



Spatial Models of Religious Market Competition: A Critical Assessment

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Introduction

Understanding the nature of religious competition has been a primary goal of the emerging field of the economics of religion (Iannaccone 1998; Iyer 2016). Though discussion of religious competition dates back centuries (Anderson 1988), the first conceptualizations of religious competition in this new field came not from economists but rather from sociologists inspired by economic theories (Stark and Bainbridge 1985, 1987; Finke and Stark 1988, 1992; Iannaccone and Stark 1994). Economists eventually rejoined the fray and over the last 15 years have used spatial-location models (Hotelling 1929) to examine the competition for adherents among religious groups.

The first task in applying a spatial model is defining the dimension in which competition occurs. The most common assumption is to assume that product differentiation and competition occur in a single dimension of religious strictness; see Barros and Garoupa (2002), Barro and McCleary (2005), McBride (2008), Ferrero (2008), McBride (2010), Gaskins et al. (2013), and North and Gwin (2014). Religious strictness is the degree to which a religious group requires absolutism and conformity to exclusive theologies and behavioral codes. The higher the strictness, the more the outside world is repudiated and the more distinctive the group. The dimension of competition

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is conceived in other ways by Poutvaara and Wagener (2010), Eswaran (2011), Raynold (2013), Reda (2012), Iyer et al. (2014), and Berg et al. (2016). It can also be intentionally described with some amount of flexibility even though it retains concrete mathematical structure, which is the approach used by Montgomery (2003).

This chapter critically assesses these spatial-location models of religious competition using three standards.¹ First, a good model concisely captures essential features of the phenomenon studied. Second, a good model is flexible enough to be applied to a variety of research questions. Third, a good model generates new insight into religious competition.

When held to these standards, the spatial models do well but are not without shortcomings. A spatial model of religious competition incorporates heterogeneity in religious demand while also accounting for product differentiation by suppliers. Moreover, product differentiation can also be formally grounded in the influential club theory of religious group production. The basic model is also sufficiently flexible to study different religious regulatory structures, thus enabling a theorist to use the model to make testable predictions. However, the spatial models have not been used to their full potential. I identify how future research should incorporate dynamic elements including the cultural transmission of religious demand, variation in birth rates, and other adaptation by religious suppliers.²

Differentiation in Religious Strictness

A Basic Model

Religious strictness is the degree of absolutism in theology and conformity to behavioral codes for a religious group. Because spatial models with differentiation in strictness are most common, I here provide some details about their mathematical structure. Consider the following two-stage dynamic game. In stage 1, each religious group g from a set of groups G chooses where to locate in strictness space. In stage 2, each individual religious consumer i from a set of individuals I decides with which religious group to affiliate or to not affiliate at all.

¹Attention is restricted to research using explicit mathematical spatial models instead of verbal descriptions of the spatial models (e.g., Blake 2014).

²Hungerman (2010) describes other shortcomings of the literature on religious competition without specific focus on spatial models.

Let each religious consumer have utility function

$$u_i = \begin{cases} y - a(s_g - s_i), & \text{if } i \text{ affiliates with } g, s_g > s_i, \\ y - b(s_i - s_g), & \text{if } i \text{ affiliates with } g, s_i > s_g, \\ -s_i, & \text{if } i \text{ does not affiliate.} \end{cases} \quad (3.1)$$

Parameter $y \geq 0$ is a fixed value of affiliation, and additional benefits of affiliation depend on the distance between the individual's ideal strictness $s_i \in [0, \bar{s}]$ and the strictness of the group $s_g \in [0, \bar{s}]$ with $\bar{s} > 0$. Parameters $a > 0$ and $b > 0$ capture asymmetry in the disutility when affiliating with a group above or below the ideal. If $a = b$, then i 's optimal affiliation is the group whose strictness is closest to her ideal strictness, but $a > b$ ($a < b$) implies the disutility is steeper from joining a group with higher (lower) strictness.

