nowadays the only remaining founder and main pastor of UCKG and has been a priest in another Pentecostal denomination, the Church of the New Life, between 1963 and 1975. Previously, he had been a Catholic and attended Umbanda rituals, which may have contributed to his understanding of religions and the future religious syncretism characteristic of the preaching style of the UCKG pastors (DREHER, 1997). Macedo is seen as a model of pastor by UCKG affiliates, chosen by God, and as a successful businessman. To his believers, he is seen as having started life with nothing and succeeding over time in conquering many things, despite alleged persecution and humiliated, resembling Jesus Christ for them.

As early as the 1980s, UCKG was booming. From 1980 to 1989, the number of temples

<sup>12</sup> In this section, we follow the descriptions of Lingenthal (2012), Mariano (2004), Campos (2006) and Reis (2006).

grew 26 times, reaching 571 by the end of the decade. The expansion strategy began in the metropolitan areas of Rio de Janeiro, São Paulo and Salvador, passing later on to other states capitals and to large and medium-sized cities. During the 1990s, UCKG also expanded to other countries, reaching at least 70, including the United States, England, Spain, Portugal, Italy and some Latin American countries.

In 2014 UCKG has found in São Paulo municipality a replicate of the Salomon Temple described in the Bible. With a total area of 70 thousand square-meters, it is a major temple, 126 meters long, 104 meters large and 55 meters high, with two underground floors and capacity to support 10 thousand people in its main sanctuary. Its opening ceremony was attended by important politicians from all the political specter, including the president of Brazil (from the Brazilian Workers' Party), the vice-president, the governor of São Paulo State, the mayor of São Paulo municipality, one minister of the Brazilian Supreme Court, the president of the Military Supreme Court, the director of the Federal Police. Presidents of competing TV channels also attended the ceremony. Its construction represented a demonstration of UCKG's political influence and vitality, at the end of a decade of reduction of its affiliations.

Macedo implemented a centralized form of operation and management of the activities of UCKG, which constituted an important factor for the maintenance of its unit. This feature contrasts with the Congregational nature of the Brazilian Pentecostal denominations of the first generation, where local units have greater autonomy for theological reflection and missionary expansion (DREHER, 1997). The process of internal adjustment and dispute with the UCKG led the initial group of founders to separate, so that the decision-making power remained centralized in Macedo. In 1980, disagreeing with what he claimed to be an authoritative form of management, Soares left the UCKG and founded the World Church of God's Power. In 1981, Macedo and Lopes consecrated each other as bishops. Lopes founded the UCKG in São Paulo and elected constituent deputy in 1986. However, he ended up returning to the Church of Nova Vida some years later, leaving Macedo as the only leader. Between 1986 and 1993, Macedo moved to the USA and administered UCKG from there, through a bishop, Renato Suhett. In 1993, Macedo consecrated more bishops and formally divided his power with the "college of bishops".

The decision-making and management of collected resources are organized into a vertical command structure, centered on Macedo, though he no longer holds the chair of the first bishop.<sup>13</sup> It should be emphasized that this type of structure seems to allow greater efficiency in the management of resources and strategic decision-making for expansion, in addition to being subject to business management techniques.

To illustrate Macedo's centralized power of decision, José Cabral, a pastor seen as one of the UCKG's intellectual leader mentions:

The Universal Church [of the Kingdom of God] is structured around Bishop Macedo. He is a man who has everything in his hands, inside the Church. He

<sup>13</sup> Macedo stepped away from this function to avoid charges against him (MARIANO, 2004).

lives and breathes in the Church 24 hours a day (...) everybody worships bishop Macedo. He gives an order here and there, on the extreme of Brazil, even in the more distant church (temple), the order is known and obeyed. UCKG's unit is guaranteed by the single central authority of bishop Macedo. Thus we have a Church that is more united than the Catholic Church itself (...). Macedo is a kind of authoritarian leader, who practices 'authoritarianism' in the good sense of the word. (CAMPOS, 2006, p. 119)

### **2.2.6 UCKG and Media**

Since its foundation, UCKG has relied on the use of broadcast media as the main way of spreading its message. For example, Macedo gained importance within the UCKG, supplanting the leadership of R. R. Soares for his popularity as a host of a religious program at the Metropolitana radio station. According to information published on the UCKG website, since the 1980s, that church started renting schedules on commercial radios for the broadcasting of evangelizing programs. In 1984, UCKG acquired its first radio station in the city of Rio de Janeiro (the above-mentioned Rádio Metropolitana) and began to purchase other radio stations throughout the country, reaching 17 own stations and a total of 30 to 35 stations broadcasting the UCKG content by the end of the 1990s, respectively, according to Lingenthal (2012) and the UCKG's website. Radio has the advantages of having comparatively lower price for renting or acquiring broadcasters, lower maintenance cost and higher audience among the poorest and these characteristics make it the favorite media of religious leaders (MARIANO, 2004).

In 1998, with the objective of unifying the programming of these radios, the Aleluia Network was founded, with one of the stations in Rio de Janeiro as the generator of content. Since then, the growth of the communication vehicles belonging to UCKG has been accelerated. In 2000, the network already had almost 80 radio stations and 21 television stations (LOBATO, 2000). In 2007, it was the largest owner of television concessions in Brazil, but it registered only 36 radio stations, suggesting the substitution of media vehicles (LOBATO, 2007a, 2007a). However, in 2018, Aleluia Network holds 69 radio stations and is one of the radio networks with the highest number of stations.

In 1990, UCKG also made a major media purchase, acquiring one of the largest Brazilian TV channels, Record TV, for US\$ 45 million. Record TV was a television channel, which had been the second most viewed channel until the beginning of the 1970s. After that, Record rose again to become the third most watched TV channel, after Rede Globo and SBT. At the end of the 1990s, UCKG also had almost 39 TV stations.



### 2.2.7 *Media and New Followers*

In the expansion strategy of UCKG, media does not have the role of converting individuals. The key role of radio and TV is to reach people who do not have prior contact with the UCKG through friends and family in contact. It enters households with motivations for practical changes in life (such as magical cures), stories of conversion of current followers and to attract viewers to attend the temples (MARIANO, 2004; LINGENTHAL, 2012). Aleluia's weekly programming consists of broadcasting gospel or non-religious songs, with some specifically religious programs conducted by bishops. In the program with largest audience, UCKG founder transmits religious messages for about 40 minutes, three times a day, every day of the week. Among the other programs, there are some in which current followers tell their own conversion stories, cults, programs of encouragement to combat what they identify as vices, as well as programs aimed at specific audiences such as students, volunteers and inmates. Record TV is a commercial TV channel which also broadcasts few hours of UCKG programming, including a daily one hour long program with UCKG founder, cults and religious programs for specific viewers.<sup>14</sup>

Stories of how converts became UCKG adherents seems to have a big influence on viewers as individuals seeking UCKG are typically in situations of suffering and distress. Stories of suffering and salvation are a pattern presented in testimonies of conversion of believers performed on Record TV shows, and potential adherents who are suffering from similar problems might recognize themselves and see a solution in UCKG<sup>15</sup>. In these TV shows, the testimonies always have a similar structure, with a crisis moment before conversion, when followers were suffering, and a moment after it, in which they found salvation. UCKG presents a story of salvation to its followers as a story of deliverance. According to it, all worldly problems are caused by the figure of the Devil and before finding UCKG, individuals are subjugated by the Devil. The problems that motivated the followers that are shown in the reports involve physical illnesses, depression and feelings of defeat, abandonment and hopelessness, dependence on alcohol or drugs, family disagreements, prostitution and financial difficulty.(BENETTI, 2000).<sup>16</sup>

When individuals go to temples, they would be more subject to persuasion to enter into worship and remain in it as a requirement for salvation. The UCKG temples have an infrastructure prepared to receive potential believers, such as periods of relatively longer working hours throughout the day, and the constant presence of volunteers (MARIANO, 2004). According to (CAMPOS, 2006), UCKG pastors who host potential adherents seem to put great effort on

<sup>14</sup> UCKG founder decided to keep Record TV as a commercial channel in order to survive the competition from other channels (CAMPOS, 2008).

<sup>15</sup> Francisco (2011) conduct qualitative interviews with UCKG followers and describe how Record TV programs aroused interest among his interviewees.

<sup>16</sup> Benetti (2000) analysed 71 testimonies aired between 1997 and 1998 on the programs "Word of Life" and "Speak, I listen to you" ("Palavra da Vida" e "Fala que Eu te Escuto").

converting new adherents, as they have a position constantly threatened by younger pastors.<sup>17</sup>

This media mechanism is illustrated on the UCKG website, with the individual story of a follower, who knew about UCKG by radio.

Today 72-year-old housewife Marta Maria de Oliveira (...) has known about Universal's work for 25 years, since she heard the church's broadcast on a radio station in São Paulo. "I liked to listen to the radio. One day I got tired of hearing bad news and then I thought about changing the tune until I found the frequency of Radio São Paulo, where a pastor from Universal spoke about things that made me think about my spiritual life" she recalls.

It was then that Dona Marta wanted to follow Universal's programming on the radio every day. "It took a while for me to go to a meeting, but I felt very sad, I felt depressed, so on a Memorial Day, I went to the cemetery, as was the tradition, but I gave up and invited my sister to go with me until that church that I listened to so much on the radio", she says.

As of that date, Mrs. Marta never stopped attending Universal. And today the whole family also accompanies her in the meetings. "I have never felt that emptiness before and my family is blessed." (CRUZ, 2016)

This mechanism is also clear in the way Aleluia Network website refers to itself, as the "radio that transforms lives", and the media are referred to as entrance doors to "contents, songs and words that do good to the spirit and soul" (IURD, 2016).

## 2.3 Data

To measure religious results, the dependent variable is a dummy variable for UCKG adherents of the 2010 Demographic Census. This survey consists on a questionnaire with some basic questions for all the Brazilian households, and another, more detailed, for a sample of those households. This sample questionnaire includes the question about religion, along with other socioeconomic variables collected for all people living in the sampled household and which we use as controls. We also construct other outcome variables from this dataset: the number of births per female, and dummy variables for self-employed workers and for employers.

Spatially, the Census data are organized in weighting areas (*Áreas de Ponderação* - WA), municipalities, microregions, mesoregions and states. WAs are the smallest spatial unit for which data on religious preferences are statistically representative and, because of that, we

<sup>17</sup> (CAMPOS, 2006) also arguments that UCKG pastors do not have job stability, as formal training is not needed and they learn on the job. Furthermore, as pastors are recruited among people with low levels of formal education, the opportunity cost of losing the job as a pastor might be considerably high.

constructed radio coverage data in the WA level. In the 2010 Census these areas totaled 10,184 units.

Our measure of signal coverage is the proportion of the population of each WA covered by the audible signal of Aleluia Network and Record TV. In order to construct this variable, we first identified which were the antennas of Aleluia Network and Record TV, through the information made available on the respective websites. Since it is in the interest of the churches to disclose their means of communication to potential believers, we consider this source of information to be reliable. In order to get the antennas which were active in 2010 (year of our result variable), we used the virtual tool Wayback Machine (ARCHIVE, 2016). For Record TV, we used the antennas listed in their current website and checked that these antennas were already transmitting in 2010.

Once the radio stations have been identified, we use technical data from the Broadcast Control System (*Sistema de Controle de Rádio Difusão* - SRD) of the National Telecommunications Agency (*Agência Nacional de Telecomunicações* - Anatel) to feed the technical model of coverage forecasting. We use a technical model of signal forecast, the Longley-Rice model, which, when taking into account the variations of the relief, is called Irregular Terrain Model (ITM). This model is currently used by broadcasters for the planning of mobile phone and radio networks and was also the model used in other papers on radio and TV effects (OLKEN, 2009; YANAGIZAWA-DROTT, 2014). To construct a variable of audible radio and TV signal, we used an online tool, from the CloudRF website, used by amateur and professional broadcasters. It uses antenna location and technical specifications, as well as data from the Shuttle Radar Topography Mission, from Nasa, to make a forecast of signal density over the territory. Following Yanagizawa-Drott (2014), we consider a cutoff of  $50 \text{ dB}\mu\text{V}/\text{m}^{18}$  to determine which signal strength is audible and construct our measure of radio and TV coverage, the share of area covered by audible radio signal from Aleluia Network and Record TV. We also make a coverage prediction based on a free-space path loss model, which estimate the coverage strength that would be observed if there were no physical obstacles.

In some specifications, we also consider information about the presence of UCKG temples in the WAs. UCKG uses both temples and mass media in its expansion strategy. The strategy of media use has the function of attracting potential believers to the temples and of spreading new congregations, while the presence of a temple available to potential followers is a key part of UCKG's expansion strategy. Data of temples active in 2010 were obtained from the Federal Revenue Office of Brazil, with the date of entry into formal registration of firms (*Cadastro Nacional de Pessoas Jurídicas* - CNPJ), situation (if in operation or not), date of the situation and address. In this way, we were able to identify the temples in operation in 2010 and obtained their geographic coordinates through the Google Maps and Google Places geocoding services. In total, we identified 5,277 temples in operation in 2010, of which 4,254 had valid and identifiable addresses.

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<sup>18</sup> Decibel micro-volt per meter, a measure of the signal density in the field.

We also use data of voting behaviour of the Electoral Superior Court (*Tribunal Superior Eleitoral* - TSE) to evaluate impact of UCKG media on voting on candidates of the political party related to it, the Brazilian Republican Party (*Partido Republicano Brasileiro* - PRB). We use data on the results of the 2010 elections for federal and state representatives, organized by voting polls. These data were geocoded using a procedure similar to that for temples, and aggregated into the WAs. We choose to identify UCKG political representatives with PRB candidates, as PRB emerged from UCKG itself. One example of this close relationship is that pastors helped to collect signatures in UCKG temples to found it (Revista *Época*, 2009).

