

Religious Pluralism and Religious Participation: A Game Theoretic Analysis*

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Abstract

Does religious pluralism decrease religious participation, or increase it? Secularization theorists claim the former while religious economies proponents claim the latter, and each side has used estimated pluralism-participation correlations to support their arguments. Using a formal game theoretic model, this paper shows how religious market forces and regulations generate plausible pluralism-participation correlations, whether or not the direct causal mechanisms argued by either side of the debate exist. The model generates testable hypotheses concerning the pluralism-participation relationship at both local and national levels and yields insights into previous empirical work.

The production and consumption of religious goods and services has been one of humankind's most enduring forms of social activity, and social scientists have, in turn, studied the many various factors that hinder or promote religious participation.¹ One issue that has received tremendous attention by researchers is the relationship between religious activity (or participation) and religious pluralism. For decades, the common belief was that pluralism decreased vitality, a belief exemplified by Berger's (1967) idea of *The Sacred Canopy*.² In short, pluralism undermines the "plausibility" of religion; having more religious worldviews makes them all more human and less divine. This idea, associated with secularization hypotheses, stood largely unchallenged until Finke and Stark (1988), proponents of a new "religious economies" or "rational choice" paradigm for the study of religion,³ argued that pluralism increases vitality.

As evidence for their claim, Finke and Stark (1988) reported a statistically significant positive correlation between pluralism and participation using data from the 150 largest U.S. cities in the year 1906. Numerous studies followed, but with mixed results. A positive correlation is obtained in some data sets while a negative correlation is found in others (Chaves and Gorski 2001). Moreover, the entire debate was undermined when Voas, Olson, and Crockett (2002) showed that the statistical nature of the Herfindahl pluralism index⁴ used in the literature yields a non-zero pluralism-participation correlation even if no substantive relationship exists. Finally, in an attempt to reframe the debate empirically, Montgomery (2003) defined a measure of religious pluralism immune to the Herfindahl measure's problems, conducted computational

¹ The sources are too numerous to cite, yet I mention Fenn (2003) and Dawson (2003) as starting points.

² Berger (1999) has since altered his stance on the predictive power of secularization theories.

³ The "religious economies" and "rational choice" titles are often used interchangeably (Young 1993), however Warner (1993) argues that the rational choice approach could be thought of as a subset of a more general religious economies paradigm.

⁴ The Herfindahl index (also called the Herfindahl-Hirschman Index, HHI) equals the sum of the squared market shares of each firm in an industry. Pluralism is measured as 1 minus the HHI.

analysis using a formal game-theoretic model to guide his empirical work, and showed again that the sign of the estimated correlation varies across data sets.

This paper continues this line of research by taking it a direction suggested by Chaves and Gorski (2001). With regard to the widely varying pluralism-participation correlations found in prior empirical work, they suggest that “One key task for future research will be to explain this variation by specifying the conditions under which one or another of these relationships obtains” (275). I pursue this agenda by formally examining the theoretical underpinnings of the pluralism and participation. Similar to Montgomery (2003), I use a Hotelling location model of product differentiation to represent religious competition in a rational choice setting,⁵ however, my model differs in a manner that allows me to conduct analytical and graphical, rather than computational, analysis. The key advantage of this approach is that I can analyze and illustrate via analytical examples how the underlying religious supply and demand co-determine the equilibrium levels of participation and pluralism and the resulting correlation.

The primary contribution of this analytical approach is that it demonstrates how religious market forces and regulations generate plausible pluralism-participation correlations, whether or not the direct causal mechanisms argued by either side of the debate exist. The estimated pluralism-participation correlation can be either positive or negative in a given data set depending on the underlying variation in the religious market’s supply and demand conditions, which in turn depends on the level of data in use (local or cross-country) and, if using national level, the types of religious regulations enforced. Three hypotheses capture the key implications of the analysis. First, population growth, all else equal, should increase pluralism in a local religious market. Second, the pluralism-participation correlation in local (town- or county-level)

⁵ Two other papers in addition to Montgomery (2003) model religious competition as a Hotelling location game. Barros and Garoupa (2002) examine how one or two religious denominations compete by offering different strictness levels, and McBride (2006) examines how economic growth affects religious competition

data will depend on the relationship between religious demand and population size. Third, religious regulations that hinder religious entry will decrease pluralism within the country, while regulations that hinder secular activities can independently promote religious participation. Taken together, these hypotheses demonstrate that a proper understanding of the pluralism-participation correlation requires recognition of both the level of data and the various impacts on religiosity that result from different types of religious regulation.

This paper's formal game-theoretic model and analysis fit securely within the religious economies paradigm of the sociology of religion (Warner 1993) because of the explicit representation of religious preferences and utility maximization. However, the results do not in and of themselves support or discredit either the secularization side or the religious economies side of the pluralism-participation debate because the results do not capture the potentially negative impact of plausibility on religious vitality.⁶ The findings are more concerned with interpretation of the data; one side could be right and the other wrong, vice versa, or both could be right to some extent, and yet the estimated correlation could still be either positive or negative due to the interplay of religious supply and demand at local and national levels. Indeed, even if future empirical work shows that the exact predictions of the model are incorrect, the paper moves forward the discussion on relationship between pluralism and participation by showing how different correlations can be plausibly explained.

MODEL

Sociologists since Johnson (1963) have characterized denominations by the level of "tension" they maintain with their society. While some denominations, called churches, exist in a state of

⁶ For recent general treatments of the secularization and religious economies paradigms, see Bruce (2002) and Stark and Finke (2000), respectively.

low tension with their surrounding environment, others, called sects, exist in a state of high tension with society. The high tension arises because of the denomination's rejection of prevailing moral codes. Although tension is, in principle, multifaceted, Iannaccone (1994) captures it with a uni-dimensional measure of denominational "strictness," because high tension denominations impose stricter behavioral standards on their members.⁷ For example, he ranks denominations in the U.S.A in the following manner. Low tension mainline denominations include Episcopal, Methodist, Presbyterian, and the United Church of Christ. Medium-low strictness, moderate denominations include Evangelical, Lutheran, Reformed Church, and Disciples of Christ. Medium-high strictness denominations include Missouri Synod Lutheran and Southern Baptist. Nazarene, Assemblies of God, Seventh Day Adventist, and Mormon are high-tension denominations.

The following model equates tension and strictness.⁸ The demand for religious strictness arises from a fundamental demand for religious and secular goods. Religious goods can take various forms, such as the promises of otherworldly rewards (Stark and Finke 2000) or social service-type public goods provided by a local congregation. Iannaccone (1988; 1994) and Montgomery (1996) formalize this idea by supposing each individual i has utility function

$$u_i = u(w_i, s_d) = Z(w_i, s_d) + R(s_d), \quad (1)$$

⁷ See Chapter 6 of Stark and Finke (2000) for a discussion of another use of the terms "church" and "sect." In short, a church is usually thought of as a conventional religious organization that accepts the existing social order and does not impose demands far beyond society's moral code. A sect, on the other hand, demands a "higher" order of living. The church-low tension, sect-high tension connections follow. A sect can be further distinguished from a "cult." A sect is rooted in the dominant religious tradition of the society, while a cult is a novel or alien religion. Because I use a uni-dimensional measure for tension or strictness, I do not distinguish between sect and cult.

⁸ Tension and strictness are conceptually distinct, e.g., members of a strict group might experience different degrees of tension depending on the local surroundings. Because the distinction is more important when thinking about multiple markets, it will be convenient to abstract from this distinction in the model. Moreover, the equating of strictness and tension in the model suggests that other terms can be used to describe the s_d variable. For example, orthodoxy is a general term that captures many of the features of religious strictness. However, because the theory of religious club production focuses on the role of strictness (Iannaccone 1992, 1994), I use strictness in the model.

where Z is the “secular” payoff, R is the religious payoff associated with goods produced by a religious group, w_i is i ’s wage rate, and s_d is the strictness of the denomination d to which i affiliates. The Z function is increasing in the wage as expected but decreasing in strictness because stricter religious practices reduce the amount of time available for secular work, restricts one’s ability to form economically beneficial social ties, and so on. The R function is increasing in strictness because stricter denominations must offset the increased strictness cost to religious consumers by providing larger religious benefits. Assume that strictness is in the range $[0,1]$. This assumption is for analytical convenience and is irrelevant for the implications of the model. It normalizes strictness, which is already an inherently relative concept.