A distribution of ideal strictnesses represents the religious demand in the market and, when combined with the groups that constitute the religious supply, provides a complete depiction of a religious market. Figure 3.1a depicts one such market with $y = 0$, $a = b$, a uniform distribution of ideal

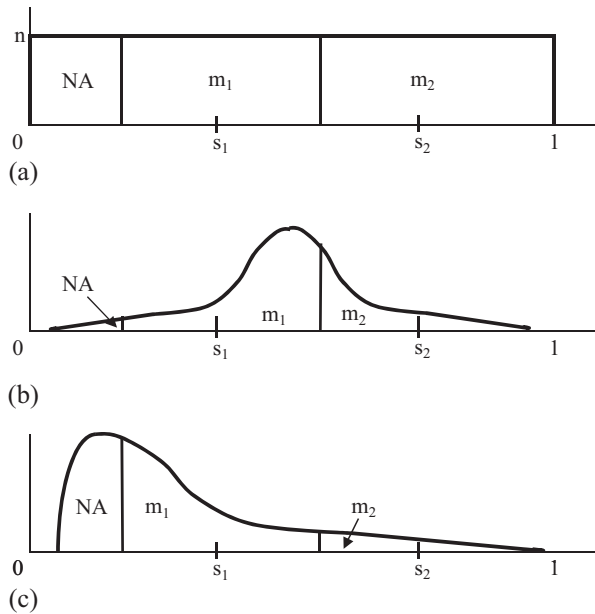


Fig. 3.1 Affiliations by religious consumers. (a) Uniform religious demand. (b) Symmetric, single-peaked religious demand. (c) Asymmetric, single-peaked religious demand

strictnesses over $[0, 1]$ (i.e., so that $\bar{s} = 1$) with mass n individuals at each ideal strictness, and two groups located at s_1 and s_2 , respectively. In the subgame equilibrium for stage 2, each individual affiliates with the closest option so that all individuals in the area marked m_1 have affiliated with group 1, all individuals in area m_2 affiliated with group 2, and all others close to 0 chose to not affiliate (NA). Of course, we might expect the distribution of ideal strictnesses to take a different shape. Stark and Finke (2000) suppose that it might be symmetric and single-peaked as in Fig. 3.1b, but other distributions, such as the one in Fig. 3.1c, could arise.

Now consider stage 1. Religious groups locate in strictness space in anticipation of the affiliation decisions just described. Where the groups locate—and, hence, the exact properties of the equilibrium—will depend on several factors, such as how many groups are in G , the sequencing of those groups' entry in the market, whether consumers can choose to not affiliate with a group, the preferences of the groups, the suppliers' cost of locating (or entry), and more. Indeed, there is so much variation in assumptions and equilibrium possibilities among the prior studies that a full summary of all possibilities is impractical here. However, a closer look at two applications of this model demonstrates their value.

Two Applications

Barros and Garoupa (2002) provide the first formal spatial model of religious competition. They use the Euclidean utilities defined above, assume that ideal strictnesses are uniformly distributed with $\bar{s} = 1$, and assume that each group maximizes the sum of utilities of its members. They then examine settings with one and two churches (i.e., $G = \{1\}$ or $G = \{1, 2\}$) and with and without non-affiliation options for the consumers.

If there is a monopoly group and consumers cannot choose to not affiliate, then the monopolist's utility is

$$\begin{aligned} V &= \int_0^s (y - a(s - s_i)) ds_i + \int_s^1 (y - b(s_i - s)) ds_i \\ &= y - \frac{1}{2}b - \frac{1}{2}as^2 - \frac{1}{2}bs^2 + bs. \end{aligned}$$

Solving the first-order condition yields $s_1 = \frac{b}{a+b}$ as the monopolist's optimal location. If $a = b$, the monopolist locates at the median $s_1 = \frac{1}{2}$, as in

