

Supplementary Appendix for:
Church Tax Exemption and Structure of Religious
Markets: a Dynamic Structural Analysis

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Appendix

This Appendix is divided in eight parts:

1. Further details on the institutional background;
2. Anecdotal evidence that we use to support “normalizations” of churches payoff functions;
3. Technical details on the structural model;
4. Estimates of Conditional Choice Probabilities (CCPs) that correspond to the first stage of the structural estimation of the model;
5. Evidence to support key assumptions behind the structural model;
6. Estimates of the structural model and counterfactuals with an alternative payoff function, under alternative interpretations of churches payoffs and different “normalizations” of churches net exit costs;
7. Churches response to taxation depending on the magnitude of entry costs; and,
8. Additional tables and figures.

A Institutional Background Details

In this Appendix we explain the taxonomy of Brazilian religious denominations that we use throughout this paper and briefly describe the three successive waves of Pentecostal denominations that started to threat Catholic hegemony.

The taxonomy of Brazilian religious denominations that we use in this paper, which primarily follows [Mariano \(2014\)](#), is shown in Table [6](#). We group all denominations into 5 major traditions. The Catholic group (I) includes the Roman Catholic Church and the Orthodox Church, the latter group being inexpressive in terms of number of members. Mainline Protestants (II) include the main denominational families that share common foundational doctrines that can be more directly traced to the Reformation, and are typically seen as European immigrant’s churches or “transplantation churches” in Brazil.

Groups (III) and (IV) have the main Evangelical denominations. According to [Noll \(2011\)](#), “(...) *evangelical traits have never by themselves yielded cohesive, institutionally compact, or clearly demarcated groups of Christians, but [rather] (...) identify a large family of churches and religious enterprises.*” Taxonomy and classifications within this religious universe are not strictly consistent across languages, religious authorities, or research. In Latin America it is commonly used as an umbrella concept that includes first and foremost Pentecostals, Neo-Pentecostals, and Neo-Charismatic movements. Non-Pentecostal Evangelicals (III) include denominations typically associated with the *Second Great Awakening* movement of the early 19th century in the United States. Pentecostal Evangelicals (IV) designate a wide range of younger and mainly indigenous churches that share several of the following features: a literal approach to the Bible, a belief that Jesus will return during

their lifetime, and the prosperity gospel. Especially in Neo-Pentecostal denominations, worship services often involve divine healing, speaking in tongues, exorcism, and the receiving of direct revelations from God (Zilla, 2018). Non-Christian religions make up Group (V), which is significantly underrepresented in the Brazilian population compared to the other groupings.

Table 6: Religious Denominations in Brazil

Group	Denominations
I Catholic	Roman, Orthodox
II Mainline Protestant	Lutheran, Anglican, Calvinist, Anabaptist
III Non-Pentecostal Evangelical	Presbyterian, Congregationalist, Baptists, Methodist, Adventist
IV Pentecostal Evangelical	Christian Congregation, Assembly of God, Foursquare, Universal Brasil para Cristo, Deus é Amor, Renascer, Mundial, Nazareno Casa da Benção, Casa da Oração, Maranata, Igreja da Graça
V Other	Afro-Brazilian, Spiritism, Eastern Religions, Judaism, Islam

Pentecostalism in Brazil was consolidated over time in three different waves. The first wave brought “classic Pentecostalism” to Brazil via Europeans migrants who converted to the new movement in the United States. It started in 1910 with the foundation of the new churches of *Christian Congregation in Brazil* and, in 1911, with the *Assembly of God*.⁶⁶

The second wave started in 1950 with the *Foursquare Church*, brought to Brazil from the US in 1951, and *O Brasil para Cristo* (Brazil for Christ), the first Pentecostal denomination founded by a Brazilian – radio-evangelist Manoel de Mello – in 1955.⁶⁷ This pattern of successful pastors who later founded their own church with intense use of mass media was a recurring phenomenon in the following decades (Lima, 2007).

The third (neo-Pentecostal) wave has as its most influential Church the *Universal Church of the Kingdom of God* (or IURD, in Portuguese), founded in 1977. Among other contemporaneous denomination, it followed an aggressive expansion strategy with the intense use of TV and radio and a combination of organizational structure and marketing strategies akin to those of a typical capitalistic corporation.⁶⁸ These churches had few traces of sectarianism and did not required followers for adherence to strict rules of conduct that characterized the Pentecostalism of the first generation. They also spread the Prosperity Gospel doctrine and strongly encouraged believers to tithe.

Neo-Pentecostal churches openly engaged in politics and started to nominate candidates in the late 1980s, who would participate go on to be part of the Constitutional Assembly

⁶⁶These new churches emphasized gifts of the spirit such as speaking in tongues, casting out demons, and prophesying (Freston, 1995; Lingenthal, 2012).

⁶⁷It distinguishing itself from the former wave through its emphasis on divine healing during worship as a gift of the Holy Spirit

⁶⁸The third wave preached the existence of a spiritual warfare against the devil and his followers on Earth, who they would identify as the other religions, especially Afro-Brazilian religions (Lingenthal (2012)).

of 1988, and obtain radio and TV concessions later used as religious media (Freston et al., 1993). Indeed, recent works show that the strategy of aggressive geographic expansion of temple building complemented with mass TV and radio presence was key for the rise of neo-pentecostalism in Brazil in the last few decades (Corbi and Komatsu, 2019).

B Normalization of Exit Costs

This Appendix shows a series of evidences that serve to support the normalization of churches net exit costs, as we discussed in Section IV. In the municipalities that are part of our sample, the temple is the only relevant component of churches capital. Net exit costs churches pay to shut down a temple will depend on what happens to this structure once a church decides to leave any market. Given that Catholic and Evangelical churches operate based on different business models, the former acquiring this capital whereas the latter typically rents it, the components of exit costs may differ across the two groups of churches. Next, we provide a separate description of the main components of net exit costs for Catholic and Evangelical churches, arguing that regardless of these differences, the exit costs of both types of churches may be very close to zero.

Evangelical churches. As discussed in Section II, Evangelical places of worship are usually housed in functional rented properties. A case in point is the *Igreja Universal do Reino de Deus* (IURD) which has 7 million members in Brazil and rents 8.806 properties (Tavolaro, 2007) placing it as one of the top tenants in the country.⁶⁹

Table 7: Household per Capita Income and Rental Expenditure – 2010 Census in R\$ of 2010, Monthly

	Mean	Median	5th Percentile	95th Percentile
Our Sample				
Household Rental Expenditure	184.7	150	50	500
Household Income (per Capita)	1541.8	900	30	4560
National Sample				
Household Rental Expenditure	325.9	250	80	770
Household Income (per Capita)	2232.7	1320	112	6600

Note: All monetary values are in 2010 Brazilian Reais.

The source of exit cost in the case of rented properties would be related to breaking a real estate lease. According to local law, the fine for returning a building before the lease expires is equal to the proportional time remaining in the contract multiplied by three months' rent. However, in many instances, tenants are exempt from paying this fine if they occupy the

⁶⁹The only Church for which we could find this kind of information is IURD.

property for a specific number of months. Next, using data from the Brazilian Census, we provide some (upper-bound) estimates of these fines.

Table 7, constructed from 2010 Census data (IBGE, 1991-2010a), reports that the mean (median) rent paid by a household in a municipality in our sample was R\$184 (R\$150), ranging from R\$50 (5th) to R\$500 (95th) percentile. The mean of monthly household income was R\$1541 (R\$900), ranging from R\$30 (5th) to R\$4560 (95th) percentile.⁷⁰ These statistics are around 40% lower than national averages as these are smaller and less urban municipalities. Assuming churches pay higher-than-average rents, equal to the 95th percentile, the maximum payable fine would be R\$1500.