Standard microeconomic theory tells us that a utility maximizing individual will choose a denomination that best equates her marginal rates of substitution across secular and religious benefits. The ideal strictness for i , denoted s_i^* , is the strictness for i that equates the two. By the envelope theorem, we find that s_i^* is a decreasing function of w_i ; for those who can earn higher wages, it is more costly to be associated with a high-strictness denomination, so the ideal strictness will be lower.⁹

Under appropriately chosen mathematical conditions on Z and R , we can represent the utility function in (1) as a linear¹⁰ spatial utility function

$$u_i = -|s_d - s_i^*|. \tag{2}$$

Simply put, individual i ’s utility is decreasing in the distance between her ideal strictness and the strictness of the group to which she affiliates. If she does not affiliate, she receives payoff $-s_i^*$,

⁹ That stricter denominations draw a larger share of their memberships from poorer segments of society (Iannaccone 1998) implies that this simple comparative static has empirical merit even if the relationship between income and ideal strictness in real life is more complex than represented in the model.

¹⁰ The linearity is not important. A quadratic or other loss function would yield identical results because the important feature is that i ’s utility is decreasing in the distance between her ideal strictness and the strictness of the groups to which she affiliates.

which is akin to joining a religious group with strictness 0. Clearly, a particular individual i will affiliate with the denomination with strictness closest to her ideal strictness. If she is indifferent between joining multiple denominations (or between affiliation and non-affiliation), then assume she will affiliate with each of those denominations (or non-affiliation) with equal likelihood (e.g., she flips a coin to decide).

Suppose individuals differ only in their wages, e.g., due to variations in skills, education, or genetically inherited intelligence that comprise human capital. Then, the religious demand of individuals in a religious market can be represented as a distribution of ideal strictnesses. Figures 1(a) and 1(b) illustrate two such distributions. Each denomination d , knowing the distribution of ideal strictnesses, chooses its strictness level s_d in order to maximize its “religious payoff function”

$$\pi_d = Am_d - c, \tag{2}$$

where m_d is the size of the membership that eventually affiliates with the denomination d , $A > 0$ captures how strongly denominations care about membership size, and $c > 0$ is the cost of providing religious services.

To complete the model, suppose that decisions are made in the following order.

1. Denominations simultaneously choose to either locate at a strictness level or postpone the decision to locate until period 2. Any denomination that chooses its strictness cannot change its strictness or exit later.
2. Any denomination that did not choose a strictness level in period 1 now chooses to locate or exit. Assume that if the denomination is indifferent between entering and not entering then the denomination exits.

3. After observing the denominations' strictness levels, religious consumers choose their denominational affiliations or choose to not affiliate.
4. Denominations and individuals receive their payoffs.

This model is what is known in the economics literature as a Hotelling location model. Hotelling (1929) first used this model to study a firm's decision to enter a market. Since then, Hotelling models have been widely used to examine location and pricing decisions of firms, politicians' policy choices, the behavior of legislatures, etc.¹¹ This model is identical to that used in McBride (2006) but differs from the other game theoretic models of religious competition. Individuals' preferences here are simpler than in Barros and Garoupa's (2002) model which allows for asymmetric preferences, (e.g., affiliating with a denomination more strict than what you prefer may be more "costly" than choosing a denomination less strict than preferred), but the model is also more general in that I allow for denominational entry. The model is simpler than Montgomery's (2003) model in one respect because his allows denominations to expend effort on services other than a strictness level, yet it extends his model by also considering two-periods of denominational entry. This two-period entry captures the idea that there are denominations already entrenched (e.g., the ones that locate first) in the market but that face the threat of entry (e.g., in the second period) by other denominations.¹² Allowing for entry implies that the level of religious pluralism will not be assumed but will instead be an outcome of the model.

Individuals' payoff functions abstract from the various complex elements of religious demand and the process of conversion and affiliation. For example, they abstract from the

¹¹ Consult Carlton and Perloff (2000) to see how Hotelling location models compare with other models of market competition. See Enelow and Hinich (1990) for applications of Hotelling location models to politics and voting.

¹² This difference also factors into the strategic nature of the religious competition in that it will "pin down" the strictness level of the strictest denomination. In technical terms, it allows the equilibrium to rule out dual deviations. An individual denomination that locates in stage 1 considers whether she should deviate, but must also be concerned with whether there will be a subsequent deviation in the form of entry in stage 2. Without stage 2, the equilibrium would not require an individual to consider deviations that may result from her deviation.

socialization of children in their parents' religion and from meaningful conversion experiences. The simplified preferences are based, however, on an underlying process of utility maximization presented earlier, which is also similar to that described by Iannaccone (1988; 1994) and Montgomery (1996). Moreover, as Montgomery (1996) shows, religious capital can be added to the model to generate additional denominational dynamics. Because my focus is on the impact on the equilibrium determination of pluralism and participation, I keep the model simple by abstracting from religious capital.

Denominations' preferences also abstract from real-life denomination leaders' motivations and the production of religious services. In the model, denominations are religious groups providing religious club goods represented via the R function instead of explicitly representing the club good production process. Each denomination leader is assumed to care only about membership size and production costs. In reality, denomination leaders have many objectives that may matter more to them than membership size, such as the well-being of denomination members (Barros and Garoupa 2002), social justice, community solidarity, etc.¹³ Moreover, production costs may depend on the membership size; e.g., too many members can create more dramatic free-rider problems. Extending the model to account for these factors will alter the exact characterization of the equilibrium outcomes, however, the substantive results developed in the examples and hypotheses below will not be meaningfully affected because the underlying market and regulatory environment will have similar effects on religious outcomes in a richer model as they do in this paper's model.¹⁴ Of course, enriching the model will enrich the

¹³ Mainline Protestant groups, for example, may pursue certain religious and social positions knowing that their membership sizes will suffer. The Amish pursue their community goals, too, even when doing so limits membership growth.

¹⁴ The model's simplified denomination preferences have the primary effect of implying that a denomination will only enter the market if it can meet a minimum membership size, which is likely true for actual religious leaders with richer preferences but who require a minimum membership to provide services. Indeed, if other goals are correlated with strictness, then a denomination leader pursuing various objectives will prefer locating at certain

results in other ways that can yield meaningful insights into other research questions not addressed in this paper.

Finally, note that both demand side (e.g., population size) and supply side factors (e.g., the cost of entry) are treated as exogenously. Taking these parameters as given, religious market outcomes are endogenously derived in the religious equilibrium discussed in the next section. Religious regulations are also treated as exogenous.

A RELIGIOUS EQUILIBRIUM

Game theoretic analysis is done on this model by using “backwards induction” to find the Subgame Perfect Equilibrium.¹⁵ Essentially, when denominations locate in the first period, they perfectly anticipate what will happen in the second period, and all denominations in both the first and second periods perfectly anticipate¹⁶ how individuals will affiliate in the third period. An equilibrium is a profile of actions for each actor that yields her the highest payoff given what the other actors are doing or will do in response to what she does. McBride (2006) describes how there are multiple equilibria in this model, yet he also shows that they all have similar features. It is these features that are of interest to us here and not all the technical details, so I use examples to analyze the important points before turning to the pluralism-participation relationship in the next section.

strictness levels more than others. However, with enough potential entrants of different preferred strictness locations, the results match those from the model used in the paper because the realization and threat of entry is credible for any strictness level. In that regard, having identical preferences for denomination leaders is a simplifying assumption but not a critical one for the results.

¹⁵ The Subgame Perfect Equilibrium concept is the standard equilibrium concept used for complete information games such as my model. See Gibbons (1992) for an intuitive presentation of the concept.

¹⁶ Perfect anticipation is clearly a strong assumption, yet it is done to simplify the analysis. In effect, the model assumes that denominations have very good information about the distribution of ideal strictnesses.

