Religious Media, Conversion, and Its Socio-Economic Consequences: The Rise of Pentecostals in Brazil

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Abstract

We investigate the role of religious media in promoting new religious movements and shaping socio-economic outcomes. Focusing on the rapid growth of Pentecostalism in Brazil, we use quasi-random variation in exposure to a church-affiliated TV channel to estimate its impact. Exploiting the placement of transmitters prior to the channel's religious affiliation, we find that exposure increased Pentecostal affiliation by 30%. Consistent with the church's conservative gender norms, municipalities exposed to the channel experienced higher fertility rates, lower female labor force participation, reduced schooling for young women, and increased support for Pentecostal candidates, with no effects on male employment or education. Event-study analysis reveals that the number of Pentecostal churches expanded following the channel's introduction, underscoring the role of media in driving both religious and social change.

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Acknowledgement: We are indebted to Andrew Foster, Jesse Shapiro, Bryce Steinberg, and Neil Thakral for continued guidance on this project. We thank Dan Bjorkegren Pedro Dal Bó, John Friedman, Brian Knight, Stelios Michalopoulos, Emily Oster, Matthew Pecenco, Vítor Possebom, Flávio Riva, Rodrigo Soares, and especially João Garcia for helpful comments and discussions. We also thank seminar participants at BU Workshop for Women in Economics, Brazilian Econometric Society (SBE), LEAP Virtual Alumni Reunion 2021 (Bocconi University), LACEA 2021, NEUDC 2021, 2022 RIDGE Forum, ASREC 2022 and 2023, and Econometric Society Summer Meeting 2023. We are very grateful to Ruben Durante for kindly sharing the ITM software, and to Jacopo Ballabio and Paolo Pinotti for their assistance with the software. Alexandra Filan provided excellent research assistance. Disclosure: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

1 Introduction

The Pentecostal movement, a part of Protestant Christianity, is one of the world's fastest-growing religious groups. It is especially influential in Latin America and Africa, where it grew by 600% and 200%, respectively, between 1970 and 2005.[1] The rapid growth of the Pentecostal movement is partly due to its extensive use of media for spreading core beliefs (Bastian and Cunneen 1998). Televangelism is a phenomenon with deep roots, stretching back to the United States where it became especially popular among Evangelical audiences.[2] Despite the magnitude of the phenomenon and considerable research on media's influence on human behavior and political outcomes, limited understanding exists regarding media's impact on religion, especially its potential to spread new religious movements in vast audiences globally in a relatively short span of time.

Such rapid shifts in religious beliefs can trigger long-lasting socio-economic consequences. Pentecostals, known for their literal interpretations of sacred texts, staunchly uphold more traditional moral values and doctrines compared to other Christians. Emphasizing traditional gender roles, they advocate for women as homemakers and stress submission to husbands, often discouraging education beyond these roles (Pew Forum on Religion & Public Life 2006). Consequently, adherence to Pentecostal beliefs can profoundly shape female education, fertility rates, and workforce participation, potentially reshaping social and economic structures in the regions where it takes root.

This paper, to the best of our knowledge, is the first to study the effect of religious media on mass conversion and its socio-economic implications. We focus on the stark rise of the Pentecostal movement in Brazil between 1990 and 2000, when membership grew

[1] Today, it is followed by 13% and 12% of the population, respectively. Source: World Christian Database. Website: https://www.worldchristiandatabase.org/.

[2] For instance, between the 1960s and mid-1980s, the number of Americans watching religious TV grew from about 5 million to almost 25 million (Hadden and Shupe 1987).

roughly 200%, while the proportion of the population identifying as Catholic has steadily declined (Pew Research Center 2014). To estimate the effect of religious media, we exploit a shift in 1990, when RecordTV, a popular Brazilian TV channel, started broadcasting religious content. Before this, RecordTV primarily aired music and entertainment shows. After going bankrupt in the late 1980s, it was purchased in 1990 by Bishop Edir Macedo, founder of the Pentecostal Universal Church of the Kingdom of God (UCKG), who transferred RecordTV's broadcasting license to the church (Nascimento 2019).[3]

Following the purchase, RecordTV programming shifted from a secular to a religious platform, framing its content around Pentecostal values. Many of its shows were modeled after the traditional televangelism found in most U.S.– based Christian networks (Reis 2006), along with moralizing soap operas and Biblical documentaries. By 1996, RecordTV aired 60 hours of religious content weekly, compared to less than an hour per week on the two largest Brazilian networks (Campos 1997). Throughout the 1990s, RecordTV programming served as a pulpit to spread Pentecostal values while consolidating a solid audience of viewers-believers, eventually becoming the second-largest TV channel by the early 2000s (Reis 2006).

To estimate the effect of exposure to religious media, we leverage the sudden change in the Brazilian media landscape in 1990, following RecordTV acquisition. We exploit cross-sectional variation in RecordTV coverage based on the transmitters installed before Bishop Macedo purchased the channel in 1990, when RecordTV was entirely devoted to light entertainment and music.[4] Our empirical strategy relies on the assumption that the placement of these inherited transmitters was exogenous to the expansion strategy of the Pentecostal church, as they were mainly installed in the 1960s, over a decade before

[3]RecordTV's bankruptcy was attributed to financial mismanagement as we will detail further in the Context section.

[4]Since the media market in Brazil was dominated by a few large companies in the early 1990s, the bankruptcy of a major TV channel such as RecordTV was a unique isolated event. The TV station was sold with its existing network of transmitters, which were placed prior to its purchase.

Macedo founded the UCKG. Therefore, it is unlikely that their location was directly functional to Macedo's later religious goals.

We compare the evolution of the outcomes of interest in municipalities covered by RecordTV before the change in ownership to those not covered. To measure RecordTV's coverage in a given municipality, we use the Irregular Terrain Model (ITM), which calculates signal strength from the closest transmitter, and validate it against data on actual viewership.[5] To account for potential local characteristics that could correlate with proximity to transmitters (such as local development), in our baseline specification, following the literature, we control for a measure of distance to transmitters, the free-space signal strength, which is the hypothetical signal strength in the absence of geomorphological obstacles, such as mountains or other obstacles to electromagnetic propagation, and a forth degree polynomial of distance. We further control for baseline municipal characteristics, geological characteristics, and state fixed effects. Therefore, we identify the effect from the residual variation in RecordTV coverage due to idiosyncratic geographic factors within areas with similar baseline socio-economics characteristics, which is uncorrelated with past religious and socio-economic trends, as well as a wide array of municipal characteristics.

Our findings reveal a significant impact of religious media exposure on the rise of Pentecostalism. Specifically, exposure to RecordTV in 1990 resulted in a 0.86 percentage point increase in the share of Pentecostals in the population, — representing a 29% surge relative to 1991 - approximately 1.3 million additional followers. This TV-driven increase accounts for 11% of the total growth in Pentecostals between 1991 and 2000. Using data on viewership, our estimates imply that RecordTV convinced between 4% and 20% of its viewers to convert to the Pentecostal church, depending on the audience measure used.

[5]This model has been largely adopted in the literature, including Olken (2009), Enikolopov, Petrova, and Zhuravskaya (2011), Adena et al. (2015), Durante, Pinotti, and Tesei (2019), and Grosfeld, Madinier, Sakalli, and Zhuravskaya (2024).

This substantial shift in religious adherence allows us to examine the behavioral impacts of joining the Pentecostal church. We focus on socio-economic outcomes likely shaped by Pentecostal teachings, particularly on women, as Pentecostals strongly promote traditional gender roles.[6] Exposure to RecordTV is associated with a 0.027 increase in the average number of children per woman, a 1.2 percentage point decline in female labor force participation, and a 1.3 percentage point decrease in the share of girls completing middle school. Overall, municipalities with access to RecordTV experienced a slowdown in positive secular trends for women, such as increasing female participation in education and the workforce. Relevantly, we find no significant effects on male labor force participation or boys' schooling after the change in ownership. We also investigate how RecordTV influences political preferences, including votes for Pentecostal candidates, reflecting their growing involvement in politics. We find no effect for the 1998 election but observe a 1.4 percentage point increase in the share of votes for candidates affiliated with the Pentecostal church in 2010.

Taken together, these findings are particularly significant as they suggest that religious programming, such as that offered by RecordTV, may attenuate positive secular trends promoting female empowerment. By reducing educational attainment among girls and reinforcing traditional gender roles for adult women, RecordTV appears to have widened the gender gap, with men largely unaffected by the influence of the religious channel.

We take several approaches to address the concern that the placement of RecordTV transmitters prior to the ownership change in 1990 might be related to unobserved factors that affect our outcome variables. First, since the model is estimated in first differences, our identification assumption is that municipalities with RecordTV coverage did

[6]Although Catholics have similar guidance, most do not practice strict observance. As discussed in Section 2.1, Catholics attend church less frequently and hold less conservative views on the role of women compared to Pentecostals.

not exhibit diverging trends prior to 1990. We find no evidence that RecordTV coverage in 1990 influenced the evolution of our outcomes of interest during the 1980–1990 pre-period. Notably, municipalities with different RecordTV coverage in 1990 displayed similar pre-trends in Pentecostal growth, ensuring that early religious trends did not drive the placement of transmitters. Second, to show that our results are specific to religious media exposure rather than general television exposure, we compare the effects of RecordTV coverage with those of Globo, Brazil's largest TV channel, and find that only RecordTV displays a measurable impact while Globo does not have effect on any outcome. Thirds, we exclude municipalities located very close to the transmitters, reducing concerns that these areas — potentially targeted for transmitter placement due to specific characteristics— are driving the findings.

In addition to our baseline strategy, which relies solely on the placement of initial transmitters for identification, we take advantage of the expansion of RecordTV transmitters over the 1990s in an event-study framework. While this strategy presents limitations — specifically that it can only be used with high-frequency outcomes - it sheds light on the mechanisms driving Pentecostal conversion following the expansion of RecordTV.[7] We show that the number of Pentecostal churches per capita took several years to increase after RecordTV coverage, while there is no evidence of an effect in the pre-coverage period. These findings mitigate the concern that our primary result on Pentecostal affiliation is driven by complementary expansion strategies of the church other than RecordTV arrival in a given municipality, such as the opening of new Pentecostal churches. If anything, the establishment of Pentecostal churches occurred only several years after the arrival of RecordTV, adding evidence in favor of the role of religious media in driving conversions before physical church expansion. Moreover, it allows us to dig deeper into the dynamics of behavioral change in one key outcome: fertility. Our results indicate that exposure to

[7]The identifying assumption for this strategy is that the timing of the expansion is not correlated with previous trends, which we can test for directly.

RecordTV increased fertility about five years after the first year of coverage, and none of the coefficients for the years preceding the event are significantly different from zero. Although we cannot employ this empirical strategy to the other behavioral outcomes due to a lack of high-frequency data, the results on fertility provide reassuring evidence against reverse causality.

Our paper relates to three main strands of literature. Primarily, this work contributes to the literature on the impacts of media on behaviors. This literature has extensively explored the significant influence of media on a broad range of economic, social, and political outcomes.[8] However, there is still limited evidence on media's role in influencing deeply rooted cultural traits such as religiosity and conformance to religious behaviors. A notable exception is the paper by Grosfeld, Madinier, Sakalli, and Zhuravskaya (2024), which shows that in Poland, after a nationalist populist party gained power, regions exposed to independent TV continued on a long-term secularization trend, while areas exposed solely to state TV saw a reversal of this trend. While their study focuses on the role of secular media in shaping broad secularization trends, we directly examine how religious media can influence religiosity and trigger rapid conversions — a dynamic that has not yet been explored but is crucial to understanding how conversion can happen swiftly. Furthermore, our study documents how specific socio-economic behaviors promoted by the Pentecostal movement are adopted by the audience. This finding uncovers a clear religious channel that is usually difficult to disentangle when the media under study have broader, mixed messages.[9]

[8]Previous research has shown that media can have important and persistent effects on various types of behavior, such as fertility (La Ferrara, Chong, and Duryea 2012), education (Gentzkow and Shapiro 2008; Kearney and Levine 2019), civic engagement (Olken 2009; Putnam et al. 2000), gender attitudes (Kearney and Levine 2015; La Ferrara and Chong 2009; Jensen and Oster 2009), health (Banerjee, La Ferrara, and Orozco-Olvera 2019), conflict and migration (Braga 2007; DellaVigna, Enikolopov, et al. 2011; Yanagizawa-Drott 2014), political orientation (Gentzkow 2006; Gentzkow, Shapiro, and Sinkinson 2011; DellaVigna and Kaplan 2007; Enikolopov, Petrova, and Zhuravskaya 2011; Adena et al. 2015; Strömberg 2004; Chiang and Knight 2011; Durante, Pinotti, and Tesei 2019; Wang 2020), and consumption choices (Bursztyn and Cantoni 2016).

[9]In an unpublished manuscript, Komatsu (2019) studies the impact of media produced by Macedo's

Our paper also relates to studies on the influence of religion on a varied set of behaviors.[10] While many of these studies focus on historical religions[11], we analyze the socio-economic impacts of the expansion of the Pentecostal Church, a relatively new religion that is one of the fastest-growing religious movements worldwide. Bryan, Karlan, and Choi (2021) examine the impact of an Evangelical education program among ultra-poor Filipino households, finding an increase in income but a decrease in perceived relative economic status, while no effects along other socio-economic outcomes. In contrast, in our paper, we find an increase in the adoption of more conservative gender-related behaviors, with crucial economic consequences.

Finally, this paper contributes to the literature that studies the rise of Evangelicals. Related to our context, Costa, Marcantonio, and R. Rocha (2023) study the effect of economic downturns on the share of Pentecostals in Brazil. They find that regions more exposed to economic distress experienced increases in Pentecostals during the 1990s and in the vote share of Pentecostal candidates. Solá (2022) studies the effect of Pentecostal growth on the support of Evangelical and far-right candidates in Brazil, using the timing of Bible translation to indigenous languages. Unlike previous research, our paper focuses on the effect of Pentecostals on behaviors, beyond voting.

The remainder of this paper proceeds as follows. Section 2 provides background

church, the Universal Church of the Kingdom of God (UCKG), on religious affiliation with the church in Brazil, exploiting cross-sectional variation in contemporaneous signal strength for identification. Our paper relies on a weaker identifying assumption and provides several robustness checks to deal with potential endogeneity in the placement of transmitters, including using only variation due to the pre-purchase set of transmitters.

[10]Previous papers have shown that religion influences dimensions such as trust and cooperation (Iannaccone 1998; Iyer 2016), fertility and family (Bassi and Rasul 2017), physical and mental health (Ellison 1991; Campante and Yanagizawa-Drott 2015; Fruehwirth, Iyer, and Zhang 2019), crime rates and corruption (Freeman 1986; Xu, Li, Liu, and Gan 2017), drug and alcohol use (Gruber and Hungerman 2008; Bryan, Karlan, and Choi 2021), income (Gruber 2005; Bryan, Karlan, and Choi 2021), and educational attainment (Gruber 2005; Squicciarini 2020).

[11]See for instance Michalopoulos, Naghavi, and Prarolo (2018), Botticini and Eckstein (2014), Becker and Woessmann (2009), Cantoni (2015), Squicciarini (2020), and Grosfeld, Madinier, Sakalli, and Zhuravskaya (2024).

information on the Brazilian context and the rise of the Pentecostal movement. Section 3 presents our data. In Section 4, we discuss our empirical strategy. Section 5 presents our main results and offers several robustness checks. In Section 6, we shed light on mechanisms, relying on an alternative empirical strategy. Section 7 concludes.