On the other hand, according to the Brazilian Internal Revenue Service, in 2010 the revenue of all Brazilian churches summed up to R\$20 billions (in R\$ of 2010) – see also Figure 1 in Section II – and the number of temples of all Christian denominations was 119142. This amounts to an average yearly revenue of R\$167,866.92. Consequently, the maximum fine expected for an Evangelical church to pay in the event of breaking a lease would be approximately 0.89% of the average revenue of a Brazilian temple. Even if we consider that the revenues of the temples in our sample are (much) smaller than the revenue of an average temple in Brazil, these fines still appear insignificant.

Catholic Church. In contrast, Catholic temples are commonly owned by the Roman Church. When the Church decides to exit a particular market, the capital associated with these properties can potentially be sold or rented, which could contribute to mitigating the financial losses incurred by the Church in markets in decline. However, as we will argue below, in many cases, the Catholic Church does not exercise this possibility and instead chooses to abandon unused temples.

The legal possibility of alienating ecclesiastical goods generates questions in both civil and canonical spheres. The 1983 Code of Canon Law (abbreviated 1983 CIC from its Latin title *Codex Iuris Canonici*), also called the *Johanno-Pauline Code*, is the fundamental body of ecclesiastical laws for the Latin Church. According to it, the ecclesiastic estate is destined to serve the Church in achieving the salvation of souls; therefore, piety and charity must always be emphasized as the compass that must guide the management of the Church’s estate. Notwithstanding, it leaves space for private law to regulate the managing of ecclesiastical goods and defines a set of limits and parameters on the sale of ecclesiastic properties in order to avoid illegal conduct. In any case, selling Church real estate in the event of bankruptcy is a lengthy and bureaucratic process because it frequently necessitates the approval of the Holy See (i.e., the Vatican).⁷¹

The aforementioned difficulties in selling properties is likely behind the numerous cases of Catholic Church buildings being abandoned across Brazil. This strategy seems to imply that the Catholic church’s exit costs are also negligible because churches do not pay property taxes and generally have no liability for abandoned infrastructure.

Even though official statistics are non-existent, anecdotal evidence of abandoned churches is widely available on the internet. For instance, a project called “Conexão Expansionista”

⁷⁰For comparison, in 2010, US\$1 was equal to, approximately, R\$1.7 (yearly average).

⁷¹<https://www.catholicnewsagency.com/news/44951/diocesan-bankruptcies-could-require-vatican-approval-vatican-official-reminds-bishops>.

has documented dozens of cases across the country – see website⁷² for the whole list. It lists abandoned Catholic temples in 13 out of 26 states in Brazil. Important to say, this list is incomplete and there are possibly many more cases around the country, as our search on the internet appears to indicate. Even temple furnishings and fittings can be seen alongside abandoned buildings in many photos, which seems to confirm that Catholic temple exit costs are also very low.

This is hardly a phenomenon specific to the Brazilian branch of the Catholic church. For instance, as documented by project “Chiesa”⁷³ of Dutch photographer Roman Robroek, there are at least 1000 confirmed abandoned churches throughout Italy, although there are probably countless more, without even a name to go by, due to records that have been lost a long time ago.

C Structural Model Details

This Appendix describes (i) identification and estimation of the parameters of the structural model and (ii) the algorithm we use to solve and simulate the model.

Identification and Estimators. Following [Miessi Sanches et al. (2016)] the identification is constructive and in closed-form, leading to easy to compute estimands.

Specifically, from equation (5) define the ex-ante expected value function as – see, for example, [Pesendorfer and Schmidt-Dengler (2008)]:

$$V_{im}(\mathbf{s}_m^t; \sigma_{im}) = \sum_{\mathbf{a}_m^t} \sigma_{im}(\mathbf{a}_m^t | \mathbf{s}_m^t) \left\{ \Pi_{im}(\mathbf{a}_m^t, \mathbf{s}_m^t) + \beta \sum_{\mathbf{s}_m^{t+1}} H_m(\mathbf{s}_m^{t+1} | \mathbf{s}_m^t, \mathbf{a}_m^t) V_{im}(\mathbf{s}_m^{t+1}; \sigma_{im}) \right\} + E[\zeta_{im}^t | \mathbf{s}_m^t, a_{im}^t = 1] \sigma_{im}(a_{im}^t = 1 | \mathbf{s}_m^t),$$

where, $V_{im}(\mathbf{s}_m^t; \sigma_{im})$ denotes the expectation of the value function before payoff shocks, ζ_{im}^t , are observed and actions are taken, $\Pi_{im}(\mathbf{a}_m^t, \mathbf{s}_m^t)$ is the payoff described by equation (2) net of the payoff shock, ζ_{im}^t , and $E[\zeta_{im}^t | \mathbf{s}_m^t, a_{im}^t = 1]$ is the expectation of ζ_{im}^t conditional on $\mathbf{s}_m^t$ and $a_{im}^t = 1$. Let N_s be the cardinality of the state vector in market m and N_p the number of parameters of the model. Stacking the previous equation for every state $\mathbf{s}_m^t$:

$$\mathbf{V}_{im} = \mathbf{\Pi}_{im} + \mathbf{D}_{im} + \beta \mathbf{G}_{im} \mathbf{V}_{im}. \quad (\text{C.1})$$

Here, $\mathbf{V}_{im}$ is a $(N_s \times 1)$ vector stacking the expected unconditional value functions for every possible state, $\mathbf{\Pi}_{im}$ is a $(N_s \times 1)$ vector stacking $\sum_{\mathbf{a}_m^t} \sigma_{im}(\mathbf{a}_m^t | \mathbf{s}_m^t) \Pi_{im}(\mathbf{a}_m^t, \mathbf{s}_m^t)$ for every possible state, $\mathbf{D}_{im}$ is a $(N_s \times 1)$ vector stacking $E[\zeta_{im}^t | \mathbf{s}_m^t, a_{im}^t = 1] \sigma_{im}(a_{im}^t = 1 | \mathbf{s}_m^t)$ for every possible state and $\mathbf{G}_{im}$ is a $(N_s \times N_s)$ transition matrix mapping $\mathbf{s}_m^t$ into $\mathbf{s}_m^{t+1}$ given $H_m(\cdot)$, $\sigma_{im}(\cdot)$ and $\mathbf{a}_m^t$. Solving equation (C.1) for $\mathbf{V}_{im}$ we have that:

⁷²<http://aurelioschmitt.blogspot.com/2013/03/igrejas-abandonadas-pedacos-da-historia.html?m=1>

⁷³Available at <https://romanrobroek.nl/chiesa-the-decline-of-the-church-in-italy/>.