Example 1: A Uniform Distribution of Ideal Strictnesses. Suppose individuals' ideal strictnesses are equally spaced along the strictness range $[0,1]$ as depicted in Figure 1(a). The horizontal axis measures a given strictness level s , while the vertical axis measures the number of individuals with that strictness level as their ideal. The horizontal line at height \bar{n} implies that for each strictness level there are \bar{n} individuals who have that strictness level as their ideal, i.e., \bar{n} individuals have strictness s' as their most preferred strictness level, and \bar{n} have s'' as their most preferred strictness, and so on. \square

Example 2: A Bell-shaped Distribution of Ideal Strictnesses. Stark and Finke (2000: 196-197) suggest that the distribution of ideal strictnesses is more likely to be bell-shaped as in Figure 1(b). The closer the strictness is to the peak of the distribution, the more individuals have that strictness level as their ideal: n'' individuals have s'' as their ideal, while n' have s' as their ideal strictness, with $n'' > n'$. \square

Although non-uniform distributions are more realistic and can be analyzed (see McBride 2006), the remaining examples use uniform distributions because uniform distributions capture the key strategic nature of the religious competition while being easier to analyze.¹⁷ The next example uses a uniform distribution diagram to illustrate how individuals make their affiliation choices.

Example 3. Affiliation Choice with Two Denominations. Suppose two denominations, 1 and 2, are located at strictnesses s_1 and s_2 , respectively, with $s_1 < s_2$. If these are the only two

¹⁷ The prior formal work (Barros and Garoupa 2002; Montgomery 2003; McBride 2006) makes the same assumption.

denominations when individuals make their affiliation decisions, then we can depict in Figure 1(c) exactly how individuals will affiliate. Individuals can choose three strictness options: affiliate with denomination 2 at strictness s_2 , affiliate with denomination 1 at strictness s_1 , or not affiliate by choosing strictness 0. Because an individual's payoff decreases in the distance between her chosen strictness level and her ideal, she will choose the strictness option that is closest to her ideal. This affiliation process results in all individuals with ideal strictnesses between 0 and s' choosing non-affiliation, all individuals between s' and s'' affiliating with 1, and all individuals higher than s'' affiliating with 2. Notice that s' is the midpoint between 0 and s_1 , and s'' is the midpoint between s_1 and s_2 . Those individuals in areas m_1 and m_2 affiliate with denominations 1 and 2, respectively. The area marked NA represents the individuals not affiliated with either denomination. \square

To find a religious equilibrium we now must consider the denominations' optimal strictness choices given the denominations' anticipation of how individuals will affiliate. This is made easier by noting an important fact about a denomination's optimal behavior. Because providing religious services yields payoff $Am_d - c$ and a denomination receives payoff 0 by exiting, a denomination in the market will only want to stay in the market if $Am_d - c \geq 0$, which is true if the denomination achieves a sufficiently large membership size $m_d \geq c/A$. Of course, if a denomination can enter and receive membership greater than c/A , then it will enter, but it will not want to be in the market if $m_d < c/A$. Thus, any equilibrium must consist of (1) enough denominations in the market so that any other denomination that wants to enter will get membership less than c/A , and (2) not too many denominations so that all located denominations have membership size c/A or greater. Example 4 illustrates one such equilibrium.

Example 4: An Equilibrium with Two Denominations. Figure 2(a) depicts an equilibrium in which two denominations, 1 and 2, enter the market in period 1, all other denominations do not enter in period 1 and then exit in period 2, and each individual affiliates with the denomination with strictness closest to her ideal strictness. Denominations 1 and 2 are close enough to each other and to the strictness boundaries to make it so that there is no location for an entrant denomination to enter and achieve a membership of worthwhile size, and they are far enough apart so that they each achieve a membership size large enough to make staying in the market worthwhile. The rest of this example proves that this profile of actions is an equilibrium; readers not interested in the proof may skip the rest of the example.

We must show that another denomination prefers to not enter and that neither denomination 1 or 2 wants to change its strictness level or exit. First consider a new denomination, which we will call denomination 3. By entering at strictness s_3 such that $s_1 < s_3 < 1$, the new denomination will get membership strictly less than c/A . That is, it will get all individuals to the right of s_3 , and it will get only half of the individuals between s_1 and s_3 . Adding these up yields $m_3 < c/A$, so it will not enter. Similarly, by entering between s_2 and s_1 or between 0 and s_2 , 3 will get $m_3 < c/A$. Thus, 3 will not enter.

Now consider whether 1 wants to change strictness. If denomination 1 moves closer to strictness 1, it will clearly get a smaller membership, so it will not move right. If it moves to the left closer to s_2 , it might be able to stake claim on larger membership, however, this will result in 3 receiving membership greater than c/A by entering at 1's right in period 2, as depicted in Figure 2(b). Because this yields a smaller payoff for 1, 1 will not shift to its left. Of course, it

will not shift to the left of s_2 for the same reason 3 will not enter to 2's left. Nor will 1 exit because her payoff is greater than 0 by staying. Thus, 1 will not move or exit.

Finally consider denomination 2. Notice that no matter where 2 is on 1's left, it always receives membership $m_2 = s_1/2$. Since it is no better off anywhere else on 1's left, 2 has no incentive to move within the range $[0, s_1]$. 2 will not want to move to 1's right for the same reason that 3 does not want to enter there. Like 1, 2 is better off staying than exiting. Thus, 2 will not move or exit, and since we have checked all conditions, this is a religious equilibrium. \square

Before turning to pluralism and participation, I mention a few characteristics of the religious equilibrium. First, the range of ideal strictnesses for one denomination's equilibrium membership does not overlap with that of another denomination as it appears to do in actual religious markets (Finke and Stark 2000: Ch. 8). This feature arises from the simplified religious preferences for individuals, and modifying the model can yield overlap in equilibrium.¹⁸

Second, equilibrium denomination sizes are roughly equal. If a denomination is too large, then it must be serving a wide range of individuals, and a new denomination could enter and provide services that better suit those individuals, thereby stealing membership and reducing the original denomination's size. If a denomination is too small, then it would not be able to cover its costs. Thus, equilibrium denominations exist in a medium size range. This feature arises because denominations use the same technology and because the cost of providing

¹⁸ This overlap could be achieved by modifying the model in three ways: (1) allow the actors to repeat the four period game over and over (i.e., turn the game into what game theorists call a "repeated game"), (2) allow multi-generational individuals who, if raised in one denomination, retain a certain amount of "religious capital" (Iannaccone 1990) that ties them to that denomination even if their ideal strictness level changes, and (3) allow members of a denomination to exert some influence over the denomination's strictness (e.g., by exercising "voice" in the leadership of the denomination). Montgomery's (1996) illustrates how these modifications yield overlap in a non-game theoretic set-up.

religious services does not depend on the strictness level of the denomination. Having very different denomination sizes in equilibrium is possible if these assumptions are relaxed.¹⁹

Finally, the least strict denomination in an equilibrium cannot be more than $2c / A\bar{n}$ in distance from strictness 0, and the strictest denomination must always have strictness $1 - c / A\bar{n}$. If the least strict denomination is more strict than strictness $2c / A\bar{n}$, then a denomination will enter on its left. If the strictest is any more to the left than $1 - c / A\bar{n}$, a denomination can enter on its right and steal membership, while if it is more to the right, then it can shift left to obtain a higher membership without losing any membership of its own. These last features have implications for equilibrium pluralism and participation, our next topic.²⁰

PLURALISM AND PARTICIPATION

Measuring Pluralism and Participation in the Analysis

To say something concrete about pluralism and participation requires a specific measure of each notion. To measure participation, this paper uses the same measure as that used by Montgomery (2003): the percent of the population affiliated with any denomination. Measuring pluralism is, of course, not without problems. As pointed out by Voas, Olson, and Crockett (2002), the commonly used Herfindahl measure has properties that can generate a correlation between religious pluralism and religious participation—properties related to the distribution of group sizes that are mathematical and not related to the substantive reasons hypothesized in the social

¹⁹ For example, earlier work describes how congregation size and strictness directly impact the ability of congregations to provide the religious public goods since it corresponds to the ability to screen religious free-riders (Iannaccone 1992; 1994). Embedding this feature of religious production into the denomination profit function will yield a wider range of equilibrium denomination sizes.