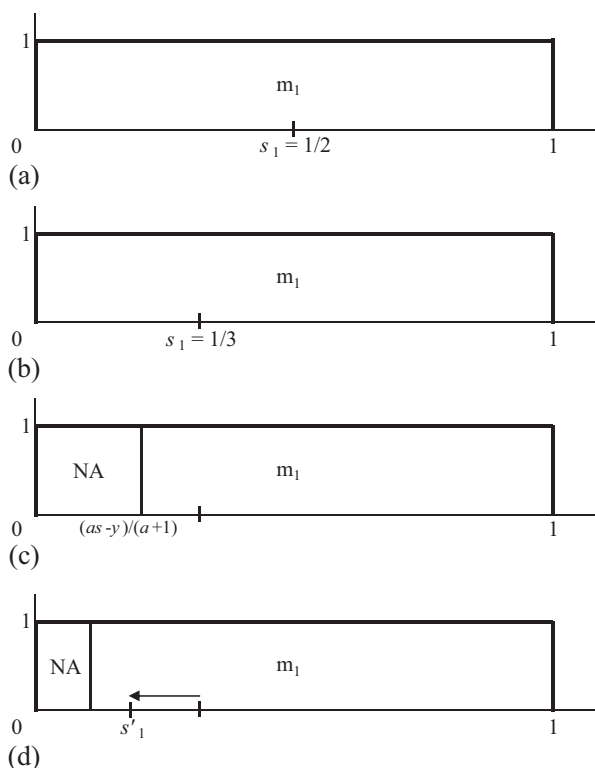


Fig. 3.2 Barros and Garoupa analysis. (a) Monopolist, $a = b$. (b) Monopolist, $a = 2 > b = 1$. (c) Monopolist without adjustment to non-affiliation, $a = 2 > b = 1$. (d) Monopolist with adjustment to non-affiliation, $a = 2 > b = 1$

Fig. 3.2a, giving equal weight to the disutilities of those with ideal strictnesses above and below its location. With $a \neq b$, the group will shift its strictness toward those who have higher disutility. Figure 3.2b illustrates this equilibrium with $a = 2$ and $b = 1$ so that it is more costly for a consumer to join a group above one's ideal strictness than below it. This asymmetry induces the monopolist to lower its strictness to $s_1 = \frac{1}{3}$.

If the consumers are given the option to not affiliate but the group remains fixed at $\frac{1}{3}$, then we have the scenario depicted in Fig. 3.2c where those with low ideal strictness choose to not affiliate (NA). The non-affiliation option now provides a good alternative for those with low ideal strictnesses. It can be directly found that an individual with ideal strictness $s_i = \frac{as-y}{a+1}$ is indifferent between not affiliating and affiliating, all those with $s_i < \frac{as-y}{a+1}$ do not affiliate,

and all with $s_i > \frac{as-y}{a+1}$ affiliate. The monopolist's utility function is now

$$\begin{aligned} V &= \int_{\frac{as-y}{a+1}}^s (y - a(s - s_i)) ds_i + \int_s^1 (y - b(s_i - s)) ds_i \\ &= -(b - 2y + a^2b + as^2 + bs^2 - ay^2 - 2a^2y + 2ab - 2bs - 4ay \\ &\quad - 2y^2 + 2abs^2 - 2a^2bs + 2a^2sy + a^2bs^2 - 4abs + 4asy) \\ &\quad \times \frac{1}{2(a+1)^2}. \end{aligned}$$

Solving the first-order condition reveals the monopolist's optimal location to be $s'_1 = \frac{b+a^2b-a^2y+2ab-2ay}{a+b+a^2b+2ab}$. Some additional derivation reveals $s'_1 < s_1$ when $y > \frac{ab}{a+b}$ and that $s'_1 > s_1$ when $y < \frac{ab}{a+b}$ so that the monopolist's optimal response to the competition from the non-affiliation option depends on the fixed value of its good. If the fixed value is high, then the group aggressively competes with the non-affiliation option by lowering its strictness, as seen in Fig. 3.2d. If the fixed value is low, then the group raises its strictness and specializes in serving those with high ideal strictness (not shown). Barros and Garoupa consider other alternatives as well, for example, a setting where the first group is a Stackelberg leader and the second group a Stackelberg follower.