2 Background

In this paper, we study the effect of religious media on the rise of the Pentecostal movement in Brazil and its broader socio-economic impact. Pentecostalism, which has rapidly gained ground across Latin America and Africa, is notable for its innovative use of media to spread its message. We focus on the case of RecordTV, Brazil's second-largest TV channel, which transformed its programming in the 1990s to broadcast Pentecostal content, creating a powerful new platform for religious influence.

2.1 Pentecostalism: a Brief Overview

Pentecostalism is one of the fastest-growing religious movements globally, now representing a quarter of world's Christianity (Pew Forum on Religion & Public Life 2006). Originating in the early 20th century in the United States as a branch of Evangelical Christianity, Pentecostalism has experienced remarkable growth, particularly in Latin America, Africa, and parts of Asia.

Pentecostalism places a unique emphasis on direct personal experiences with God, particularly the work of the Holy Spirit, which often manifests through speaking in tongues, divine healing, and prophecy. This focus on miraculous experiences sets Pentecostalism apart from more traditional Christian denominations, which tend to emphasize structured liturgy and doctrine over charismatic experiences. Additionally, Pentecostals

stand out for their literal interpretation of the Bible and strong religious commitment, often attending church frequently and reading the Bible daily. This devotion is associated with more conservative views on issues like family roles, abortion, LGBT rights, or alcohol consumption (Pew Forum on Religion & Public Life 2006).

Regarding women, Pentecostal doctrine is rooted in the patriarchal tradition of the late 19th and early 20th century in the US and reinforces dominant beliefs about the natural subordination of women to men as part of a divinely ordained hierarchy (Gill 1990). Women are seen as primarily responsible for domestic roles, such as caring for husbands, children, and maintaining the household. Pastors often stress the importance of traditional domestic skills for women and encourage mothers to instill these values in their daughters, preparing them for similar roles. Modesty is considered a critical virtue, supporting a vision of women's lives centered on submission, family, and moral discipline.

2.2 The Rise of Pentecostals in Brazil and their Influence on Gender Norms

Brazil hosts one of the largest Pentecostal populations worldwide, which grew approximately 115% between 1990 and 2010, reaching 13% of the total population by the end of this period (Datafolha 2016). This upsurge of Pentecostalism has coincided with a steady decline in Catholicism, Brazil's historically dominant religion, which represented around 90% of the population in 1980s (Pew Research Center 2014).[12] The most significant Pentecostal wave began in the late 1970s, following the formation of the UCKG by the Pentecostal bishop Edir Macedo in 1977; in our study period, between 1991 and 2000, there was a six-fold increase in their share of the Brazilian population (Pew Forum on

[12] Census estimates show that the proportion of Catholics in Brazil declined from over 90% in the 1970s to 65% in 2010.

Religion & Public Life 2006).

In Brazil, Pentecostals stand out for their fervent practice and conservative views compared with other Christians.[13] Leveraging data from the 2002-2003 Brazilian Household Expenditure Survey, in Table A1, we observe that Pentecostals spend significantly less on alcohol, tobacco, gambling, and secular entertainment compared to Catholics, while both groups spend similarly on categories unrelated to religious prescriptions, such as dining out and transportation.

Brazilian Pentecostals have more conservative views about gender roles and family issues. For instance, Pew Forum on Religion & Public Life (2006) shows that 61% of Pentecostals believe that a wife must obey her husband, compared to 42% of other Christians, and 37% of Pentecostals say divorce can never be justified, compared to 15% of other Christians. Pentecostal pastors emphasize that women should marry men who are their cultural and financial superiors. In a recent sermon aired on TV, Macedo stated that he made his daughters forgo college to ensure they would not become "smarter" than their future husbands, asserting that a woman's happiness comes from submission.[14] A common invitation is for women to submit to their husbands, following the divine example of the church being lead by Christ.[15]

A system of teachers and programs reinforces and instills Pentecostalist's vision of women as submissive figures dedicated to domestic roles and moral discipline, most of them aired on TV.[16] At all-female events like the quarterly "Self-help meeting" at

[13] Pew Forum on Religion & Public Life (2006) shows that Pentecostals in Brazil are strictly observant, with 86% attending church every week in contrast to 32% of other Christians and 51% reading the Scripture daily in contrast to 10% of other Christians.

[14] "I want my daughters to marry men who will be the head of the household, because without that, their marriages will fail." (https://www.correiobraziliense.com.br/app/noticia/brasil/2019/09/24/interna-brasil,789307/bispo-edir-macedo-diz-que-mulher-nao-pode-ter-mais-estudo-que-o-marido.shtml)

[15] For instance, in a recorder session, a UCKG female pastor stated: "Wives, submit yourselves to your own husbands as you do to the Lord. For the husband is the head of the wife as Christ is the head of the church, his body, of which he is the Saviour."

[16] An UCKG female teacher reported in a recorded session: "A woman's duty is to care, to make food,

the São Paulo's Temple of Salomon, main UCKG venue, women are guided to embrace their roles as caregivers and spiritual supporters.[17] Other training programs, such as "Godllywood," founded by Macedo's daughter, play a significant role in shaping women's behaviors and values. Described as a mix of sorority and self-improvement, it assigns daily tasks like cooking for husbands, maintaining the household, and adhering to strict appearance standards, for instance by avoiding carbohydrates and doing their hair and nails regularly.[18] To instill such values in younger generations, they organize gender-specific activities, such as tea parties and princess-themed church services for girls and car-themed events for boys.

A particular feature of the Pentecostal churches is that they have intensively used television as their preferred "traditional" mass medium to propagate their messages, a phenomenon known as televangelism, following a successful formula perfected by Evangelicals in the United States between the 1970s and 1980s (P. Rocha 2000).[19] This approach extends to Brazil, where, for instance, Pew Forum on Religion & Public Life (2006) reports that 78% of Pentecostals engage with religious media at least weekly, compared to just 34% of other Christians.

to keep things tidy. First, she has to live up to her role, make the man happy; that way, he'll treat her well. Unfortunately that's just how it is; we're more resilient." Another female pastor stated: "It's very important that we look cheerful and take care of our physique. A cheerful woman changes the atmosphere of the home. So does a grumpy one." https://lab.org.uk/brazils-women-of-virtue/

[17] In one of these events, Macedo stated: "If you're the provider, your marriage is doomed to failure. My wife replaced my mother; she looks after me and I give her the best of everything. In marriage, the man is Jesus and the woman is the Church." To see more read: https://lab.org.uk/brazils-women-of-virtue/

[18] https://lab.org.uk/brazils-women-of-virtue/

[19] Such Church-TV and its successful template include a mix of expert "infusion of commercial values and experimental theologies, with emphasis on technology, charismatic leaders (televangelists), and formats that are similar to conventional broadcasting".

2.3 Religious Media: The Case of RecordTV

RecordTV, Brazil's second-largest TV channel, has been pivotal in popularizing religious programming since the 1990s, marking a significant shift in the country's media landscape. Founded in 1953, RecordTV quickly gained popularity and became a major channel, especially for its music programs and entertainment shows.[20] Financial difficulties in the late 1980s led the channel to declare bankruptcy, creating a unique opportunity in Brazil's highly concentrated media market, which is dominated by a few large companies.[21] Edir Macedo seized this opportunity by purchasing the station in 1990, incorporating it into the broader expansion strategy of his church. For the purpose of our identification strategy, it is important to notice that, upon purchase, Macedo inherited RecordTV's original set of antennas as a block. These antennas had been placed during the 1960s, well before Macedo's acquisition, making their locations unrelated to his subsequent expansion efforts.

After the change of ownership, RecordTV introduced a large amount of religious content into regular programming, aimed at converting viewers to Pentecostalism. By the mid-1990s, RecordTV aired 60 hours of religious programming weekly, while the two largest networks by audience at the time had less than an hour per week (Campos 1997). In particular, from 2 a.m. to 6 a.m., the channel broadcast the "Universal Programming," which consisted entirely of religious content, accounting for 28.7% of the network's total revenue. Appendix Tables A2 and A3 provide examples of weekday and weekend schedules, respectively, with religious content typically aired in the morning, prime time or late night.

The religious programming took various forms, including preaching modeled on U.S. televangelism and interactive live shows like *Palavra de Vida*, *Fala que eu te escuto*,

[20] From the mid-1960s on, RecordTV's music shows launched the careers of many prominent Brazilian singers and songwriters (Reis 2006).

[21] In the mid-1990s, there were seven TV channels in Brazil operating nationwide.

Jesus Verdade and *Awakening of Faith*, where pastors engaged with viewers through testimonies, faxes, and phone calls, offering spiritual guidance and solutions to personal problems.[22] Throughout these shows and during commercial breaks, viewers were repeatedly invited to visit UCKG temples, with the programming serving as a continuous "electronic church" aimed at attracting new followers by focusing on relatable family issues to engage a broader audience (Reis 2006).

Additionally, RecordTV pioneered the creation of Biblical telenovelas, a successful product designed to appeal not only to believers but also to everyday viewers, reserved for the network's prime time (Nascimento 2019).[23] These biblical telenovelas combine traditional soap opera elements – like romance, emotional conflicts, and cliffhangers – with biblical stories, emphasizing themes of faith, redemption, and divine intervention.[24] In Brazil, telenovelas have a special cultural status due to its ability to gather vaste audiences and create a collective imaginery. RecordTV's decision to invest in religious programming signified more than just a market strategy; these productions served not only as entertainment but also as a powerful evangelizing product to convert masses (Clayton 2020).

Besides promoting church membership, RecordTV's programming also encouraged viewers, particularly women, to adopt behaviors prescribed by the church. The network produced a variety of non-explicitly religious programs that promoted more conservative

[22]Many of the shows rely on testimonials contrasting individuals' lives before and after joining the church that depict their change of behavior as leading to a better life. For instance, in an episode of *Fala que eu te escuto* (Speak that I will listen), one of most the influential shows, an ex-sex worker and former drug and alcohol user shared her testimonial about how the UCKG helped her transform her life and taught her how to be a wife. The Appendix contains more details on this specific episode and other examples.

[23]See Appendix A.3 for several examples of Biblical telenovelas and their plots. Table A2 shows an example of a Biblical telenovela aired during prime time.

[24]As other exaples, the *Caminhos da Esperança* programming employed light entertainment to encourage viewers to embrace the UCKG. Regarding popular Biblical miniseries, such as *A filha do Demônio, Olho da Terra, Direito de vencer, Por amor e ódio, Canoa do Bagre, Janela para o céu, Velas de sangue, A sétima bala, O desafio de Elias, Do fundo do coração, and Alma de Pedra.*, they were centered around religious themes, biblical stories, and testimonials from the UCKG as means of persuasion.

roles for women in society, often focusing on gender-oriented content like cooking and handicrafts (Pinheiro and Reckziegel 2006). A famous hit was *Note e Anote*, a weekday show inspired by traditional women's magazines, which featured segments on cooking, home décor, fashion, beauty, and celebrity gossip, with a strong emphasis on "making money from home" through handicrafts (Temer 2000).[25] Moreover, RecordTV has openly supported specific political candidates, usually religiously-aligned political figures. The most notable example was during the 2018 presidential campaign, when RecordTV aired Edir Macedo blessing Jair Bolsonaro in front of a live audience of nearly 10,000 at the Temple of Solomon in São Paulo, and millions more on TV.

3 Data

Our empirical work relates the exposure of RecordTV to religious affiliation and behaviors associated with the church's prescriptions - fertility, female labor force participation, schooling and voting. This section describes the data used to build the coverage measure, as well as the main outcomes of the study.

3.1 Exposure to RecordTV: Treatment Definition

Our definition of the treatment is based on the availability of signal from inherited RecordTV transmitters, that is, the ones installed before the change of ownership in 1990. Data on transmitters are available at the Brazilian National Agency of Telecommunications (ANATEL). For each transmitter, we have information on its latitude, longitude, and technical characteristics, such as transmitting frequency and power, height, broadcaster owner, and installation date. We select all transmitters that belonged to RecordTV in

[25] https://observatoriodatv.uol.com.br/critica-de-tv/melhor-da-tarde-parece-perdido-no-tempo

1990, when Macedo acquired them, and we use a professional engineer-developed software based on the Longley-Rice Irregular Terrain Model (ITM) (Hufford 2002) to compute a measure of RecordTV coverage in each municipality.

Signal transmission obeys the laws of electromagnetic propagation. In the absence of obstacles such as mountains, air particulates, etc., the signal strength decreases with the square of the distance from the transmitter. However, decay patterns are a much more complex function of these obstacles as they diffract the signal across the space. To take into account the impact of geography on actual signal propagation, the model considers the geographic location and height of the transmitters, the frequency of transmission, and several characteristics of the surface and air. Following Olken (2009), we use the ITM algorithm to compute the signal loss between each RecordTV transmitter and each receiving location, in this case a municipality.[26] Finally, we compute the predicted signal strength in each municipality as the maximum signal power received across all transmitters. Figure A2 displays the output of the ITM model, where signal strength values range from -245 dB to 8 dB (decibels).

Although signal strength is a strong predictor of reception (Olken 2009; Durante, Pinotti, and Tesei 2019), the quality of TV does not increase linearly with the signal strength but discontinuously. We follow Bursztyn and Cantoni (2016) and Grosfeld, Madinier, Sakalli, and Zhuravskaya (2024) and calculate the actual availability of RecordTV signal based on a signal cut-off. While reception quality remains relatively consistent above a certain signal strength, below a critical threshold — when noise overpowers the signal — reception becomes impossible. According to engineering guidelines, most televisions require a minimum signal of -65 dB, but it can be as low as -75 dB to as high as -55 dB.[27].

[26]We use the centroid of each municipality as the receiving location.

[27]A minimum signal of -65 dB is based on estimating real world noise interference from other transmissions and any near-by electrical and electronic sources.Lee et al. (2014) and Dagher et al. (2004), websites

In order to determine an appropriate cut-off for the case of Brazil, we analyze available Globo coverage data from La Ferrara, Chong, and Duryea 2012, which provides information of areas with TV reception good enough to watch Globo's programs in a given year. Following Grosfeld, Madinier, Sakalli, and Zhuravskaya 2024, we then regress a dummy for positive Globo reception on Globo signal strenght obtained from the ITM model. Using a local polynomial regression, we find an S-shaped relationship - a pattern consistent with Olken 2009; Bursztyn and Cantoni 2016; Grosfeld, Madinier, Sakalli, and Zhuravskaya 2024. Panel A of Figure 1 illustrates that signal strength significantly impacts reception quality only within the middle range. Most municipalities with signal strength above -60 dB receive Globo's coverage, while those below -60 dB generally do not. Accordingly, we classify municipalities as having TV reception if their signal strength exceeds -60 dB. This relationship justifies the decision to discretize signal strength, as variations meaningfully affect reception quality only within the middle range, not at extreme levels.