²⁰ Notice also that non-affiliation only occurs near strictness 0. If consumers will only join a group if its strictness is “close enough” to their ideal strictnesses, then we can observe an equilibrium in which there are “gaps” of non-affiliated members between two located denominations. Pluralism and participation would be lower with gaps than without gaps. However, gap-free equilibria will still also exist. More importantly, the key logic and intuition of the model remains intact with the gaps, so I do not devote attention to it here.

scientific literature on religious pluralism and participation.²¹ Other measures of pluralism, by being correlated with the Herfindahl measure, may also suffer from the same problem.²² While empirical work must confront the challenge posed by this measurement issue, the issue is not critical to the theoretical analysis of this paper. Indeed, the model lends itself to two measures of pluralism. The first is the number of denominations. Because denomination sizes are roughly equal in equilibrium, and because they spread across the strictness spectrum, the number of denominations is easy to calculate and intuitively captures pluralism; one setting is more pluralistic than another if it has more denominations than another. The second measure relates to religious behavior. Because the strictness level is meant to capture religious behavior, one market is more pluralistic than another if its observed range of strictnesses is wider than the other. If some individuals do not affiliate, then this range will be $[0, s_H]$, where s_H is the strictness level of the most strict denomination. If all individuals affiliate, then the range will be $[s_L, s_H]$, where s_L is the least strict denomination. Thus, if there are two markets each with two denominations such that one exhibits a wider range of religious strictness, then the wider strictness range market has higher religious pluralism. Though technically distinct, these two measures are related in the model's equilibrium because having more equilibrium denominations will generally imply having a wider range of observed strictness.

How Supply and Demand Co-determine Pluralism and Participation

²¹ Consider this example from Voas, Olson, and Crockett (2002). Town A is 50% Anglican and 20% Methodist, town B is 55% Anglican and 20% Methodist, and town C is 45% Anglican and 20% Methodist. Pluralism is lowest in B, then A, then C. Compare these to towns D and E, where D is 50% Anglican and 25% Methodist and E is 50% Anglican and 15% Methodist. Assuming individuals not in these denominations are not affiliated or participating, then we see that pluralism and participation are negatively related if the size of the larger denomination varies (compare A, B, and C), while pluralism and participation are positively related if the size of the smaller denomination varies (compare A, D, E). In short, the pluralism measure varies in a way that is not consistent with our understanding of what pluralism is to capture. Thus, the Herfindahl measure cannot reliably capture pluralism.

²² I thank a reviewer for clarifying this point.

To see how supply and demand determine pluralism and participation, I show how exogenous variation in supply and demand affects the religious equilibrium. First consider variation in demand.

Example 5: Variation in Religious Demand. Suppose there is an urban city with a large population that has a wide range of religious preferences depicted as a uniform distribution that covers the entire strictness range $[0,1]$ and with \bar{n} individuals at each strictness level. Also suppose there is a rural town with a smaller population with narrower religious preferences over a smaller strictness range $[1/4,1]$, again with \bar{n} individuals at each strictness level in that range.

Figures 3(a)-(b) depict a religious equilibrium for each market assuming

$$\frac{c}{A} = \frac{1}{4}\bar{n}$$

and that individuals in one geographic area cannot travel to another area. Using superscripts c for city and t for town, there is an equilibrium with denominations located at

$$s_1^c = \frac{3}{4}, s_2^c = \frac{1}{2}, s_3^c = \frac{1}{4},$$

$$s_1^t = \frac{3}{4}, s_2^t = \frac{1}{2}.$$

The equilibrium denomination sizes are

$$m_1^c = \frac{3}{8}\bar{n}, m_2^c = \frac{1}{4}\bar{n}, m_3^c = \frac{1}{4}\bar{n},$$

$$m_1^t = \frac{3}{8}\bar{n}, m_2^t = \frac{3}{8}\bar{n}.$$

Using logic similar to that used in Example 4, we can show that the denomination profiles correspond to equilibrium behavior. In this equilibrium, the town has lower pluralism than the city because all town residents belong to two denominations while the affiliated city

residents are partitioned into three denominations. The town also has a higher participation rate because, unlike the city, all individuals have denominational affiliations. \square

If we had a large sample of cities and towns with the city and town characteristics in Example 5, then we would estimate a negative pluralism-participation correlation due to the variation in demand across the two geographical locations and not due to a *Sacred Canopy* effect. In fact, the proponents of the religious economies paradigm could be correct that pluralism increases participation, and we could still estimate a negative correlation.

Variation in demand can also produce a positive correlation.

Example 5 (cont.). Suppose now that the town has uniform distribution across $[0,1]$ but that its population is smaller so that each strictness level has only $\bar{n}' = \frac{\bar{n}}{2}$ individuals. With

$\frac{c}{A} = \frac{1}{4}\bar{n} = \frac{1}{2}\bar{n}'$, the town's new religious equilibrium involves only one religious denomination, located at $s'_1 = 1/2$, as depicted in Figure 3(c). Clearly, the town has lower pluralism than the city. Note, however, that the participation rate is now lower in the town than in the city because a quarter of the town is not affiliated, while only an eighth of the city is not affiliated. Pluralism and participation are both lower in the town than in the city.

Comparing Figures 3(a), 3(b), and 3(c), we notice that the different outcomes result from changes in two dimensions of religious demand: population size and the concentration of demand. The towns in Figures 3(b) and 3(c) both have a smaller population than the city, which, as will be discussed later, impacts religious pluralism. But their smaller populations have different characteristics; one is uniform across the entire strictness range, while the other is

massed in the high strictness region. The smaller population yields lower pluralism in both cases because the smaller population cannot sustain as many religious groups. Whether participation is higher or lower depends on the manner in which demand is spread across the strictness spectrum. High participation occurs in these examples when religious demand is more concentrated at the high strictness levels. □

If in our data cities and towns exhibit the characteristics of the city and town in the continuation of Example 5, then we would estimate a positive pluralism-participation correlation, not due to the religious economies logic but because of the variation in religious demand. In fact, the secularization claim that pluralism decreases participation could be correct, and we could still find a positive correlation, so long as the secularization process has only just begun.

Variation in supply parameters, depicted as variation in the c/A -ratio, can also yield a positive or negative correlation.

Example 6: Variation in Religious Supply. Consider a city and town with identical populations. In each, religious demand is uniformly distributed across $[0,1]$ with \bar{n} at each strictness level. Suppose, however, that the town's elites—the mayor, sheriff, educators, leading businesspersons, etc.—all belong to denomination 1, have ideal strictness $5/8$, and decide to use their influence to regulate the religious market. Because of their political power, this coalition succeeds in making life very difficult for other denominations. Other denominations must pay extra fees for electricity to their buildings and for special clergy licenses, they lose their tax-exempt status, their leaders are harassed by local law enforcement, etc. The religious market is now infused with regulations that suppress religious freedom by effectively raising the cost c of

operating for any denomination other than denomination 1. In fact, if the cost of supplying religion c is raised a sufficient amount, then no other denomination will find it “profitable” to remain in operation. Moreover, if the coalition also co-opts denomination 1’s leadership, then they can set $s'_1 = 5/8$ and achieve their ideal strictness. Figures 4(a)-(b) depict the city and town’s equilibria, respectively. Closing the religious market has now led to lower pluralism and a lower affiliation rate in the town than in the city. If these regulations were repeated in all towns but not in the cities, we would estimate a positive pluralism-participation correlation.

Supply side variation due to religious regulations can also lead to a negative correlation. Suppose the coalition now punishes all residents who do not participate in denomination 1, e.g., non-affiliating residents are not awarded government grants or loans, they are harassed by law enforcement, etc. If these regulations sufficiently raise the cost of not affiliating, the coalition essentially removes the non-affiliation option and forces all residents to belong to denomination 1. This scenario is depicted in Figure 4(c). The town still has lower pluralism than the city, but it now has higher participation because all residents are affiliated with the monopoly denomination. We would now calculate a negative pluralism-participation correlation if this city and town were representative in our data. □

Example 6 illustrates how variation in the supply side of the religious market due to religious regulations can lead to either a positive or a negative pluralism-participation correlation, depending on the type of supply side variation in the data. Examples 5 and 6 together demonstrate how underlying supply and demand forces operate together to generate pluralism and participation correlations.