Table 1 shows descriptive statistics of the observations of 2010 Demographic Census we used in econometric exercises, divided between countryside and state capitals and Metropolitan Regions. In table 2, we present descriptive statistics for the sample used in regressions for Record TV.

Table 1 – Descriptive Statistics - Aleluia Network

Variables	Countryside			State Capitals and MRs		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
<b>Major Religious Groups (Share of pop. × 100)</b>						
Catholics (p.p.)	7,783,516	71.12	45.32	4,586,180	59.27	49.13
Evangelical - UCKG (p.p.)	7,783,516	0.70	8.34	4,586,180	1.22	11.00
Evangelical - Other Protestants (p.p.)	7,783,516	19.05	39.27	4,586,180	23.52	42.42
Not religious (p.p.)	7,783,516	6.28	24.26	4,586,180	9.86	29.81
Other religions (p.p.)	7,783,516	2.86	16.65	4,586,180	6.12	23.97
<b>Media Variables</b>						
Aleluia ITM broadcast covered area (p.p.) (min. Dist)	7,783,516	0.09	0.25	4,586,180	0.33	0.41
Aleluia FREE broadcast covered area (p.p.) (min. Dist)	7,783,516	0.43	0.48	4,586,180	0.88	0.32
<b>Geographic Variables</b>						
Average altitude (m)	7,783,516	472.96	305.77	4,586,180	426.55	389.39
Altitude variance (m <sup>2</sup> )	7,783,516	6790.14	17613.07	4,586,180	2742.42	12530.06
Latitude	7,783,516	-17.93	7.52	4,586,180	-19.92	7.20
Longitude	7,783,516	-45.58	5.53	4,586,180	-45.12	4.78
<b>UCKG Temples Variables</b>						
Presence of IURD temple in 2010 (p.p.)	7,783,516	0.38	0.49	4,586,180	0.61	0.49
Number of IURD temples in 2010	7,783,516	0.48	0.85	4,586,180	1.18	1.71
<b>Socioeconomic Variables</b>						
16-24 y.o.	7,783,516	0.21	0.41	4,586,180	0.20	0.40
25-40 y.o.	7,783,516	0.34	0.47	4,586,180	0.36	0.48
41-60 y.o.	7,783,516	0.30	0.46	4,586,180	0.31	0.46
61 y.o. or older	7,783,516	0.15	0.35	4,586,180	0.13	0.34
Female	7,783,516	0.51	0.50	4,586,180	0.53	0.50
Black or Native	7,783,516	0.47	0.50	4,586,180	0.46	0.50
Primary Sch.	7,783,516	0.52	0.50	4,586,180	0.36	0.48
Middle Sch.	7,783,516	0.18	0.38	4,586,180	0.20	0.40
Highschool or more	7,783,516	0.23	0.42	4,586,180	0.32	0.47
HH Income per Capita - Richer Group	7,783,516	0.26	0.44	4,586,180	0.16	0.37
HH Income per Capita - Middle Group	7,783,516	0.36	0.48	4,586,180	0.30	0.46
HH Income per Capita - Lower Group	7,783,516	0.38	0.49	4,586,180	0.54	0.50
HH in Urban Area	7,783,516	0.78	0.41	4,586,180	0.96	0.19
<b>Entrepreneurship</b>						
Employer (among Workers)	7,783,516	0.01	0.11	4,586,180	0.01	0.12
Self-Employed (among Workers)	7,783,516	0.14	0.35	4,586,180	0.12	0.33
<b>Fertility</b>						
Total Births	3,934,232	2.39	2.68	2,402,488	1.85	2.11

Religious variables, socioeconomic variables, labor market and fertility variables are measured at the individual level. Labour market variables only for working individuals, fertility only for females. Media variables, geographic variables and variables for UCKG temples are measured at the WA level. Religious variables are multiplied by 100. Sample of 16-year-old or older individuals and WA at less than 300km from the closest Aleluia Network antenna.

Table 2 – Descriptive Statistics - Record TV

Variables	Obs.	Mean	Std. Dev.
<b>Major Religious Groups (Prop. of population)</b>			
Catholics (p.p.)	11,521,351	68.00	46.65
Evangelical - UCKG (p.p.)	11,521,351	0.83	9.08
Evangelical - Other Protestans (p.p.)	11,521,351	20.34	40.25
Not religious (p.p.)	11,521,351	7.32	26.04
Other religions (p.p.)	11,521,351	3.52	18.42
<b>Media Variables</b>			
Record ITM broadcast covered area (p.p.) (min. Dist)	11,521,351	0.18	0.35
Record FREE broadcast covered area (p.p.) (min. Dist)	11,521,351	0.99	0.10
<b>Geographic Variables</b>			
Average altitude (m)	11,521,351	434.97	333.91
Altitude variance (m <sup>2</sup> )	11,521,351	6135.05	16939.07
Latitude	11,521,351	-18.59	7.76
Longitude	11,521,351	-46.14	5.96
<b>UCKG Temples Variables</b>			
Presence of UCKG temple in 2010 (p.p.)	11,521,351	0.42	0.49
Number of UCKG temples in 2010	11,521,351	0.62	1.10
<b>Socioeconomic Variables</b>			
16-24 y.o.	11,521,351	0.21	0.41
25-40 y.o.	11,521,351	0.34	0.47
41-60 y.o.	11,521,351	0.30	0.46
61 y.o. or older	11,521,351	0.14	0.35
Female	11,521,351	0.51	0.50
Black or Native	11,521,351	0.46	0.50
Primary Sch.	11,521,351	0.49	0.50
Middle Sch.	11,521,351	0.18	0.38
Highschool or more	11,521,351	0.33	0.47
HH Income per Capita - Richer Group	11,521,351	0.29	0.45
HH Income per Capita - Middle Group	11,521,351	0.34	0.47
HH Income per Capita - Lower Group	11,521,351	0.37	0.48
HH in Urban Area	11,521,351	0.81	0.39
Capital	11,521,351	0.13	0.34
Metropolitan Region	11,521,351	0.38	0.48
<b>Labor Market and Entrepreneurship</b>			
Employer (among Workers)	6,953,626	0.02	0.14
<b>Self-Employed (among Workers)</b>			
Fertility	6,953,626	0.23	0.42
Total Births	5,892,942	2.28	2.58

Religious variables, socioeconomic variables, labor market and fertility variables are measured at the individual level. Labour market variables only for working individuals, fertility only for females. Media variables, geographic variables and variables for UCKG temples are measured at the WA level. Religious variables are multiplied by 100. Sample of 16-year-old or older individuals and WA at less than 300km from the closest Aleluia Network antenna.

## 2.4 Empirical Strategy

In this paper we aim to verify if the Aleluia Network and Record TV signals have an effect on affiliations to UCKG. We follow the empirical strategy proposed by Olken (2009) and Yanagizawa-Drott (2014), for the transmitter antennas of Aleluia Network and Record TV in Brazil. The main identification challenge in our estimation is the fact that both networks strategically chooses the location of their radio transmitter antennas, in order to maximize their target audience or potential new UCKG believers, and this choice can be underpinned to unobservable determinants which also correlates with individuals' religious choice.

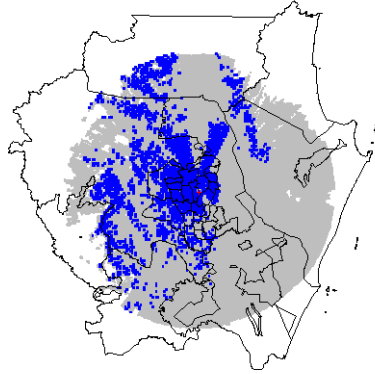
To isolate the effects due to topography, we use a electromagnetic signal propagation model combined with data on locations of transmission antennas and receiving areas. The propagation of the media signal follows a technical model which, conditional on the power of the transmission equipment and the frequency of the emitted wave, depends mainly on the distance between the transmitter and the receiving locations and obstacles between them. If there if mountains or other geographic obstacles in the line of sight, signal quality at receiver's location would be a complex function of terrain irregularities, diffraction caused by air and the curvature of Earth, and the degree to which the diffraction occurs would also depend on the signal frequency. By using the ITM model, we construct the predicted coverage for Aleleuia Network and Record TV resulting from the influence of all those factors. As a consequence, this predicted signal captures the effects of topography, as well as the fact that some WAs are closer to the transmitting antennas than others. To isolate the variation due only to topography, we flexibly control for the predicted coverage from the free-space path loss model, that would be observed in the absence of physical barriers.

We further control for characteristics of the receivers' location. In our exercise, we controlled for geographic characteristics of the WAs, as well as fixed effects of the microregions around a broadcasting antenna, which could be correlated with the choice of that location. Thus, the variation of signal quality depends only on the obstacles between the transmitting antenna and the receiver device. This is a source of arguably exogenous variation in coverage of the broadcasting signal.

Religious networks cannot freely choose the location of the transmitting antenna at any point in space, because, rather than construct by themselves many of the radio stations they operate, they acquire existing ones. Furthermore, it might have been difficult for media firms use a precise signal prediction model in its locational decision during the 1990s and most of the 2000s. Although the technical model of signal prediction is relatively old, the main source of geographical variation data has only been made available to the general public by NASA in recent years.

Figure 3 shows one of the broadcasting antennas of Aleluia Network. In the Figure, we can see WAs, superimposed on the area of coverage of the audible signal using free-space path loss

Figure 3 – Signal Forecasting Models



Fonte: IURD (2016); SRD/Anatel; CloudRF. Prepared by the authors.

forecasting model (the gray area), the audible signal using ITM forecast model (blue area) and the red plus sign shows the location of the antenna.

We estimate the probability that an individual is a UCKG follower as a function of the presence of audible signal from Aleluia Network of Record TV. We use the following linear probability model:

$$UCKG_{ijk} = \beta ITM_{jk} + \gamma FREE_{jk} + \mathbf{X}_{ijk} + GEOGRAPHY_{jk} + \mu_k + \varepsilon_{ijk} \quad (2.1)$$

where  $UCKG_{ij}$  is the dummy variable which equals 1 if individual  $i$ , in weighting area  $j$  and microregion  $k$  is a UCKG follower, and equals zero otherwise,  $ITM_{jk}$  is the share of weighting area  $j$  covered by audible signal considering terrain irregularities,  $FREE_{jk}$  is the share of audible signal considering line of sight propagation model,  $\mathbf{X}_{ijk}$  is a vector of socioeconomic characteristics which may influence individual's religious decision,  $GEOGRAPHY_{jk}$  is the set of geographic variables of the receiving areas,  $\mu_k$  is the fixed effect of microregion of receiving areas and  $\varepsilon_{ijk}$  is the error term. The individual's socioeconomic characteristics include sex, age, race, household income, schooling and a dummy variable for urban areas. The geographic characteristics of WAs include those used by Olken (2009) and Yanagizawa-Drott (2014): latitude and longitude of centroids, a linear term and a quadratic term for the average elevation, and the variance of elevation.

In our estimations, we restrict our sample to 16-years-old individuals or older, as most of younger teenagers and children would not be able to choose their own religion by themselves. We also restrict our sample to WAs at a maximum distance of 300km from the closest transmitting antenna, as this is the limit of the propagation predicting algorithm. For Aleluia Network, we also investigate effects only for the countryside, defined as municipalities which are not state capitals and are not in Metropolitan Areas. In less populous rural areas, radio represents a more important source of information and means to spread religious message, as other types of media might not be present as in Metropolitan Regions. Moreover, in those areas, illiteracy

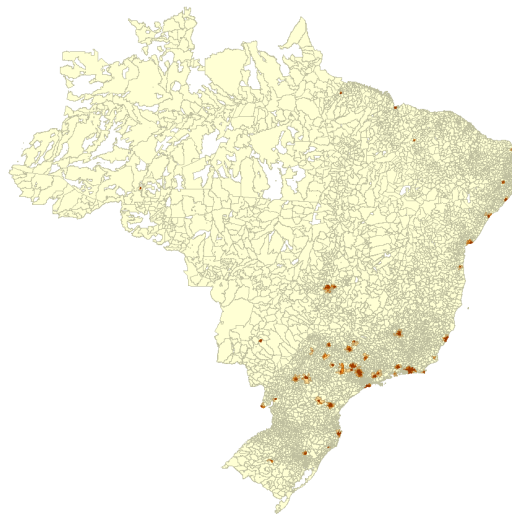
rate is higher, which means that written sources of media (as newspaper and internet websites) might not be used as a source of information. We further restrict our sample to states which have Aleluia Ntework signal or Record TV signal.

## 2.5 Descriptive Results

In this section, we present our empirical results. We first present some descriptive results for WAs with 2010 data. Figure 4 shows the population covered by the Aleluia Network signal for radio broadcasting antenna for which we have available technical data. In 2010, there were 78 radio transmitting antennas connected to the Aleluia Network, of which 68 operated in FM frequency. Of these, 18 did not have relevant technical data for the forecast of signal coverage by ITM technical model. We also identified 55 Record TV antennas, but just 29 of them had available technical information.

In Figure 4 we divide weighting areas into four categories according to the share of its area covered by the audible signal: up to 25%, from 25% to 50%, from 50% to 75% , and more than 75%. We can observe the highest concentration of antennas in the Southeast, Northeast and South regions. In addition, there is greater concentration of the covered areas in large cities and state capitals. A similar pattern is associated with Record TV antennas, shown in figure 5. Record TV antennas are more spread over the space than Aleluia antennas, and they reach farther WAs.