$$\mathbf{V}_{\text{im}} = [\mathbf{I}_{N_s} - \beta \mathbf{G}_{\text{im}}]^{-1} (\mathbf{\Pi}_{\text{im}} + \mathbf{D}_{\text{im}}),$$

with $\mathbf{I}_{N_s}$ representing a $(N_s \times N_s)$ identity matrix. Notice that because $\Pi_{im}(\mathbf{a}_{\text{m}}^t, \mathbf{s}_{\text{m}}^t)$ is linear in the $(N_p \times 1)$ parameter vector, $\mathbf{\Theta}_i = (\theta_{0i}, \theta_{1i}, \theta_{2i}, \pi_{0i}, F_i, \gamma_i)'$, we can write $\mathbf{\Pi}_{\text{im}} = \mathbf{X}_{\text{im}} \mathbf{\Theta}_i$, where $\mathbf{X}_{\text{im}}$ is a $(N_s \times N_p)$ matrix stacking $\mathbf{X}_{\text{im}}(\mathbf{s}_{\text{m}}^t)$ for every state, and $\mathbf{X}_{\text{im}}(\mathbf{s}_{\text{m}}^t)$ is a $(1 \times N_p)$ known vector that depends only on states and beliefs. Using this fact we can write the vector of unconditional value functions as:

$$\mathbf{V}_{\text{im}} = \tilde{\mathbf{X}}_{\text{im}} \mathbf{\Theta}_i + \tilde{\mathbf{D}}_{\text{im}}, \quad (\text{C.2})$$

where $\tilde{\mathbf{X}}_{\text{im}} = [\mathbf{I}_{N_s} - \beta \mathbf{G}_{\text{im}}]^{-1} \mathbf{X}_{\text{im}}$ and $\tilde{\mathbf{D}}_{\text{im}} = [\mathbf{I}_{N_s} - \beta \mathbf{G}_{\text{im}}]^{-1} \mathbf{D}_{\text{im}}$. Therefore, defining $\tilde{\mathbf{X}}_{\text{im}}(\mathbf{s}_{\text{m}}^{t+1})$ as the $(1 \times N_p)$ vector in the row of $\tilde{\mathbf{X}}_{\text{im}}$ that corresponds to state $\mathbf{s}_{\text{m}}^{t+1}$ and $\tilde{D}_{im}(\mathbf{s}_{\text{m}}^{t+1})$ as the element in the row of $\tilde{\mathbf{D}}_{\text{im}}$ that corresponds to state $\mathbf{s}_{\text{m}}^{t+1}$ we can write:

$$\int V_{im}(\mathbf{s}_{\text{m}}^{t+1}, \varsigma_{im}^{t+1}; \sigma_{\text{im}}) dQ(\varsigma_{im}^{t+1}) = \tilde{\mathbf{X}}_{\text{im}}(\mathbf{s}_{\text{m}}^{t+1}) \mathbf{\Theta}_i + \tilde{D}_{im}(\mathbf{s}_{\text{m}}^{t+1}). \quad (\text{C.3})$$

On the other hand, the value function conditional on $a_{im}^t = 1$ net of the payoff shock ς_{im}^t – see equation (6) – is:

$$\begin{aligned} V_{im}^1(\mathbf{s}_{\text{m}}^t; \sigma_{\text{im}}) = & \sum_{\mathbf{a}_{-\text{im}}^t} \sigma_{im}(\mathbf{a}_{-\text{im}}^t | \mathbf{s}_{\text{m}}^t) \pi_i(\mathbf{a}_{-\text{im}}^t, p_m^t) + \pi_{0i} + (1 - a_{im}^{t-1}) F_i + \gamma_i \cdot e^{\mu_m^t} + \\ & \beta \sum_{\mathbf{a}_{-\text{im}}^t} \sigma_{im}(\mathbf{a}_{-\text{im}}^t | \mathbf{s}_{\text{m}}^t) \left\{ \sum_{\mathbf{s}_{\text{m}}^{t+1}} H_m(\mathbf{s}_{\text{m}}^{t+1} | \mathbf{s}_{\text{m}}^t, \mathbf{a}_{-\text{im}}^t, a_{im}^t = 1) \int V_{im}(\mathbf{s}_{\text{m}}^{t+1}, \varsigma_{im}^{t+1}; \sigma_{\text{im}}) dQ(\varsigma_{im}^{t+1}) \right\}. \end{aligned} \quad (\text{C.4})$$

Substituting equation (C.3) into equation (C.4):

$$\begin{aligned} V_{im}^1(\mathbf{s}_{\text{m}}^t; \sigma_{\text{im}}) = & \left(\mathbf{X}_{\text{im}}^1(\mathbf{s}_{\text{m}}^t) + \beta E_{\mathbf{s}_{\text{m}}^{t+1}} \left[\tilde{\mathbf{X}}_{\text{im}}(\mathbf{s}_{\text{m}}^{t+1}) | \mathbf{s}_{\text{m}}^t, a_{im}^t = 1 \right] \right) \mathbf{\Theta}_i + \\ & \beta E_{\mathbf{s}_{\text{m}}^{t+1}} \left[\tilde{D}_{im}(\mathbf{s}_{\text{m}}^{t+1}) | \mathbf{s}_{\text{m}}^t, a_{im}^t = 1 \right], \end{aligned} \quad (\text{C.5})$$

where,

$$\begin{aligned} \mathbf{X}_{\text{im}}^1(\mathbf{s}_{\text{m}}^t) = & \begin{bmatrix} p_m^t & p_m^t \sum_{\mathbf{a}_{-\text{im}}^t} \sigma_{im}(\mathbf{a}_{-\text{im}}^t | \mathbf{s}_{\text{m}}^t) n_{im}^{E,t} & p_m^t \sum_{\mathbf{a}_{-\text{im}}^t} \sigma_{im}(\mathbf{a}_{-\text{im}}^t | \mathbf{s}_{\text{m}}^t) n_{im}^{C,t} & 1 & (1 - a_{im}^{t-1}) & e^{\mu_m^t} \end{bmatrix}, \end{aligned}$$

and,

$$E_{\mathbf{s}_m^{t+1}} \left[\tilde{\mathbf{X}}_{im}(\mathbf{s}_m^{t+1}) \boldsymbol{\Theta}_i + \tilde{D}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 1 \right] = \sum_{\mathbf{a}_{-im}^t} \sigma_{im}(\mathbf{a}_{-im}^t | \mathbf{s}_m^t) \left\{ \sum_{\mathbf{s}_m^{t+1}} H_m(\mathbf{s}_m^{t+1} | \mathbf{s}_m^t, \mathbf{a}_{-im}^t, a_{im}^t = 1) \int V_{im}(\mathbf{s}_m^{t+1}, \varsigma_{im}^{t+1}; \sigma_{im}) dQ(\varsigma_{im}^{t+1}) \right\}.$$

Simplifying the notation:

$$V_{im}^1(\mathbf{s}_m^t; \sigma_{im}) = \tilde{\mathbf{X}}_{im}^1(\mathbf{s}_m^t) \boldsymbol{\Theta}_i + \beta E_{\mathbf{s}_m^{t+1}} \left[\tilde{D}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 1 \right],$$

with $\tilde{\mathbf{X}}_{im}^1(\mathbf{s}_m^t) = \mathbf{X}_{im}^1(\mathbf{s}_m^t) + \beta E_{\mathbf{s}_m^{t+1}} \left[\tilde{\mathbf{X}}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 1 \right]$. Using the same reasoning we can write the value function conditional on $a_{im}^t = 0$ as $V_{im}^0(\mathbf{s}_m^t; \sigma_{im}) = \tilde{\mathbf{X}}_{im}^0(\mathbf{s}_m^t) \boldsymbol{\Theta}_i + E_{\mathbf{s}_m^{t+1}} \left[\tilde{D}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 0 \right]$. Now, plugging $V_{im}^0(\cdot)$ and $V_{im}^1(\cdot)$ into equation (6) we have that:

$$Q^{-1}(P(a_{im}^t = 1 | \mathbf{s}_m^t; \sigma_{im})) = \left(\tilde{\mathbf{X}}_{im}^1(\mathbf{s}_m^t) - \tilde{\mathbf{X}}_{im}^0(\mathbf{s}_m^t) \right) \boldsymbol{\Theta}_i + \tilde{D}_{im}^{10}(\mathbf{s}_m^t),$$

where, $Q^{-1}(\cdot)$ is the inverse of the CDF of the iid shock, ς_{im}^t , and,

$$\tilde{D}_{im}^{10}(\mathbf{s}_m^t) = \beta \left(E_{\mathbf{s}_m^{t+1}} \left[\tilde{D}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 1 \right] - E_{\mathbf{s}_m^{t+1}} \left[\tilde{D}_{im}(\mathbf{s}_m^{t+1}) | \mathbf{s}_m^t, a_{im}^t = 0 \right] \right).$$