We further validate the choice of the threshold using viewership data from RecordTV. Unfortunately, this data is only available for the ten largest metropolitan areas of Brazil. We define the cutoff by identifying in the data the minimum signal strength necessary to have positive RecordTV viewership for the first time. Our viewership data comes from the Brazilian Institute of Public Opinion and Statistics (IBOPE), containing detailed information on the audience for the main Brazilian TV channels over the period 1991-1999. We aggregate daily average viewership by year, restricting attention to audience for RecordTV shows exclusively. Panel B of Figure 1 plots RecordTV's signal strength received in each metropolitan region against RecordTV daily average viewership. The dots represent the years before and after the event t = 0, which is the year when viewership becomes positive for the first time in the metropolitan region. The figure highlights

(https://otadtv.com/; http://www.aa6g.org/DTV/Noise/noise.html) and handbooks (ETSI 2014; NTSC 1994)

that viewership increases with signal strength only within two specific thresholds. Viewership becomes positive just above -60 dB, as signal quality below this threshold is too poor for viewing. However, beyond the upper threshold of -20 dB, further improvements in signal strength have no effect on viewership, as the signal is already strong enough to ensure high-quality reception. This exercise validate further our definition of control areas, as all municipalities with a signal strength of -60 dB or below. The treatment area therefore comprises all municipalities with a positive probability of reception of RecordTV broadcasts.[28]

Therefore, our approach differs from previous research that employs signal strength as a linear predictor of viewership (Olken 2009; Durante, Pinotti, and Tesei 2019). Instead, we implemented a discrete measure of reception, as this choice is well-supported by both our empirical data and engineering models. This discrete approach provides clearer interpretation of our statistical coefficients. We have validated the robustness of our findings using alternative continuous measures of treatment, including both the linear signal strength measure common in existing literature and a continuous transformation designed to model the actual probability of viewership based on observed patterns in our data. We show results using these alternative measures in Table A7.

3.2 Outcome Variables

Our outcomes of interest are derived from the 1991 and 2000 waves of the Brazilian Census. The Census is conducted every ten years and contains detailed information such as demographics, income, labor market participation, and education. We aggregate all

[28]It is important to note that some households within the treatment area, particularly those with signal strength between -60 dB and -20 dB, may have had limited or no access to RecordTV broadcasts for part or most of the time. The control area is thus structured to include only individuals who with certainty had no access to religious media.

the information at the level of the municipality[29], our primary unit of analysis.

3.2.1 Behaviors

To construct our measure of adherence to a specific religion, namely Pentecostalism, Catholicism, Traditional Protestantism, and Non-Religious, we create dummy variables indicating the person's unique self-declared religion. We keep only individuals between 15 and 60 years-old, as they are more likely to choose or change their own religion than younger or older people. Our main variable is then the share of Pentecostals in a given municipality-year.

As a measure of labor force participation, we construct a dummy that equals one if the person claimed to have a job at the reference period. We restrict the analysis to people between 18 and 60 years when they are more likely to have already finished school and not retired yet, following Hirata and Soares (2020).[30] We distinguish between female and male labor force participation, and we aggregate at the level of the municipality.

We build our fertility measure using the 1991 and 2000 Census waves. Our measure of fertility is the total number of children born alive to a mother. Our analysis includes all women in childbearing age, that is those aged 15 to 49. To gain deeper insights into women's reproductive behaviors, we further categorize the data into age groups, in order

[29]Municipality boundaries were not constant over the studied period. That is, many municipalities were created or split over time. Because changes in municipal boundaries may not always be nested, we employ a standard procedure to harmonize boundaries from 1970 to 2000 into minimum comparable areas (Assunção, Lipscomb, Mobarak, and D. Szerman 2017; Lima and Silveira Neto 2018; Dahis and C. Szerman 2024). This process results in a sample of 3,814 minimum comparable areas (Ehrl 2017), which we refer to as municipalities. We exclude the archipelago of Fernando de Noronha, for which no information is available prior to the 1991 census, remaining with 3,813 municipalities.

[30]The definition of employment status changes between 1991 and more recent waves. While in the 1991 Census, the reference period is the 12 months before assessment, in 2000, it is the census reference week. We follow Dix-Carneiro and Kovak (2017), Dix-Carneiro, Soares, and Ulyssea (2018), and Hirata and Soares (2020) and define the employment status dummy as follows: in 1991, the dummy is equal to one if the person regularly worked during the previous 12 months; and in 2000 and 2010, the dummy equals one if the person, in the reference week, either worked (for pay or not) or had a job but did not work for any reason.

to identify whether women are having more children at younger ages or continuing to have children at older ages.

We examine gender differences in schooling with a focus on middle school completion. Our analysis centers on individuals aged 15 to 25, as this group was old enough to have completed middle school when their schooling was measured but had not necessarily done so. We exclude individuals older than 25, as they were not exposed to RecordTV during their school-age years.[31] Our emphasis on middle school completion rather than high school reflects the educational context of the period.[32] In 1991, high school completion rates were notably low, with only 18% of girls and 13% of boys between ages 18 and 25 having completed high school. However, we conduct additional analyses using alternative measures of educational attainment and different age ranges to ensure robustness and further interpret the findings.

Table A4 reports the population-weighted mean and standard deviation of the main characteristics of interest at the municipal level. As a general secular trend in the developing world, we witness an increase in education levels and female labor force participation, and a decrease in the average number of live births per woman. Additionally, the share of Pentecostals experienced a remarkable growth of approximately 200%.

3.2.2 Voting Data

We investigate the effect on electoral results by analyzing the percentage of votes obtained by candidates affiliated with any Pentecostal denomination in each federal representative

[31] For instance, a woman aged 30 in 2000 would have been 20 years old in 1990, when RecordTV became religiously affiliated, leaving no time during her schooling years when the religious message could have influenced her educational path.

[32] We also report results using as measure years of education. Although the results are very similar, they are less precise. This could be attributed to differences on how the years of education were computed across census waves. Differently, our main measure recording the end of schooling cycles is computed with more precision across census waves.

election, using data from the Tribunal Superior Eleitoral (TSE). The data contains information on the number of votes received by each candidate and the characteristics of the candidates, which is publicly available for all states since 2002.

We restrict our analysis to candidates running for Congress ("Deputado Federal"). Unlike single-member district representation systems, such as that of the United States, Brazil employs an open-list proportional representation system, where candidates compete for votes across the entire state, rather than in localized districts. Thus, we do not need to worry about a mechanical effect where a higher share of Pentecostals lead to more Pentecostal candidates and, consequently, a higher share of votes for Pentecostals. Since the pool of candidates is selected from the entire state, local demographics differences should not influence candidate characteristics.

Since the TSE does not provide any information regarding candidates' religion, we identify candidates' connections to the Pentecostal church in two ways. First, we rely on the data compiled by Lacerda (2017). He hand-coded a list of Pentecostal candidates, considering religious references in candidacy names, published biographical sources, and newspaper mentions. It is important to note that this classification method might be skewed towards candidates with higher popularity and those situated in regions with extensive media attention.

Second, we rely on the campaign names to infer candidates' religion. When registering a candidacy in the TSE, each candidate chooses the candidacy name to be officially used in the elections. This name is the one that will appear on the voting ballots. We consider a candidate as Pentecostal if the campaign nickname contains designations that can be associated with the Pentecostal church. We associate the designations *Pastor*, *Irmão*, *Reverendo*, or *Bispo* (and its feminine versions) to the Pentecostal church, following Costa, Marcantonio, and R. Rocha (2023).

4 Empirical Strategy

We estimate the effect of exposure to RecordTV, a church-affiliated TV channel, on religious affiliation and behaviors consistent with Pentecostal prescriptions. Our empirical strategy leverages variation in RecordTV coverage based on transmitters installed before 1990 and the channel becoming religiously affiliated. A key assumption of this strategy is that RecordTV's pre-1990 coverage is exogenous to future religious trends. Indeed, the inherited transmitter network originated from the bankruptcy of a major secular channel in a highly concentrated market and was sold in a bundle, meaning that these transmitters, and thus their locations, could not be strategically selected by Macedo. Second, this original transmitter placement was unlikely to benefit Pentecostal expansion.

However, the initial placement of these transmitters might still be correlated with different socio-economic factors that could influence our outcomes of interest. For instance, since RecordTV might have placed its transmitters in more central areas, such as places with better infrastructure and economic development, the distance to the transmitter could be affecting our outcomes through channels other than RecordTV coverage itself. To account for that, following Olken (2009), we control for the signal in the free-space, which decays with the square of the distance from the nearest RecordTV transmitter, and captures variation in signal due to distance, height, and power of the transmitter. This means, effectively, that our coefficient of interest is identified out of the idiosyncratic differences in signal strength due to geological features and diffraction patterns caused by topographical obstacles, such as mountains or watersheds. Finally, we additionally control for a range of municipalities' socio-economic characteristics at baseline, exploiting residual variation among municipalities within areas that share similar socio-economic characteristics.

Specifically, we estimate the following equation:

$$Y_{m,t} - Y_{m,1991} = \beta_1 \cdot Coverage_{m,1990} + \beta_2 \cdot Propagation\ Controls_{m,1990} + \beta_3 \cdot X_{m,1991} + \delta_{state(m)} + u_m, \quad (1)$$

where $Y_{m,t}$ is the outcome of interest in year t in municipality m, and our baseline measure of RecordTV availability, $Coverage_m^{1990}$, is equal to 1 if municipality m received RecordTV signal until 1990.[33] $PropagationControls_{m,1990}$ includes municipal-level variables that predict signal propagation: signal in the free-space coming from RecordTV's transmitters in 1990, and the distance to the nearest transmitter. Since distance to more central areas is probably the main determinant of the placement of the transmitters, we directly control for it in a flexible way using a fourth-order polynomial.[34] We add state fixed-effects, $\delta_{state(m)}$, to account for any state-level policy, which can correlate with local economic conditions. Finally, we incorporate a set of municipal-level characteristics measured at baseline, $X_{m,1991}$: the share of white population, the share of adults who completed at least high school, the share of working-age population, the share of elderly people, the share of women, the log of population, the log of average household income, the log of the municipal GDP per capita, and exposure to trade shocks at the micro-region level.[35] u_m is the error term, clustered at the municipal level. We also report robustness to alternative assumptions about the variance-covariance matrix, adjusting standard errors to account for spatial correlation in the data.[36] Finally, we weight observations by the population in

[33] We show that the results are robust to using the continuous RecordTV signal strength, as well as a non-linear transformation.

[34] Given Brazil's continental size, we flexibly allow for the possibility of nonlinear relationships. In Table A12, we show that results are robust to the inclusion of first- to sixth-order polynomials, except for girls education, which is statistically significant only when including third- or higher order polynomials.

[35] Costa, Marcantonio, and R. Rocha 2023 show that economic downturns increased Pentecostal affiliation during the 1990s, using trade shocks to identify their effects. To ensure we are not picking up the same effect, we control for such trade shock. We rely on Kovak 2013; Dix-Carneiro, Soares, and Ulyssea 2018; Hirata and Soares 2020 to define a measure of exposure to the trade shock for Brazil microregions in the early 1990s.

[36] We allow the error terms to be correlated between different municipalities within 100 km of each

1991, in order to make the estimates representative at the individual level.

The coefficient of interest β_1 captures the average causal effect of exposure to RecordTV on changes in religious affiliation and specific behaviors. Our identification strategy relies on the assumption that the evolution of outcomes would have been the same between areas with and without RecordTV exposure in 1990, had the channel not become religiously affiliated. Although this assumption cannot be directly tested, we provide support in favor of the parallel trends assumption through a falsification test, where we estimate the effect of RecordTV coverage in 1990 on changes in the outcomes measured during the pre-period 1980-1991.[37] Specifically, we estimate the following equation:

$$\begin{aligned} Y_{m,1991} - Y_{m,1980} = \gamma_1 \cdot Coverage_{m,1990} + \gamma_2 \cdot Propagation\ Controls_{m,1990} + \\ \gamma_3 \cdot X_{m,1991} + \delta_{state(m)} + u_m, \end{aligned} \tag{2}$$

Table 1 shows the result of this exercise. Conditional the full set of baseline controls, RecordTV exposure is not correlated with changes in our outcomes between 1980 and 1990. The estimated coefficients are also small in magnitude. The results provides support to the hypothesis that changes in religiosity and behaviors in 1991-2000 were not systematically related to factors correlated with RecordTV coverage per se but to its shift toward religious content after the change of ownership in 1990.

other, choosing this threshold as the one yielding the most conservative standard errors.

[37] We are unable to perform this exercise for voting since microdata is only available starting in 1998, as explained in the Data Section.

5 Results

By exploiting quasi-random variation in exposure to religious television, we find that religious media lead to an increase in Pentecostal affiliation in Brazil. This change in religious composition provides an opportunity to examine behavioral changes. Our results show that individuals adopt practices prescribed by the church, particularly those related to conservative gender norms.

5.1 Pentecostal Affiliation

Baseline Results. Table 2 reports the estimated effects of exposure to RecordTV on the probability of being Pentecostal, obtained from estimating the model described in equation 1. We find that exposure to RecordTV has a positive impact on the share of self-identified Pentecostals. Column (1) presents results with no additional covariates, displaying a positive, but statistically not significant, relationship. In Column (2), we control for our propagation controls at baseline; estimates become positive and statistically significant, suggesting that pre-existing characteristics correlating with the placement of the antennas may systematically bias results if not taken into account.[38] In Columns (3) through (5), we add respectively our baseline: (3) demographic controls (share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women), (4) state fixed-effects and, (5) socio-economic controls (log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level).[39] The

[38]For instance, signal-in-the free space exhibits a negative and significant relation with our dependent variable, which may bias downward the coefficient of interest.

[39]A possible confounder for our model is the share of urban population. In our preferred model, we opt for directly controlling for "Regional Tariff Change", relying on Kovak 2013; Hirata and Soares 2020; Dix-Carneiro, Soares, and Ulyssea 2018; Costa, Marcantonio, and R. Rocha 2023, to define a measure

progressive inclusion of these controls does not substantially affect the magnitude of the main coefficient. In Column (5), our preferred specification, we estimate the full model described in equation 1 by adding all baseline controls. In this specification, receiving RecordTV coverage increases the share of self-identified Pentecostals by 0.89 percentage points, an increase of about 30% from the baseline level (3.01%).[40] This implies that, ceteris paribus, being exposed to RecordTV leads to the same increase in the probability of being Pentecostal as of the effect of passing from having 4-7 years of education to 3 or less. This is quite sizeable, if we consider that, in our sample, 31.17% of individuals above 14 years old have at most 3 years of education. In Column (6), we show that the results are robust to allowing for spatial correlation in a radius of any size from zero to 100 kilometers, following Conley (1999). Overall, coverage by RecordTV accounts for 11% of the total growth of Pentecostals over the studied period. However, this reflects potential exposure — i.e., the availability of the channel in the municipality — rather than actual exposure. To capture the real impact of exposure, we turn to compute persuasion rates using data on viewership.

Persuasion. We implicitly estimate the share of people induced by RecordTV to convert to the Pentecostal church by computing the persuasion rate (DellaVigna and Kaplan 2007). The persuasion rate captures the effect of the treatment on the relevant behavior, adjusting for exposure to the message and for the size of the population left to be convinced

for the microregion's exposure to the early-1990s. This variable exploits variation across regions in 1991 industry mix. Many of these variables – especially urbanization rate and share of manufacturing – are highly correlated with the local trade shock (Dix-Carneiro, Soares, and Ulyssea 2018). Therefore, when we control for the "Regional Tariff Change", we are indirectly already taking into account the urbanization rate. Nonetheless, as a robustness check, we directly control for the share of urban population, share of people employed in manufacture, and share of people employed in non-tradable sectors at the municipal levels, finding that results are mostly unchanged (see column (6) of Table A5).