Figure 4 – Aleluia Network Signal Coverage by Weighting Area

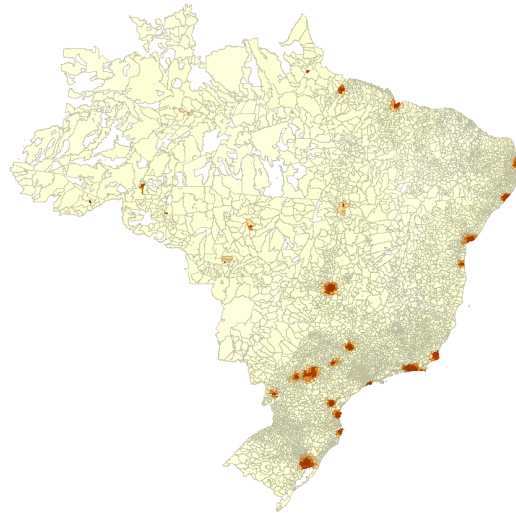


Font - Estimates calculated with spatial data of weighting areas; radio coverage prediction estimated in CloudRF, from SRD/Anatel data.

Figure 6 shows the share of population affiliated to UCKG. We can verify reasonable overlap of the areas covered by the audible signal of Aleluia and Record with the highest shares of



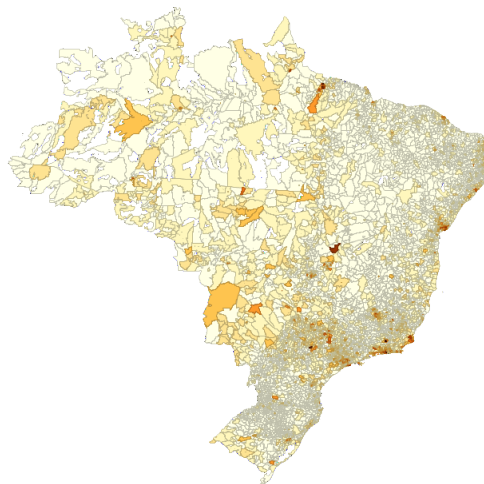
Figure 5 – Record TV Signal Coverage by Weighting Area



Font - Estimates calculated with spatial data of weighting areas; radio coverage prediction estimated in CloudRF, from SRD/Anatel data.

UCKG members, although there is some concentration of the proportion of affiliates not covered by the signal. These areas are likely to be covered by broadcasting antennas for which we do not have available technical data. Despite this, we can verify higher shares of UCKG affiliates in areas close to major cities and state capitals, especially in Rio de Janeiro and São Paulo.

Figure 6 – Share of Population affiliated to UCKG, by Weighting Areas



Font: Demographic Census 2010.

## 2.6 Econometric Results

### 2.6.1 Main Results

Tables 3 and 4 contain our main results for Aleluia Network and Record TV coverage. In both tables, the dependent variable is a dummy variable for UCKG followers, which we multiplied by 100 to adjust the scale of estimates. Our variable of interest is  $ITM_{ijk}$ , which captures the effect of topographic variation between the transmitter and reception areas, when we control for  $FREE_{ijk}$  and propagation characteristics of the reception area. We estimate equation 2.1 as a linear probability model and use standard errors clustered at the weighting area level, which is the level of media coverage variation.

Table 3 – Aleluia Coverage and UCKG Converts

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Aleluia ITM Coverage	0.108* (0.056)	0.094* (0.056)	0.119** (0.054)	0.109* (0.057)
Aleluia FREE Coverage	-	0.074*** (0.029)	0.072** (0.028)	0.085*** (0.033)
Observations	7,783,516	7,783,516	7,783,516	7,783,516
R-Squared	0.002	0.002	0.004	0.004
UCKG Share	0.701	0.701	0.701	0.701
Propagation Controls	Yes	Yes	Yes	Yes
Socioeconomic Controls	No	No	Yes	Yes
Microregion FE	Yes	Yes	Yes	No
Microregion and Broadcaster FE	No	No	No	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

In column 1 of table 3, we regress  $UCKG_{ijk}$  on Aleluia Network coverage variables, with no other controls and obtain a positive correlation. The point estimate for ITM coverage is around 0.11 percentage points (pp.). In columns 2 and 3 we add  $FREE_{ijk}$  and socioeconomic controls and estimate does not vary. In column 4, we further control for microregion and broadcaster fixed effects to capture possible differences of broadcasts contents, as stations are allowed to insert a percentage of local content. The estimate is unaltered.

Column 3, with microregion fixed effects control, is our benchmark specification. Its mag-

nitude of 0.12 pp. represents an effect of 13% of the average of UCKG followers in the countryside, which means that in areas in which there is audible Aleluia Network signal, individuals have a probability 13% higher of becoming a UCKG believer.

Table 4 shows the same specifications as in table 3, and we can see a similar pattern for Record TV signal coverage. Exercises of table 4, however, include the countryside, the state capitals and Metropolitan Regions. In column 1, we obtain a positive estimate for ITM coverage, which does not vary when we control for FREE signal coverage in column 2. In column 3, point estimate slightly goes up and microregion-broadcaster fixed effects does not change the estimate significantly. Taking again column 3 as our benchmark specification, we can see that Record TV has an impact of 0.26 pp., which represents 26% of the average of the UCKG followers in its sample.

In contrast with Aleluia Network results, Record TV presents a positive overall impact on the total sample of countryside and Metropolitan Region WAs. Moreover, Record TV also has a relatively bigger impact on the countryside. Table 5 shows that when we restrict the sample to just the individuals in WAs in the countryside, we see that the effect is bigger. In column 3, with the benchmark specification we obtain an estimate of 0.41 pp., which represents 57% of the average of that sample.

Table 4 – Record TV Coverage and UCKG Converts

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Record ITM Coverage	0.237*** (0.063)	0.238*** (0.063)	0.258*** (0.059)	0.251*** (0.060)
Record FREE Coverage	-	0.091 (0.080)	0.087 (0.076)	0.148* (0.077)
Microregion and Broadcaster FE	No	No	No	Yes
Observations	11,521,351	11,521,351	11,521,351	11,521,351
R-Squared	0.003	0.003	0.005	0.005
UCKG Share	0.998	0.998	0.998	0.998
Propagation Controls	Yes	Yes	Yes	Yes
Capital and MR FE	Yes	Yes	Yes	Yes
Population and Density	Yes	Yes	Yes	Yes
Socioeconomic Controls	No	No	Yes	Yes
Microregion FE	Yes	Yes	Yes	No
Microregion and Broadcaster FE	No	No	No	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 5 – Record TV Coverage and UCKG Converts - Countryside

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Record ITM Coverage	0.422*** (0.099)	0.421*** (0.099)	0.416*** (0.095)	0.406*** (0.096)
Record FREE Coverage	-	0.074 (0.081)	0.070 (0.077)	0.129* (0.078)
Microregion and Broadcaster FE	No	No	No	Yes
Observations	7,119,982	7,119,982	7,119,982	7,119,982
R-Squared	0.002	0.002	0.004	0.004
UCKG Share	0.725	0.725	0.725	0.725
Propagation Controls	Yes	Yes	Yes	Yes
Capital and MR FE	Yes	Yes	Yes	Yes
Population and Density	Yes	Yes	Yes	Yes
Socioeconomic Controls	No	No	Yes	Yes
Microregion FE	Yes	Yes	Yes	No
Microregion and Broadcaster FE	No	No	No	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna and in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 2.6.2 Placebo

We test our benchmark of Aleluia Network result with a placebo test in table 6. We conduct a placebo test with one of the biggest Brazilian commercial radio networks called Jovem Pan in the same sample we use in our benchmark specification. In column 1, we control for individual socioeconomic characteristics, propagation variables and microregion fixed effects to obtain a positive, although not significant, estimation for the Jovem Pan ITM coverage. In column 2, we add Aleluia Network coverage variables. While Jovem Pan estimation becomes close to zero, point estimate for Aleluia is positive and significant. This result reinforces our conviction that Aleluia Network coverage increases the number of UCKG adherents.

Table 6 – Placebo Test for Aleluia Network - Jovem Pan and UCKG Converts

Independent Variables	Dependent Variable:	
	UCKG Dummy (multiplied by 100) (1)	(2)
JP ITM Coverage	0.090 (0.076)	0.051 (0.077)
JP FREE Coverage	0.035 (0.029)	0.024 (0.030)
Aleluia ITM Coverage	-	0.111** (0.054)
Aleluia FREE Coverage	-	0.069** (0.028)
Observations	7,783,516	7,783,516
R-Squared	0.004	0.004
UCKG Share	0.701	0.701
Propagation Controls	Yes	Yes
Socioeconomic Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. JP and Aleluia ITM coverage are the share of WA area that has, respectively, Jovem Pan and Aleluia Network reception using ITM model. JP and Aleluia FREE coverage are the share of WA area that has Jovem Pan and Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 2.6.3 Expansion Strategy

We also check whether UCKG strategically places temples and Aleluia coverage close together, so that their action would be reinforced in focused areas, or if they build temples in areas not covered by their radios. We do this in table 7 by regressing dummy of presence of UCKG temple in the weighting area and the number of UCKG temples in the weighting area on Aleluia coverage variables, at the WA level.

The two columns of table 7 show that correlations between both coverage variables and temple presence are negative for temple dummy and number of temples. These results suggest that it is possible that UCKG expect their temples to have an effect on conversions which is independent of radio coverage. Moreover, this result indicate that the locational decision of Aleluia Network radio signal does not follow the construction of temples, so that the estimated effects of table 3 are not due to the presence of UCKG temples.

In contrast, Record TV and temples presence have no significant correlation, as we can see on table 8. Both estimates are small and not statistically significant. This result suggests that location decision for Record TV antennas also do not lead our benchmark results of table 4.

Table 7 – Aleluia Network Aggregated Coverage and Temples

Independent Variables	Dependent Variable:	
	UCKG Temple Dummy (1)	N. of UCKG Temples (2)
Aleluia ITM Coverage	-0.183*** (0.049)	-0.188*** (0.065)
Aleluia FREE Coverage	0.023 (0.026)	0.015 (0.031)
Observations	5,322	5,322
R-Squared	0.223	0.239
Sample Average	0.265	0.305
Propagation Controls	Yes	Yes
Average Socioeconomic Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG temple dummy and number of UCKG temples on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 8 – Record TV Aggregated Coverage and UCKG Temples

Independent Variables	Dependent Variable:	
	UCKG Temple Dummy (1)	N. of UCKG Temples (2)
Record ITM Coverage	-0.015 (0.039)	0.147 (0.093)
Record FREE Coverage	-0.081 (0.084)	-0.103 (0.102)
Observations	7,845	7,845
R-Squared	0.232	0.256
Sample Average	0.371	0.497
Propagation Controls	Yes	Yes
Av. Socioecon. Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG temple dummy and number of UCKG temples on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at microregion level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 2.6.4 Heterogeneity

### 2.6.4.1 UCKG Media and Temples

We investigate the heterogeneity of effects for the presence of UCKG temples and other radios. As qualitative studies suggest, temples are important places for conversions, and radio and TV broadcasts role is just to call potential believers to the meetings and services (MARIANO, 2004; LINGENTHAL, 2012). In fact, they should be complements to the use of mass media. Despite these conjectures, we do not find any relevant difference in effects between areas with stronger and weaker presence of UCKG temples, as shown in table 9. In the odd columns, we show regressions adding the variable for UCKG presence; in even columns, we add the interaction term of these variables with Aleluia coverage. The interaction terms in the even columns are very small and none of them have statistical significance.

Table 9 – Aleluia Network Heterogeneous Effects - Presence of UCKG Temple

Independent Variables	Dependent Variable:	
	UCKG Dummy (multiplied by 100)	
	(1)	(2)
Aleluia ITM Coverage	0.118** (0.053)	0.118* (0.061)
Aleluia FREE Coverage	0.061** (0.027)	0.068** (0.029)
Temple Dummy	0.196*** (0.015)	0.205*** (0.017)
Aleluia ITM Coverage × Temple Dummy	-	0.003 (0.083)
Aleluia FREE Coverage × Temple Dummy	-	-0.022 (0.035)
Observations	7,783,516	7,783,516
R-Squared	0.004	0.004
UCKG Share	0.701	0.701
Propagation Controls	Yes	Yes
Socioeconomic Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

However, when we restrict our sample to rural areas in table 10, heterogeneity of effects appears, with bigger effects for areas with stronger presence of temples. In column 1, we estimated the same specification of column 3 of table 3, restricted to individuals who live in

rural areas. As we can see, the effect of Aleluia Network is bigger in these areas. In columns 2 to 5, we introduce variables for temples and their interactions with Aleluia coverage. As we can see, estimates for the interaction terms of columns 3 and 5 are positive and significant. It is possible that in relatively more dense urban areas it makes little difference to have a temple in the WA of residence, as WAs are smaller there and the cost to move to a farther temple is not relevant. In rural areas, on the other hand, weighting areas are wider, so that the cost to reach a temple outside the area in which an individual lives is relatively more important.

Table 10 – Aleluia Network Heterogeneous Effects in Rural Areas- Presence of UCKG Temple

Independent Variables	Dependent Variable:		
	UCKG Dummy (multiplied by 100)		
	(1)	(2)	(3)
Aleluia ITM Coverage	0.870*** (0.305)	0.855*** (0.299)	0.238 (0.308)
Aleluia FREE Coverage	0.064** (0.032)	0.057* (0.031)	0.050 (0.032)
Temple Dummy	-	0.107*** (0.019)	0.071*** (0.019)
Aleluia ITM Coverage × Temple Dummy	-	-	1.607*** (0.521)
Aleluia FREE Coverage × Temple Dummy	-	-	0.049 (0.048)
Observations	2,139,197	2,139,197	2,139,197
R-Squared	0.003	0.003	0.004
UCKG Share	0.319	0.319	0.319
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in rural areas, in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Results for Record TV are shown in table 11 and are similar to those of table 9. When we introduce a dummy variable for UCKG temples, estimate for Record TV is unaltered from the benchmark result (column 3 of table 4) and it also does not change when we introduce the interaction term in column 3.