Stacking this equation for all states and market types:

$$\mathbf{Y}_i = \left(\tilde{\mathbf{X}}_i^1 - \tilde{\mathbf{X}}_i^0 \right) \boldsymbol{\Theta}_i,$$

where $\mathbf{Y}_i$ is a column vector stacking $Q^{-1}(P(a_{im}^t = 1 | \mathbf{s}_m^t; \sigma_{im})) - \tilde{D}_{im}^{10}(\mathbf{s}_m^t)$ for all states and market types. Multiplying both sides of the equation above by $\left(\tilde{\mathbf{X}}_i^1 - \tilde{\mathbf{X}}_i^0 \right)'$ and solving for $\boldsymbol{\Theta}_i$:

$$\boldsymbol{\Theta}_i = \left[\left(\tilde{\mathbf{X}}_i^1 - \tilde{\mathbf{X}}_i^0 \right)' \left(\tilde{\mathbf{X}}_i^1 - \tilde{\mathbf{X}}_i^0 \right) \right]^{-1} \left[\left(\tilde{\mathbf{X}}_i^1 - \tilde{\mathbf{X}}_i^0 \right)' \mathbf{Y}_i \right]. \quad (\text{C.6})$$

From the estimates of beliefs and state transitions obtained in the first stage and given β , $\left(\tilde{\mathbf{X}}_i^1, \tilde{\mathbf{X}}_i^0, \mathbf{Y}_i \right)$ can be computed and $\boldsymbol{\Theta}_i$ can be estimated using this formula.

Model solution and simulation. The algorithm we use to solve the model is similar to that used by Sweeting (2013). The algorithm works as follows:

1. Given the initial guesses for beliefs, the state transitions, the discount rate and the vector of structural parameters estimated using equation (C.6), in step h we compute the vector of equilibrium probabilities implied by the model for all states, market types and players using equation (6):

$$P^h(a_{im}^t = 1 | \mathbf{s}_m^t; \sigma_{im}) = Q \left(V_{im}^1(\mathbf{s}_m^t, \varsigma_{im}^t; \tilde{\mathbf{P}}_{im}^{h-1}) - V_{im}^0(\mathbf{s}_m^t, \varsigma_{im}^t; \tilde{\mathbf{P}}_{im}^{h-1}) \right), \quad (\text{C.7})$$

where, $\tilde{\mathbf{P}}_{im}^{h-1}$ is the vector of probabilities obtained in step $h - 1$. We represent the vector of probabilities for all states and churches in market m obtained from equation (C.7) by $\mathbf{P}_m^h$.

2. If $\|\mathbf{P}_m^h - \mathbf{P}_m^{h-1}\| < \lambda$ the algorithm stops; otherwise we set $\tilde{\mathbf{P}}_m^h = \mathbf{P}_m^h \psi + \mathbf{P}_m^0 (1 - \psi)$, where $\psi \in [0, 1]$ is a parameter and $\mathbf{P}_m^0$ is the initial guess for beliefs, and go back to (1) substituting $\tilde{\mathbf{P}}_m^h$ on the right hand side of equation (C.7).

In practice we used $\lambda = 10^{-3}$ and $\psi = 0.75$. The advantage of this algorithm is that it is quite fast. Convergence was always achieved after a few iterations. All counterfactuals in this paper were computed using this algorithm.

With the equilibrium probabilities obtained in the previous step and with the estimates of state transitions we forward simulate the number of temples of each denomination in each market. What we do is:

1. Starting from the initial vector of states observed in every market, draw an action for every church from the equilibrium probability distribution obtained in the previous step for every market and compute the total number of active temples of every church across all markets, $\hat{n}_i^t = \sum_{m=1}^M \mathbb{I}(a_{im}^t = 1)$, where $\mathbb{I}(\cdot)$ is an indicator function that assumes 1 if the argument of the function is true and 0 otherwise.
2. Using the transition function for the state vector, compute the state vector for $t + 1$.
3. Repeat the procedure described in (1) and (2) to generate a time series of the total number of active temples until 2018.
4. Repeat this process S times and take the average number of temples for every denomination at every year across simulations.

D Conditional Choice Probabilities

This Appendix shows estimates for the CCPs. We estimated two models. One for the Evangelical churches and one for the Catholic Church. The model for the Evangelical churches pools the 6 largest Evangelical denominations – Assembly of God, Baptist, Christian Congregation, Mundial, Foursquare and Universal – in all markets and periods of time. The CCP estimates for the Evangelical churches are based on the following Probit model:

$$P\left(a_{im}^t | a_{im}^{t-1}, n_{im}^{E,t-1}, n_{im}^{C,t-1}, p_m^t, \mu_m^t\right) = \Phi\left(\rho_0 + \rho_1 a_{im}^{t-1} + \sum_{j \in E} \rho_{2j} d_{ij} n_{im}^{E,t-1} + \sum_{j \in C} \rho_{3j} d_{ij} n_{im}^{C,t-1} + \rho_4 p_m^t + \rho_5 a_{im}^{t-1} \mu_m^t + \rho_6 \mu_m^t + \mu_i\right), \quad (\text{D.1})$$

where, $a_{im}^t \in \{0, 1\}$ is Church i 's action in municipality m , period t , a_{im}^{t-1} is Church i 's action in municipality m , period $t - 1$, $n_{im}^{E,t-1}$ is the number of temples of (other) Evangelical churches competing with Church i in market m , period $t - 1$; $n_{im}^{C,t-1}$ is the number of Catholic

temples competing with Church i in market m and period $t-1$; d_{ij} is a dummy that assumes 1 if $i = j$ and 0 otherwise;⁷⁴ p_m^t is the population in market m , period t ; μ_m^t is a variable capturing unobserved heterogeneity that varies across markets and periods of time – obtained in a first-step as explained in Section V; μ_i is Church i 's fixed effect; and $\Phi(\cdot)$ represents the CDF of a standard Normal distribution.

For the Catholic Church we estimate an analogous model:

$$P(a_{im}^t | a_{im}^{t-1}, n_m^{E,t-1}, p_m^t, \mu_m^t) = \Phi(\rho_0 + \rho_1 a_{im}^{t-1} + \rho_2 n_m^{E,t-1} + \rho_3 p_m^t + \rho_4 a_{im}^{t-1} p_m^t + \rho_5 \mu_m^t), \quad (\text{D.2})$$

where, $n_m^{E,t-1}$ is the number of Evangelical temples competing with the Catholic Church at period $t-1$ and municipality m ; all other variables have the same interpretation as in equation (D.1).⁷⁵

Estimates of the coefficients are in Table 8.⁷⁶ In the first column, the coefficients $n^E : i$, with i in the set of Evangelical churches, capture the effect of the number of Evangelical competitors of Evangelical Church i at period $t-1$ on the entry probabilities of Evangelical church i ; the coefficients $n^C : i$, with i in the set of Evangelical churches, capture the effect of the number of Catholic temples at period $t-1$ on the entry probabilities of Evangelical Church i . In the second column, the coefficient $n^E : Catholic$ captures the effects of the number of Evangelical temples at period $t-1$ on the entry probabilities of the Catholic Church.

⁷⁴Therefore, the interaction $d_{ij}n_{im}^{E,t-1}$ captures the effect of the number of Evangelical competitors of (Evangelical) Church i at period $t-1$ and municipality m on the activity probabilities of Evangelical Church i at period t in the same municipality; and, $d_{ij}n_{im}^{C,t-1}$ captures the effect of the number of Catholic temples at period $t-1$ in municipality m on the activity probabilities of Evangelical Church i at period t in the same municipality.