[40]Long term effects are shown in column (1) of Table A6, where we include in the analysis the 2010 wave of Census. Interestingly, results persist into 2010.

in the initial period, according to the following expression:

$$f = \frac{y_T - y_C}{e_T - e_C} \cdot \frac{1}{1 - y_0,}$$

where $y_T - y_C$ corresponds to the change in Pentecostal affiliation as a result of the expansion of RecordTV signal, which is captured by $\hat{\beta}_1$ in equation 1 and reported in Table 2; $e_T - e_C$ is the effect of the signal on viewership; finally, the denominator of the last term represents the non-Pentecostal population in 1991, which amounted to 96.5%.

To calculate the persuasion rates implied by our analysis, we use the information on how TV availability translates into viewership. This exercise is useful since it provides us with a measure that can be compared to other studies' results. However, the nature of our viewership data is somewhat different from what is often used in the literature, making such comparison difficult without some assumptions. While our viewership measure represents the monthly average share of households connected to a given TV channel during a two-hour time interval in a day of the week, most of the relevant studies make use of discrete measures, such as a dummy indicating whether the surveyed individual watched a given channel for a certain amount of time per day (DellaVigna and Kaplan 2007). In order to overcome this issue, we construct two alternative measures of viewership based on different assumptions, that allow us to compute an upper- and lower-bound of the persuasion rate.

First, we assume that people watch RecordTV at most two hours a day. Thus, in each two hours-time slot there are different viewers. We then construct our measure of viewership by summing all the households within a day that were connected to RecordTV, and taking the average across days of the week and months to obtain an annual estimate of viewership.[41] Column (1) of Table A13 reports the estimated value of $e_T - e_C$ using this

[41] Since we are assuming that these households are the only ones watching TV over this period, this

measure of viewership. The expression above gives us a persuasion rate equal to 4.6%, and is the lower bound of our persuasion rate.

Second, we construct an alternative measure of viewership by taking the maximum number of households across the two-hours slots within a day that were connected to RecordTV, and take the average across days of the week and months to obtain an annual estimate of viewership.[42] Using the estimated coefficient of $e_T - e_C$ for this alternative measure (column (2) of Table A13), the persuasion rate is equal to 20.7%, which is the upper bound of our persuasion rate. Both the lower and upper bound rates are comparable to values found by the relevant literature on persuasion (see DellaVigna and Gentzkow 2010). According to our estimates, RecordTV may have triggered around 580,000 to 2,600,000 conversions to the Pentecostal church over the 90s.

Interpretation. Our empirical analysis suggests that RecordTV coverage positively affected individual affiliation to the Pentecostal faith. In this section, we further discuss our main result, by analyzing more in detail the dynamics of the conversion phenomenon.

The rise in Pentecostalism induced by RecordTV might be understood as resulting from individuals changing their religious affiliation over time, i.e., by switching, or, by non-religious individuals adopting Pentecostalism in the first place, i.e., by conversion. According to a survey conducted in São Paulo by Datafolha (2016) in 1996, 60% of all Pentecostals were Catholic before, 22% had no religion and 7% belonged to Afro-Brazilian religions. Interestingly, 60% of all conversions occurred within the previous six years, which is the time when the religious channel started operating. In Table 3, Panel (a), we test for this hypothesis by replicating the same analysis of equation 1, but using the municipal share of Catholics (column (2)), nonreligious (column (3)), mainline Protestants

measure might still underestimate the actual number of viewers, and thus the lower bound's persuasion rate might still be overestimated.

[42] This measure is very conservative, as we assume the that the only people watching RecordTV were the ones connected during the time slot with the highest audience.

(column (4)) and others (column (5)). Columns (3) and (4) of Table 3 suggest that our empirical analysis captures both a dynamic of conversion and of people switching from mainline Protestant groups.

However, the nature of our data does not allow us to disentangle whether the observed switch arises from younger cohorts adopting Pentecostalism in the first place, i.e. by replacement, rather than from individuals changing their religious affiliation over time. To shed more light into such a dynamic, we examine whether young adults raised Catholics are more likely to self-declare Pentecostals in areas where RecordTV is available. We define someone as being raised Catholic if their parents self-identify as Catholic. Therefore, if the individual identifies with a different religion than their parents, we interpret this as a proxy for individual conversion. We focus on a sub-sample of individuals aged 15-18, that by law are residing with their parents, who may have "converted" during the study period, aggregating data at the municipal level. Column (3), Panel (b), of Table 3 shows the analysis for this subsample, where the coefficient is positive and statistically significant at the 1% level. Young people converting, mostly from non-religious positions, explain around 65% of the observed change in Pentecostal affiliation. However, the magnitude of the coefficient is smaller than our main result, suggesting that part of the unaccounted change in Pentecostal affiliation cannot be explained by a replacement effect, but rather from adults converting over time.

Next, we analyze the possibility that the effect of exposure to RecordTV may be heterogeneous along several dimensions. We start by analyzing how the effect of exposure to RecordTV varies across different age categories. In Panel A of Table A9, we re-estimate equation (1) on different samples obtained from the following age-cuts: (1) 15-20, (2) 20-30, (3) 30-40, (4) 40-50, (5) 50-60. The coefficient of interest remains significant and stable in magnitude through columns (1) to (5), consistent with both a conversion and a replacement story. Finally, since Brazil is a strongly Catholic country where the median

share of Catholics in a municipality in 1991 was around 92%, we analyze whether areas with even stronger Catholic presence show lower effects of exposure to RecordTV on the probability of being Pentecostal. In Panel B of Table A9, we find evidence that the effect of RecordTV is slightly stronger in municipalities with below median share of Catholics in 1991.

5.2 Behaviors

The large increase in the share of Pentecostal followers presents an opportunity to investigate the social and behavioral consequences arising from the expansion of Pentecostalism.

Table 4 presents the impact of exposure to RecordTV on several behaviors that are consistent with the prescriptions of the Pentecostal church, as discussed in Section 2. We estimate the coefficient of interest using the methodology outlined in equation 1. Column (1) presents the result on fertility, measured by the number of children born to women aged 15-49. Columns (2) and (3) display the effects on female and male labor for participation, respectively. Finally, Columns (4) and (5) show the results on education, using the share of 15-25 year-old girls and boys who finished at least middle school.[43]

Our analysis reveals noteworthy trends: regions covered by RecordTV exhibit a substantial and enduring increase in fertility rates alongside a decline in female workforce participation, which run counter to the general secular trends of fertility decline and increasing female labor force participation. In Column (1), we find that places exposed to RecordTV saw an increase of 0.027 in the number of children, significant at the 5% level. This corresponds to a 1.2% increase in the total number of children. Notably, our result goes starkly against the secular negative trend in fertility (around -0.46 children per woman); exposure to RecordTV slowed down the fertility decline by about 5.9%.

[43] We show results using other measures for education and other age ranges in Table A11.

Additionally, in Column (2), we observe a decline in female workforce participation: areas covered by RecordTV experience a 1.2 p.p decrease in female labor force participation, significant at the 1% level. The estimate corresponds to a reduction of 3.2% with respect to the baseline rate of of female labor force participation (38%). This effect also goes against the broader trend of increasing female labor force participation, reducing its speed by 15%. These findings seem coherent with Pentecostals beliefs, in particular the emphasis placed on the role of women as homemakers and men as main bread-winners in the household. Indeed, Column (3) shows no significant effects on male labor force participation, suggesting that exposure to RecordTV systematically affected female labor force, but had no impact on male labor force, consistent with proselitizing a narrative of men being the bread-winner of the household.

Finally, we find a reduction on educational attainment of girls, aligning with more traditional gender roles. Despite variations in perspectives regarding education within Pentecostal churches, several denominations emphasize that women should not surpass their husbands in educational attainment. To explore this, we examine the impact of RecordTV coverage on the share of girls and boys aged 15-25 who finished at least middle school. We focus on this age range because those children had not made all their school decisions when RecordTV became religiously affiliated. In Column (4), we find that exposure to the religious channel led to a reduction of 1.2 p.p. in the share of girls finishing middle school, a 3.3% decrease compared to the baseline. In contrast, the effect on boys is ten times smaller and has no significant effects, as shown in Column (5). Again, RecordTV exposure has attenuated the positive secular trend in girls' education by an order of magnitude of 6%.

These findings are particularly important because they suggest that religious programming, such as RecordTV, may attenuate positive secular trends promoting female empowerment. By reducing educational attainment in girls and reinforcing traditional

gender roles for adult women, RecordTV seems to have widened the gender gap, with men largely unaffected by the influence of the religious channel.

Heterogeneity. We investigate if fertility patterns are best explained by behaviors around the first or the last births. Related to the former case, Moreno (1991) and Flórez and Núñez (2003) find negligible changes in the starting age of fertility in Brazil because of both stable marital patterns and high teenage fertility rates. Related to the latter case, La Ferrara, Chong, and Duryea (2012) and Moreno (1991) show that increased spacing and stopping of childbirth have been more important behaviors driving fertility patterns. Accordingly, in Table A10, we find strong and significant effects for women aged 35 and above, while there seems to be no effect on teenagers and young adults.

In Table A11, we decompose the effects on education further, using alternative measures and age ranges.[44] First, in columns (1) and (2), Panel A, we show that our results are robust to using a different measure of educational attainment, that is, the total years of education. Columns (3) and (4) present findings using our main measure of education as benchmark. Moreover, we explore whether RecordTV coverage affected individuals at higher levels of their educational path, that is at the start of high school (columns (5) and (6) of Panel A), and at the end of high school (columns (7) and (8) of Panel A). Interestingly, we observe that RecordTV coverage reduced by 0.96 p.p. the likelihood to start high school for girls, but did not affect their chances to complete highschool. We do not detect significant effects on boys. Taken together, these results suggest that the religious channel affected girls in an important intermediate step of education, that is the transition between middle school and highschool. Panels B and C repeat the analysis for samples of older individuals. In Panel B, we analyze the results for 25-30 year-old individuals. We find that for this age range there is a significant negative effect on the

[44]We don't provide evidence on very young kids aged 6-10, since elementary school completion was already high at that time. Non-sgnificant results are available upon request.

share of girls finishing middle school, but the coefficient is substantially smaller than that on 15-25 year-old individual.[45] For this age group, we also document a negative effect for girls finishing high school, who may have been affected by RecordTV coverage in their later years of education. Reassuringly, we do not find effects on the sample of people aged 30-40, who were unlikely to still be in school by the time RecordTV became religiously affiliated.[46]

5.3 Voting

Lately, Pentecostal religious leaders have significantly increased their presence in politics. In 2021, 195 out of 513 federal deputies in Brazil were affiliated with the Evangelical lobby. On the supply side, the substantial involvement of Pentecostals in politics may be motivated by their objectives of opposing LGBTQ rights and abortion, maintaining tax-exempt status, and addressing religious competition (*The Economist* magazine, June 5th 2021 Edition). On the demand side, the literature has identified both economic distress Costa, Marcantonio, and R. Rocha (2023) and religious identity Solá (2022) as key drivers.

Building to this literature, we analyze whether exposure to religious media contributed to voting for Pentecostal candidates. We identify politicians affiliated with Pentecostal churches using Lacerda (2017)'s classification. For this analysis, we are not able to estimate the effect in differences because the voting micro-data covering the entire country is only available starting from 2002. However, given that the political presence of candidates associated with Pentecostal churches was virtually non-existent in the early 1990s (Kramer 2005), we follow Costa, Marcantonio, and R. Rocha (2023) and interpret the dependent variable in changes from a common zero baseline.

[45] This result is plausible since many people finish school in delay.

[46] In addition, we can notice that the coefficients for the sample of oldest individuals are similar across girls and boys.

Table 6 shows the effect of exposure to Record TV for the 1998 and 2010 elections. While there is no effect on the 1998 election results, RecordTV coverages increases by 1.4 p.p. the share of votes for Pentecostals candidates in 2010.[47] Relevantly, the absence of political implications in 1998 mitigates concerns that our main results on religion and behaviors may be driven by Pentecostal politicians and their agenda, such as policies on fertility and family planning.[48]

5.4 Robustness

A main concern about our empirical strategy is that it might fail to disentangle the effect of RecordTV from the effect of exposure to TV in general. To address this issue, we created measures of TV exposure to Globo in 1990, the largest TV network in Brazil during the study period, and performed a falsification test.[49] Specifically, we run a statistical horse race, by including exposure to Globo into our baseline regression for each outcome of interest. Table 5 presents these results, showing that the effects of exposure to Globo are considerably smaller and statistically insignificant, while the estimates for exposure to RecordTV are mostly unaffected. We take this as evidence that exposure to RecordTV programming, instead of exposure to TV programs in general, is driving our results.

Since RecordTV may have preferentially targeted larger municipalities in its early strategy, reaching the smaller surrounding municipalities may be of relatively little value, and differences in RecordTV access between them are plausibly incidental from the point of view of the agent choosing the placement of the transmitters. To test for this hy-

[47] Since the "Deputado Federal" is elected at the state level and our specification includes state fixed effects, our results cannot be explained by a higher number of Pentecostal candidates running for those seats, but by a more intensive amount of votes for Pentecostal candidates.

[48] We show similar results in columns (3) and (4) when we rely on a differen classification based on Costa, Marcantonio, and R. Rocha (2023).

[49] To create these measure, we follow the same procedure as employed to compute RecordTV signal, as detailed in Section 3.

pothesis, in Table A8 in the Appendix, we exclude from the sample the places where the transmitter is located and progressively remove the surrounding municipalities that, conditional on receiving the signal, are in the top 1% of the distance distribution from the closets transmitter (column (1)), top 5% (column (2)), top 10% (column (3)), top 25% (column (4)), and top 50% (column (5)). In this way, we aim to remove the municipalities that were initially targeted by RecordTV's 1990 coverage strategy. Results of these exercises are presented in Table A8. Overall, the coefficients remain stable and comparable with our benchmark estimation (column (6) of Table 2 and Table 4). In column (6), we remove the geographical North region, where RecordTV penetration was extremely low, showing that results are unchanged if we drop this area.

Moreover, Table A5 presents our main results with different specifications. We start the analysis without including any controls or fixed effects (column 1) and progressively add: signal in the free space and distance controls (column 2), demographic controls (column 3), state fixed-effects (column 4), and economic controls (column 5), that is our preferred specification. We observe, although results go in the same direction across columns, they only get stable after including demographic controls and state fixed-effects. The inclusion of economic controls does not change the size of the coefficient much. Next, we show that results survive to the correction of standard errors for spatial autocorrelation within 100 km (column 6). In column (7), we include further economic controls in addition to our baseline ones: share of urban population, share of people employed in manufacturing and, share of people employed in nontradable sectors. Lastly, Column (8) includes trends in the outcomes of interest in the pre-period 1980-1991.

We also show, in Table A7, that our results are mostly robust to using alternative continuous measures of treatment, that is the linear signal strength measure typically used in the literature (Panel A), and a continuous transformation intended to replicate the actual likelihood of viewership according to the functional form in the data (Panel

B). In Table A6, we report the results for the 1991-2010 period: effects do not persist far into 2010, although the estimates are similar in direction to our main ones.

Next, we test the sensitivity of our main result to different cutoffs for coverage. According to the engineering literature, the minimum signal needed to ensure viewership ranges from as high as -55 dB for a TV with poor sensitivity in a noisy environment to as low as -70 dB for a TV with good reception in a low or noiseless environment. Figure A3 shows that the coefficient for the share of Pentecostals does not change if we decrease the cutoff up to -69 dB. After that, the coefficient decrease in magnitude, which remains stable until -75 dB, when it asymptotes to zero. When we increase the cutoff, there is no change in the coefficient up to -54 dB. After that, the coefficient drops sharply to zero, and it remains at this value. Our results are thus robust to changes in the cutoff as long as it does not cross the minimum coverage thresholds.