The same pattern of Aleluia Network emerges when we restrict our sample to the rural areas. In table 12, column 1 shows the result with our benchmark specification (column 3 of table 4) and it is higher our previous result for the whole sample. In column 2, we add the UCKG temple dummy, and in column 3 the interaction. We can see that in this latter case, the estimate for



Table 11 – Record TV Heterogeneous Effects - Presence of UCKG Temple

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)	
	(1)	(2)
Record ITM Coverage	0.238*** (0.059)	0.259*** (0.064)
Record FREE Coverage	0.086 (0.076)	0.078 (0.081)
Temple Dummy	0.168*** (0.014)	0.147 (0.114)
Record ITM Coverage × Temple Dummy	-	-0.035 (0.052)
Record FREE Coverage × Temple Dummy	-	0.028 (0.116)
Observations	11,521,351	11,521,351
R-Squared	0.005	0.005
UCKG Share	0.998	0.998
Propagation Controls	Yes	Yes
Socioeconomic Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Record ITM coverage decreases and lose its significance, while the interaction term represents is positive. This result, as in the case of Aleluia Network, shows the importance of temples in UCKG expansion strategy.

Table 12 – Record TV Heterogeneous Effects in Rural Areas- Presence of UCKG Temple

Independent Variables	Dependent Variable:		
	UCKG Dummy (multiplied by 100)		
	(1)	(2)	(3)
Record ITM Coverage	0.406*** (0.132)	0.383*** (0.130)	0.264 (0.161)
Record FREE Coverage	0.081 (0.099)	0.102 (0.099)	0.072 (0.108)
Temple Dummy	-	0.124*** (0.019)	0.008 (0.158)
Record ITM Coverage × Temple Dummy	-	-	0.272* (0.153)
Record FREE Coverage × Temple Dummy	-	-	0.099 (0.162)
Observations	2,220,538	2,220,538	2,220,538
R-Squared	0.004	0.004	0.004
UCKG Share	0.416	0.416	0.416
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in rural areas of WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

#### 2.6.4.2 Aleluia Network and Other Radios

In table 13 we examine whether the presence of reception of any other radio affects the impact of Aleluia Network. We do this by introducing a dummy variable for the presence of other radios in the WA and the number of other radios.<sup>19</sup> In the odd columns of table 13, the point estimate for Aleluia coverage becomes smaller when we include the dummy for other radios in column 1, or the number of other radios in column 3. However, when we add the interaction term in the even columns, the effect reapers. Point estimates for the interaction terms are all negative, but have statistical significance only for the dummy of other radios in column 2. In this case, areas with no other radio explains all the effect estimated. This result suggests that competition among radios makes Aleluia worse off, such that it loses its ability to increase converts for UCKG.

<sup>19</sup> We considered that a radio is present in an WA when its ITM audible signal covers more than 50% of WA area. Exercises using more restricted cutoffs for their presence of the radio were tested and results do not change significantly.

Table 13 – Aleluia Network Heterogeneous Effects - Presence of Other Radios

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Aleluia ITM Coverage	0.077 (0.055)	0.429** (0.187)	0.063 (0.058)	0.198** (0.089)
Aleluia FREE Coverage	0.070** (0.028)	0.069** (0.029)	0.073*** (0.028)	0.076*** (0.029)
Other Radios Dummy	0.070*** (0.019)	0.095*** (0.020)	-	-
Aleluia ITM Coverage × Other Radios Dummy	-	-0.367* (0.191)	-	-
Aleluia FREE Coverage × Other Radios Dummy	-	-0.024 (0.039)	-	-
Number of Other Radios	-	-	0.018** (0.008)	0.040*** (0.010)
Aleluia ITM Coverage × Number of Other Radios	-	-	-	-0.037 (0.023)
Aleluia FREE Coverage × Number of Other Radios	-	-	-	-0.021 (0.016)
Observations	7,783,516	7,783,516	7,783,516	7,783,516
R-Squared	0.004	0.004	0.004	0.004
UCKG Share	0.701	0.701	0.701	0.701
Propagation Controls	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 2.6.4.3 Socioeconomic Characteristics

We further investigate if effects of exposure to Aleluia Network and Record TV signals are heterogeneous by socioeconomic characteristics. We introduced interaction terms for our socioeconomic controls and both coverage predictions in tables 14 and 15, in which we omitted the estimates for the coefficients of those variables. In column 1 of table 14, we investigate effects heterogeneity along the age dimension, with three interaction terms. The omitted dummy is that for teenagers and young adults that are 16 to 24 years old. The interaction terms with the ITM coverage show that the effect is the lowest for the reference group, although differences are not significant for older groups. We do not find relevant differences in effects between both categories of sex. Women are more prone to become a UCKG follower (the estimate is 0.23, significant at 1% level), it might be the case that other ways of conversion are more important, as the physical presence of temples. Heterogeneity of effect along race and type of residence

dimensions are outstanding. All the effect estimated seems to occur among black or native people. The interaction term captures all the effect, while the estimate for the ITM coverage term is reduced to a small value. In a similar way, the entire effect of Aleluia broadcast occurs in rural areas.

In table 15, we examine heterogeneity along education and income dimensions. In both cases, the omitted dummy is that for the less schooled group and for those with less household income per capita. The impact of Aleluia coverage is stronger among the less schooled group, as well as for the poorer people. For the groups of the most schooled and with higher incomes, effects of Aleluia coverage are nearly zero. Except for the rural areas, the results above might be expected as populations with these characteristics are the main target of Pentecostal churches. Furthermore, the above results for rural areas, education and income are all coherent with the hypothesis that in those areas the radio represents a relatively more important way of mass media and source of information and entertainment. One would expect that the poorer, less educated and living in rural areas might be less likely to have written sources of information (like newspaper or websites).

Record TV seems to have different effects on young ages. As column 1 of table 17 shows, the effects of ITM coverage are positive for the omitted category (teenagers and young adults up to 24 years old), however it is even stronger for the older generations. This difference with Aleluia results might be due to differences in the audiences of TV and radio, and the way each media organizes its religious content over the day. Columns 2 and 3 shows that the whole Record TV effects occurs on females and black or native people. Despite negative, the estimate for the interaction with urban areas dummy is not statistically significant.

As for heterogeneity of effects along income and education, the pattern for Record TV is the same as for Aleluia Network. Table 17 shows that the effect of Record TV is bigger for the less schooled and in the group with lower incomes, and decreases to zero for the most schooled or with higher income. As we observed in tables 4 and 5, effects of Record coverage in the countryside (not MR and not capital) are higher. In MRs and state capitals, it is significantly lower.

Table 14 – Aleluia Network Heterogeneous Effects - Age, Sex and Race

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Aleluia ITM Coverage	0.174*** (0.066)	0.117** (0.051)	-0.022 (0.056)	0.997*** (0.267)
Aleluia ITM Coverage × Young Adults ppl. (25-40 y.o.)	-0.091* (0.052)	-	-	-
Aleluia ITM Coverage × Adults ppl. (41-60 y.o.)	-0.039 (0.050)	-	-	-
Aleluia ITM Coverage × Elder ppl. (61 or more y.o.)	-0.080 (0.073)	-	-	-
Aleluia ITM Coverage × Female	-	-0.003 (0.034)	-	-
Aleluia ITM Coverage × Black or Native	-	-	0.441*** (0.073)	-
Aleluia ITM Coverage × Urban Area	-	-	-	-0.887*** (0.264)
Aleluia FREE Coverage	0.076** (0.031)	-0.005 (0.028)	-0.010 (0.029)	0.045 (0.033)
Aleluia FREE Coverage × Young Adults ppl. (25-40 y.o.)	0.002 (0.019)	-	-	-
Aleluia FREE Coverage × Adults ppl. (41-60 y.o.)	-0.007 (0.020)	-	-	-
Aleluia FREE Coverage × Elder ppl. (61 or more y.o.)	-0.016 (0.025)	-	-	-
Aleluia FREE Coverage × Female	-	0.153*** (0.014)	-	-
Aleluia FREE Coverage × Black or Native	-	-	0.164*** (0.023)	-
Aleluia FREE Coverage × Urban Area	-	-	-	0.031 (0.031)
Observations	7,783,516	7,783,516	7,783,516	7783516
R-Squared	0.004	0.004	0.004	0.004
UCKG Share	0.606	0.606	0.606	0.606
Propagation Controls	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 15 – Aleluia Network Heterogeneous Effects - Schooling, Income and Regions

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)	
	(1)	(2)
Aleluia ITM Coverage	0.177*** (0.060)	0.448*** (0.117)
Aleluia ITM Coverage × Lower Sec. Ed.	-0.075 (0.057)	-
Aleluia ITM Coverage × Upper Sec. Ed.	-0.152*** (0.051)	-
Aleluia ITM Coverage × Medium HH Income per Capita	-	-0.182 (0.113)
Aleluia ITM Coverage × High HH Income per Capita	-	-0.443*** (0.115)
Aleluia FREE Coverage	0.043 (0.029)	0.134*** (0.035)
Aleluia FREE Coverage × Lower Sec. Ed.	0.031 (0.021)	-
Aleluia FREE Coverage × Upper Sec. Ed.	0.107*** (0.018)	-
Aleluia ITM Coverage × Medium HH Income per Capita	-	-0.037 (0.029)
Aleluia ITM Coverage × High HH Income per Capita	-	-0.158*** (0.033)
Observations	7783516	7783516
R-Squared	0.004	0.004
UCKG Share	0.606	0.606
Propagation Controls	Yes	Yes
Socioeconomic Controls	Yes	Yes
Microregion FE	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 16 – Record TV Heterogeneous Effects - Age, Sex and Race

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
Record ITM Coverage	0.198*** (0.062)	0.099* (0.058)	0.093 (0.060)	0.357*** (0.096)
Aleluia ITM Coverage × Young Adults ppl. (25-40 y.o.)	0.049* (0.029)	-	-	-
Aleluia ITM Coverage × Adults (41-60 y.o.)	0.094*** (0.029)	-	-	-
Aleluia ITM Coverage × Adults Elders (61 or more y.o.)	0.106** (0.041)	-	-	-
Aleluia ITM Coverage × Female	-	0.301*** (0.022)	-	-
Aleluia ITM Coverage × Black or Native	-	-	0.342*** (0.035)	-
Aleluia ITM Coverage × Urban Area	-	-	-	-0.103 (0.085)
Record FREE Coverage	0.144 (0.096)	0.047 (0.075)	0.048 (0.076)	0.026 (0.104)
Aleluia FREE Coverage × Young Adults ppl. (25-40 y.o.)	-0.087 (0.072)	-	-	-
Aleluia FREE Coverage × Adults (41-60 y.o.)	-0.045 (0.074)	-	-	-
Aleluia FREE Coverage × Adults Elders (61 or more y.o.)	-0.093 (0.095)	-	-	-
Aleluia FREE Coverage × Female	-	0.082* (0.044)	-	-
Aleluia FREE Coverage × Black or Native	-	-	0.083 (0.068)	-
Aleluia FREE Coverage × Urban Area	-	-	-	0.082 (0.110)
Observations	11,521,351	11,521,351	11,521,351	11,521,351
R-Squared	0.005	0.005	0.005	0.005
UCKG Share	0.998	0.998	0.998	0.998
Propagation Controls	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 17 – Record TV Heterogeneous Effects - Schooling, Income and Regions

Independent Variables	Dependent Variable:		
	UCKG Dummy (multiplied by 100)		
	(1)	(2)	(3)
Record ITM Coverage	0.549*** (0.064)	0.561*** (0.074)	0.513*** (0.080)
Record ITM Coverage × Lower Sec. Ed.	-0.230*** (0.036)	-	-
Record ITM Coverage × Upper Sec. Ed.	-0.573*** (0.036)	-	-
Record ITM Coverage × Medium HH Income per Capita	-	-0.166*** (0.049)	-
Record ITM Coverage × High HH Income per Capita	-	-0.547*** (0.053)	-
Record ITM Coverage × Capital Dummy	-	-	0.002 (0.074)
Record ITM Coverage × MR Dummy	-	-	-0.505*** (0.106)
Record FREE Coverage	0.077 (0.084)	0.095 (0.097)	0.069 (0.076)
Record FREE Coverage × Lower Sec. Ed.	0.080 (0.075)	-	-
Record FREE Coverage × Upper Sec. Ed.	-0.038 (0.065)	-	-
Record FREE Coverage × Medium HH Income per Capita	-	-0.033 (0.095)	-
Record FREE Coverage × High HH Income per Capita	-	-0.014 (0.104)	-
Record FREE Coverage × Capital Dummy	-	-	-0.533 (28.222)
Record FREE Coverage × MR Dummy	-	-	0.453 (0.556)
Observations	11,521,351	11,521,351	11,521,351
R-Squared	0.005	0.005	0.005
UCKG Share	0.998	0.998	0.998
Propagation Controls	Yes	Yes	
Socioeconomic Controls	Yes	Yes	
Microregion FE	Yes	Yes	

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



## 2.6.5 Other Results

### 2.6.5.1 Entrepreneurship

As discussed in section 2.2, one of the main doctrines of the neo-Pentecostal churches, the Theology of Prosperity, has a close relationship with entrepreneurship, through a positive attitude towards work and wealth. We investigate if Aleluia and Record broadcasts have effects on this dimension. Table 18 shows estimations for effects on the probability of being an employer or self-employed (among people who work). In the first column, we use the same specification as our benchmark, in columns 2 and 3, we repeat the same exercise for, respectively, the UCKG followers and for the rest of the sample. Our results show that working people in areas more exposed to Aleluia Network are more prone to be Employers of Self-employed, which is coherent with the narrative about entrepreneurship. Point estimate for UCKG followers is slightly higher, but the difference with other workers are not statistically significant. Table 19 show that we obtain a similar pattern for Record TV, however, results are not statistically significant.