⁷⁵Note that in equation (D.1) we included the interaction $a_{im}^{t-1}\mu_m^t$ and in equation (D.2) we included the interaction $a_{im}^{t-1}p_m^t$. The fitting of the structural estimated under these specifications was slightly superior to the fitting of alternative models where either $a_{im}^{t-1}\mu_m^t$ was included in both equations or $a_{im}^{t-1}p_m^t$ was included in both equations.

⁷⁶In some alternative versions of these CCPs we also included interactions of population with the terms $d_{ij}n_{im}^{E,t-1}$ and $d_{ij}n_{im}^{C,t-1}$ for the pool of Evangelical churches and with the term $n_m^{E,t-1}$ for the Catholic Church. Most of these interactions were not statistically significant at 10%. Therefore, we kept the specifications above, without these interactions, as our baseline CCP specifications.

Table 8: Conditional Choice Probabilities (CCPs)

	Evangelical	Catholic
μ_m^t	15.214***	20.095***
	[0.57]	[1.39]
a_{im}^{t-1}	5.964***	6.019***
	[0.17]	[0.75]
p_m^t	0.000	-0.000**
	[0.00]	[0.00]
$\mu_m^t \cdot a_{im}^{t-1}$	10.038***	-
	[1.94]	-
$p_m^t \cdot a_{im}^{t-1}$	-	0.000
	-	[0.00]
n^E : Assembly	-0.131***	-
	[0.04]	-
n^E : Baptist	-0.098**	-
	[0.04]	-
n^E : Christian Congr	-0.007	-
	[0.06]	-
n^E : Mundial	0.109***	-
	[0.03]	-
n^E : Foursquare	-0.272***	-
	[0.06]	-
n^E : Universal	-0.125***	-
	[0.05]	-
n^E : Catholic	-	-0.166***
	-	[0.05]
n^C : Assembly	-0.190*	-
	[0.11]	-
n^C : Baptist	-0.121	-
	[0.14]	-
n^C : Christian Congr	-0.077	-
	[0.19]	-
n^C : Mundial	0.019	-
	[0.11]	-
n^C : Foursquare	-0.490*	-
	[0.25]	-
n^C : Universal	-0.238	-
	[0.16]	-
Observations	38,376	6,396

Note: Standard-errors clustered at the municipality level in brackets. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.10$. The model for Evangelical churches include denomination dummies.

E Stationarity, Independence across Markets and the Two-Step Probit Model

This Appendix provides discussion on stationarity, independence of churches decisions across markets conditional on the vector of states and on the performance of the two-step Probit model we described in Section III (see Footnote 32).

Two-step Probit model. We run a model analogous to model (1) using the same two-step procedure used in Collard-Wexler (2013), Lin (2015), Minamihashi (2012) and Sanches et al. (2016). Specifically, in the first step we run a Linear Probability Model of actions of Church i in market m and period t on (i) the first lag of this variable, (ii) the number of competitors of Church i in that municipality at period $t - 1$ (iii) church dummies and (iv) interactions of year and market dummies. We pooled all churches. We collected the coefficients attached to the interactions between market and year dummies and created a new variable, μ_m^t . In the second step we run the same Probit model in equation (1) including μ_m^t as an additional control instead of year and market dummies, i.e. excluding μ^t and μ_m from the model. The estimates of the coefficients ρ_E^E , ρ_E^C and ρ_C^E are shown in Table 9. All the coefficients have the same sign and roughly the same magnitudes as the coefficients shown in Table 2.

Table 9: Two-Step Probit Model

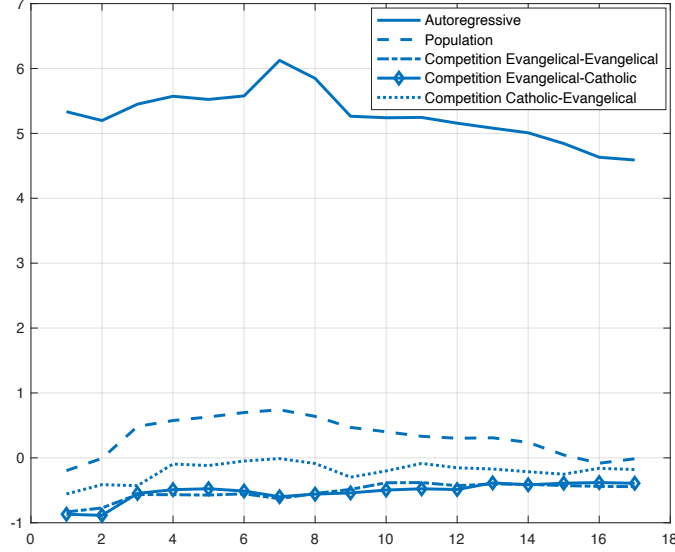
	Two-Step Probit
ρ_E^E	-0.073*** [0.02]
ρ_E^C	-0.174*** [0.04]
ρ_C^E	-0.189*** [0.06]
Observations	44,772

Note: Robust standard errors estimated from 100 bootstrap repetitions in brackets. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.10$.

Stationarity. To analyze the possibility of non stationarity in our data we estimate equation (1) for all 10 years rolling windows starting in 1992. We pool Evangelical denominations and the Catholic Church. Figure 8 shows the estimates of ρ_1 (autoregressive component), ρ_4 (population), ρ_E^E (competition Evangelical-Evangelical), ρ_E^C (competition Evangelical-Catholic), ρ_C^E (competition Catholic-Evangelical) for all time windows. All coefficients are relatively stable over time, except the autoregressive component, that seems to exhibit a negative trend in the last windows. This trend is, nonetheless, very mild. For example, the point estimate of the autoregressive coefficient is 5.33 (with 95% confidence interval [4.54; 6.13]) in the 1st window and it is 4.59 (95% confidence interval [4.35; 4.83]) in the last window, not far from the point estimate based on the full sample (which is 4.71 and 95% confidence interval [4.54; 4.88]). Based on this evidence we believe *that conditional on the*

state vector – which includes, as explained in Section 4, a time varying market-specific shock in the same spirit as [Minamihashi \(2012\)](#), [Collard-Wexler \(2013\)](#), [Lin \(2015\)](#) and [Sanches et al. \(2016\)](#) – potential nonstationarity of our data does not seem to be a major source of bias to our results.

Figure 8: Rolling Probit Regressions



Independence across markets. To analyze whether churches entry decisions are independent across markets (conditional on the vector of state variables) we created a new variable K_i^{t-1} representing the sum of the temples of Church i in all municipalities of our sample (except municipality i) at period $t - 1$ and included it in the Probit model described by equation (1) – same used in our descriptive regressions. Table 10 shows the results of the same Probit model estimated in column (3) of Table 2 including K_i^{t-1} (first column) as an additional control and K_i^{t-1} interacted with a dummy for the group of Evangelical churches and a dummy for the Catholic Church (second column).

The results show that, in the second column, the interaction between K_i^{t-1} and the dummy for Evangelical churches is negative and significant at 10%. The same coefficient is not significant for the Catholic Church. On the other hand, we also note that the magnitude of the coefficient is very small when compared with the coefficients capturing competition at the local level (e.g. the point estimate is approximately 50 times smaller than the coefficient ρ_E^E) and, importantly, the inclusion of this variable has very little effect on the other coefficients of our model, in particular, the coefficients capturing strategic interactions between churches – ρ_E^E, ρ_E^C and ρ_C^E in Table 10 are pretty close to the same coefficients in the 3rd column of Table 2.

That said, we believe that the performance (in terms of number of active temples) of the Church at the national level has little effect on the payoffs of the Church at the local level. A possible explanation to this fact is that our sample contains only small isolated municipalities which, until recently, did not have access to the internet, cable tv, etc. and,

therefore, had little information about the performance of these churches at the national level.