HYPOTHESES

This section extends the previous section's analysis to derive more specific hypotheses about the pluralism-participation relationship. An important distinction arises between pluralism and participation at the level of single markets and that at the level of aggregations of markets. For concreteness, single markets are best thought of as local towns or local counties, while the national level is an aggregation of markets. This distinction is important because the variation in demand and supply will differ in local market data sets than in national data sets due to the nature of religious competition. For example, competition within a market may lead to innovations in engaging and acquiring new members, and knowledge of these innovations can spread across markets. However, competition between religious groups in a single market over adherents, which is the form of competition in the model, is primarily about the availability or threat of religious substitutes, and a denomination in a town far away from an individual does not comprise a viable substitute to the denominations in that individual's local vicinity. Individuals may, of course, move long distances for religious purposes such as escaping religious persecution, yet, in the simplest case, religious competition for members occurs within local markets and not across markets. This distinction implies that supply and demand factors will vary differently across data from local markets than in data of aggregations of markets. Indeed, for this reason, it is possible to simultaneously obtain pluralism-participation correlations of opposite signs in market-level (town or county) and aggregated (cross-country) data.

Let us first consider an individual market. The following hypothesis follows directly from Example 5 above.

Hypothesis 1: *All else equal, a uniform increase in population in a religious market will generally increase both religious pluralism and religious participation in that market.*

A uniform increase in a market's population, depicted as an increase in parameter \bar{n} in the model, implies an overall increase in religious demand in that market. This increase in population is illustrated as a move from \bar{n}' in Figure 3(c) to \bar{n} in Figure 3(a). Holding all other supply and demand parameters fixed, this increase in religious demand implies that a larger number of religious groups can be sustained in that market, and with more people at each religious preference, the larger number of religious suppliers will, together, offer a wider range of religious services. The strictest equilibrium denomination, located at $1 - c / A\bar{n}$, is more strict as the population \bar{n} increases, and the maximum strictness for the least strict denomination, $2c / A\bar{n}$, decreases. A uniform increase in population also increases participation. A larger population means that more suppliers can exist in the equilibrium, and as these suppliers locate across the strictness spectrum, more consumers will find a denomination closer to their ideal strictness. More of the non-affiliated are now willing to affiliate as the least strict denomination is now lower than before. Hypothesis 1 uses the qualifier “generally” for technical reasons related to the multiplicity of equilibria.²³ Generically speaking, however, both pluralism and participation will increase with uniform increases in population.

²³ Holding population size fixed, there usually exist multiple equilibria in a single market, some of which have a different number of denominations. For example, suppose with \bar{n} individuals at each strictness level, there are equilibria with $x_L, x_L + 1, \dots, x_H$ denominations. As \bar{n} increases, x_L and x_H will also both increase, yet the new x_L might still be smaller than the old x_H . Montgomery (2003) found a similar pattern in his computation examples. Thus, the precise statement behind Hypothesis 1 is that the number of denominations in the fewest-denominations equilibrium and the number in the most-denominations equilibrium will each increase as population increases, even though picking out any two equilibria at random, each associated with a different population, will not necessarily imply that the lower population equilibrium has lower pluralism. Participation rates will also vary in these multiple equilibria as pluralism varies.

Hypothesis 1 considers a single market, yet most empirical studies of pluralism and participation consider a cross-section of markets (e.g., across towns in the same country) or a cross-section of aggregations of markets (across countries). To compare across markets, we must recognize that the two important conditions in Hypothesis 1—that population size is uniform across market data and that all else is constant—might not be met in cross-section data. Population size, in particular, may be correlated with other parameters in the model that work to counter the positive impact on pluralism predicted by Hypothesis 1.

One such possibility is that the forces behind differences in population levels across markets are systematically related to the opportunity cost of supplying religious services in those markets. In this case, according to the model, both pluralism and participation can decrease with population growth. Holding population size fixed, an increase in the cost of supplying religious services, c , will decrease the number of equilibrium denominations and the observed range of religious strictness. As the cost of supplying religion increases, the strictest equilibrium denomination becomes less strict (i.e., $1 - c / A\bar{n}$ decreases), and the least strict equilibrium denomination may become more strict (i.e., $2c / A\bar{n}$ increases). A rise in the cost of supplying religious services thus decreases pluralism and participation. Overall, if population increases uniformly by a relatively small amount and if there is simultaneously a sufficiently large rise in the cost of supplying religion, then pluralism and participation will be lower in towns or counties with larger populations.

Another possibility is that population size may be correlated with changes in religious demand other than changes in the number of religious consumers. For example, a larger population means improved secular economic opportunities due to greater specialization in production, and the improved secular opportunities will, in turn, influence religious demand.

Economic growth and rising wages increase the distribution of wages, $F(w)$, and an increase in the value of secular activities does effectively the same thing by increasing the real value of a given wage. Either way, the result is a shift leftward in the distribution of ideal strictnesses, akin to a shift from Figure 3(b) to 3(c). When this occurs, the model predicts a decrease in denominations' equilibrium strictness levels; intuitively, the denominations decrease their strictnesses to cater to the new religious demand. If the original distribution was sufficiently to the right, then the shift leftward also implies that non-affiliation becomes a more viable alternative to religious participation for many individuals, and this may decrease the number of religious groups in the market. The drop in pluralism and participation is seen in the shift from Figure 3(b) to 3(c), where Figure 3(c) has fewer denominations and non-affiliated individuals. In short, an increase in population size, though not directly reducing religious demand, may be negatively correlated with it via an indirect link through secular economic factors.

There are reasons to suspect that both of these possibilities deserve more than passing mention and are strong enough to counter the positive correlation described in Hypothesis 1 and instead create a negative correlation between pluralism and participation within a given data set. First, population growth in a town may foster economic growth in that town because population growth creates economic opportunities not present in smaller towns. These opportunities raise the opportunity cost of supplying religion (an increase in c) and lead to increased wages and income and an increasing number and variety of secular activities which are substitutes to religious participation (a leftward shift in $F(w)$). If these forces are sufficiently strong, they will generate a negative correlation between population size and both religious pluralism and participation. Second, an increase in population in a particular religious market may also be the result of economic growth. An exogenous increase in incomes and wages in a particular town,

e.g., due to an increase in the production of secular goods, may lead to migration into that town of those who will benefit from new economic opportunities. These people have higher opportunity costs of religious activity, and thus relatively lower ideal strictnesses. This feedback relationship implies positive correlations between population size, the cost of supplying religion, and incomes in a cross-section of towns. That said, economic growth may also be associated with a decline in c if religious groups can use improvements in technology to reduce the costs of supplying religion. In this case, the positive relationship between population size and the cost of supplying religion may be smaller than originally thought or even negative if this second force is stronger. Overall, the correlation between population size and wages is likely to be positive, but the correlation between population size and supply cost is unclear.

The above logic yields the following hypothesis about the pluralism-participation in local (town or county) data.

Hypothesis 2: *(a) If population size is weakly positively correlated or negatively correlated with economic activity in a cross-section of religious markets in local level data, then religious pluralism and religious participation will be positively correlated in that cross-section. (b) If population size is strongly positively correlated with economic activity, then the pluralism-participation correlation in local level data will be negative.*

If the correlation is weak or negative, then in a cross-section in which population size varies across markets, the positive effect of population size on pluralism and participation will outweigh any impact of counteracting effects should there be any. This relationship is depicted

in Figure 5(a). One-sided arrows represent causality, two-sided arrows represent correlation, and arrow thickness represents the strength of the relationship. The case of the strong positive correlation between population growth and economic activity is depicted in Figure 5(b). In this second case, the negative impact on participation is enough to generate the negative pluralism-participation correlation.

To consider the pluralism-participation relationship in national level data across countries, we must now account for aggregation issues because national level measures are aggregations over the many different local markets in the country. A nation's overall population is not directly relevant because it is population in the local markets that matters for local religious competition. The national level measure of participation is a population-weighted average of the participation levels of the various local markets within the country. If religious groups in one market tend to have congregations in other markets, then the country level measure of participation will also average over the participation in the various local markets. Together, these facts imply that the pluralism-participation correlation might be very different across countries than it is across towns or cities—even in the very same countries for which the researcher has country level data—for reasons unrelated to the secularization-religious economies debate.