Barros and Garoupa's focus on monopoly and duopoly settings fits historically regulated religious markets in Europe. They show the conditions under which a monopolist lowers its strictness (i.e., secularizes) under pressure from secular alternatives, and they demonstrate why a monopolist may increase its religious strictness to compete with a new religious group entrant. They also illuminate our understanding of other cases. They demonstrate, for example, why a change from compulsory to voluntary membership results in a liberalizing trend in the monopoly church. Moreover, it provides a competition-based logic to differences between the western Catholic church and its eastern counterpart. Because the western church was a strong monopolist while the eastern church faced competition from Islam and local Greek religious movements, the western church could maintain its strict religious character, while the eastern church could not.

McBride (2008) changes the basic model in two important ways. While fixing $y = 0$ and $a = b$, he keeps a large set of groups and assumes that each group maximizes its membership size (rather than the sum of members' utilities) and then considers two-period endogenous entry. In the first period

of entry, each religious group decides whether to locate and at what locations to locate. Entry entails a fixed cost c for the group, and the group has an outside option that yields payoff 0. A group will thus only want to enter the market and produce religious goods and services if doing so produces a large enough membership to make entry worthwhile. Any group that does not locate in the first period observes the groups that located and, then, in the second period, decides whether to locate and at what location.

McBride examines an equilibrium in which the firms that locate in the first period do so optimally in a way to prevent additional entry in the second period. The number of entrants is endogenous and reflects how religious markets with low barriers to entry can function like contestable markets where both current entrants and the threat of future entry constrain the behavior of incumbent suppliers. There are typically multiple equilibria, yet every equilibrium shares some important properties: the groups must be sufficiently close together to prevent an entrant from entering between a group and its nearest competitor, but the groups must also be sufficiently far away from their nearest competitors to make it worthwhile to remain in the market.

Figure 3.3a depicts a market equilibrium with four groups. Notice that the groups are not necessarily equally sized, and they are close enough together

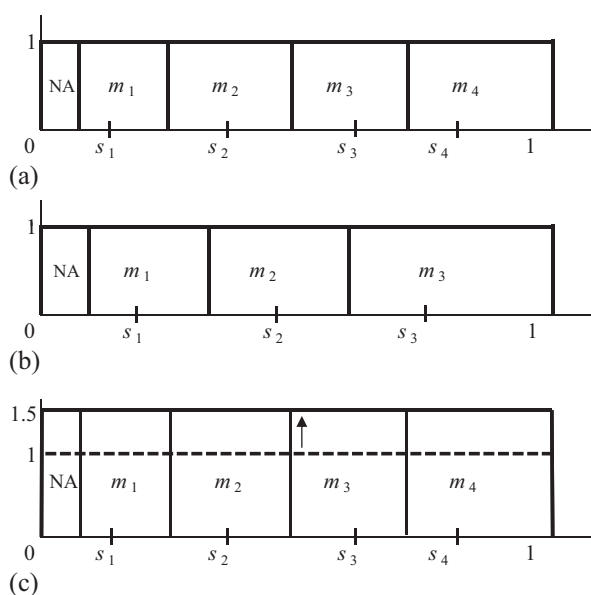


Fig. 3.3 McBride analysis. (a) Low entry cost. (b) High entry cost. (c) High entry cost, population increase

to prevent new entry in between any two groups. Figure 3.3b depicts the market equilibrium with a higher cost. Fewer groups find it worthwhile to remain in the market, and the groups that did enter can now spread out farther from each other. The higher entry cost thus implies a lower level of religious pluralism. Yet, even with the higher cost, if there is growth in the population, then pluralism can increase as groups have more consumers to attract. Figure 3.3c depicts an increase in the population and an equilibrium with more religious groups than in Fig. 3.3b, holding fixed the high entry cost.