Table 18 – Aleluia Network Effects on Entrepreneurship

Independent Variables	Dep. Var.: Share of Entrepreneurs		
	Total (1)	UCKG (2)	Other (3)
Aleluia ITM Coverage	2.512*** (0.467)	2.929* (1.621)	2.498*** (0.468)
Aleluia FREE Coverage	-1.036** (0.410)	-1.878 (1.463)	-1.034** (0.411)
Observations	4619666	26020	4593645
R-Squared	0.085	0.078	0.085
Dep. Var. Average	24.33	23.50	24.33
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older working individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 2.6.5.2 Fertility

UCKG is the only Pentecostal church that supports abortion in specific cases and the use of birth control methods. This position is expressed directly by its founder in few entries of his blog, but also in the church policies of distributing preservatives. It is thus expected that exposition to Aleluia coverage could reduce fertility, as followers might align their opinions

Table 19 – Record TV and Entrepreneurship

Independent Variables	Dep. Var.: Share of Entrepreneurs		
	Total (1)	UCKG (2)	Other (3)
Record ITM Coverage	0.567 (0.523)	1.855 (1.355)	0.545 (0.525)
Record FREE Coverage	0.703 (1.039)	-11.129*** (3.901)	0.760 (1.045)
Observations	6,953,626	54,283	6,899,339
R-Squared	0.079	0.066	0.079
Dep. Var. Average	23.54	24.05	23.54
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older working individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

and behaviour to UCKG's declared position. Religion can influence fertility by two channels. It can have a direct effect, by converting females or families, who might start to share the views of UCKG and become more pro-birth-control. In addition, it can convert one of the members of the couple, who might reduce fertility through the bargaining inside the family (LEHRER, 2008). If this happens, conversion to UCKG also may increase instability of the couple, which could also reduce fertility.

Table 20 shows the affects of Aleluia on fertility, measured by the number of total births per woman. As in table 18, the in the second and third columns, we redo the regression for the sample of UCKG followers and for the rest of the sample. Our results show an overall negative effect, especially strong for UCKG followers. These results suggest the pro-birth-control position of UCKG may be being transmitted specifically to believers by conversions made through radio. Table 21 shows the similar results.

Table 20 – Aleluia Network Effects on Fertility

Independent Variables	Dependent Variable: Total Births		
	Total (1)	UCKG (2)	Other (3)
Aleluia ITM Coverage	-0.153*** (0.022)	-0.256*** (0.078)	-0.152*** (0.022)
Aleluia FREE Coverage	-0.052*** (0.013)	-0.032 (0.069)	-0.053*** (0.013)
Observations	3934232	29506	3904724
R-Squared	0.395	0.394	0.395
Dep. Var. Average	2.495	2.785	2.493
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: female 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 21 – Record TV and Fertility

Independent Variables	Dependent Variable: Total Births		
	Total (1)	UCKG (2)	Other (3)
Record ITM Coverage	-0.202*** (0.018)	-0.335*** (0.063)	-0.200*** (0.018)
Record FREE Coverage	-0.012 (0.035)	-0.153 (0.196)	-0.011 (0.035)
Observations	5,892,942	60,265	5,832,674
R-Squared	0.389	0.378	0.389
Dep. Var. Average	2.097	2.432	2.093
Propagation Controls	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: 16-year-old or older females in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We also examine whether religious media impacts on the vote choice. In table 22 we show the results for Aleluia Network in the aggregated level of weighting areas. In column 1, we obtain a positive and statistically significant estimate for the effect of Aleluia on UCKG share in the countryside of the same magnitude of our benchmark. In column 2, we regress the share of valid votes on PRB state representatives and obtain positive and statistically significant estimate, which represents roughly 74% of the sample average. In column (3) we obtain a positive coefficient for the vote share of PRB federal representatives, but it is not statistically significant.

In table 23, we repeat the estimations for Record TV coverage in all WAs. In column 1, we obtain roughly the same estimate of our benchmark, however, as the sample is reduced, the standard error increased and make it not statistically significant at 10% level (p-value of 0.11). In columns 2 and 3, however also obtain positive and significant results for the PRB voting shares.

Table 22 – Aleluia Network Aggregated Coverage and PRB Vote Share

Independent Variables	Dependent Variable		
	UCKG Share (1)	Share of PRB Federal Rep. Votes (2)	Share of PRB State Rep. Votes (3)
Aleluia ITM Coverage	0.102** (0.048)	0.680*** (0.225)	0.242 (0.520)
Aleluia FREE Coverage	0.078** (0.031)	0.112 (0.181)	0.225* (0.130)
Observations	5277	5277	5277
R-Squared	0.008	0.363	0.381
Dep. Var. Average	0.575	0.918	1.034
Propagation Controls	Yes	Yes	Yes
Av. Socioecon. Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG share and PRB vote shares on Aleluia Network coverage. In column (1) we regress the aggregated UCKG share on controls after partialing out individual socioeconomic characteristics. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Sample: WAs at less than 300km from closest Aleluia Network antenna in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 23 – Record TV Aggregated Coverage and PRB Vote Share

Independent Variables	Dependent Variable		
	UCKG Share (1)	Share of PRB Federal Rep. Votes (2)	Share of PRB State Rep. Votes (3)
Record ITM Coverage	0.222 (0.139)	0.927** (0.365)	1.012** (0.415)
Record FREE Coverage	0.045 (0.072)	0.219 (0.266)	-0.004 (0.258)
Observations	7,760	7,760	7,760
R-Squared	0.008	0.442	0.505
Dep. Var. Average	0.801	1.349	1.506
Propagation Controls	Yes	Yes	Yes
Av. Socioecon. Controls	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes

Regression of UCKG share on Record TV coverage. In column (1) we regress the aggregated UCKG share on controls after partialing out individual socioeconomic characteristics. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Total sample: WAs at less than 300km from closest Record TV antenna. Restricted Sample: WAs in total sample for which we have Standard errors in parenthesis, clustered at microregion level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## 2.7 Conclusion

Neo-Pentecostal churches, and Universal Church of Kingdom of God (UCKG) in particular, have intensely used mass media in their strategies to grow and spread their messages. UCKG's history is filled with scandals related to heterodox methods of collecting tithes money and using them to expand the corporate firm-like religious organization. Their aggressive strategies of marketing and acquisition of radio stations, TV and cable television channels, music records and press firms called attention of the public opinion from the 1980s on, especially after purchasing Record Network TV channel.

This paper aims to examine the effect of the coverage of UCKG's radio and TV networks, the Aleluia Network and Record TV, on UCKG affiliations. We use the arguably exogenous variation due to topography between the transmitter antennas and the receiving areas to identify the effect of exposure to UCKG's religious broadcast in the Brazilian weighting areas of 2010. In our benchmark specification, we find that Aleluia coverage have an effect of increasing UCKG conversions in 13% of its average share in the countryside, while Record TV has an overall effect of 26%. These effects are robust to further control by broadcaster fixed effect, and is stronger among black and native people, less schooled and poorer. For Aleluia, the effect is also stronger in rural areas, and for Record TV, the impact on females drive the overall effect.

Moreover, we find that the Aleluia effect vanishes if there is another radio transmitter in the area. Record TV effect is also stronger in the countryside, reaching an effect of over 60% of the sample average. This result suggests that competition between media might play an important role, as state capitals and big cities tend to have more media coverage.

We also detect complementary effects of temples and religious media in rural areas, where the cost to reach a temple is bigger. This positive interaction is consistent with the mechanism described by the literature and present in adherents own personal experiences. In rural areas, where the cost to reach a temple is bigger. This does not mean that in urban areas this relationship does not exist, but our measure of presence of UCKG temple does not allow us to capture it properly.

We further investigate the impacts of religious media on other behaviors we expect Pentecostals act differently from other people: entrepreneurship, fertility and political choice. UCKG is one of the churches that use the Gospel of Prosperity as an important element of its proselytism, and the entrepreneur attitude is the main way to actively seize success. We find positive and significant effects for Aleluia Network. For Record TV, the result is positive, but does not have statistical significance.

In contrast with the average Pentecostal churches, UCKG is the only church which is openly supports birth-control methods and abortion, in specific cases. Accordingly, we found negative effects of Aleluia Network and Record coverage on the number of children per female.

Religious media also influences voting for the parties related to the church. We found that UCKG media, specially Record TV, has a significant overall impact on PRB vote shares. This fact can help explain the electoral success of Pentecostal candidates in successive elections since the 1980s.

Our findings are the first to our knowledge to show quantitative evidence of the importance of media for neo-Pentecostal expansion in Brazil, and for other dimensions of individual's behaviour. The strategy of acquiring radio and TV channels might be seen as one important determinant of the steep increase of neo-Pentecostal followers in recent decades. In a country with a broad penetration of broadcasting receivers such as radios and TVs (FERRARA; CHONG; DURYEA, 2012; MARIANO, 2008), it is possible that the religious messages conveyed by these media have the potential to overcome the barrier posed by the high percentage of illiterates for religions which are based on messages contained in a sacred book and whose members are historically characterized by high levels of literacy.



### 3 THE UNIVERSAL KINGDOM OF GOD EXPANSION BY CHURCHES

#### 3.1 Introduction

The third-generation of Pentecostal churches, or neo-Pentecostals, in Brazil and Latin America is usually characterized by the intense use of mass media as a strategic tool for expansion. Despite the relevance of mass media, after almost 40 years of existence, the Universal Church of the Kingdom of God (UCKG) is still opening new churches and it inaugurated a temple of gigantic proportions in 2014 called Temple of Solomon in one of the most populous districts of the city of São Paulo. With a constructed area of 74,000  $m^2$  and seating capacity of 9,500 people, the temple was built with a total budget of R\$ 680 million and is part of a series of recent large temple constructions in Brazil. Although it is smaller in size than the largest basilica of the Catholic Church (the Basilica of Our Lady of Aparecida has 143,000  $m^2$  of built area and has a capacity for 30,000 people inside), the construction of this temple signals the remaining importance of physical presence of temples in the expansion strategy of UCKG.

The oldest and most fundamental strategy of a church to convert new members in places where they still do not have a religious denomination is precisely through the physical presence of priests and the construction of temples. In addition to representing a direct form of persuasion of potential members of the new religion, the presence of temples makes possible complementary expansion strategies with mass media, acting as a receiver of the new believers (MARIANO, 2004; LINGENTHAL, 2012).

In this chapter, we investigate the effects of the opening and permanence of UCKG temples in Brazilian municipalities in the 1990s and 2000s on religious conversions. The expansion of the UCKG temples in the 1980s was extremely fast, and continued into the following decades with a path of expansion focused on state capitals and large cities. Just two years after the construction of its first temple in 1978, UCKG already had 6 temples in 1980, reaching 456 in 1990, 3,267 in 2000 and 5,625 in 2010.

We explore the difference of timing of entry of UCKG into the municipalities. Our main explanatory variables are a dummy that indicates the presence of the temple in the municipality and a set of dummies that capture the amount of years of existence since UCKG entered it, both constructed from information of the Federal Revenue Office's administrative records on inauguration and functioning status of temples. The individuals' religiosity data were obtained from the 1991, 2000 and 2010 editions of the Demographic Census of the Brazilian Statistics Bureau (*Instituto Brasileiro de Geografia e Estatística* - IBGE) and were constructed for people aged 16 years and over. We estimate the probability of an individual being a member of the UCKG, controlling for individual socioeconomic characteristics, aggregate variables that could orient the choice of the entry and permanence of UCKG in a municipality, as well as municipal and time fixed effects. Our results indicate that the presence of at least one UCKG temple in the



municipality increases the probability that an individual will convert in 0.11 percentage points, which represents 15% of sample the average. In addition, the effects of exposure to UCKG temples shows that they have positive effects that grow over time. One interesting result is that it takes few years for UCKG temples to start having a positive impact, which can be related to a reaction of the entry of a new competitor in the market.

Our main problem of identification is the potential presence of omitted variables, which are correlated to the decision of entry of UCKG in municipalities and, at the same time, with the probability that an individual converts to UCKG. We deal with this possible source of endogeneity by controlling for fixed municipal effects. There might be still specific trends that can explain both UCKG entry decisions and the conversions. For this reason, we further control flexibly for microregions and time specific effects. We additionally test the robustness of our results using data from another source, the Annual Relation of Social Information (*Relação Anual de Informações Sociais* - RAIS). Our results are further confirmed by a falsification test on the timing of entry of UCKG in the municipality.

The effect of UCKG temples is stronger for the same groups in which we obtained the bigger impacts for religious media in chapter 2: females, black and native, the less schooled and with lower income. Although the expansion path has been concentrated in large cities, the effect is stronger in cities that are not capitals and do not belong to any Metropolitan Region, or when we removed the municipalities where there was a UCKG temple before 1991 from our estimations. UCKG started its expansion entering the bigger cities firstly and entered most of the Metropolitan regions in the period before our analysis. In those areas, residents of one city commute to the other city, so that a new temple closer to home might not make a relevant difference for potential new followers.

Interestingly, temples have stronger impact on urban areas, in contrast with Aleluia radio, as seen in chapter 2. This result may suggest some division of functions between those two forms of expansion.