Table 10: Probit Model with Churches Total Stock of Temples (K_i^{t-1}) as Additional Control

	[1]	[2]
ρ_E^E	-0.186*** [0.03]	-0.189*** [0.03]
ρ_E^C	-0.237*** [0.04]	-0.214*** [0.04]
ρ_C^E	-0.099 [0.09]	-0.105 [0.09]
K_i^{t-1}	-0.002 [0.00]	- -
K_i^{t-1} Evangelical	- -	-0.004* [0.00]
K_i^{t-1} Catholic	- -	-0.001 [0.00]
Observations	44,772	44,772

Note: Standard-errors clustered at the municipality level in brackets. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.10$.

F Structural Model: Robustness Checks

This Appendix discusses robustness of our results to changes in the interpretation of churches payoff function, in the functional form of churches payoffs and different “normalizations” of churches net exit costs.

Profit maximization. We assume that payoffs estimated in Section V represent a reduced form of churches profit function, i.e. pecuniary revenue minus pecuniary costs, which ultimately means that these payoffs can be taxed. Evidently, if churches payoff estimates also embed any non pecuniary motivation that is not susceptible to taxation – e.g. number of members, social welfare, or more abstract purposes (Hungerman, 2010; Iyer, 2016; Corbi et al., 2022) – the results of our analysis may change.

While the discussion in Section II.B suggests that profit is central to explain churches expansion, it does not rule out the possibility that temples entry and exit decisions are also motivated by more abstract, non pecuniary reasons. To attenuate this concern we examine how taxation would affect the relative market shares of the Catholic and Evangelical churches assuming that only a fraction of churches payoffs correspond to financial gains and can, therefore, be taxed, while the remaining fraction, correspond to non-financial motives that are not taxed.

Specifically, let $\Gamma_E \in [0, 1]$ and $\Gamma_C \in [0, 1]$ be, respectively, the fraction of expected payoffs net of entry costs of Evangelical churches and the Catholic Church that is subject

to taxation.⁷⁷ Let $MS_E(\Gamma_E, \Gamma_C, \varrho)$ be the combined market shares of Evangelical denominations given Γ_E , Γ_C and $\varrho > 0$ and MS_E^0 the combined market shares of Evangelical denominations when $\varrho = 0$ (baseline tax-exemption scenario). Table 11 shows the differences $MS_E(\Gamma_E, \Gamma_C, \varrho) - MS_E^0$ for all combinations of $\Gamma_E, \Gamma_C \in \{0.25; 0.50; 0.75; 1.00\}$ and $\varrho = 0.3$, such that if $MS_E(\Gamma_E, \Gamma_C, \varrho) - MS_E^0 < 0$ the tax implies a decrease in the shares of Evangelical churches (and, consequently, an increase in the shares of the Catholic Church) given $(\Gamma_E, \Gamma_C, \varrho)$.

The results show that these differences are negative for almost all scenarios except in extreme cases where Γ_E is small and Γ_C high, i.e. our conclusion that Evangelical churches benefit more from tax-exemptions holds true in most alternative scenarios where churches pay taxes only on parts of their payoffs. In spite of its limitations (the most obvious being that monetary and non-monetary payoffs have the same functional form) the exercise may serve to mitigate concerns related to the compositions of churches payoffs.

Table 11: Variation in Market Shares of the Evangelical churches when $\varrho = 0.3$ and Different Values of Γ

	$\Gamma_E = 0.25$	$\Gamma_E = 0.50$	$\Gamma_E = 0.75$	$\Gamma_E = 1.00$
$\Gamma_C = 0.25$	-0.02	-0.09	-0.17	-0.24
$\Gamma_C = 0.50$	0.00	-0.06	-0.14	-0.22
$\Gamma_C = 0.75$	0.01	-0.05	-0.13	-0.21
$\Gamma_C = 1.00$	0.01	-0.05	-0.13	-0.20

Functional form of churches payoffs. Our counterfactual results also depend on the specific functional form we used to express churches payoffs, regardless of the discussion in the preceding paragraphs. We now assess the robustness our counterfactual findings to this assumption. With this goal in mind, we reestimate the model and the counterfactuals using

$$\pi_i(\mathbf{a}_{-im}^t, p_m^t) = \theta_{0i} p_m^t + \theta_{1i} n_{im}^{E,t} + \theta_{2i} n_{im}^{C,t}, \quad (\text{F.1})$$

instead of equation (3). The only difference between this model and the model developed in Section IV is that, in the former, variable profits are a linear function of population while in the latter variable profits are proportional to population. This functional form is also very common in the literature and was used to represent firms profits in other contexts – see, for example, Berry (1992), Mazzeo (2002), Collard-Wexler (2013), Igami and Yang (2016), Seim (2006) and Sanches et al. (2016).

The estimates of this model are in Table 12. First we note that the estimates of sunk entry costs are identical across the two models. This result follows directly from Theorem 2 in Komarova et al. (2018), which shows that when the payoff is linear in the parameters entry costs in dynamic games can be identified independently of other components of the payoff function and the discount factor. Second, estimates of π_0 (operating costs) and γ (unobserved payoff shock) are also very similar across the two models. Qualitatively, the estimates of θ_1 and θ_2 (that measure competition across churches) are also robust to changes

⁷⁷Equivalently, if the tax on profits is ϱ , in these exercises we are assuming that the effective tax rate is $\varrho \times \Gamma_E$ for Evangelicals and $\varrho \times \Gamma_C$ for the Catholic Church.

in the specification of churches payoff. Together these results imply that, as shown by Figure 10, the counterfactual results obtained from both models are very close.

Table 12: Structural Parameters – Alternative Payoff Function

	Assembly	Baptist	Congregation	Mundial	Foursquare	Universal	Catholic
Constant (π_0)	-6.367 [0.402]	-6.137 [0.385]	-6.225 [0.394]	-5.941 [0.397]	-6.927 [0.478]	-6.182 [0.362]	-1.865 [0.333]
Evang Comp (θ_1)	-0.036 [0.01]	-0.025 [0.009]	-0.002 [0.009]	0.028 [0.008]	-0.075 [0.02]	-0.032 [0.01]	-0.02 [0.009]
Cat Comp (θ_2)	-0.053 [0.027]	-0.033 [0.035]	-0.02 [0.039]	0.006 [0.029]	-0.139 [0.089]	-0.061 [0.037]	
Population (θ_0)	-0.052 [0.006]	-0.043 [0.005]	-0.033 [0.006]	-0.039 [0.005]	-0.03 [0.006]	-0.042 [0.006]	-0.13 [0.012]
Shock (γ)	6.93 [0.428]	6.558 [0.406]	6.398 [0.394]	6.16 [0.423]	7.153 [0.495]	6.603 [0.384]	3.369 [0.301]
Entry Costs (F)	-6.116 [0.252]	-6.17 [0.256]	-6.262 [0.255]	-6.211 [0.256]	-6.326 [0.264]	-6.183 [0.253]	-9.445 [0.557]

Note: Robust standard errors estimated from 50 bootstrap repetitions in brackets. Population is local population divided by 10000. Average population in our sample across years and markets is 13452.