This endogenous-entry setting is ideal for examining the richness of highly competitive and pluralistic religious markets like those in the United States. The model demonstrates how religious markets with low entry costs and heterogeneous religious consumer preferences will manifest high levels of religious diversity with churches spread across the strictness spectrum. We see such diversity in the open and competitive American religious market. However, the model can account for a wide variety of market structures by merely changing model parameters. Religious markets with large populations and low barriers to entry will have high pluralism and participation (large cities in the United States), those with high entry costs (cities in Saudi Arabia) or low populations (small towns) will have lower pluralism, and those with inhibited secular alternatives (cities in Saudi Arabia) will have low pluralism. Importantly, this model reveals how the interplay of both supply-side (e.g., the entry cost) and demand-side (e.g., population size) factors determines both the level of pluralism and the rate of participation. The model thus provides a concise framework for explaining and interpreting cross-country patterns of religiosity.

Assessment

The strictness spatial models have several merits. First, strictness spatial models capture several key features of actual religious markets. They allow for variation in religious demand and supply, two key features of actual religious markets. They also identify the dimension of competition with the conceptual notion of strictness, a concept understood as key to understanding differentiation in religious services as well as the nature of collective production within religious groups. The club theory of religious production (see Iannaccone 1992, 1994) has established that strictness provides a means to confront free-riding, thus enabling stricter churches to better succeed in providing collectively produced goods. Assuming strictness as the dimension

of competition is thus not merely for convenience but actually includes substantive interpretational value.

As shown by McBride (2008, 2010), this link can be derived from primitives. Let $s_g \geq 0$ denote the strictness of group $g \in G$. Individual $i \in I$ has type w_i with utility function

$$u_i(w_i, s_g) = \begin{cases} R(s_g) + Z(w_i, s_g), & \text{if affiliate with group } g, \\ Z(w_i, 0), & \text{if not affiliate.} \end{cases}$$

The $R(s_g)$ term captures the religious benefits from affiliating and participating with group g . According to the club theory, religious groups are collective organizations that must solve free-rider problems, and they can use religious strictness as a screening and sorting mechanism. Stricter groups impose more extensive behavioral requirements on their members, thereby raising the cost of entry into the group and reducing the influx of free-riders into the group. Assuming religious benefits increase in strictness, $R_s > 0$, concisely captures this religious production technology because stricter groups produce more benefits for their members. The $Z(w_i, s_g)$ term captures the simple trade-off between religious and non-religious pursuits. The parameter w_i , with $Z_w > 0$, represents the individual's secular productivity, so that a higher w_i corresponds to higher secular benefits. Higher conformity as measured by higher s_g implies less success in secular pursuits, $Z_s < 0$. Under standard assumptions about second-order and cross-partial derivatives, each i , given her type w_i , will have a uniquely defined ideal strictness s_i , which is the strictness of a group that, should she join, gives i her highest utility over joining any other group with any other strictness. Because each i has a unique ideal strictness, a distribution of individuals with different types will map one-to-one into a distribution of ideal strictnesses, thus allowing for graphical analysis as with the simple Euclidean preferences.

This derivation from primitives also highlights an important trade-off between secular and religious that is captured by the spatial model. A crude interpretation is that w_i is i 's market wage, s_g is the time spent by i in group g , and $1 - s_g$ is time spent by i pursuing secular goods. Several studies have found a negative correlation between income and time spent toward religious pursuits, and time is naturally bounded between 0 and an upper limit. A broader interpretation is that s_g represents a more general notion of effort and resources that an individual contributes to the group. The more resources contributed to the group, the less in secular benefits obtained by the individual but the larger the benefits produced by and received from the group.