We also investigate if the impact of UCKG temples are heterogeneous depending on competition of local religious markets. Our results show that the number of temples of other religions lowers the effect of UCKG temples, however this difference is not statistically significant.

This article relates to one main strand of the growing literature on the economics of religion. It investigates determinants of religious behavior, especially through the still scarce topic of the role of temples. There are few studies which suppose an objective function for a denomination, to investigate how the decision of decentralized Protestant churches in a religious market (WALRATH, 2016), or to study how the entry in nonprofit markets are impacted by its rivals' decision in a strategic interaction problem (RENNHOFF; OWENS, 2012). To our knowledge, however, there are no study which investigates the impact of the presence of a temple on conversion. This study is also the first to use administrative records to analyze UCKG expansion.

In addition to this introduction, this chapter will be organized as follows. In section 3.2, we will describe the history of the UCKG. Section 3.3 details the empirical strategy and data. In section 3.4, we will present the econometric results, and conclude in section 3.5.

### 3.2 UCKG Background and Expansion

UCKG is classified as belonging to the neo-Pentecostal denominations, created in Brazil from the late 1970s (e.g. Freston et al. (1993) and Freston (1995)). Pentecostalism is a form of Christianity that emerged between the late nineteenth and early twentieth centuries in the United States and is one of the religious phenomena most important of the last century. In general terms, followers of these denominations believe they receive gifts of the Holy Spirit and experience ecstasy, such as the gift of speaking unknown tongues and the gift of divine healing. Its proponents introduced changes in the Christian doctrine, spurring the diffusion between people with lower levels of education and income, spiritual and material assistance to the poor. Moreover, in contrast to the Catholic tradition, in the Pentecostal denominations, anyone could become religious leaders, which opened space for entrepreneurs and new religious producers. In about a hundred years of existence, the number of followers in the world has reached between 250 and 500 million, spreading in countries of all continents, in rural and urban contexts, between rich and poor (ROBBINS, 2004).

In Latin America and Brazil, Pentecostal denominations began to appear from the beginning of the 20th Century, coming from the United States, but they did not earn much of the public attention until the 1970s (ALVES; BARROS; CAVENAGHI, 2012). This coincide with the emergence of the so-called third generation of Pentecostals in Brazil. UCKG is part of the generation of Pentecostals, sometimes called neo-Pentecostals, whose distinctive characteristics are the intense use of the media, low level of sectarianism, diffusion of a doctrine known as Prosperity Theology and an emphasis on spiritual warfare against the devil. The Theology of Prosperity represents an important point of differentiation the Pentecostals of this generation from older Pentecostal churches and from historical Protestants. It is related to the ideal of living life with abundance, in contrast to the frugality of the reformist churches. In this sense, the believer understands that the world, created by God, would be an inheritance to His children, who must claim it. The attitude towards the world and the work is therefore active and drives them to invest in their own businesses, in the pursuit of prosperity. Tithing enters this equation as a measure of faith and proof that the believer is worthy of the divine blessings.

UCKG was founded in 1977 by a group of religious people which included Edir Macedo in Rio de Janeiro, but the temple that would become the formal headquarters of the church was founded in São Paulo in 1978. Macedo became a religious leader at the age of 18 at the New Life Church in 1963, having previously been a Catholic and an Umbanda follower. After twelve years, he left the New Life Church to found the Crusade of the Eternal Way, from which he left two years later to found the UCKG (MARIANO, 2004).

UCKG is characterized by a centralized management and decision-making structure that has been in place since its foundation. In addition, from the outset, Macedo used mass media as a major strategy for the expansion of the UCKG, when the church still did not have its own

communications vehicles and rented broadcast time on radios. The use of radio and television as a means of spreading religious ideas and attracting potential believers is not an innovation of the UCKG, and has been used by churches of the second generation of Pentecostals since the 1950s (LIMA, 2007). However, Macedo was able to purchase one of the largest channels of the Brazilian television, Record TV, in 1990, as a result of heterodox forms of tithing and corporate investment. Since then, UCKG has been increasing investments in media and communication through the purchase of TV and radio stations, magazine and newspaper publishers and record companies.

The opening of new congregations is fundamental to the expansion strategy with the use of mass media. UCKG invests in new places of worship, in the maintenance of pastors and volunteers who work full time. The broadcasting of religious messages by radio and TV enters households of individuals who do not have anyone with a relationship of trust, friendship or kinship who is already a member of the UCKG, calling them to attend meetings in the temples. Temples function as conversion sites, where potential members are persuaded to break down barriers that prevent them from adopting the new religion. Interpersonal contact is important in this process, and it is for this reason that UCKG strives to welcome the entrants well, placing them in smaller, more intimate groups, such as youth groups (MARIANO, 2004).

A common narrative of conversion is of people in need or despair regarding unemployment or financial distress, addiction to drugs, disease or family conflicts go to UCKG temples and find there the solution to their problems (BENETTI, 2000). Although they do not offer money to the believer who needs it, UCKG offers religious healings, motivation and contacts for the creation of new businesses of their own. There are reports of pastors' preference for potential believers under these conditions, because in that way they could see more clearly the potential of divine healing (FIGUEIREDO et al., 2007).

### 3.3 Data and Methodology

Our objective is to estimate the effect of the presence of UCKG temples and their period of permanence on the probability of an individual to convert to it. For this, we combine information about the religion of individuals with data of the entrance and permanence in activity of temples.

We estimate the following linear probability model for all people aged 16 years or over:

$$UCKG_{imt} = X_{imt}\beta + X_{mt}\gamma + \delta Temple_{mt} + d_m + d_t + \varepsilon_{imt} \quad (3.1)$$

where  $UCKG_{ijt}$  is the dummy variable that is equal to 1 for individual  $i$ , of county  $j$ , at time  $t$  and that is of the UCKG, and zero otherwise;  $X_{ijt}$  is a vector of individual socioeconomic characteristics that determine individual choice and that vary in time;  $X_{mt}$  is the vector of

characteristics of municipality  $m$  that orient the decision of entry of the UCKG and that they vary in the time;  $d_m$  is the fixed effect of the municipality and  $d_t$  is the fixed effect of the years. The fixed effects of time capture the secular trend of reduction of Catholicism, in favor of Protestant and not religious people. When we control for municipality level fixed effect, we control for time-invariant characteristics that can be simultaneously correlated to the decision of entry of UCKG and to the individual religious choice.

We also estimate the effects of years of temples' presence on the individual choice of becoming a believer of UCKG, with the following equation:

$$\begin{aligned}
 UCKG_{imt} = & \alpha_{-4/-3}D_{-4/-3} + \alpha_{-2/-1}D_{-2/-1} \\
 & + \alpha_{0/1}D_{0/1} + \alpha_{2/3}D_{2/3} + \dots + \alpha_{8+}D_{8+} + X_{imt}\beta + X_{mt}\gamma + d_m + d_t + \varepsilon_{imt}
 \end{aligned} \tag{3.2}$$

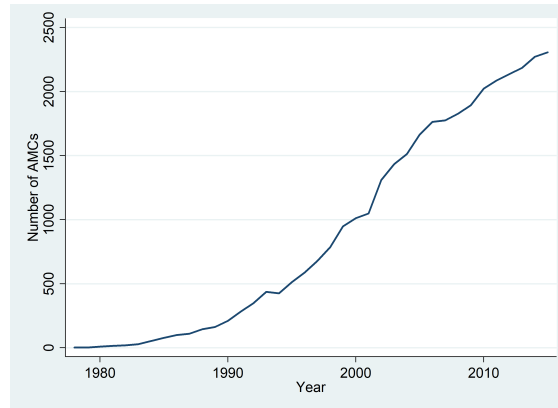
where  $D_{0/1}$  is the dummy for year of entry of UCKG or the following year;  $D_{-s}$  is the dummy for  $s$  years before the entry of UCKG;  $D_{+s}$  is the dummy for  $s$  years after UCKG entry. As we introduce dummy variables for periods pre-treatment, we conduct a robustness test to check whether the effects of UCKG temple occurs after it enters the municipality.

A potential source of endogeneity in the two specifications is the fact that the UCKG could strategically decide to open temples in places with more vulnerable populations and that could be more easily convinced to seek a religious solution to their practical problems, a problem of time-varying omitted variable. On the other hand, UCKG may decide to open temples in richer areas in an attempt to obtain a greater return on tithes and contributions. For these reasons, we control the proportions of the groups of municipalities defined by education, age, sex and race, and for the total municipality population. We additionally control for aggregate municipality wealth index, created in the same way as Ferrara, Chong e Duryea (2012), using information about the first principal component extracted from a set of dummies for each household, including access to piped water from the public system, sanitation, electricity, ownership of radio, ownership of refrigerator, ownership of car and ownership of TV.

The data of religion and the socioeconomic controls of individuals and municipalities come from the Demographic Census of the Brazilian Bureaus of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE). We make municipalities compatible over time throughout the analyzed period using the concept of minimum comparable areas (MCA) between 1991 and 2010, and the definition of Ipea and PUC-RJ.

Information on the foundation and activity status of temples was obtained from the National Registry of Legal Entities (*Registro Nacional de Pessoas Jurídicas* - CNPJ), held by the Federal Revenues Office, of the Ministry of Finance. We obtained the data of all the establishments of that registry whose main activity was a philosophical or religious organization, and whose legal nature was to be a religious organization. The data include the CNPJ registry number, official name, opening date, status, and date of status. It extends from 1978 through 2015, and include temples that are no longer active. With this information, it was possible to identify which are

Figure 7 – Number of MCAs with UCKG Presence



Source: National Registry of Legal Entities.

the UCKG's temples, at which time they were opened and whether they are active or inactive in each year.<sup>1</sup>

Figure 7 shows the evolution of municipalities that had at least 1 active UCKG temple. We can see that proportional growth is very accelerated, especially in the early years. Two years after the opening of the first temple in São Paulo, in 1980 the UCKG already had temples in 9 municipalities. In 1990, this number had already been multiplied by 20, reaching 210 municipalities. In 2000, there were 1,012 municipalities with the presence of the UCKG, and in 2010, 2,023 arriving in 2015 with 2,306, out of a total of 4,267 MCAs (54%).

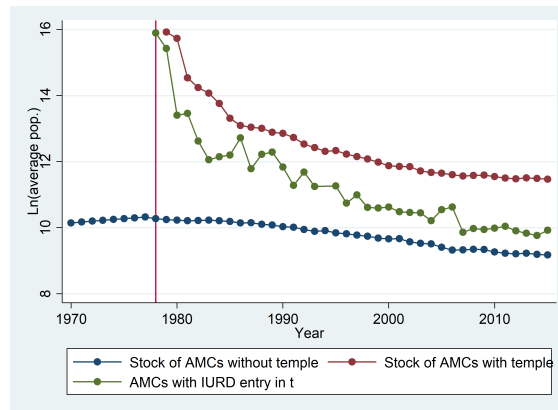
The UCKG's strategy was to expand first into large cities and capitals. Figure 8 shows the average population of municipalities without the presence of UCKG, the municipalities that already had a UCKG temple, and the municipalities where the UCKG was entering each year between 1978 and 2015. We can note that the average population of municipalities where UCKG enters is high at the beginning (it starts with the most populous municipality, São Paulo) and then decreases until it becomes very close to the group without UCKG temples. However, that average is always higher than the average population of municipalities without UCKG temples, which means that UCKG still chooses relatively bigger cities to enter.

Table 24 shows the descriptive statistics of the sample of individuals, and some characteristics by municipality. The religion variables are multiplied by 100. Table 25 shows summary statistics at the level of MCAs. From a share of almost zero in 1980 (only 6 MCAs with UCKG temples), we can note that the share of MCAs with UCKG temples multiply four times between 1991 and 2000, and from then to 2010 it doubles. These numbers represent a fast spread of UCKG over the territory.

The same movement can be seen in figure 9. UCKG started in the municipality of Rio de Janeiro in 1977 and opened a second temple in the municipality of São Paulo a year later. In 1980, besides these two cities, UCKG had temples in Salvador (Bahia State capital), Barra

<sup>1</sup> In contrast with other denominations, UCKG's centralized structure makes it easier to identify its temples in data, as they all hold the same official name and registry number prefix.

Figure 8 – Average Population of Municipalities by UCKG Presence



Source: National Registry of Legal Entities.

Mansa, Nova Iguaçu and São Gonçalo (in the state of Rio de Janeiro, the latter two in the Metropolitan Region). In 1991, UCKG had opened temples in 23 states, excluding four in the Northern region (the states of Acre, Roraima, Amapá and Tocantins), although it was present in only 22% of the MCAs. The northern and northeastern parts of Brazil was still with low presence of UCKG in 2000 (respectively 16% and 30% of their MCAs, while Brazil had 44% of its MCAs with UCKG temples).

The National Registry of Legal Entities is a good source of data for religious institutions, especially for the major ones as UCKG, as they need to have this registry in order to apply for the tax immunity offered by the Brazilian Federal Constitution.<sup>2</sup> For robustness, we also use data of the Annual Relation of Social Information (*Relação Anual de Informações Sociais - RAIS*), which is an administrative record which formally registered firms has to declare every year to the Brazilian Ministry of Labour and Employment. As it is declared every year, the information of whether firms are active can be more accurate. We compare both sources in figure 10. In panel 10a, we plot the number of UCKG temples by MCA from both sources for 1991, 2000 and 2010. As we can see, they show a positive correlation and few discrepancies. In panel 7, we can see that the total number of MCAs with UCKG temples follow the same trend, starting from the middle of the 1990s. Up to this period, RAIS data shows systematically a smaller number of MCAs with temples. The same pattern can be seen for the total number of UCKG temples in panel 10c. CNPJ's number of UCKG temples seems to be more accurate and is closer to that reported by media vehicles during the 1990s: 1.435 in 1993, 1.876 in 1994 and 2.014 in 1995 (CAMPOS, 2006).