Though the forces at work behind Hypothesis 2 would be at work across towns within any particular country, the variation in pluralism and participation across countries will depend on the factors that differ systematically across countries. Indeed, it is in cross-country data where the impact of national level religious regulations will be manifest because religious regulations which are legislated at the national level will impact all the local religious markets

within that country. Thus, we will observe more variation in regulations across countries than within countries.²⁴

Example 6 illustrates two types of religious regulations, those that hinder the entry of new religious groups and those that punish individuals not in the privileged religious group. Both of these types of regulation hinder religious entry and thereby limit religious pluralism, though they do it in different ways. The first directly raises the operational costs for new religious suppliers. If this cost is prohibitively high for the discriminated religious groups in all markets in that country, then all markets within that country will have low religious pluralism, and the country overall will also have low pluralism. Whether or not the local regulated markets have high participation will depend on the second type of regulation, which is regulation that changes the consumers' benefits or costs of participation in the privileged group. In Example 6, the town's elites use their political power to punish those who do not participate, thereby making non-affiliation a costly option for religious consumers and making affiliation with the privileged group the only viable choice. This type of regulation directly affects the consumer, thereby indirectly affecting the supplier's choice to enter, but it can lead to higher participation if it makes alternatives to the privileged group too costly. The impact of regulation on participation thus depends on the mix of regulations.

Governments throughout the world both historically and today have placed restrictions on secular activities thought to be substitutes for religious participation. Laws in modern Israel require shops to be closed on the Sabbath, and modern Islamic states have even stricter prohibitions on many different secular activities. By placing restrictions on secular substitutes for religious activity, the government decreases the opportunity cost of religious participation,

²⁴ This point is particularly true in Europe where regulations are enacted at the national level. In the United States, which has relatively few national level regulations, any variation in regulation would occur at more local levels.

thereby artificially increasing demand for religious participation. Evidence of this effect was found by Gruber and Hungerman (2006) in their study of the repeal of blue laws in the U.S. In my model, these restrictions cause a rightward shift in the distribution of ideal strictnesses. Individuals demand stricter religion not because they prefer strictness per se but instead because the opportunity cost of strictness decreases as secular activities are hindered by state regulations. The result is high religious participation. Because these regulations tend to exist at the national level, we expect the regulatory environment to have a relatively stronger impact on pluralism-participation correlations in cross-country data.

Hypothesis 3 follows from this logic.

Hypothesis 3: *(a) Countries with few or no regulations on religious entry and secular activities will have high religious pluralism and high religious participation. (b) Countries with regulations that significantly inhibit religious entry but not secular activities will have low pluralism and low participation. (c) Countries with regulations that inhibit both religious entry and secular activities and punish non-affiliates will have low pluralism and high participation.*

The “high” and “low” in this hypothesis are relative. The countries mentioned in (a) and (c) are predicted to have high participation, but which group manifests higher participation will depend on the extent of the regulations. If the countries in (c) have sufficiently strict laws prohibiting secular activities, then they will sustain higher levels of religious activity than in the unregulated countries. The same can be said when comparing pluralism in the (b) and (c) countries.

Viewing Hypotheses 1, 2 and 3 together, we observe how the pluralism-participation correlation depends on underlying supply and demand factors and that the correlation with local data will differ from that found using national data.

DISCUSSION

This paper has two goals. The first goal was to advance the theoretical understanding of the relationship between pluralism and participation. The paper to this point has sought this end by developing a formal game theoretic model of a religious competition, examining the equilibria of the model to examine how pluralism and participation arise as equilibrium outcomes of that competition, and then formulating empirically meaningful hypotheses that arise naturally out the model. The second goal, to which the paper now turns, is to use the insights from the above effort to advance our understanding of past empirical work.

The chief insight from the model is that religious pluralism and participation are co-determined by religious supply and demand, and this implies that we can observe plausible pluralism-participation correlations without the other direct causal mechanisms proposed in the debate. Notice how this insight stands in contrast to what has come to be thought of as a primary premise of the religious economies view, that “pluralism causes levels of activity and participation to increase” (Finke and Stark 1988: 41). According to this paper’s “religious economies” model, participation is not caused by pluralism. Instead, both high participation *and* high pluralism are caused by unregulated religious entry, low costs of producing religious services, and a wide range of religious preferences. To be sure, this result coincides with another way of representing the religious economies view: religious competition will yield high pluralism and high participation in unregulated religious markets. Yet, the distinction between

these two claims is important. The first claim confuses a cause with an effect, while the second more accurately identifies a cause. For empirical purposes, it also means that observing a negative pluralism-participation correlation should not be interpreted *prima facie* as evidence against the religious economies view because simple correlations do not control for more fundamental causes.

Ironically, this paper's inherently religious economies model also shows that regulations designed to inhibit secular activities can artificially maintain high religious demand and, as a result, high participation. Thus, depending on the type of regulation, religiosity and pluralism may be undermined or sustained. This finding modifies the dominant religious economies thinking that regulations hinder religious participation, and in so doing it also demonstrates a more accurate understanding of what constitutes demand in economic theory. The economic concept of demand is a function of the costs of different opportunities faced by consumers, and regulations can alter these costs. Researchers in the religious economies view have focused on the impact of supply-side regulations, and, consistent with that emphasis, the model shows how supply side regulations hinder religious activity. However, the model also shows how other forms of regulation can independently influence the demand side of the religious market by altering the costs of secular activities. We may thus observe markets in which the chosen mix of regulations simultaneously inhibits religious supply and fosters religious demand. Again, basic pluralism-participation correlations are not evidence for or against the religious economies view because they do not disentangle the different types of regulations.

Another insight is that the correlation between pluralism and participation using local level data will differ from that using national level. Religious competition occurs within relatively local religious markets with local religious supply and demand. Town- or county-level

data reflect the outcomes of this local competition directly, while a national level measure captures an aggregation of the outcomes of many markets. As a result, the variation in pluralism and participation in local level data will differ from that in aggregated data. For example, religious regulations will vary differently across Europe than they will across the different towns and cities within a particular European country.

Continuing this logic, cross-country analysis will thus be a better level on which to test religious economies predictions about the impact of regulations on religiosity. This point may help explain the findings reported by Chaves and Gorski (2001) in their review of 193 empirical models from 26 research articles on the empirical relationship between pluralism and participation.²⁵ 61 of the 193 models found a statistically significant positive pluralism-participation correlation, 47 found no statistically significant correlation, and 85 found a statistically significant negative correlation. Their findings are perplexing initially, yet looking closer they found some interesting patterns: cross-country correlations were positive or insignificant; correlations across twentieth-century U.S. towns and counties were more often negative; analyses of 1835 and 1865 New York towns generally found positive correlations; and analyses of Swedish municipalities and pastorates were nearly always positive.²⁶ Their examination of these results let them to conclude that the religious economies prediction of a positive correlation “is not supported” (274) and that, as quoted at the beginning of this paper, future research should seek to understand the reasons for this variation (275).

²⁵ Contact Mark Chaves (mchaves@u.arizona.edu) for a data set containing the complete table of their findings. The data set records the source, author, publication year, model, year of data, unit of analysis, controls, dependent variable (usually a measure of membership or affiliation), correlation sign and significance, and potential problems.

²⁶ Specifically: 3 of the 11 cross-country models found significantly positive correlations, with 8 insignificant correlations; 68 of 106 twentieth-century U.S. correlations were significantly negative, with 27 insignificant and 11 significantly positive; 7 of 9 1835 and 1865 NY towns were significantly positive; and 29 of 32 Swedish municipalities and pastorates were significantly positive.

My model provides a framework for such future work. It suggests that the patterns reported by Chaves and Gorski can be understood by looking more closely at how supply and demand vary in the data for each of the studies in their survey. For example: positive cross-country correlations may be due to supply-side regulations as maintained by the religious economies view; negative correlations across U.S. towns and counties may be due to correlation between economic activity and population size across markets; positive correlations across nineteenth-century towns may be due to a weaker correlation between economic activity and population size; and a positive correlation across markets within Swedish may be due to local variation in hindrances to religious entry. These possibilities fit naturally into the analysis of the model, and future empirical work must determine the empirical validity of these claims and of the hypotheses in the paper, as well as distinguishing the causal effects described here from different potential causal factors that have similar effects on pluralism and participation.