A second commendable feature of the strictness spatial models is that they are flexible enough to be applied to a variety of research questions. In addition to two papers previously examined, strictness spatial models have been used to study secularization (McBride 2010), the transformation of Christianity from sect to church (Ferrero 2008), the likelihood that a country will have a state church (Barro and McCleary 2005), and more. That such a wide range of topics has been studied using the strictness spatial model is a testament to the flexible nature of spatial models more generally but also to the fundamental role of strictness in religion more specifically. Because strictness is a fundamental way in which actual religious groups distinguish themselves from one another, a model that captures strictness succinctly has huge potential to study several aspects of religious competition.

A third commendable feature is that these models generate new insight into our understanding of religious markets. In some cases, the model provides new insight into previously known empirical patterns or historical cases. Such is the case with Barros and Garoupa (2002) showing how response of a monopolist to rising competition from secular competition depends on how valuable are the religious goods, McBride (2008) demonstrating how conflicting findings in the empirical literature on religious competition have been misinterpreted because they did not properly account for the level of analysis, and Ferrero (2008) interpreting theological choices made by Roman Christianity in response to competition from paganism and Judaism. In other cases, the model generates new predictions that are then tested econometrically. This combination of theory and data analysis can be found in Barro and McCleary's (2005) linkage between the population share of a religious group and likelihood a country has a state church, North and Gwin's (2014) examination of population homogeneity and the presence of a state church, and Gaskins et al.'s (2013) investigation of how religious participation changes with the level of economic development.

Of course, the models are not without their shortcomings. One criticism is that the simplifying assumptions limit the realism and, hence, applicability of the models. Yet, many simplifications provide analytical convenience without losing substantive content. Assuming a uniform distribution of ideal strictnesses, for example, will typically enhance clarity without reducing the substantive merits of the analytical results. The same is likely true when assuming that all entrants use an identical religious technology. Given the high rate at which new religious groups fail, it is unrealistic to assume that all religious suppliers are equally effective at overcoming the coordination, collective action, and moral hazard problems inherent in collective production, and differences in effectiveness will lead to entry, churn, and exit in the

religious market. Nonetheless, the model can be understood as capturing competition between the most effective religious suppliers. That is, the model can be understood as capturing the long-run market trajectory rather than the short-run dynamics. Criticisms about modeling simplifications are less compelling even if literally accurate.

Other criticisms are more compelling and demonstrate limits of the strictness spatial models currently found in the literature. One criticism is that the focus on only a single dimension misses key aspects of competition when multiple dimensions may be equally relevant. For example, the desire to worship with people of similar traits may be just as important for some individuals as worshipping in a group that is closest to one's ideal strictness. "The most segregated hour of Christian America," as the Reverend Martin Luther King, Jr. once called the time when Americans are at church on Sunday mornings, may be so segregated not just because of social and governmental efforts to separate people by race but also by people's desire to worship with similar others. This possibility especially applies in cities and towns where one religious denomination has a large presence because different congregations of the same denomination often specialize by adopting a particular worship style or appealing to a particular demographic. This additional product differentiation creates inter-congregation competition even within the same denomination. It is unclear how robust will be the predictions of a single-dimension spatial model once other dimensions of product differentiation are added.

Another glaring omission from the current strictness spatial models is the disregard of various dynamic aspects of religious markets. Religious groups can and do change their strictness levels in response to both internal and external pressures but do so in a variety of ways (e.g., Mauss 1994; Stark and Finke 2000). They can also merge and split apart. The strictness spatial models account for external competition in the form of secular and religious substitutes, but they do not account for the internal dynamics that drive many changes in religious groups' behavior. Neither do they account for the dynamic formation of preferences in religious populations. Neither religious capital formation (Iannaccone 1990) nor cultural transmission (Bisin and Verdier 2001) nor differential fertility across groups (McBride 2015) has been incorporated into spatial models that can be analytically solved. Agent-based modeling provides one way to directly examine the dynamics of religious competition when formal analysis is too complicated (Montgomery 1996; Makowsky 2011; Chen et al. *Forthcoming*).