Finally, we show that migration patterns that affect the demographic composition of municipalities could not explain our results. In column (1) of Table A14, RecordTV coverage is not correlated with trends in migration during the 1990s, defined as the difference in the share of migrants in a given municipality between 1990 and 2000. Furthermore, we observe that our results are not affected in magnitude and significance when we control for the share of migrants in 1991 (column (2)-(7)).

6 Alternative Empirical Strategy: Event Study of RecordTV Expansion

In addition to our baseline strategy, which leverages the placement of initial transmitters for identification, we take advantage of the expansion of RecordTV transmitters over the 1990s in an event-study framework. While this method has limitations — it requires high-

frequency data and is based on different assumptions — it provides important insights.

First, it helps disentangle the mechanisms driving Pentecostal conversion following the expansion of RecordTV. In particular, it addresses concerns that our main result on Pentecostal affiliation is driven by complementary expansion strategies other than RecordTV expansion in a given municipality, such as the opening of Pentecostal churches. Second, it allows us to directly examine the dynamics of the observed changes in behaviors in one key outcome: fertility. Although we lack the high-frequency data necessary to extend this analysis to other outcomes, the fertility results also offer valuable reassurance against potential reverse causality.

Figure A1 shows the steady expansion of RecordTV channel over the 90s. We define the first year of entry in a given municipality as the year in which the signal from a RecordTV transmitter got larger than -60 dB for the first time and we consider a municipality as covered when the signal strength is above this threshold.

We use a staggered difference-in-differences strategy, and compare the outcomes of interest of municipalities that were covered by RecordTV for the first time during the 1990s with those covered after 2000 and that were not, therefore, treated during our study period. We exclude municipalities that were already covered in the pre-period, i.e. before 1990.[50] Recent evidence suggests that "staggered access" estimations might be biased by heterogeneous effects over time (Callaway and Sant'Anna 2021; De Chaisemartin and d'Haultfoeuille 2020). To address this concern, we estimate the parameter of interest following Callaway and Sant'Anna (2021).

[50]Nowadays, close to hundred percent of municipalities are covered by RecordTV.

6.1 Complementary Expansion Strategies

A potential concern with our baseline empirical strategy is that the church, in its expansion strategy, may have begun investing additional resources, such as in media other than TV, or in physical church premises, prioritizing areas that were already covered by RecordTV in 1990. If this is the case, our results may not be driven by RecordTV's content per se, but instead by a bundle of church's investments aimed at penetrating treated areas.

To mitigate this concern, we propose an alternative empirical strategy exploiting the expansion of RecordTV over time using high-frequency data on churches' openings. Specifically, we test in an event study framework whether the increase of Pentecostal churches occurred only a few years after RecordTV's entry into the municipality. We interpret this delay as evidence that, at least for a specific kind of church's investment, there is no immediate complementarity between RecordTV's penetration and opening of churches as part of the Pentecostal expansion strategy.

Outcomes. We derive the number of Pentecostal churches opened in each municipality-year, using data from the Brazilian IRS. The data contain information on formal firms, including the initial date of operation, location, sector, and name. We classify a church as Pentecostal if its name matches any official Pentecostal denomination, such as "*Convenção da Assembleia de Deus no Brasil*", "*Assembleia de Deus Vitória em Cristo*", "*Igreja Pentecostal Deus é Amor*", among others.[51]

Results. Figure 2 displays the coefficients of a full set of dummies spanning six years before to ten years after RecordTV's introduction in a given municipality. The findings show that the number of churches per capita increases in the years following RecordTV coverage, although this growth takes several years to materialize. This delayed effect

[51] We use the list of Pentecostal denomination available at https://pt.wikipedia.org/wiki/Lista_de_ denomina%C3%A7%C3%B5es_protestantes_no_Brasil.

mitigates the concern that our results are primarily driven by complementary Pentecostal expansion strategies other than TV, such as the opening of new churches. If anything, the establishment of Pentecostal churches occurred only several years after the arrival of RecordTV, adding evidence in favor of the role of religious media, or the "digital" church, in driving conversions before the "physical" expansion of the church. Also, there is no evidence of an effect in the pre-coverage period, suggesting that the rise in Pentecostal churches did not predate RecordTV's arrival in a given municipality.

6.2 Dynamics of Behavioral Change: Fertility

Finally, relying on this alternative event study strategy and the high-frequency nature of our data on fertility, we can show how the documented changes in behaviors took place over time at least on this behavioral outcome. Furthermore, this framework allows us to directly test for the plausibility of the parallel-trend assumption.

Outcomes. Our measure of fertility is the number of children a woman gave birth in the given period of time. Since the age of each child in the 2000 Census is not available, we follow an approach similar to La Ferrara, Chong, and Duryea (2012) and reconstruct annual births as follows.[52] We keep only households where there is a 15-49-year-old woman who is either the household head or spouse and assume she is the mother of all kids when there are any.[53] We retrieve the year of birth of each child by subtracting the child's age from the census year. We keep only children born between 1991 and 2000.[54] Finally, for each woman, we compute the total number of children conceived between 1991 and 2000.

[52] Unlike the 1991 Census, the 2000 Census does not contain a variable that identifies the mother when she lives in the same household as her children. Thus, we are unable to use the same approach as La Ferrara, Chong, and Duryea (2012).

[53] When there are kids in the household but the woman reports having had zero live births, we drop the household from the analysis.

[54] We exclude kids born before 1991 because pregnancy must have happened before RecordTV was religiously affiliated.

Results. Figure 3 shows that exposure to RecordTV increases the chance of giving birth only after about four years from RecordTV entry in an area. Also, the rise in fertility does not occur before RecordTV coverage, since none of the coefficients for the years preceding the event is significantly different from zero. After that, there is a positive increase in fertility. To contextualize the magnitude of this effect, we compare our findings on fertility to those of La Ferrara, Chong, and Duryea (2012), who employed a similar empirical strategy to examine the impact of the expansion of Globo's coverage during the 1980s. Their study revealed that Brazilian women in areas covered by Globo experienced a fertility decline of approximately 0.006, driven primarily by the influence of novelas. These soap operas frequently depicted small, affluent families, which inspired viewers to adopt similar family planning practices. In contrast, our results indicate a comparable but opposite effect: women in areas covered by RecordTV during the 1990s increased their fertility by approximately 0.005. This finding underscores the capacity of television and edutainment to shape behaviors across large audiences. However, it also highlights the distinct role of religious narratives in reversing broader social transformations, such as fertility decline, which are typically associated with economic growth and prosperity.

7 Conclusions

This paper sheds light on the influence of religious media, particularly within the context of the Pentecostal movement in Brazil. By examining the impact of exposure to a major TV channel that transitioned to broadcasting religious content, the study provides insights into the dynamics of church affiliation and its consequences on societal behaviors. We find that exposure to RecordTV in the 1990s resulted in a large increase in Pentecostal affiliation. This shift in religious affiliation allows us to study the socio-economic consequences of the expansion of the Pentecostal movement.

We find that religious media cause an alignment of social behaviors with the church's prescriptions. Exposure to RecordTV led to higher fertility rates and decreased female participation in the labor force, suggesting a shift towards traditional gender roles. We also find suggestive evidence of a decrease in the educational attainment of the next generation of girls. Finally, we find that areas with higher RecordTV exposure tended to yield greater vote shares for Pentecostal candidates, strengthening Pentecostal influence on society.

In a broader context, these findings underline the transformative power of new media technologies on deeply ingrained societal values and norms, such as religious affiliation, and its ripple effects on various aspects of society. The increasing use of media platforms for religious proselytization highlights the need for a deeper understanding of their implications on individual behaviors and even political outcomes. While economists have always been interested in the impact of changing technology on society, and increasingly in media technology in particular, this paper emphasizes how this impact is channeled through social norms and religious practices. On the other hand, it also highlights how the study of social norms has to account for the possibility of rapid change, as social movements can leverage changing technology to further their goals and quickly reshape the social landscape.

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Tables

Table 1: Effects of RecordTV Exposure on Behaviors in the Pre-Period 1980-1991 (Placebo)

Dep. Var.:	Δ Share Pentecostals	Δ Number of Children	Δ LFP		Δ Education	
			Women	Men	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage 1990	-.0015	.0038	-.0023	.0022	.0038	-.0049
	(.0019)	(.03)	(.0061)	(.0046)	(.0048)	(.0046)
Number of Observations	3775	3775	3775	3775	3775	3775
Mean of dep. var. in 1991	✓	✓	✓	✓	✓	✓
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the behavioral outcomes of interest measured in the pre-period 1980-1991. The unit of analysis is the municipality. Each dependent variable is the change between 1980 and 1991 in: (1) share of Pentecostals (2) total number of children born alive to women aged 15-49, (3) female labor for participation, (4) male labor for participation (5) share of 15-25 year-old girls who finished middle school, and (5) share of 15-25 year-old boys who finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 2: Effect of RecordTV Exposure on Pentecostal Affiliation

Dep. Var.:	Δ Share of Pentecostals					
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage 1990	.0029	.015***	.0099**	.0096***	.0086***	.0086***
	(.0043)	(.0056)	(.004)	(.0025)	(.0024)	(.0031)
Number of Observations	3813	3813	3813	3813	3813	3813
Mean of dep. var. in 1991	0.03	0.03	0.03	0.03	0.03	0.03
Signal Free Space/Distance		✓	✓	✓	✓	✓
Demographic Controls			✓	✓	✓	✓
State FE				✓	✓	✓
Economic Controls					✓	✓
Spatial SE						✓

Notes: This table presents the effect of RecordTV's coverage in 1990 on affiliation to the Pentecostal church. The dependent variable is the change in the share of Pentecostals between 1991 and 2000. The unit of analysis is the municipality. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 3: Effect of RecordTV Exposure on Other Religions and Conversion

Dep. Var.:	Δ Share of Pentecostal (1)	Δ Share of Catholics (2)	Δ Share of No Religion (3)	Δ Share of Protestants (4)	Δ Share of others (5)
Panel A: Full Sample					
Coverage 1990	.0086***	.0056	-.0061**	-.0031**	.00021
	(.0024)	(.004)	(.0029)	(.0014)	(.001)
Number of Observations	3813	3813	3813	3813	3813
Mean of dep. var. in 1991	0.03	0.84	0.05	0.03	0.03
Panel B: 15-18 yo raised Catholic					
Coverage 1990	.0049***		-.0081**	-.0031	.0019
	(.0014)		(.004)	(.0021)	(.0016)
Number of Observations	3813	3813	3813	3813	3813
Mean of dep. var. in 1991	0.01		0.05	0.03	0.02
Signal Free Space/Distance	✓		✓	✓	✓
Demographic Controls	✓		✓	✓	✓
State FE	✓		✓	✓	✓
Economic Controls	✓		✓	✓	✓

Notes: This table presents the effect of RecordTV exposure in 1990 on religious affiliation and conversion. The unit of analysis is the municipality. Each dependent variable is the change between 1991 and 2000 in the share of: (1) Pentecostals, (2) Catholics, (3) non religious, (4) Protestants, and (5) adherent to other religions. Panel B restricts the sample to children between 15-18 years old affiliated whose parents are Catholics. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 4: Effect of RecordTV Exposure on Behaviors

Dep. Var.:	Δ Number of Children	Δ LFP Women	Δ LFP Men	Δ Schooling Girls	Δ Schooling Boys
	(1)	(2)	(3)	(4)	(5)
Coverage 1990	.028**	-.011**	-.0032	-.013***	.00046
	(.011)	(.0047)	(.0042)	(.0042)	(.0043)
Number of Observations	3813	3813	3813	3813	3813
Mean of dep. var. in 1991	✓	✓	✓	✓	✓
Signal Free Space/Distance	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the behavioral outcomes of interest. The unit of analysis is the municipality. Each dependent variable is the change between 1991 and 2000 in: (1) total number of children born alive to women aged 15-49, (2) female labor for participation, (3) male labor for participation (4) share of 15-25 year-old girls who finished middle school, and (5) share of 15-25 year-old boys who finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 5: Effect of RecordTV and Globo Exposure on Religion and Behaviors

Dep. Var.:	Δ Share Pentecostals	Δ Number of Children	Δ LFP		Δ Education	
			Women	Men	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)
RecordTV 1990	.009***	.028**	-.012**	-.003	-.013***	-.001
	(.0024)	(.012)	(.0046)	(.0042)	(.0044)	(.0045)
Globo 1990	-.003	-.0049	.0049	-.0008	-.0037	.003
	(.0021)	(.0092)	(.0036)	(.0029)	(.0033)	(.0035)
Number of Observations	3813	3813	3813	3813	3813	3813
Mean of dep. var. in 1991	0.03	2.19	0.38	0.88	0.36	0.30
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV and Globo coverage in 1990 on religious affiliation and the behavioral outcomes of interest. The unit of analysis is the municipality. Dependent variable is the change between 1980 and 1991. Each dependent variable is the change between 1991 and 2000 in: (1) share of Pentecostals (2) total number of children born alive to women aged 15-49, (3) female labor for participation, (4) male labor for participation (5) share of 15-25 year-old girls who finished middle school, and (6) share of 15-25 year-old boys who finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 6: Effect of RecordTV Exposure on Voting for Pentecostal Candidates

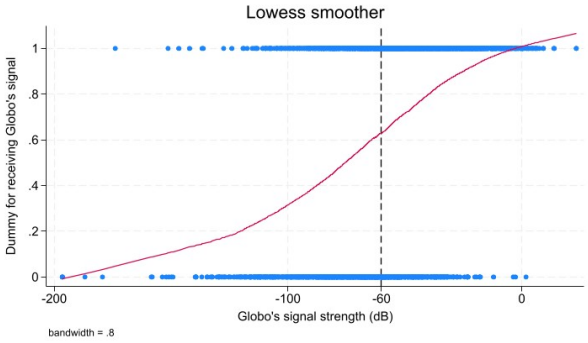
	Pentecostal Vote Share			
	Lacerda		Bispo	
Election cycle:	1998	2010	1998	2010
	(1)	(2)	(3)	(4)
Coverage 1990	-.0038	.012*	.000049	.003***
	(.0055)	(.0071)	(.0021)	(.0011)
Number of Observations	3806	3806	3806	3806
Signal Free Space/Distance	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the share of votes for Pentecostal candidates in the 1998 and 2010 election cycles. We use two different methods to classify candidates. In Columns (1) and (2), we use the vote share of candidates associated with Pentecostal churches from Lacerda 2017); in columns (3) and (4), we use the vote share of Pastors in each election—that is, candidates who used a Pentecostal designation. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