Any future work must also confront the problems inherent in the pluralism measure that were identified in Voas, Olson, and Crockett's (2002) paper, published a year after Chaves and Gorski's (2001) survey. Montgomery's (2003) measure of religious "competition" is an important step in this direction. Montgomery call market A more "competitive" than market B if all religious groups from market B are also in market A and if market A also includes at least one religious group not in B. Ranking markets in this way yields only a partial ranking of markets because the set of religious groups in one town might not be a subset or a superset of groups in another town, yet it sidesteps the inherent problem in market share based measures such as the Herfindahl index. Montgomery uses this new measure to test two propositions that follow from his numerical examples: pluralism is higher in more competitive markets, and population is higher in more competitive markets. Using hierarchical class analysis, he finds evidence in

support of the second proposition in a 1865 cross section of New York towns and in a 1990 cross section U.S. counties (see Figures 6 and 7 of his paper), and he finds that pluralism is higher in more competitive markets in the 1865 data but lower in the 1990 data (see Figures 6 and 7 of his paper). At the end of his paper, Montgomery acknowledges that the findings related to his first proposition could be due to a different type of demand-side variation in the 1990 data than in the 1865 data, i.e., that market demands were similar in across towns in 1865 but very different across U.S. counties in 1990.

My work does not advance the search for better measures of pluralism. On the other hand, I agree with Montgomery's concluding conjecture yet take the implication of his thinking much further. Both demand and supply are integral parts of my analysis. Montgomery's two propositions assume that all markets in the data set have similar market demand, and, by reconsidering this assumption, we obtain a richer set of hypotheses.²⁷ Future theoretical work should extend this paper's analysis—e.g., by considering religious groups' internal sect-to-church dynamics, by considering how to capture plausibility in a model of religious markets, etc.—to develop hypotheses that are richer still. Although the general finding that supply and demand co-determine pluralism and participation will not change, accounting for additional variation in supply and demand will yield hypotheses that bring the theory that much closer to the data. And such work, combined with theoretically informed empirical work, will bring us

²⁷ The hypotheses also differ in other ways from Montgomery's propositions. First, they are derived from a model with one fewer parameter in the market competition space. My model uses a one dimensional space (strictness location) while Montgomery's model uses two dimensions (location and effort). This point is insightful for future theoretical work. Because only one dimension is necessary to obtain a key prediction about pluralism, future models can use one dimensional location models for analytical convenience without fear of missing an important component of religious market competition. It also allows me to find equilibria analytically and graphically. A second, more substantive, difference is that my hypotheses are derived for pluralism generally and not Montgomery's specific measure of "competition." In this sense, my hypotheses are more general. Finally, I distinguish individual markets from aggregations of individual markets. This distinction makes clear the interpretational differences between cross-country and within-country studies.

that much closer to understanding the relationship between religious pluralism and religious participation.

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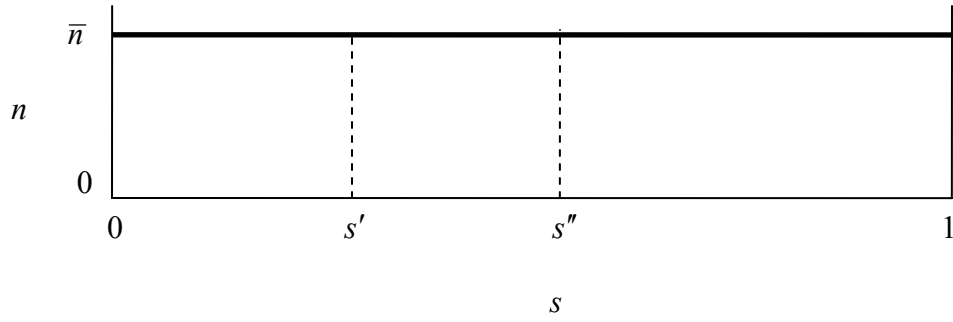
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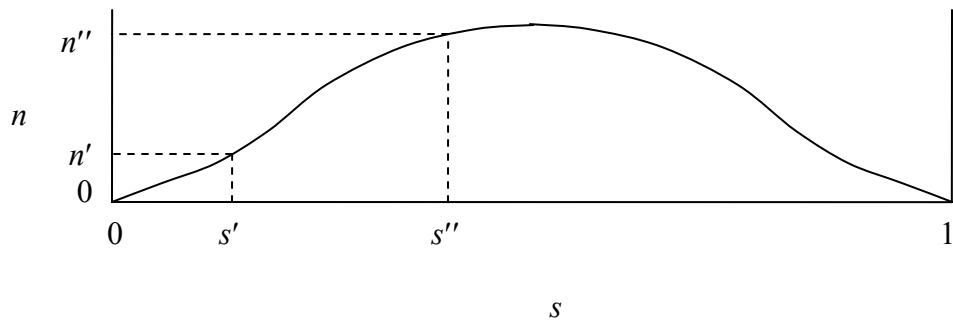
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Figure 1: Illustrations of Religious Demand and Affiliation Choices

(a) A Uniform Distribution of Religious Demand



(b) A Bell-shaped Distribution of Religious Demand



(c) Affiliation Choices with Uniform Demand

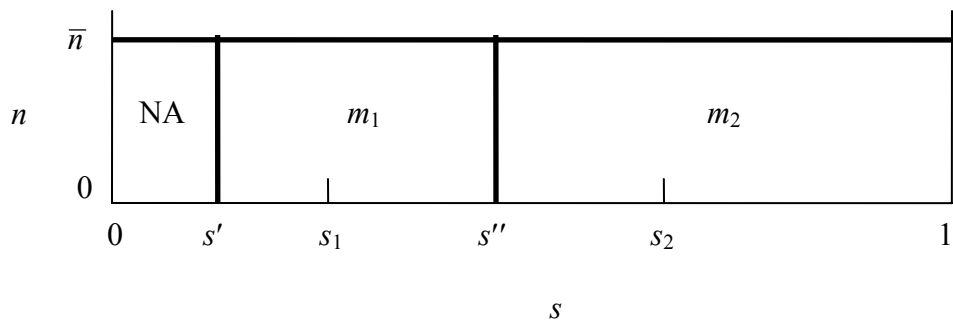
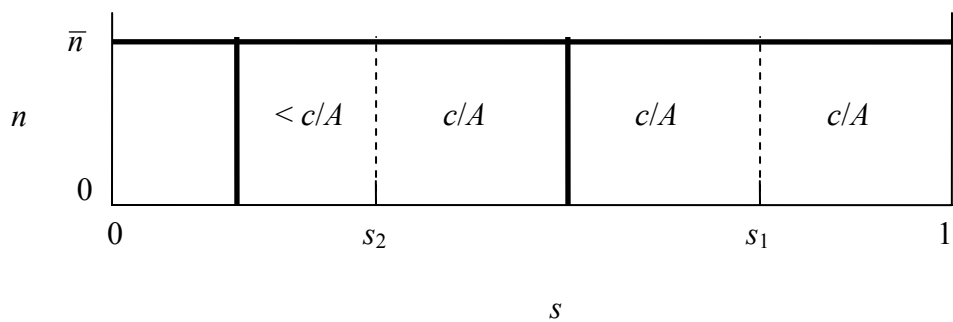