Differentiation Similar to Strictness

In three papers, the religious groups are competing for adherents as in the strictness spatial models, and the dimension is not labeled strictness even though the dimension is either directly or indirectly related to strictness.

Montgomery (2003) is conspicuously agnostic about labeling the dimension, though he explains that it could refer to a close relative of religious strictness called religious tension (p. 784). His model, which includes clergy effort as an additional factor affecting the quality of religious services, is actually inspired by the same sociological work that inspired the first spatial model in Barros and Garoupa's (2002). However, Montgomery's research question is quite different from the other papers: he constructs and applies a new measure of competition that avoids some of the problems of the oft-used Herfindahl index. This derivation of a new measure from a spatial model makes Montgomery's paper unique in the literature on religious competition. When he applies his measure, he finds that cities with more groups have lower participation. This findings runs counter to economic intuition but can still be explained by variation in religious demand across those cities (McBride 2008).

Reda (2012) refers to the single dimension in his spatial model as "religious investment," that is, the amount of money and time the individual is willing to contribute to religious goods. He then examines how government subsidies to religious groups affect the location of religious groups in this dimension; attention is restricted to a setting with two groups. In particular, the funds allow the group to dedicate more of its resources to proselytizing efforts, thereby shifting the ideal points of the consumers. By deriving the ideal points from more primitive assumptions instead of directly asserting Euclidean preferences, Reda is able to identify how religious preferences may shift as the result of religious regulations, a clear contribution to the literature. The relabeling of the dimension from strictness to religious investment is less significant. The club theory of religious production already teaches us that high strictness generates higher contributions, so Reda's dimension could easily be labeled strictness without any substantive change in interpretation.

In Iyer et al. (2014), individuals differ in "religiousness," and each of the two groups chooses a "focal point" in the dimension of religiousness as its location. The groups choose their focal points simultaneously to maximize their adherents, yet unlike other models the groups also provide non-religious services. The analysis reveals that the groups differentiate from each other when there is competition in the provision of non-religious goods, and that provision of non-religious services by the groups increases as economic

inequality increases. Econometric analysis using data from India supports both predictions. The notion of religiousness is sufficiently flexible to account for various aspects of religiosity, including strictness. In some countries like the United States, the correlation between certain forms of religious belief and strictness is positive and strong. As such, Iyer et al.'s model can be applied beyond India.

Because the models just discussed place competition in dimensions similar to strictness, the strengths and weaknesses of the strictness spatial models will apply to these models as well. These models capture key aspects of religious markets, are flexible enough to examine a range of questions and issues related to religious competition, and provide new insight into our understanding of religious competition. The models also ignore many of the dynamic aspects of both religious supply and religious demand in real-world religious markets.

Differentiation Dissimilar to Strictness

Unlike the above three papers, Eswaran (2011) conceptualizes competition in a novel manner that does not directly relate to strictness, even though his motivating research question (i.e., how does religiosity depend on market structure?) is similar to some of the previously discussed papers. Eswaran assumes that each religious group seeks to increase the piety of its members and does this by encouraging members to donate both time and money to the group. Interestingly, the group can distort its message by adjusting how members mix these two resources. Consumer preferences are identified by a point on a circle that represents “theology or its practical implementation” rather than strictness, with utility decreasing in the distance between the individual’s ideal point and the point on the circle where the group located. Eswaran identifies conditions under which a monopoly would dilute its message to increase its profits, but he also shows that state subsidization of religion can increase the quality of the spiritual product, while competition can lead groups to focus on monetary donations at the expense of piety. By separating time and money in the analysis, he takes the spatial-competition analysis in a new direction and offers different insight to questions previously asked.