<sup>2</sup> Bill n. 4.503/1964.

Table 24 – Descriptive Statistics

	1991		2000		2010		Total	
	N	Mean	N	Mean	N	Mean	N	Mean
<b>Religion</b>								
Catholics	10,207,017	0.834	13,360,320	0.745	14,931,916	0.659	38,499,253	0.733
Evangelical	10,207,017	0.095	13,360,320	0.158	14,931,916	0.220	38,499,253	0.167
Other Religion	10,207,017	0.025	13,360,320	0.027	14,931,916	0.042	38,499,253	0.032
Not Religious	10,207,017	0.046	13,360,320	0.070	14,931,916	0.079	38,499,253	0.068
Evangelical - UCKG	10,207,017	0.002	13,360,320	0.012	14,931,916	0.010	38,499,253	0.008
Evangelical - Other Pentecostal	10,207,017	0.052	13,360,320	0.089	14,931,916	0.115	38,499,253	0.090
Evangelical - Historical	10,207,017	0.032	13,360,320	0.042	14,931,916	0.040	38,499,253	0.038
Evangelical - Other Evangelical	10,207,017	0.005	13,360,320	0.008	14,931,916	0.048	38,499,253	0.024
<b>Socioeconomic</b>								
Young People (16 to 24 y.o.)	10,207,017	0.273	13,360,320	0.263	14,931,916	0.215	38,499,253	0.246
Young Adults (25 to 40 y.o.)	10,207,017	0.379	13,360,320	0.358	14,931,916	0.351	38,499,253	0.361
Adults (41 to 60 y.o.)	10,207,017	0.242	13,360,320	0.264	14,931,916	0.299	38,499,253	0.272
Elder (61 y.o. or more)	10,207,017	0.106	13,360,320	0.115	14,931,916	0.135	38,499,253	0.121
Female	10,207,017	0.514	13,360,320	0.516	14,931,916	0.518	38,499,253	0.516
Black and Native	10,207,017	0.455	13,360,320	0.439	14,931,916	0.501	38,499,253	0.469
No Ed./ Primary Ed.	10,207,017	0.573	13,360,320	0.440	14,931,916	0.448	38,499,253	0.478
Lower Secondary Ed.	10,207,017	0.214	13,360,320	0.251	14,931,916	0.185	38,499,253	0.214
Upper Secondary Ed.	10,207,017	0.213	13,360,320	0.309	14,931,916	0.367	38,499,253	0.308
HH Income per Capita - Lower	10,207,017	0.271	13,360,320	0.209	14,931,916	0.119	38,499,253	0.189
HH Income per Capita - Medium	10,207,017	0.335	13,360,320	0.351	14,931,916	0.283	38,499,253	0.319
HH Income per Capita - Higher	10,207,017	0.388	13,360,320	0.440	14,931,916	0.598	38,499,253	0.491
Urban Area	10,207,017	0.783	13,360,320	0.830	14,931,916	0.854	38,499,253	0.827
Wealth index	10,113,403	-0.373	13,281,959	0.080	14,898,472	0.237	38,293,834	0.026
<b>Temple Variables</b>								
Dummy UCKG Temple in MCA	10,207,017	0.469	13,360,320	0.728	14,931,916	0.880	38,499,253	0.722
Dummy UCKG Temple in MCA (RAIS)	10,207,017	0.262	13,360,320	0.594	14,931,916	0.876	38,499,253	0.622
Years of Existence of the Oldest UCKG Temple in MCA	10,207,017	3.496	13,360,320	8.938	14,931,916	17.061	38,499,253	10.825

Religious variables and socioeconomic variables. Variables for UCKG temples are measured at the MCA level. Religious variables are multiplied by 100. Sample of 16-year-old or older individuals of Demographic Censuses of 1991, 2000 and 2010.

Table 25 – Descriptive Statistics at MCA Level

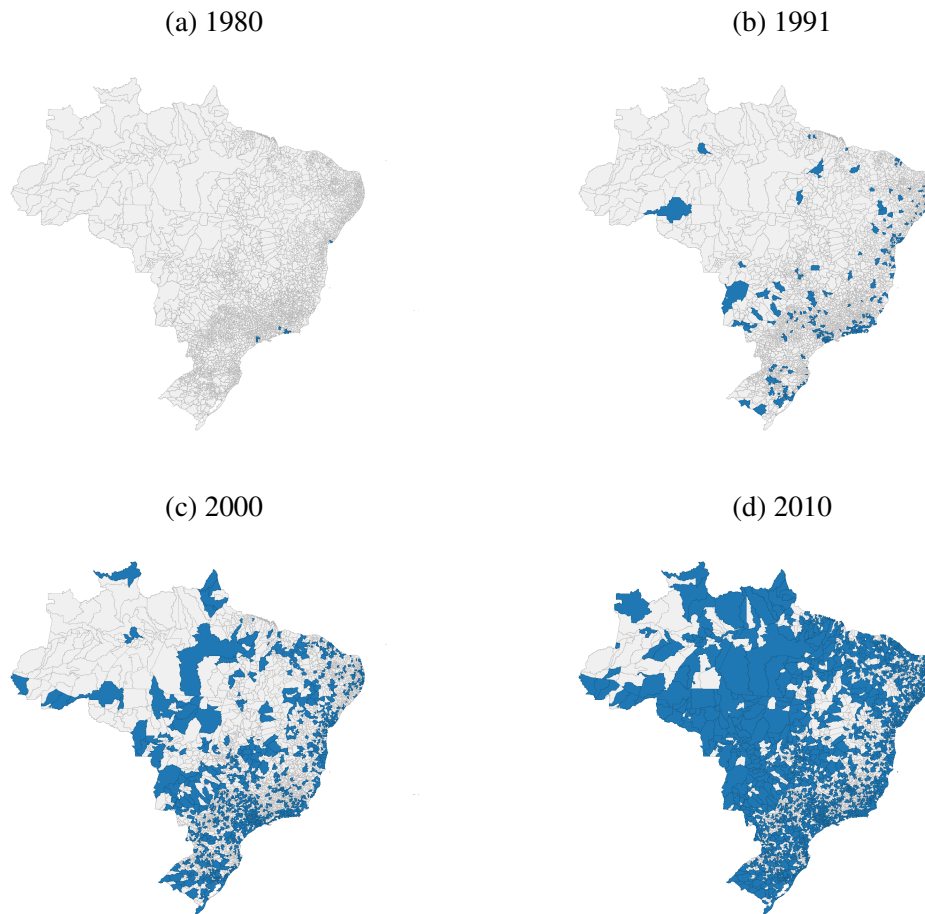
	1991		2000		2010		Total	
	N	Mean	N	Mean	N	Mean	N	Mean
Dummy UCKG Temple in MCA	4267	0.05	4267	0.22	4267	0.44	12801	0.24
Years of Existence of the Oldest UCKG Temple in MCA	4267	0.21	4267	1.36	4267	4.73	12801	2.10

### 3.4 Econometric Results

In this section we explore the difference in time of entry of the UCKG temples in the municipalities to estimate the effect of the temples and the years of existence on the probability of conversion.

Table 26 shows our main results. Column 1 shows that the correlation between the presence of at least one active temple in the municipality and the probability of being a UCKG adherent is positive when we control for year dummies and MCA fixed effects. In columns 2 and 3, we added individual socioeconomic controls, which may affect the decision to join the UCKG, and socioeconomic controls of municipalities, which may affect the decision of the UCKG to enter

Figure 9 – Evolution of UCKG Temples Coverage



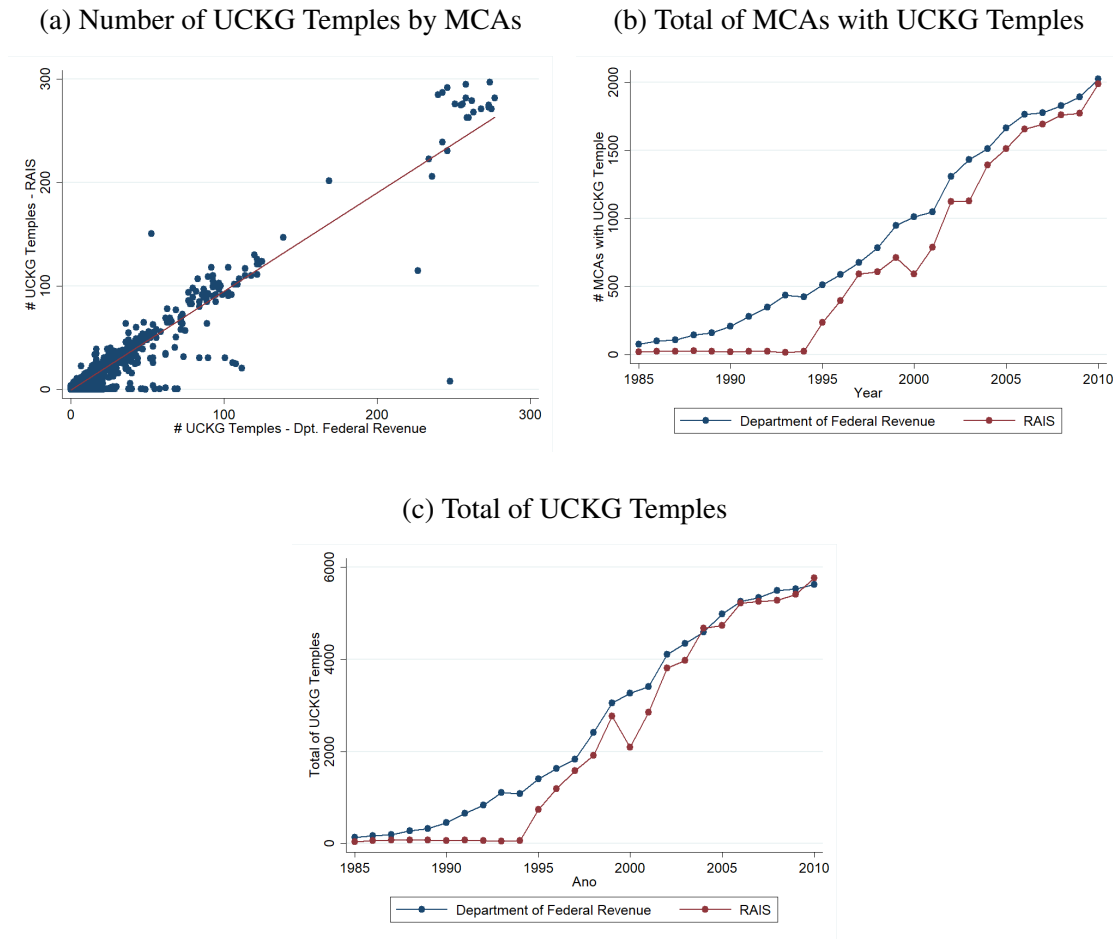
Source: National Registry of Legal Entities.

the municipality. Point estimates are slightly reduced when we add municipality socioeconomic controls. The inclusion of specific time and microregion effects in column 4 does not change the results. In column 5, we test whether excluding MCAs that had UCKG temples previously from the first year of our sample would change the results. Estimation in column 5 shows that the strongest effects are in MCAs which receive a new temple in the period of analysis. UCKG entered most of the state capitals and big cities in the years before our period of analysis, and the effect of UCKG entry in those areas are smaller (see table 29).

The estimate in column 3 is our benchmark and indicates that the effect of at least one UCKG temple in the municipality is 10.9 percentage points (p.p.), which represents 15% of the average number of believers in the period. Although relatively small, this effect has a magnitude double the difference between having completed the lower secondary school when compared to those who have not. In column 3, we can also see the estimates for individual socioeconomic controls. For age, the omitted category is for the elder (61 years old or more). We can see that the younger generations have a higher probability of becoming UCKG followers. The probability is also higher for females, black or native people, for the less schooled, for those



Figure 10 – Comparison of Data Sources



who live in urban areas and have lower income.

In figure 11, we plot estimations for dummies of time of exposition, for every two year, including a set of dummies for the 4 years before UCKG entry. As we can see, the impact of UCKG entry is positive, but small in  $t/t + 1$ , and it suffers a downward turn in the following two years. Only few years will it become positive again. This fact can be related to the reaction of incumbents as a new competitor enters the markets, increasing its efforts not to lose followers (MONTGOMERY, 2003b). Moreover, the result for the dummies before the entry are not statistically significant and reinforces the plausibility of our identification. The positive conversion effect does not occur before the entry, which would be the case if UCKG entered the municipality oriented by an unobservable time varying factor that also impacts in conversions.

Table 27 shows a robustness test with the RAIS data. In columns 1 and 4, we repeated the specification of tables 25. The results are positive and slightly higher than those of our benchmark and reinforces our confidence in them.

In tables 28 a 29, we explore some heterogeneity of effects, along the number of other religions and temples in the municipality.