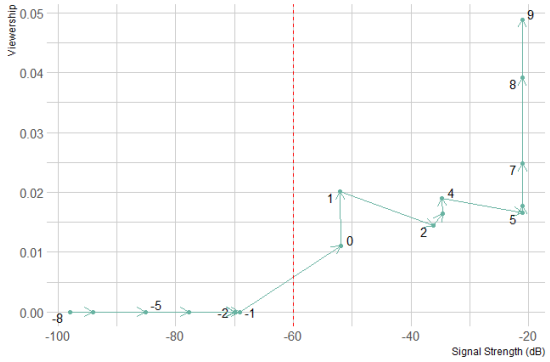
Figures

Figure 1: Choice of the Threshold for Good TV Coverage

(a) Globo's signal strength and Globo's coverage across municipalities

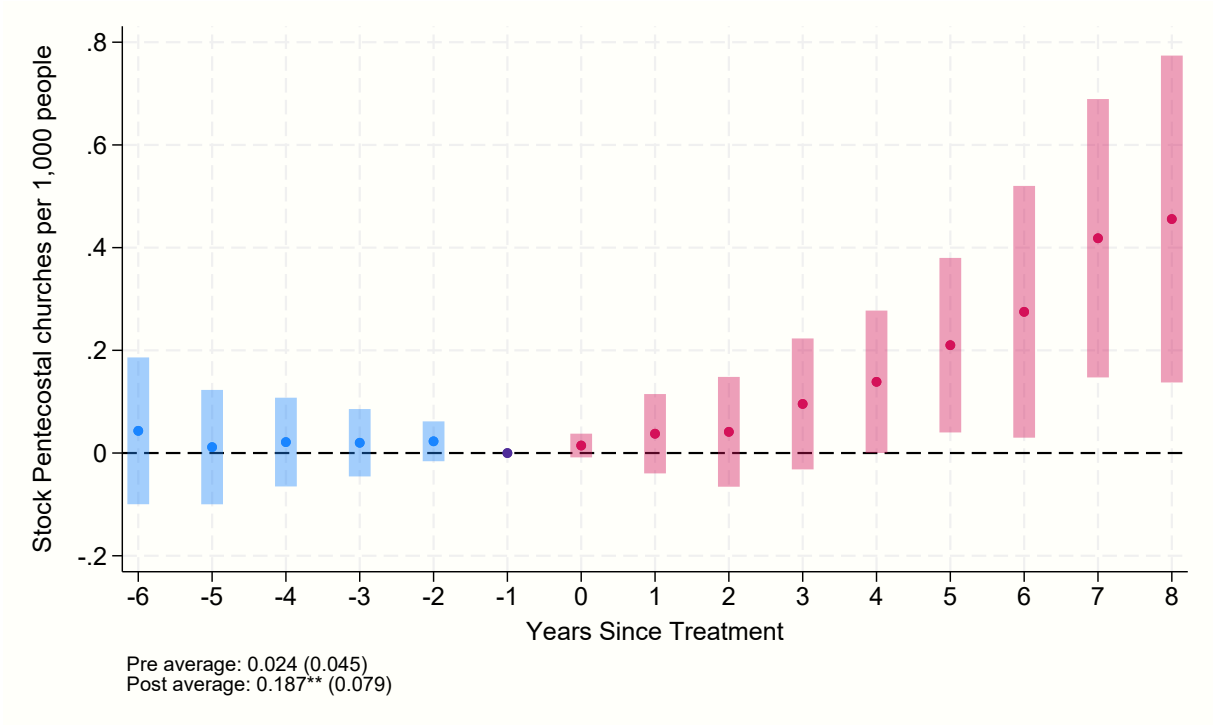


(b) RecordTV's signal strength and RecordTV's viewership across metropolitan regions



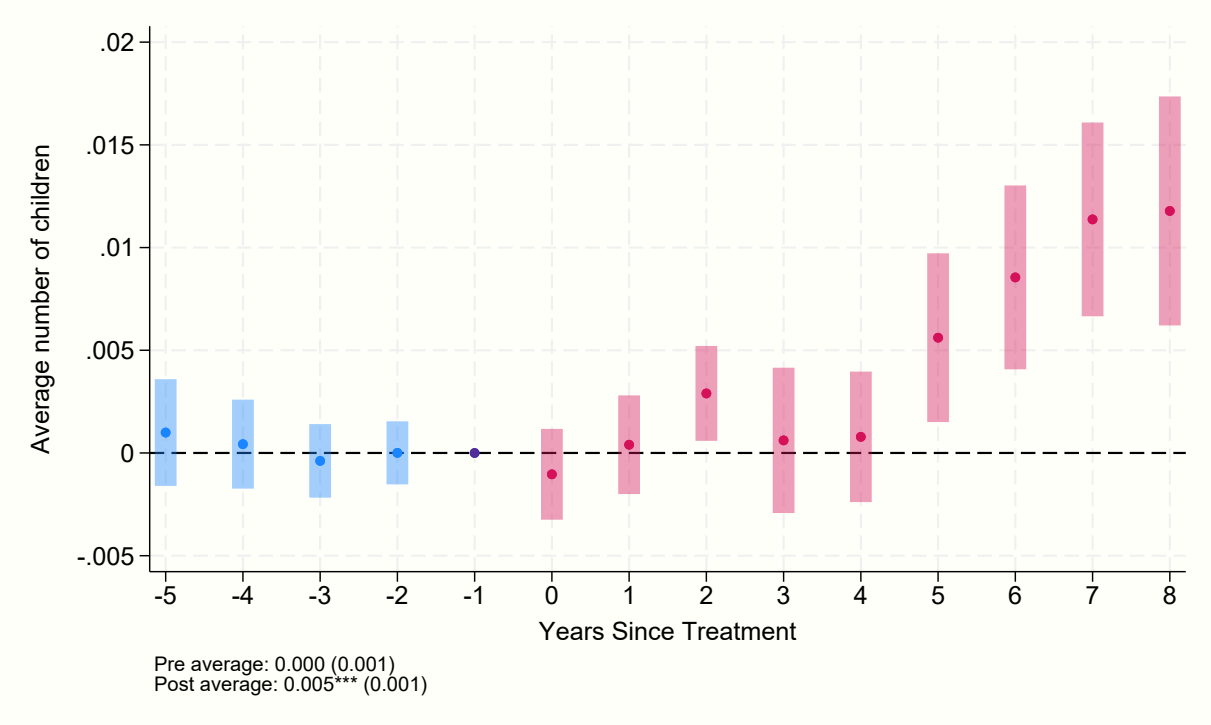
Notes: Panel (a) presents the non parametric fit obtained from a local polynomial regression, where we regress dummy for having reception coming from Globo on the signal strength we compute using the ITM model across municipalities. Panel (b) plots RecordTV's maximum signal strength received by each metropolitan region and RecordTV's daily average viewership. The dots represent the years before and after the event $t = 0$, which is the year when viewership becomes positive for the first time in the metropolitan region. The vertical dashed line represents the cutoff point of -60 dB, used to discretize the signal strength from the ITM to create our measure of coverage.

Figure 2: Event Study on Pentecostal Churches' Openings



Notes: This figure plots the coefficient values and 95% confidence interval for the lead/lag indicator variables for time periods from t = 6 to t = t + 8 around the year of RecordTV entry. The unit of analysis is municipality × year. Standard errors are clustered at the municipal level. Dependent variable is the number of Pentecostal churches per 100,000 inhabitants in each municipality-year.

Figure 3: Event Study on Fertility



Notes: This figure plots the coefficient values and 95% confidence interval for the lead/lag indicator variables for time periods from t = 6 to t = t + 8 around the year of RecordTV entry. The unit of analysis is municipality × year. Standard errors are clustered at the municipal level. Dependent variable is the share of 15 to 49 year-old women that gave birth in each municipality-year.

Appendix A

Table A1: Opinions about Sensitive Topics and Expenditure on Selected Goods by Religious Group

	Pentecostal		Catholic		P-C
Variable	Mean	SD	Mean	SD	p-value
Panel A: Opinion about Sensitive Topics					
Practice Religion Frequently (%)	77.2	42.2	42.1	49.4	0.00
Have Full Confidence in the Church (%)	62	48.8	55.8	49.7	0.26
God is Most Important in Life (%)	97.8	14.7	94.6	22.6	0.07
Think Religion is Important to Teach to Children (%)	79.3	40.7	65.7	47.5	0.00
Homosexuality Can Be Justified (%)	14.1	35	29	45.4	0.00
Abortion Can Be Justified (%)	4.35	20.5	9.33	29.1	0.04
Panel B: Individual Monthly Expenditure on Selected Goods as Share of Total Expenditure					
Alcohol (%)	.699	5	1.78	8.25	0.00
Tobacco (%)	1.4	7.68	4.08	13.7	0.00
Gambling (%)	.308	2.79	.999	6.21	0.00
Entretainment (%)	.208	2.23	.553	3.9	0.00
Transportation (%)	13.2	22.1	12.7	21.9	0.26
Food Outside the Home (%)	7.12	15.5	7.18	15.7	0.87

Notes: Data sources: 2002 Latin Barometer and 2002/2003 and the Brazilian Household Expenditure Survey (POF/IBGE).

Table A2: RecordTV Programming in a Saturday (10/05/1996)

Show	Type
06h00 - Programa Educacional MEC	Educational
06h30 - Jesus Verdade	Religious
07h00 - Renascer	Religious
07h30 - Reunião dos Milagres	Religious
08h30 - Espaço Evangélico	Religious
10h00 - Falando de Vida	Religious
11h00 - Gospel Line	Religious
12h00 - Brasil Feliz com Edson Moura	Talk-show
14h30 - Mara Maravilha Show	Children's show
16h00 - Quem Sabe... Sábado!	Comedy show
18h00 - Circuito Mundial de Vôlei de Praia	Sport
19h00 - Cidade Alerta	News
20h00 - Jornal da Record	News
20h45 - Informe Local	News
21h00 - The Nanny	Sitcom
21h30 - Programa Ana Maria Braga	Talk-show
23h30 - Palavra de Vida	Religious
03h00 - Sessão Transnoite: Família Adams	Series

Notes: This table presents an example of RecordTV schedule in a weekend in the 90s. Sources: http://ehmbdeolhonatv.blogspot.com/2020/10/programacao-antiga-5-de-outubro-de-1996.html.

Table A3: RecordTV Programming in a weekday (01/13/1998)

Show	Type
05h00 - O Despertar da Fé	Religious
06h00 - Santo Culto em Seu Lar	Religious
07h00 - Ponto de Fé	Religious
08h30 - Caminhos da Esperança	Religious (soap-opera)
09h15 - Forno, Fogão & Cia.	Cooking show
09h45 - Desenhos da Vovó	Cartoons
11h00 - O Mundo de Beakman	Children's show
11h30 - Desenho Mania	Cartoons
12h00 - Informe Local	News
12h30 - Zorro	Series
13h00 - Note & Anote	Cooking, art crafts
17h30 - Cidade Alerta	News
19h15 - Jornal da Record	News
20h00 - Olho da Terra	Religious
20h30 - Ratinho Livre	Variety show
22h00 - Programa Ana Maria Braga	Talk-show
24h00 - Jornal Onze e Meia	News
24h25 - Programa de Negócios	Business show
24h30 - 25ª Hora	Religious
01h30 - Palavra de Vida	Religious

Notes: This table presents an example of RecordTV schedule in a weekday in the 90s. Source: http://ehmbdeolhonatv.blogspot.com/2020/01/programacao-antiga-13-de-janeiro-de-1998.html.

Table A4: Descriptive Statistics

variable	mean	median	sd	min	max	count
Panel A: Religious Affiliation						
Share of Pentecostals 1991	.032	.028	.023	0	.21	3813
Share of Catholic 1991	.84	.84	.089	.24	1	3813
Share of Protestants 1991	.03	.024	.036	0	.74	3813
Share of No Religion 1991	.047	.04	.041	0	.3	3813
Share of Other Religions 1991	.028	.019	.026	0	.58	3813
Share of Pentecostals 2000	.098	.099	.046	0	.36	3813
Share of Catholic 2000	.75	.74	.11	.31	1	3813
Share of Protestants 2000	.04	.031	.038	0	.64	3813
Share of No Religion 1991	.047	.04	.041	0	.3	3813
Share of Other Religions 2000	.04	.034	.029	0	.42	3813
Panel B: Behaviors						
Number of Children 1991	2.2	2	.6	1.3	5	3813
Female LFP 1991	.38	.4	.1	.049	.89	3813
Male LFP 1991	.88	.88	.045	.39	1	3813
15-25 yo Girls with Middle School 1991 (%)	.36	.38	.15	0	.75	3813
15-25 yo Boys with Middle School 1991 (%)	.3	.31	.16	0	.64	3813
Number of Children 2000	1.8	1.7	.44	1.1	3.7	3813
Female LFP 2000	.46	.47	.083	.11	.86	3813
Male LFP 2000	.79	.78	.057	.32	.98	3813
15-25 yo Girls with Middle School 2000 (%)	.55	.58	.17	.047	.93	3813
15-25 yo Boys with Middle School 2000 (%)	.46	.5	.18	.028	.9	3813
Panel C: Cross-sectional covariates (1991)						
Population	38506	13742	205122	751	9646185	3813
Share Urban Population	.75	.85	.25	.022	1	3813
Share of White	.52	.52	.25	.00036	1	3813
Share of Black	.05	.039	.037	0	.57	3813
Share of brown	.43	.42	.24	0	1	3813
Less than 4 years of educaction (%)	.44	.39	.21	.11	.95	3813
4 to 7 years of educaction (%)	.29	.3	.095	.04	.71	3813
8 to 10 years of educaction (%)	.082	.085	.041	0	.17	3813
11 or more years of educaction (%)	.17	.14	.11	0	.49	3813
Share Working Age (18-60yo)	.52	.54	.057	.35	.62	3813
Average household income (2010 BRL)	443	385	281	49	1401	3813
Gini index	.54	.55	.057	.32	.92	3813
GDP in 1991 (in million, 2010 BRL)	29956	1139	74938	2.3	285930	3813
Share Urban Population	.75	.85	.25	.022	1	3813
Share Employed in Manufacture	.061	.052	.047	0	.36	3813
Share Employed in Non-tradable sectors	.22	.24	.091	.022	.45	3813
Height (m)	398	364	340	0	1628	3813
Area (km^2)	5290	798	23876	3.7	279368	3813
Panel D: Signal Strength and Coverage						
Signal	-85	-87	34	-245	8.2	3813
Signal FS	-21	-22	9.8	-43	20	3813
Coverage	.24	0	.43	0	1	3813

Table A5: Effect of RecordTV Exposure on Religious Affiliation and Behaviors - Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A:Δ Share Pentecostal								
Coverage 1990	.0029	.015***	.0099**	.0096***	.0086***	.0086***	.0081***	.0075***
	(.0043)	(.0056)	(.004)	(.0025)	(.0024)	(.0031)	(.0022)	(.0024)
Mean of dep. var. in 1991	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Panel A:Δ Number of Children								
Coverage 1990	.069**	.079***	.016	.028**	.028**	.028**	.03***	.028***
	(.034)	(.022)	(.011)	(.011)	(.011)	(.012)	(.011)	(.011)
Mean of dep. var. in 1991	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
Panel B:Δ FLFP								
Coverage 1990	-.0039	.0049	-.0033	-.011**	-.011**	-.011*	-.007*	-.012**
	(.0081)	(.0081)	(.0047)	(.0047)	(.0047)	(.006)	(.0041)	(.0047)
Mean of dep. var. in 1991	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Panel C:Δ MLFP								
Coverage 1990	.017***	.011**	.0024	-.004	-.0032	-.0032	-.0035	-.0032
	(.0036)	(.0045)	(.004)	(.0042)	(.0042)	(.0048)	(.0042)	(.0042)
Mean of dep. var. in 1991	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Panel A:Δ Schooling Girls								
Coverage 1990	-.012	-.0065	-.029***	-.016***	-.013***	-.013**	-.013***	-.013***
	(.013)	(.0082)	(.0053)	(.0047)	(.0042)	(.0052)	(.0043)	(.0042)
Mean of dep. var. in 1991	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Panel D:Δ Schooling Boys								
Coverage 1990	-.012	.0074	-.02***	-.0024	.00046	.00046	-.000036	-.00098
	(.013)	(.011)	(.0063)	(.0048)	(.0043)	(.0053)	(.0043)	(.0043)
Mean of dep. var. in 1991	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Signal Free Space/Distance		✓	✓	✓	✓	✓	✓	✓
Demographic Controls			✓	✓	✓	✓	✓	✓
State FE				✓	✓	✓	✓	✓
Economic Controls					✓	✓	✓	✓
Spatial SE						✓		
Alternative Econ. Controls							✓	
Double lagged dep. var.								✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the behavioral outcomes of ineterst. The unit of analysis is the municipality. Dependent variables are in changes between 1991 and 2000. Dependent variable in each Panel are defined as: (A) share of Pentecostals, (B) total number of children, (C) female labor for participation, (D) male labor for participation, (E) share of 15-25 year-old girls that finished middle school, and (F) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, log of GDP per capita and, exposure to trade shocks at the micro-region level. Alternative economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, log of GDP per capita, share of urban population, share of people employed in manufacturing and, share of people employed in nontradable sectors. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A6: Long-term Effect of RecordTV Exposure on Religious Affiliation and Behaviors