Figure 2: Illustrations of Religious Market Outcomes

(a) A Religious Market Equilibrium



(b) Denomination 3 Enters if 2 Lowers its Strictness

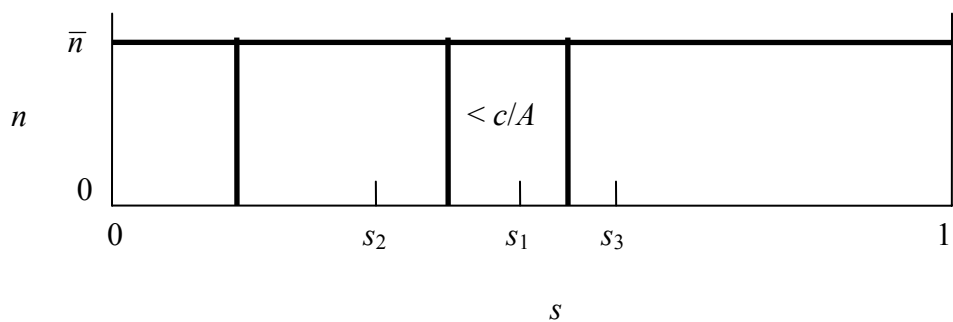
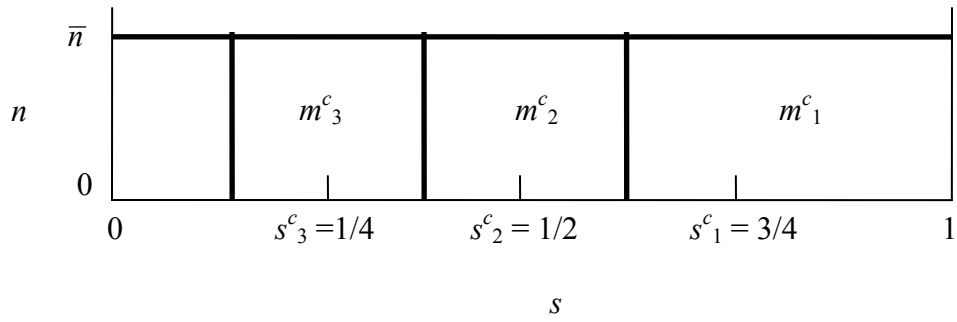
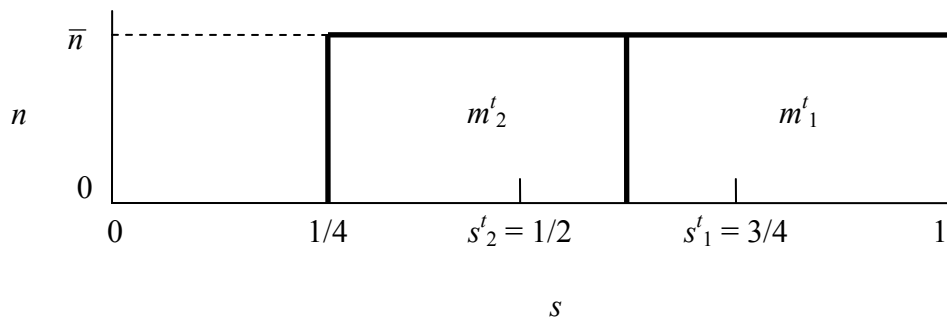


Figure 3: Illustrations of Variation in Religious Demand

(a) The City's Equilibrium



(b) The Town's Equilibrium with Narrower Demand



(c) The Town's Equilibrium with Proportionally Smaller Demand

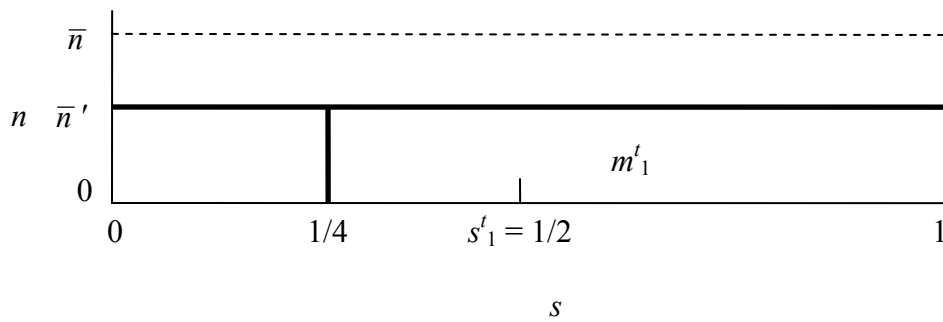
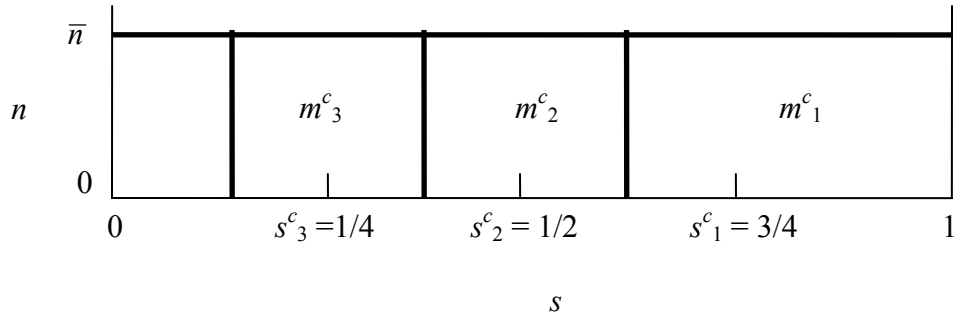
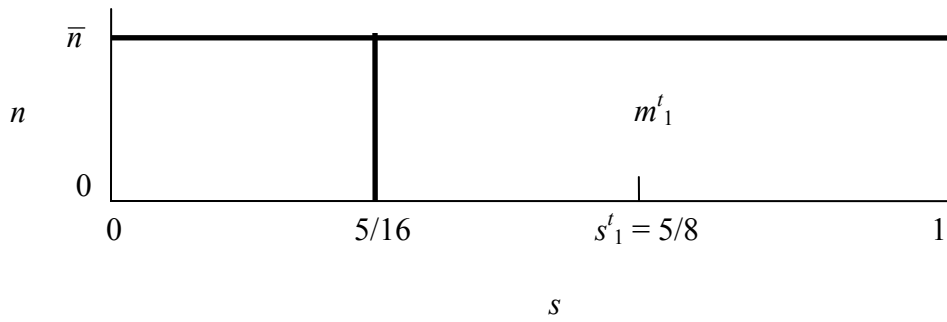


Figure 4: Illustrations of Variation in Religious Supply

(a) The City's Equilibrium



(b) The Town's Equilibrium with Restricted Competition



(c) The Town's Equilibrium without Non-affiliation Option

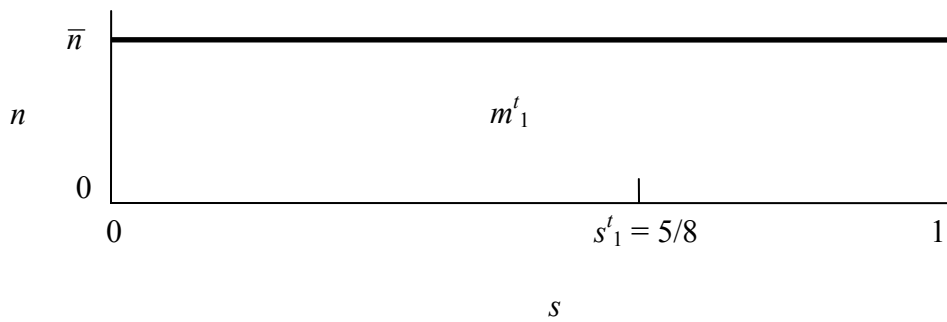
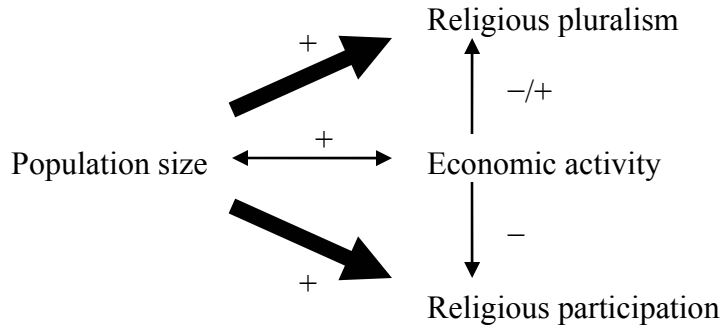


Figure 5: Representation of Hypothesis 2

(a) Weakly Positive or Negative Correlation between Population Size and Economic Activity



(b) Strongly Positive Correlation between Population Size and Economic Activity