Figure 9: Predicted Shares – Data and Model for all Years from 1992 to 2018

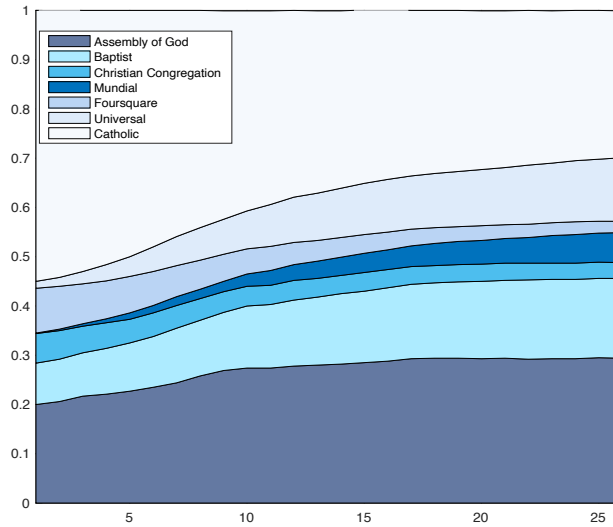
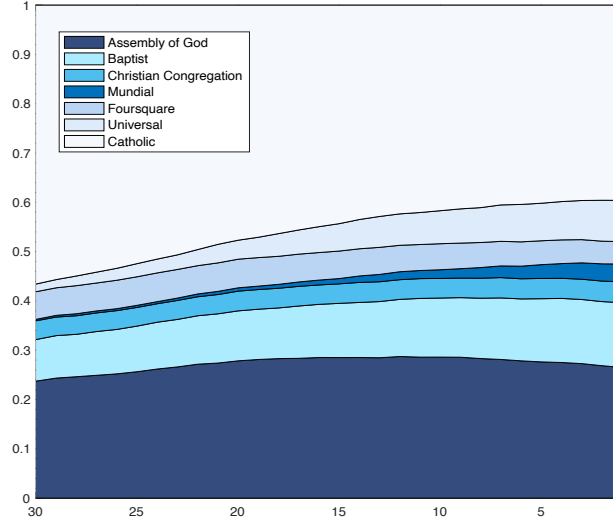


Figure 10: Average Share of Each Church for $\varrho \in [0, 0.30]$ (Horizontal Axis in Reverse Order)



Normalization of churches net exit costs. Finally, we assess the robustness of our counterfactual results to different “normalizations” of churches net exit costs. These “normalizations” are guided by anecdotal evidences in Section II and Appendix B, which suggest that net exit costs of Evangelical churches may be negative and related to fines they must pay to return a rented temple before the lease expires, and that net exit costs of Catholic Church may be positive and related to the value of its temples, which, in theory, can be sold if the Church decides to leave a declining market.

Specifically, we reestimated the model and recomputed our counterfactual exercises assuming that net exit costs of all Evangelical denominations are given by a proportion $\Upsilon_E \in [0, 1]$ of their operating costs – i.e. negative net exit costs proportional to operating costs, which embed rents paid by Evangelical churches – and that net exit costs of Catholic temples are equal to a proportion $\Upsilon_C \in [0, 1]$ of the negative of its entry costs – i.e. positive exit costs, proportional to entry costs, which represents the value of the temple built by the Church.⁷⁸

Let $MS_E(\Upsilon_E, \Upsilon_C, \varrho)$ be the combined market shares of Evangelical denominations given Υ_E , Υ_C and $\varrho > 0$ averaged across years. To see how the different parametrizations – represented by different values of Υ_E and Υ_C – affect our results we computed the differences $MS_E(\Upsilon_E, \Upsilon_C, 0.30) - MS_E(\Upsilon_E, \Upsilon_C, 0)$ for $\Upsilon_E, \Upsilon_C \in \{0; 0.01; 0.05; 0.10; 0.20; 0.30\}$, such that if this difference is negative, for that parametrization, taxation has a negative effect on the shares of Evangelical churches (and positive on the share of the Catholic Church). Although anecdotal evidence suggest that Υ_E and Υ_C are very close to zero, we calculate

⁷⁸As we argued, the estimates of F and of π_0 in Table 3 are equal to entry costs plus net exit costs and to operating costs minus $(1 - \beta)$ times net exit costs, respectively (Aguirregabiria and Suzuki, 2014). Hence, given the alternative parametrizations, net exit costs of each Evangelical church and of the Catholic Church, as well as churches entry and operating costs consistent with each parametrization, can be directly obtained from the estimates in Table 3.

these differences for a wide range of Υ_E and Υ_C to assess the plausibility of our findings even in less realistic scenarios.

Figure 11: Variation in Market Shares of the Evangelical Churches when $\varrho = 0.3$ under Different Normalizations of Churches Net Exit Costs

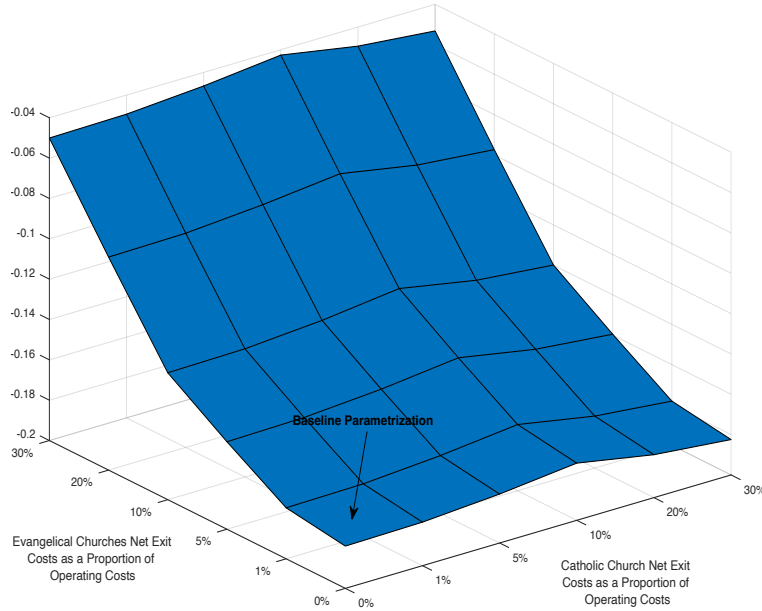
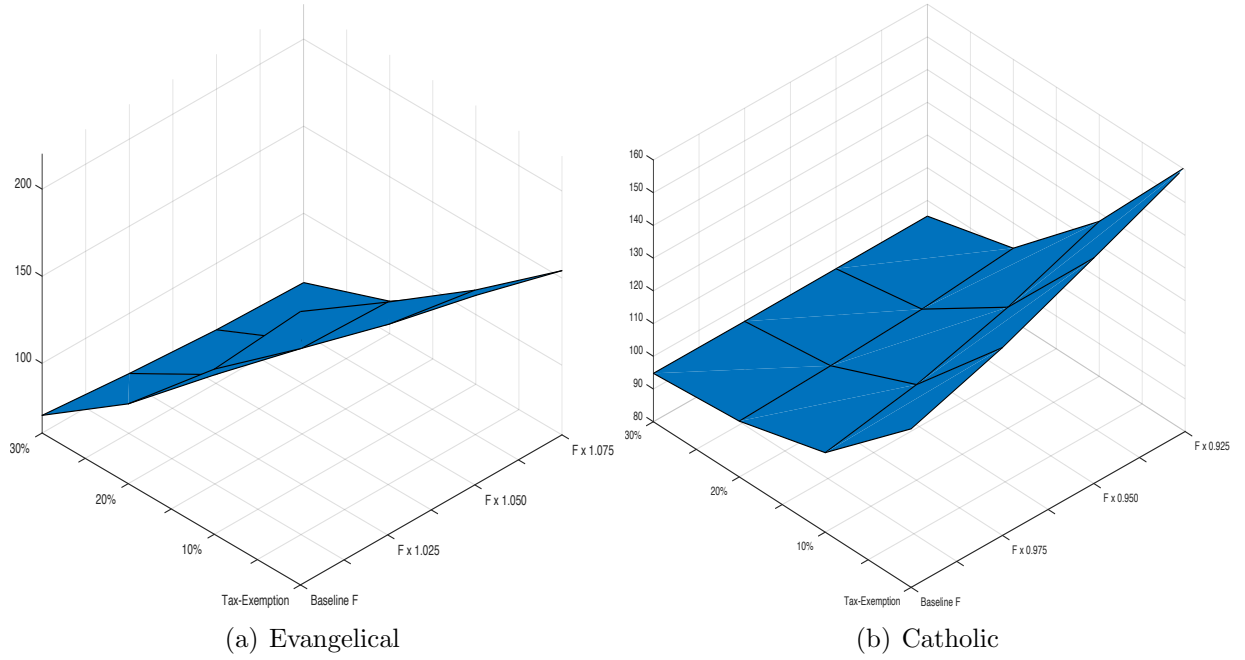