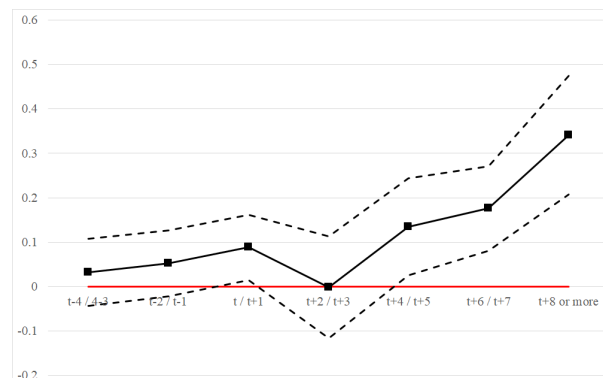
In table 28, we repeat our benchmark specification to the sample of countryside municipalities in column 1 and for state capitals and Metropolitan Regions in column 2. All the effect

Table 26 – UCKG Presence and Conversions

Independent Variables	Dependent Variable UCKG Dummy (multiplied by 100)				
	Total Sample				Excluding previously treated (5)
	(1)	(2)	(3)	(4)	
UCKG Temple Dummy	0.093*** (0.031)	0.096*** (0.030)	0.109*** (0.026)	0.129*** (0.013)	0.235*** (0.018)
Young People (16 to 24 y.o.)	-	0.077*** (0.022)	0.077*** (0.022)	0.078*** (0.021)	0.033*** (0.007)
Young Adults (25 to 40 y.o.)	-	0.149*** (0.022)	0.150*** (0.022)	0.152*** (0.022)	0.089*** (0.006)
Adults (41 to 60 y.o.)	-	0.211*** (0.017)	0.210*** (0.017)	0.210*** (0.017)	0.143*** (0.006)
Female	-	0.417*** (0.027)	0.417*** (0.027)	0.417*** (0.027)	0.264*** (0.007)
Black or Native	-	0.273*** (0.037)	0.271*** (0.036)	0.270*** (0.036)	0.138*** (0.007)
Lower Sec. Ed.	-	-0.044*** (0.011)	-0.039*** (0.010)	-0.039*** (0.010)	-0.009* (0.005)
Upper Sec. Ed.	-	-0.443*** (0.047)	-0.454*** (0.047)	-0.455*** (0.046)	-0.242*** (0.009)
Urban Areas	-	0.274*** (0.017)	0.288*** (0.015)	0.286*** (0.015)	0.241*** (0.008)
Lower HH Income per Capita	-	0.149*** (0.020)	0.128*** (0.019)	0.134*** (0.021)	0.043*** (0.007)
Medium HH Income per Capita	-	0.210*** (0.024)	0.206*** (0.024)	0.210*** (0.025)	0.096*** (0.007)
MCA Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes	Yes
MCA Time-Varying Controls	No	No	Yes	No	Yes
Microregion × Year Dummies	No	No	No	Yes	No
Observations	38,499,253	38,499,253	38,499,253	38,499,253	25,498,276
UCKG dummy sample av.	0.731	0.731	0.731	0.731	0.731

Regression of UCKG dummy on UCK temple dummy. Sample: 16-year-old or older individuals. Standard errors in parenthesis, clustered at MCA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Figure 11 – Time of Exposition



Note - Estimated coefficients and 95% confidence interval from a regression of the probability of being a UCKG follower on a set of dummies from  $t - 4$  to  $t + 8$  or more, where  $t = 0$  is the time of UCKG entry in the municipality.

Table 27 – Regressions with RAIS Data

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)			
	(1)	(2)	(3)	(4)
UCKG Temple Dummy	0.167*** (0.040)	0.173*** (0.039)	0.140*** (0.034)	0.158*** (0.015)
MCA Fixed Effects	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
MCA Time-Varying Controls	No	No	Yes	No
Microregion × Year Dummies	No	No	No	Yes
Observations	38499253	38499253	38499253	38499253
UCKG dummy sample av.	0.731	0.731	0.731	0.731

Regression of UCKG dummy on UCK temple dummy. Sample: 16-year-old or older individuals. Standard errors in parenthesis, clustered at MCA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 28 – Heterogeneity of UCKG Presence - Heterogeneity Between Countryside and Capital and MRs

Independent Variables	Dependent Variable: UCKG Dummy (multiplied by 100)	
	Countryside (1)	State Capitals and MR (2)
UCKG Temple Dummy	0.156*** (0.017)	-0.023 (0.070)
MCA Fixed Effects	Yes	Yes
Year Dummies	Yes	Yes
Individual Controls	Yes	Yes
MCA Time-Varying Controls	Yes	Yes
Observations	23482335	15016918
R Squared	0.006	0.008

Regression of UCKG dummy on UCK temple dummy. Sample: 16-year-old or older individuals. Standard errors in parenthesis, clustered at MCA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

is explained by the countryside, an unexpected result, given the strategy of entering big cities. As UCKG entered most of the state capitals and Metropolitan Regions before 1991, it is possible that the impact of new entries in those areas are not relevant. This is essentially the same explanation as that for cl Besides that, these areas are more populous and an important part of the population commutes within them, so that a new temple in a municipality whose population might attend ceremonies in another municipality may not have significant impact. In contrast, the effect from the countryside represents more recent entries in smaller cities. Even though UCKG does not have a share of population as their followers as high as Assembly of God in state capitals and Metropolitan Regions, it seems that at some point it does not worth it open a new temple in those areas.

In table 29, we examine heterogeneity effects along socioeconomic variables. UCKG temples are stronger among the same groups the literature indicates that would be more prove to frequent churches: females, black and native people, the less schooled group and the lowest income group. It is interesting that people in the intermediary age groups have effects relatively stronger than that for young people or elders. Moreover, the positive result for urban areas contrasts with that found to Aleluia Network. As Aleluia effects are stronger in more sparse rural areas, it is possible that temples need to be place in more dense urban areas to have effects. If we think of temples as firms selling services, it makes sense that they are more successful in areas where more people circulate and they can show their products.

In table 30, we check whether competition with other temples affect the effects of UCKG temples. In column 1 of table 30, we add a variable for the number of other temples and verify that it has a negative correlation with UCKS affiliation. In column 2, its interaction with UCKG temples dummy is negative, but not statistically significant.

Table 29 – Heterogeneity of UCKG Presence - Individual Socioeconomic Characteristics

Independent Variables	Dependent Variable					
	UCKG Dummy (multiplied by 100)					
	(1)	(2)	(3)	(4)	(5)	(6)
UCKG Temple Dummy	0.043 (0.037)	-0.114*** (0.031)	-0.062 (0.041)	0.218*** (0.025)	-0.098*** (0.031)	0.193*** (0.028)
UCKG Temple Dummy × Young People (16 to 24 y.o.)	-0.008 (0.024)	-	-	-	-	-
UCKG Temple Dummy × Young Adults (25 to 40 y.o.)	0.061*** (0.022)	-	-	-	-	-
UCKG Temple Dummy × Adults (41 to 60 y.o.)	0.174*** (0.019)	-	-	-	-	-
UCKG Temple Dummy × Female	-	0.441*** (0.028)	-	-	-	-
UCKG Temple Dummy × Black or Native	-	-	0.358*** (0.052)	-	-	-
UCKG Temple Dummy × Lower Sec. Ed.	-	-	-	-0.036** (0.015)	-	-
UCKG Temple Dummy × Upper Sec. Ed.	-	-	-	-0.474*** (0.059)	-	-
UCKG Temple Dummy × Urban Areas	-	-	-	-	0.280*** (0.040)	-
UCKG Temple Dummy × Lower HH Income per Capita	-	-	-	-	-	0.076*** (0.014)
UCKG Temple Dummy × Medium HH Income per Capita	-	-	-	-	-	-0.295*** (0.049)
MCA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
MCA Time-Varying Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,499,253	38,499,253	38,499,253	38,499,253	38,499,253	38,499,253
UCKG dummy sample av.	0.731	0.731	0.731	0.731	0.731	0.731

Regression of UCKG dummy on UCK temple dummy. Sample: 16-year-old or older individuals. Standard errors in parenthesis, clustered at MCA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### 3.5 Conclusion

In this paper, we aimed to measure how effective is the expansion strategy of a new church by opening temples in municipalities. We do this by examining the expansion history of Universal Church of the Kingdom of God (UCKG) over Brazilian municipalities in the 1990s and 2000s. We explore the difference in timing of entry of new temples in Brazilian municipalities and years of existence to identify the effect of presence and permanence of temples on the probability of conversions to UCKG.

After controlling for characteristics at individual level, time-variant and time-invariant characteristics at municipal level and time dummies, we find that the presence of UCKG temples has an impact of increasing conversions with a magnitude of 15% of the average share of UCKG

Table 30 – Heterogeneity of Years of Existence, Other Temples and Radio Coverage

Independent Variables	Dependent Variable	
	UCKG Dummy (multiplied by 100)	
	(1)	(2)
UCKG Temple Dummy	0.148*** (0.019)	0.173*** (0.017)
Number of Other temples	-0.008*** (0.002)	-0.004 (0.004)
UCKG Temple Dummy × Number of Other temples	-	-0.004 (0.002)
MCA Fixed Effects	Yes	Yes
Year Dummies	Yes	Yes
Individual Controls	Yes	Yes
MCA Time-Varying Controls	0.Yes	0.Yes
Observations	32263701	32263701
UCKG dummy sample av.	0.731	0.731

Regression of UCKG dummy on UCK temple dummy. Sample: 16-year-old or older individuals. Standard errors in parenthesis, clustered at MCA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

believers. Permanence in the municipality also has a cumulative positive impact over time after few years of activity. It is interesting that effects take a downturn after UCKG entry and take few years to become positive again. This result can be related to religious competition, as incumbent churches react to the entry of a new competitor in the market. The effect of UCKG temples is stronger for the groups for which the literature of economic of religion predicts more frequency of attendance to the church: females, black and native, the less schooled and with lower income.

Effects are not significant in state capitals and Metropolitan Regions, which can be explained as UCKG entered most of them in the years before the period we analyze. UCKG started its expansion entering the bigger cities firstly and entered most of the Metropolitan regions in the period before our analysis. In those areas, residents of one city commute to the other city, so that a new temple closer to home might not make a relevant difference for potential new followers.

UCKG temples also have effects only in urban areas, which contrast with the result for Aleluia Network in chapter 2. If we think of temples as firms selling services, it makes sense that they are more successful in areas where more people circulate and they can show their products.



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## APPENDIX A – APPENDIX TO CHAPTER 2 - EFFECTS ON OTHER RELIGIONS

Once we established the results for effects of exposure to Aleluia signal on UCKG conversions, we examine its effects on conversions to other religions also suffer its effects. Table 31 repeat our benchmark estimation for Catholics, UCKG, other Protestants, not religious and other religions.<sup>1</sup> As we can see, effects are strong and negative for Catholics and positive for the rest of the religions. This result can not be interpreted as the direct causal effect of Aleluia Network, as other churches might react to the entrance of UCKG media in their market and increase efforts or mobilize their own media resources.

Table 31 – Aleluia Network Coverage and Religious Denominations

Independent Variables	Dependent Variable (multiplied by 100)				
	Catholics (1)	UCKG (2)	Other Protestants (3)	Not Religious (4)	Other Religions (5)
Aleluia ITM Coverage	-7.245*** (0.758)	0.119** (0.054)	3.063*** (0.633)	0.983*** (0.270)	3.081*** (0.243)
Aleluia FREE Coverage	-0.558 (0.516)	0.072** (0.028)	0.265 (0.382)	0.220 (0.192)	0.001 (0.109)
Observations	7,783,516	7,783,516	7,783,516	7,783,516	7,783,516
R-Squared	0.070	0.004	0.042	0.041	0.027
Dep. Var. Average	73.651	0.606	17.741	5.704	2.297
Propagation Controls	Yes	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes	Yes	Yes

Regression of UCKG dummy on Aleluia Network coverage. Aleluia ITM coverage is the share of WA area that has Aleluia Network reception using ITM model. Aleluia FREE coverage is the share of WA area that has Aleluia TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Other religions include Legion of Good Will, Spiritists, Afro-Brazilian religions, Jews, Hindus, Budists, other Asian religions, Islamists, Native and Esoteric religions, non determined Christian religiosity, other non determined religions and multiple affiliations. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Aleluia Network antenna and located in the countryside. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The same is valid for the results for Record TV, on table 23. In this case, estimation for the Catholics and for not religious are not significant. Estimation for other Protestants is negative, while for UCKG and other religions, it is positive.

<sup>1</sup> This five categories are mutually exclusive and sum to one.



Table 32 – Aleluia Network Coverage and Religious Denominations

Independent Variables	Dependent Variable (multiplied by 100)				
	Catholics (1)	UCKG (2)	Other Protestants (3)	Not Religious (4)	Other Religions (5)
Record ITM Coverage	-0.505 (0.749)	0.258*** (0.059)	-1.608*** (0.592)	0.353 (0.350)	1.502*** (0.192)
Record FREE Coverage	0.252 (1.444)	0.087 (0.076)	-0.162 (1.000)	0.409 (0.505)	-0.587 (0.481)
Observations	11,521,351	11,521,351	11,521,351	11,521,351	11,521,351
R-Squared	0.078	0.005	0.039	0.045	0.034
Dep. Var. Average	64.129	0.998	21.832	8.392	4.650
Propagation Controls	Yes	Yes	Yes	Yes	Yes
Socioeconomic Controls	Yes	Yes	Yes	Yes	Yes
Microregion FE	Yes	Yes	Yes	Yes	Yes

Regression of UCKG dummy on Record TV coverage. Record ITM coverage is the share of WA area that has Record TV reception using ITM model. Record FREE coverage is the share of WA area that has Record TV reception using free-space path loss model. Propagation controls are: latitude, longitude, second-order polynomial of WA mean altitude and WA altitude variance. Other religions include Legion of Good Will, Spiritists, Afro-Brazilian religions, Jews, Hindus, Budists, other Asian religions, Islamists, Native and Esoteric religions, non determined Christian religiosity, other non determined religions and multiple affiliations. Sample: 16-year-old or older individuals in WAs at less than 300km from closest Record TV antenna. Standard errors in parenthesis, clustered at WA level. Significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$