Dep. Var.:	Δ Share Pentecostal	Δ Number of Children	Δ LFP		Δ Schooling	
			Women	Men	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage 1990	.0062**	.014	-.0069	-.0052	-.0018	.0069
	(.0031)	(.014)	(.007)	(.0046)	(.0051)	(.0055)
Mean of dep. var. in 1991	0.03	2.19	0.38	0.88	0.36	0.30
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the behavioral outcomes of interest. The unit of analysis is the municipality. Each dependent variable is the change between 1991 and 2010 in: (1) share of Pentecostals, (2) total number of children, (3) female labor for participation, (4) male labor for participation, (5) share of 15-25 year-old girls that finished middle school, and (6) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level. Regressions are weighted by population in 1991. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A7: Effect of RecordTV Exposure on Religious Affiliation and Behaviors using Alternative Measures of Coverage

Dep. Var.:	Δ Share Pentecostal	Δ Number of Children	Δ LFP		Δ Schooling	
			Women	Men	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)
Non-linear transformation	.015**	.07*	-.015	.015	-.026**	-.0013
	(.0073)	(.036)	(.015)	(.011)	(.011)	(.011)
Linear (std)	.0034*	.014	-.002	.0045*	-.0077***	-.0029
	(.002)	(.0091)	(.0039)	(.0026)	(.0027)	(.0028)
Mean of dep. var. in 1991	0.03	2.19	0.38	0.88	0.36	0.30
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓

Notes:: This table shows the effect of RecordTV exposure in 1990 on the behaviors using two different continuous measures of the signal: (a) a logistic transformation of the signal and (b) linear. The unit of analysis is the municipality. Dependent variables are in changes between 1991 and 2000. Dependent variables are defined as: (1) share of Pentecostals, (2) total number of children, (3) female labor for participation, (4) male labor for participation, (5) share of 15-25 year-old girls that finished middle school, and (6) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A8: Effect of RecordTV Exposure on Religious Affiliation and Behaviors using Different Sample

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Δ Share Pentecostal						
Coverage 1990	.0085***	.0084***	.0084***	.0086***	.0077***	.0092***
	(.0024)	(.0024)	(.0024)	(.0024)	(.0027)	(.0024)
Mean of dep. var. in 1991	0.03	0.03	0.03	0.03	0.03	0.03
Panel B: Δ Number of Children						
Coverage 1990	.028**	.028**	.029**	.028**	.032**	.027**
	(.011)	(.012)	(.012)	(.012)	(.013)	(.011)
Mean of dep. var. in 1991	2.19	2.19	2.19	2.19	2.20	2.14
Panel C: Δ FLFP						
Coverage 1990	-.012**	-.012**	-.012**	-.012**	-.0086*	-.012**
	(.0047)	(.0047)	(.0047)	(.0048)	(.0048)	(.0048)
Mean of dep. var. in 1991	0.38	0.38	0.38	0.38	0.38	0.39
Panel D: Δ MLFP						
Coverage 1990	-.003	-.003	-.0028	-.0034	-.0052	-.0029
	(.0042)	(.0043)	(.0043)	(.0044)	(.0046)	(.0043)
Mean of dep. var. in 1991	0.88	0.88	0.88	0.88	0.88	0.88
Panel E: Δ Schooling Girls						
Coverage 1990	-.013***	-.013***	-.013***	-.015***	-.013***	-.014***
	(.0042)	(.0042)	(.0043)	(.0043)	(.0047)	(.0042)
Mean of dep. var. in 1991	0.36	0.36	0.36	0.36	0.36	0.37
Panel F: Δ Schooling Boys						
Coverage 1990	.00011	-.00026	-.00043	-.0011	-.0028	.00043
	(.0043)	(.0044)	(.0044)	(.0045)	(.0051)	(.0043)
Mean of dep. var. in 1991	0.30	0.30	0.30	0.30	0.30	0.31
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓
Distance above percentile	1	5	10	25	50	
Excluding region North						✓

This table shows the effect of RecordTV exposure in 1990 on the behavioral outcomes of interest. The unit of analysis is the municipality. Dependent variables are in changes between 1991 and 2000. Dependent variables are defined as: (A) share of Pentecostals, (B) total number of children, (C) female labor for participation, (D) male labor for participation, (E) share of 15-25 year-old girls that finished middle school, and (F) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, share of household that own a TV, Gini index, log of GDP. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A9: Effect of RecordTV Exposure on Pentecostal Affiliation by Age

	(1)	(2)	(3)	(4)	(5)
Panel A: by age	15-20	20-30	30-40	40-50	50-60
Coverage 1990	.01***	.01***	.0078***	.0067**	.0085***
	(.0026)	(.0025)	(.0028)	(.0028)	(.0028)
Mean of dep. var. in 1991	0.03	0.03	0.03	0.03	0.03
Panel B: by share of Catholics in 1991	Below	Above			
Coverage 1990	.0072**	.0048*			
	(.0029)	(.0025)			
Mean of dep. var. in 1991	0.04	0.01			
Signal Free Space/Distance	✓	✓			
Demographic Controls	✓	✓			
State FE	✓	✓			
Economic Controls	✓	✓			

Notes: This table shows the effect of RecordTV exposure in 1990 on the change in the share of Pentecostals between 1991 and 2000 using the following samples: individuals aged 15-20 (Panel A, column 1), individuals aged 20-30 (Panel A, column 2), individuals aged 30-40 (Panel A, column 3), individuals aged 40-50 (Panel A, column 4), individuals aged 50-60 (Panel A, column 5), municipalities with below median Catholic share (Panel B, column 1), municipalities with above median Catholic share (Panel B, column 2). Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A10: Effect of RecordTV Exposure on Fertility by Women's Age Ranges

	15-49	15-25	25-35	35-49
	(1)	(2)	(3)	(4)
Coverage 1990	.028**	.0044	.025	.065*
	(.011)	(.0077)	(.016)	(.034)
Mean of dep. var. in 1991	2.19	0.62	2.31	4.06
Signal Free Space/Distance	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on fertility by women's range of age. Dependent variable is defined as the change in the total number of children of women aged: (1) 15-49, (2) 15-25, (3) 25-35, (4) 35-49. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A11: Effect of RecordTV Exposure on Education by Gender, Age Ranges, Employing Alternative Schooling Measures

	Years of Education		Finished Middle School		Started High School		Finished High School†	
	Girls (1)	Boys (2)	Girls (3)	Boys (4)	Girls (5)	Boys (6)	Girls (7)	Boys (8)
Panel A: 15 to 25 years old								
Coverage 1990	-.046*	.015	-.013***	.00046	-.0096**	-.00073	-.0044	-.0012
	(.028)	(.031)	(.0042)	(.0043)	(.0038)	(.0037)	(.0042)	(.0038)
Mean of dep. var. in 1991	6.03	5.42	0.36	0.30	0.25	0.19	0.21	0.16
Panel B: 25 to 30 years old								
Coverage 1990	-.056	-.036	-.0069*	-.0032	-.0053	-.0025	-.0067**	-.0018
	(.041)	(.045)	(.004)	(.0044)	(.0034)	(.0041)	(.0032)	(.0036)
Mean of dep. var. in 1991	6.33	5.97	0.38	0.37	0.29	0.26	0.25	0.22
Panel C: 30 to 40 years old								
Coverage 1990	-.015	-.034	-.0033	-.0033	-.0037	-.0053	-.0041	-.0037
	(.033)	(.032)	(.0042)	(.004)	(.0033)	(.0033)	(.0031)	(.0032)
Mean of dep. var. in 1991	5.56	5.53	0.33	0.33	0.25	0.24	0.22	0.21
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓	✓	✓

Notes: This table shows the effect of RecordTV exposure in 1990 on the outcomes in 2000. Dependent variables are defined as: (1) total years of education for girls, (2) total years of education for boys, (3) share of girls that finished middle school, (4) share of boys that finished middle school, (5) share of girls that completed at least one year of high school, (6) share of boys that completed at least one year of high school, (7) share of girls that finished high school, (8) share of boys that finished high school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, share of household that own a TV, Gini index, log of GDP and, exposure to trade shocks at the micro-region level. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

† We exclude girls and boys between 15-17 years-old from Panel A because they are not old enough to have finished high school yet.

Table A12: Robustness: Alternative Distance Polynomials

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Δ Share Pentecostal						
Coverage 1990	.0044**	.0064***	.0077***	.0086***	.0086***	.0081***
	(.0021)	(.0023)	(.0024)	(.0024)	(.0024)	(.0024)
Mean of dep. var. in 1991	0.03	0.03	0.03	0.03	0.03	0.03
Panel B: Δ Number of Children						
Coverage 1990	.016*	.016	.023**	.028**	.028**	.027**
	(.0084)	(.01)	(.011)	(.011)	(.011)	(.012)
Mean of dep. var. in 1991	2.19	2.19	2.19	2.19	2.19	2.19
Panel C: Δ FLFP						
Coverage 1990	-.012***	-.0077*	-.0098**	-.011**	-.011**	-.0097**
	(.0038)	(.0043)	(.0047)	(.0047)	(.0047)	(.0048)
Mean of dep. var. in 1991	0.38	0.38	0.38	0.38	0.38	0.38
Panel D: Δ MLFP						
Coverage 1990	-.00046	-.0007	-.0025	-.0032	-.0031	-.0014
	(.0029)	(.0034)	(.0041)	(.0042)	(.0042)	(.0042)
Mean of dep. var. in 1991	0.88	0.88	0.88	0.88	0.88	0.88
Panel E: Δ Schooling Girls						
Coverage 1990	-.0028	-.0069*	-.014***	-.013***	-.013***	-.014***
	(.0036)	(.0038)	(.0041)	(.0042)	(.0042)	(.0043)
Mean of dep. var. in 1991	0.36	0.36	0.36	0.36	0.36	0.36
Panel F: Δ Schooling Boys						
Coverage 1990	.0032	.002	-.00089	.00046	.00026	-.000064
	(.0036)	(.0038)	(.0042)	(.0043)	(.0043)	(.0044)
Mean of dep. var. in 1991	0.30	0.30	0.30	0.30	0.30	0.30
Distance 1st order	✓	✓	✓	✓	✓	✓
Distance 2nd order		✓	✓	✓	✓	✓
Distance 3rd order			✓	✓	✓	✓
Distance 4th order				✓	✓	✓
Distance 5th order					✓	✓
Distance 6th order						✓

This table shows the effect of RecordTV exposure in 1990 on the behaviors. The unit of analysis is the municipality. Dependent variables are in changes between 1991 and 2000. Dependent variables are defined as: (A) share of Pentecostals, (B) total number of children, (C) female labor for participation, (D) male labor for participation (E) share of 15-25 year-old girls that finished middle school, and (F) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. All regressions control for the signal in the free-space. Regressions are weighted by the 1991 population. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A13: Effect of RecordTV Coverage on Viewership

	Measure 1	Measure 2
	(1)	(2)
coverage	.2**	.043***
	(.057)	(.01)
Mean of dependent variable	0.55	0.13

Notes: This table shows the effect of RecordTV exposure on the channel's viewership for ten metropolitan regions whose viewership data are available, using two different measures of viewership. In column (1), we assume that people watch RecordTV at most two hours a day. Thus, in each two hours-time slot there are different viewers. We then construct our measure of viewership by summing all the households within a day that were connected to RecordTV, and taking the average across days of the week and months to obtain an annual estimate of viewership. In column (2), we take the maximum number of households across the two-hours slots within a day that were connected to RecordTV, and take the average across days of the week and months to obtain an annual estimate of viewership. *p<0.10,**p<0.05,***p<0.01

Table A14: Effect of RecordTV Exposure on Migration and on Religious Affiliation and Behaviors controlling for Baseline Share of Migrants

Dep. Var.:	Δ Share Migrants	Δ Share Pentecostal	Δ Number of Children	Δ LFP		Δ Schooling	
				Women	Men	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Coverage 1990	-.0046	.0081***	.03***	-.011**	-.0031	-.014***	-.00012
	(.0029)	(.0023)	(.011)	(.0047)	(.0043)	(.0042)	(.0043)
Mean of dep. var. in 1991	0.10	0.03	2.19	0.38	0.88	0.36	0.30
Signal Free Space/Distance	✓	✓	✓	✓	✓	✓	✓
Demographic Controls	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓
Economic Controls	✓	✓	✓	✓	✓	✓	✓
Share of Migrants 1991		✓	✓	✓	✓	✓	✓