Two other papers use the structure of a spatial model but ask quite different questions, thus necessitating a very different conceptualization of the dimension of competition. Raynold (2013) envisions competition in religious risk mitigation rather than in strictness, and although the two may be related, the distinction allows Raynold to derive new predictions. Drawing

from Iannaccone's (1995) insight that congregational structures are designed in part to reduce the perceived risk of specializing in one religious group, Raynold's dimension of product differentiation is a "fellowship ratio." This ratio reflects how much total time spent in religious activity is devoted to group activities rather than private, independent activities. Raynold shows how an individual's optimal fellowship ratio increases in her degree of aversion to religious risk and that belief in "one true path" and monotheism are both positively related to fellowship ratios. By reconceptualizing the dimension of religious competition, Raynold's spatial model connects aspects of religious doctrine more directly to market structure.

Berg et al. (2016) examine segmentation in the market for Islamic financial institutions (IFIs). In all of the above papers, religious competition occurs between religious groups typically best understood as congregations or denominations, yet Berg et al. demonstrate that religious competition occurs between other kinds of religious organizations. In their model, the groups are not religious congregations or denominations but are instead IFIs competing for customers who vary in how much they value an IFI's Shariah compliance. This variation in preference for Shariah compliance thus serves as the dimension of product differentiation. The authors demonstrate how market segmentation occurs with one IFI catering to high-piety types and another catering to low-piety types.

A key novelty of Poutvaara and Wagener (2010) is that both consumers and suppliers are *ex ante* differentiated. Consumers are distributed along a single dimension that reflects their willingness to pay for services, while suppliers are *ex ante* distinguished by their degrees of persuasiveness. Having both dimensions of differentiation creates a rich setting for religious competition and a rich set of results. Poutvaara and Wagener show that multiple equilibria abound, some with more sects, higher welfare, and lower membership costs, and secular societies with sects with higher membership costs. An implication of their findings is that cross-country differences in patterns of religiosity need not be directly mapped into fundamental differences in demand and supply or informational asymmetries, but may instead be merely different realized equilibria in a world where very different equilibria are possible. This insight challenges the more widely held view in the literature that cross-country differences in religious regulation drive national differences in religiosity (Iannaccone and Stark 1994; McBride 2008).

By reconceptualizing the dimension of product differentiation, these papers further reveal the general flexibility of spatial models to study religious competition. New questions can be asked and new dimensions of religious competition can be explored. Again, these papers confine their attention to

one-shot or static analysis, thus limiting their applicability to studying many of the dynamics inherent in religious markets.

Conclusion

The last 15 years has witnessed a blossoming literature that uses spatial-location models to study religious competition. My review of this literature has identified several strengths and limitations of the literature. The models capture several important features of actual religious markets, are sufficiently flexible to study a variety of religious phenomena, and provide new insight into those phenomena. A model that considers differentiation in strictness as the dimension of analysis has the best claim to being the canonical model of religious competition. Half of the papers reviewed (7 of 14) specifically mentioned that the dimension could or should be understood as strictness, and three of the remaining seven described the dimension of differentiation as something similar to strictness. I also note that I have used a strictness spatial model when teaching undergraduate students about religious competition for more than a decade and have found it to be a very effective teaching tool.

Spatial models have long had a secure home in economic analysis, so it should not be surprising that they have found a place in the economics of religion literature. However, the value of these models going forward will depend on researchers' continued ability to incorporate new and novel features. Perhaps a particularly fruitful area of future work would be to more directly combine the spatial models with models of cultural transmission (e.g., Chen et al. [Forthcoming](#)). The spatial models have as their particular strength the ability to identify competitive responses by religious suppliers, but they have largely ignored the dynamics of the demand side. Conversely, models of cultural transmission, which are blossoming in the economics of religion literature (e.g., Carvalho 2013; Carvalho et al. 2017), have as their strength the characterization of how cultural values are distributed throughout society and change as societal conditions change, although they do not provide much insight into the supply side. A fully fledged combination of the cultural transmission in a spatial framework with endogenous entry would draw from the strengths of each.

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