Figure 11 shows the results of the exercise. The value indicated by the arrow represents $MS_E(\Upsilon_E, \Upsilon_C, 0.30) - MS_E(\Upsilon_E, \Upsilon_C, 0)$ in the baseline scenario, i.e. when $\Upsilon_E = \Upsilon_C = 0$, given $\varrho = 0.3$. The figure reveals that increases in Υ_C has little effect on these differences independently of the Υ_E . In particular, if Υ_E is close to zero – which is consistent with the anecdotal evidence presented in this paper – the difference is roughly the same as in the baseline scenario even when Υ_C is very large; the normalization of net exit values of the Catholic Church to zero seems to do not have major effects on our conclusions that the tax has a more negative effect on Evangelical churches relatively to the Catholic Church. On the other hand, changes in Υ_E have a more pronounced effect on $MS_E(\Upsilon_E, \Upsilon_C, \varrho) - MS_E(\Upsilon_E, \Upsilon_C, 0)$ but, in any case, even when net exit costs of Evangelical temples are implausibly large, this difference continues to be negative, still suggesting that taxation has a more negative effect on the share of Evangelical temples. In more realistic scenarios where Υ_E is relatively small, we do not observe greater changes in our baseline results. In summary, our main conclusions that taxation seems to have a more negative effect on the combined share of Evangelicals appear to hold under different “normalizations” of churches net exit costs.

G Entry Costs and the Effects of Tax-Exemption on Church Entry

In line with our arguments in Section VI, this Appendix shows that the effect of tax-exemption on the number of temples is less pronounced when entry costs are higher.

Figure 12: Number of Evangelical (left) and Catholic (right) Temples for Different Tax Rates and Different Entry Costs



Specifically, panel (a) in Figure 12 shows yearly averages of the number of temples of Evangelical churches for different taxes (tax-exemption, 10%, 20% and 30%) when entry costs of Evangelical temples, F , are scaled up by different factors (1.025, 1.050 and 1.075). The graph shows that the reduction of the tax has a stronger effect on the number of Evangelical temples when entry costs are at the baseline level (“Baseline F ” in the graph) than when entry costs are higher (“ $F \times 1.025$ ”, “ $F \times 1.050$ ” or “ $F \times 1.075$ ” in the graph). Analogously, panel (b) shows the number of Catholic temples for the same tax levels when entry costs of Catholic temples are multiplied by 0.975, 0.950 and 0.925. Again, it shows that the effect of tax-exemption on the stock of Catholic temples is more pronounced when entry costs are fixed at “ $F \times 0.975$ ”, “ $F \times 0.950$ ” or “ $F \times 0.925$ ”, than under baseline F . Overall, these results indicate that differences in the entry costs of Catholic and Evangelical temples are important to explain the asymmetric effects of taxation on the relative shares of Evangelical and Catholic temples.

H Additional Tables and Figures

This Appendix shows additional tables and figures.

Figure 13: Evangelical Participation in Politics, 1998-2018

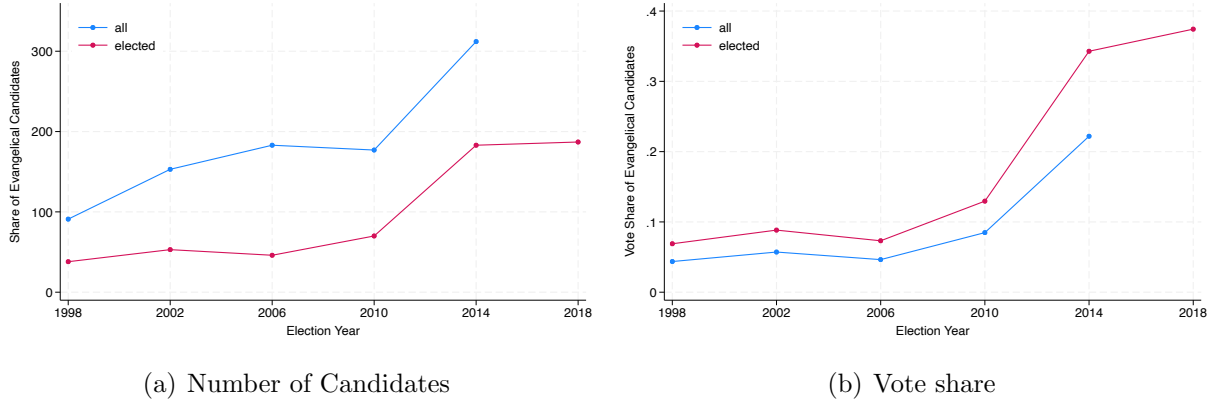


Table 13: Temple Entry and Evangelical Voteshare

	(1)	(2)	(3)	(4)
-3 election term	0.0069 [0.0278]	0.0078 [0.0309]	0.0444 [0.0346]	0.0160 [0.0267]
-2 election term	0.0080 [0.0197]	0.0074 [0.0174]	0.0159 [0.0141]	0.0095 [0.0148]
-1 election term	-0.0144 [0.0200]	-0.0158 [0.0188]	0.0005 [0.0104]	0.0033 [0.0113]
0 current term	0.0479 [0.0182]	0.0479 [0.0175]	0.0657 [0.0363]	0.0490 [0.0267]
+1 election term	0.0462 [0.0193]	0.0451 [0.0236]	0.1113 [0.0681]	0.0936 [0.0283]
+2 election term	0.0722 [0.0240]	0.0706 [0.0246]	0.0802 [0.1668]	0.1203 [0.0484]
Observations	1462	1462	1462	1462
Population	No	Yes	Yes	Yes
Sociodemographics X year	No	No	Yes	No
State X year	No	No	No	Yes

This table reports estimates of Evangelical temple entry on FPE vote share. Standard-errors within square brackets. A unit of observation is a municipality-election-term, where terms represent four-year periods (1995-1998, 1999-2002, ..., 2014-2017). Sociodemographics are calculated using data from the 1991 Census and include share of males, whites, evangelicals; individuals with primary, middle and college education, and average family income. Robust standard errors are clustered at the municipal level. Our estimates are computed using the *did_multiplegt* Stata package as recommended by [de Chaisemartin and D'Haultfoeuille \(2020\)](#).

Table 14: Number of Temples and Evangelical Voteshare

	(1)	(2)	(3)	(4)
Number of temples	0.0097 [0.0037]	0.0082 [0.0037]	0.0072 [0.0038]	0.0047 [0.0035]
Observations	1462	1462	1462	1462
Population	No	Yes	Yes	Yes
Sociodemographics X year	No	No	Yes	No
State X year	No	No	No	Yes

Note: This table reports estimates of the number of Evangelical temples on FPE vote share. Standard-errors within square brackets. A unit of observation is a municipality-election-term, where terms represent four-year periods (1995-1998, 1999-2002, ..., 2014-2017). Sociodemographics are calculated using data from the 1991 Census and include share of males, whites, evangelicals; individuals with primary, middle and college education, and average family income. Robust standard errors are clustered at the municipal level.