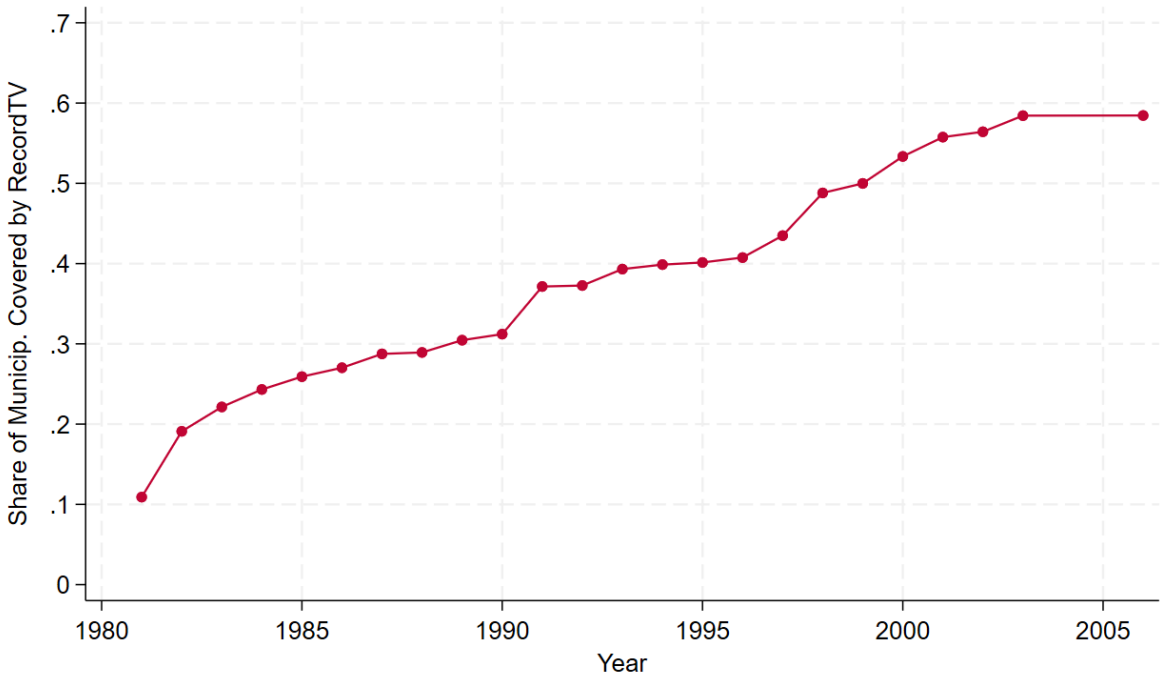
Notes: This table shows the effect of RecordTV exposure in 1990 on the share of migrants and the main results controlling for the share of migrants in 1991. The unit of analysis is the municipality. Dependent variables are defined as: (1) share of migrants in the municipality, (2) share of Pentecostals, (3) total number of children, (4) female labor for participation, (5) male labor for participation (6) share of 15-25 year-old girls that finished middle school, and (7) share of 15-25 year-old boys that finished middle school. Demographic controls measured in 1991 include: share of people with 4-7 years of education, share of people with 8-10 years of education, share of people with 11 or more years of education, share of white, share of working age population, share of elderly people, share of women. Economic controls measured in 1991 include: log population, log average household income, exposure to trade shocks, and log of GDP per capita. All regressions control for the signal in the free-space. Regressions are weighted by the 1991 population. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A15: Determinants of Coverage (logit)

	(1)	(2)	(3)
Population (log)	-0.077	-0.060	-0.088
	(0.206)	(0.192)	(0.193)
Share urban population	0.697	4.047**	1.079
	(0.753)	(1.696)	(1.265)
(mean) log_avg_hh_income	-0.304	-0.056	0.109
	(0.208)	(0.285)	(0.304)
log_gdp_pc1991	-0.321	0.237	0.070
	(0.269)	(0.317)	(0.323)
Gini index	-0.846	-1.978	-2.578
	(2.815)	(2.553)	(2.490)
4 to 7 years of educaction (%)	-1.106	-7.125***	-3.602
	(1.574)	(2.450)	(2.541)
8 to 10 years of educaction (%)	34.158***	14.794	-3.182
	(8.893)	(10.979)	(9.341)
11 or more years of educaction (%)	6.163*	-7.059	-5.151
	(3.579)	(6.194)	(4.810)
Share of white	-0.020	4.324***	1.652
	(0.684)	(1.138)	(1.265)
Share above 60 yo	39.834***	23.265**	7.704
	(11.633)	(11.367)	(9.412)
Share working age (18-60 yo)	8.404*	1.131	-19.415**
	(4.738)	(8.625)	(8.789)
Share of women	-46.075**	-29.379*	-3.752
	(18.676)	(17.344)	(16.537)
Share of households that owns a TV	-5.812***	-4.609**	2.565
	(1.784)	(2.185)	(2.203)
Population employed in manufacture (%)	6.447**	-3.307	1.202
	(2.653)	(3.454)	(3.937)
Population employed in services (%)	-1.669	-2.472	-1.072
	(3.268)	(4.733)	(4.332)
Regional tariff reductions	-0.149	6.862	5.253
	(3.509)	(5.037)	(5.440)
Mean of dependent variable	0.26	0.26	0.28
p-value of F-test	0	0	.024
R^2	0.14	0.79	0.82
Signal Free Space/Distance		✓	✓
State FE			✓

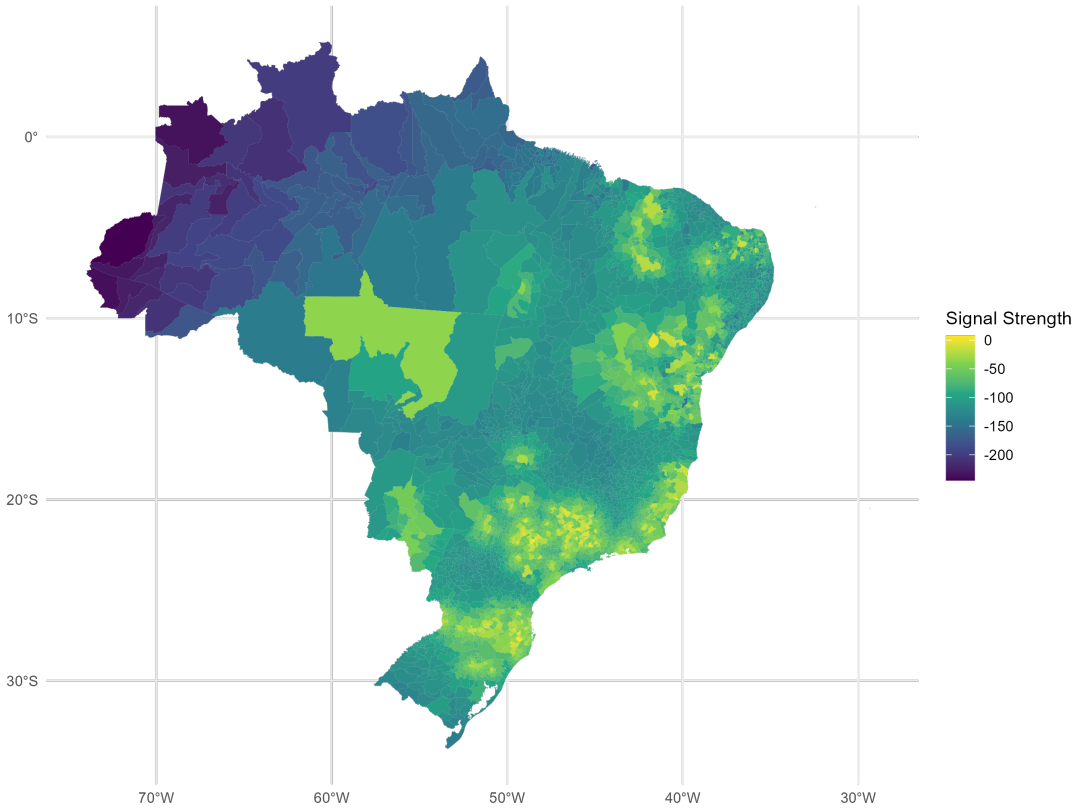
Notes: This table shows the determinants of RecordTV's coverage in 1990. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Figure A1: Expansion of RecordTV



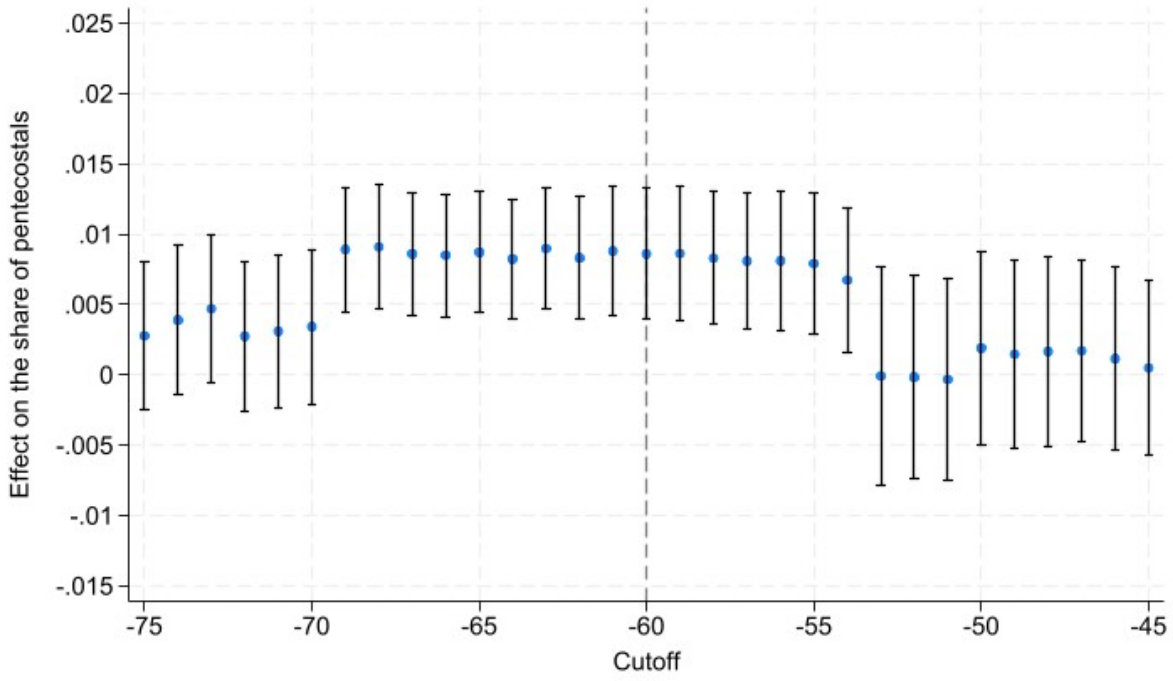
Notes: This figure shows the percentage of municipalities covered by RecordTV over time.

Figure A2: RecordTV Signal Strenght in Brazil



Notes: This map shows RecordTV's signal strength in 1990 across municipalities.

Figure A3: Sensitivity analysis



Notes: This figure shows the effect of RecordTV exposure on the share of Pentecostals using alternative cutoffs to define coverage. 95% confidence intervals are reported. The gray vertical dashed line indicates the cutoff used in this paper.

A.1 Determinants of TV signal

In this section, we explore the correlates of the cross-sectional variation in the signal strength of Record TV. Table A15 presents the results of municipality level logit regressions. Relevantly, our identifying assumption does not require RecordTV coverage to be balanced across municipal-level characteristics that are likely correlated with TV access. As our model is estimated in first-differences, we require RecordTV's coverage not to be correlated with previous trends in the outcomes, which we test in Table 1. Nonetheless, in Table A15, we still investigate the correlation between RecordTV's coverage in 1990, thus upon purchase by Macedo, and municipal socio-economic characteristics at the time. In Column (1), we regress coverage on several characteristics and, not surprisingly, the initial coverage is higher in areas with better socio-economic conditions, such as places where the population was more educated, or older. In Column (2), we control for our set of propagation controls, i.e. the signal in the free-space and four polynominal of the distance to the closest transmitter. Interestingly, the R^2 shown at the bottom of the table indicates that most of the variation in RecordTV signal is explained by such measures of the distance from the closest antenna. Finally, in column (3), coverage becomes balanced across all municipal characteristics but one, after we further include state-fixed effects. To be conservative, we include all these socio-economic characteristics as controls in equation 1.

A.2 Example From a Specific Show

The show aired in February 2nd, 2011 started by showing a short documentary about traffic of women for sex work. After that, telespectators were invited to give their opinion on the whether these women are victims or guilty for the situation. The pastor took the calls, listened to the person's opinion, and discussed it briefly. Then, an ex-sex worker and

a drug and alcohol user gave her testimonial on how the UCKG helped her to transform her life. Here is an exert:

Woman: "I was in there [in the brothel], but I wanted to meet someone, to change my life. I wasn't there because I wanted to, because I liked it. Then the day came and it happened. I met my husband there. I got out, we talked and I left. Then we moved in together."

Narrator: "Despite recognizing that life had given her a very valuable gift, Sueli had left family values in the distant past and thus, her attitude put everything at risk."

Woman: "At home I didn't serve as a wife, I still didn't have wisdom, I didn't have direction. I lived a completely wrong life and then I came to change. Suddenly I couldn't. So I started to fight with him. I started arguing, cursing, not respecting the patience and unconditional love of a man without prejudice."

Narrator: "It reached the limit. Her husband's harsh words sounded like a bomb in Sueli's ears.

Woman: "And that's when he told me the right place for me was the brothel. I have had the opportunity to change to change. And I was throwing away this opportunity that our marriage was going to work out, even though I wasn't born to have a family, to marry, because that way there was no way for us to live."

Narrator: "Sueli knew that in that way she was destroying their relationship, that there was truth in every word she heard from her husband. She knew that she needed to assume the position of a married woman, but on the other hand, she also knew that she couldn't do it alone. So, Sueli took the first step in seeking help.

Woman: "I had already been attending Universal Church programs for three months and I was proud. I didn't want to go to church, I thought that wasn't going to change any-

thing. Then when I saw that either I would go to church or I would lose that opportunity, and I was afraid of I losing it. And that's when I decided to go to church with a heart that wanted a change."

Narrator: "Sueli arrived at the Universal Church of the Kingdom of God. From each meeting she attended, she took with her a new lesson, which reflected in changes in my marriage."

Woman: "Today we live well, we have a good relationship, we understand each other."

Narrator: "With the experience of those who knew firsthand the results of exercised faith, Sueli started a new stage in another area of her life."

Woman: "I took a hairdressing course. Then I started working at my house, until over time I built a salon. So, today my financial life was transformed. We have our car, we have a beautiful, big house with several rooms, we have a comfortable house."

A.3 TV Shows

25th Hour/Speak that I will listen (*25a Hora/Fala que eu te escuto*): "25th Hour" was a live show hosted by Pastors that was launched in 1992. Its content was strictly religious. At the end of the show, a glass of sanctified water was used to bless the audience. In 1998, the show was replaced by "Speak that I will listen", which followed a similar format although the content was expanded to topics other than religion. It was one of the most popular night shows on the Brazilian TV.

Mysteries (*Mistérios*): [...] The show had an section called "Exorcism Sections", where Pastors associated diseases and misconducts to the action of devil spirits of Afro-Brazilian religions. RecordTV faced a law suit because of this show.

Nosso Tempo: This show follows the true cases of people who overcame their problems thanks to their meeting with faith and succeed in changing their life.

O despertar da fé: at the beginning, this program was personally conducted by Edir Macedo. The logo used was that of two hands joined in a prayer position, gently cut by sunlight, and rigorously selected testimonies came to speak about their religious experiences.

In 1997, RecordTV started producing short soap operas with religious and moralizing content. Here, we briefly describe some of these shows.

The Devil's Daughter (*A filha do Demonio*): Ana's soul was sold to the Devil by her father, a poor man, for US$100,000. While her father lived a frivolous life, Ana grew up angry and bitter because of the devilish pact. This rage turned her into a rebellious and mean adult. When the father decides to confess her about the pact, she gets a chance of changing her destiny.

The Eye of the Earth (*O olho da Terra*): Sara was a spiteful woman that used witchcraft to attack the wife of the man she loved. Her misdeeds ended when an evangelizing man arrived to the town. The show had the participation of a famous Brazilian gospel singer.

Soul of Stone (*Alma de Pedra*): Leandro was a bitter and disturbed man. His life transformed when he decided to convert to the UCKG. This story was based on testimonies of the UCKG's believers.

Elias' Challenge (*O desafio de Elias*): this historical fiction gravitates around the struggle of Elijah, an ordinary man who received the divine call, to make the Word of the God of Israel prevail and to convince the Jewish people of their sins. Opposed by the proud King Ahab and his wife, the evil Jezebel, he fought to prove that the Lord is

more powerful and stronger than the false god Baal.

A História de Ester: Ester, a Jewish girl, decided to marry a pagan king and became queen to protect the Jews from extermination, while hiding her religious identity.