P(r)aying for Friends:

Religious Groups and the Market for Social Contacts

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Abstract

We analyze religious markets where religious groups provide spiritual services and, potentially, also social contacts. Given that secular markets for friends are missing, religious groups fill an important gap. Potential entrepreneurs in the religious market decide whether to establish a religious group and, if so, whether to also provide a social network for its members. We establish how changes in the demand for religious services and for social interaction affect the equilibrium in the religious market, the average size of religious groups, and their membership charges. Finally, we link our findings to cross-country differences in religious participation.

Keywords: Sects, religion, social contacts, tithes, occupational choice

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I. Introduction

Many more options for different ways and styles of life are available to individuals today than to previous generations. These options encompass higher social and geographical mobility, wider choices for professional careers and consumption patterns, greater freedoms in choosing political or religious attitudes, fewer infringements by custom and tradition etc. The flip side of this increased freedom is a decrease in the predictability of life and in the stability of social relationships. Social networks are more difficult to establish and to maintain, and not only in the U.S. has "bowling alone" (Putnam, 2000) become a paradigmatic shorthand for a decline in civic engagement along almost all dimensions, ranging from joining clubs, labor unions, parties and committees to informally socializing with family, friends and neighbors. The second half of the 20th century was characterized, in many countries, not only by continued urbanization and decline in civic engagement but also by increased participation in charismatic religious groups. These movements, like Evangelical Christians in the United States, Islamic organizations, and various new religions, offer also emotional and social guidance. They provide comprehensive social networks to those deprived of them.[1]

We argue that the rise of charismatic religious groups can result from their unique advantage in the market of social contacts. Though most people value new friends and a network of social contacts highly,[2] getting and, in particular, keeping these "goods" has become increasingly difficult. Markets for friends and social interactions do not exist as friends typically cannot be bought and, even if they could, there would be no lenders to

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[1] In Latin America, the number of Protestants increased from around 7 million in 1960 to about 50 million in 1990. In 1989, the Latin American Catholic bishops identified as causes for this success the Catholic Church's "slowness in coming to terms with the technicalities of urban life" and "its structure that occasionally makes it incapable of responding to the psychological needs of present-day people" (Huntington 2002 [1996], p. 99). In South Korea, rapid economic development and urbanization were associated with exodus from traditional Buddhism to Christianity. In 1950, Christians were one to three percent of population. In 1980s, their share exceeded 30 percent. Islamic fundamentalist movements have been strong in many economically more advanced Muslim countries, such as Algeria, Egypt, Iran, Lebanon and Tunisia. (see ibid., pp. 98-99, 101) For an overview of religious participation around the world, see adherents.com.

[2] Happiness studies constantly show that being embedded in a network of meaningful social interactions is among the major sources for individual well-being.

finance these purchases.[3] Moreover, institutions and organizations that specialize in the provision of infrastructure for meaningful social interaction are hardly conceivable. Such infrastructure is highly specific and, to a great degree, has the character of a public good. Once costs are sunk for its installment, it is difficult to recover them from its users or to devote it to other purposes.

There are several reasons why religious groups have a specific role and a comparative advantage in providing sustainable social networks. First, enrollment in a sect is typically thought of as a longer-term, less easily revocable, and more serious decision than, say, joining a golf club or entering a pub.[4] Hence, sects are per se more attractive for those seeking long-lasting relationships. Second, through the multidimensionality of their products, which encompass spiritual experience, moral guidance, counselling, joint leisure activities, social assistance and many things more, sects provide the opportunity to know each other in a comprehensive way. Third and most important, sects have available a unique commitment technology to future contributions: For the case of non-compliance (i.e., exit from the club) they can establish the threat of afterlife punishment. For believers – or those made to believe –, such a threat is credible; individuals unwilling to adhere to the sect's rules, discipline and charges risk the wrath of God, damnation, or other heavenly sanctions.[5]

The unique commitment device of afterlife punishment may also explain the specific time structure for the payment of contributions to sects. Unlike most normal clubs, where membership duties are fully laid down and, in some cases, also due upon entrance of the member, sects typically ask for "voluntary" contributions after individuals have

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[3]While there are dating services matching people for a fee, these are typically restricted to matching two persons at a time, instead of providing vaster social networks.

[4]Whether the question is of a congregation belonging to a larger denomination, a religious sect or a cult, we refer to those groups simply as sects. In the social sciences, a "sect" is usually defined as a small, exclusive, mostly religious or ideological group that demands substantial commitment of its followers and which places special emphasis on the group's otherness from its environment (Abercrombie et al., 2000, pp. 371f). Colloquial use of language often adds to this the degradation and bonding of individuals or the preaching of intolerance – a perspective that we do not endorse in the present paper.

[5]It is well-known from "Pascal's Wager" (Pascal, 1995[1660], § 233) that such a threat need not be trustworthy with probability one, but will make members of religious groups obey to the obligations of the sect even if only a positive probability is attached to a sufficiently high loss in the post-mortal quality of life.

participated or got enmeshed in the sect's activities for quite a while. First, getting members deeply involved into the sect's life and, thereby, cutting off their worldly activities and friendships increases the members' exit costs and may therefore increase the sect's future rents well above the level they would earn if they tithed newbies. Moreover, keeping membership free for a while gives sects more opportunities for conveying their doctrine and, in particular, the adverse afterlife treatment awaiting those not adhering. The greater the outworldly risk that sect members can be made to envisage at stake, the higher is the willingness to pay for sect membership and, naturally, the higher is the sect's profit. Finally, pointing to the wrath of the gods also reduces the vulnerability to free-riding sect members who, after having found the social contacts they were initially looking for (a spouse,[6] say) would opt out of the sect without ever paying contributions.

Sects are by no means the only institutions providing and charging for friendship services. Social contacts and collective activities can be bundled together with other features and then be sold as part of a package: E.g., gyms and sports clubs not only provide the option to work-out but also advertise to offer ample opportunities for meeting (mostly good-looking and charming) people. Getting into touch with other people and establishing networks of friends are important fringe benefits of many activities, ranging from having a drink at a bar over sports to taking evening classes. Certainly, numerous people have started deep friendships and true love affairs on such occasions. However, given that the provision of opportunities for social contacts only is a side effect of their original purpose, the institutions just mentioned are more designed for casual encounters, meeting buddies, and making acquaintances than for serious relationships, intense friendships, and, in particular, for establishing sustainable social networks.[7]

Our model builds on the idea of religious market as conceptually discussed, e.g., in Stark and Bainbridge (1996) or Iannaccone (1992, 1998): Customers (i.e., potential mem-

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[6]To a certain extent, sects can also perform the function of dating services, as there is empirical evidence that persons of same religious affiliation are more likely to marry and less likely to divorce (Lehrer/Chiswick 1993).

[7]Also sports clubs and political associations provide ample opportunities to socialize with the like-minded. However, they cannot expect to receive tithes in the same way as sects do since they cannot refer non-compliers to after-life punishment. A really fanatical sports club with life-long commitment would, in our terminology, qualify as a sect.

bers of religious groups) have religious and, possibly social wants and religious groups can satisfy these by providing spiritual services and social interaction ("friendship services"). These religious groups are established by entrepreneurs in the religious market who incur some costs in establishing either service in return for compensation that depends on their personal characteristics.[8] In exchange for their various services, religious groups can and do require a lot of their members (Iannaccone 1992b, Berman 2000, 2003). They impose significant costs in terms of sacrifice, abstinence from certain reprehensible pleasures, strict morality and even stigma upon their members and, in the extreme, may even drive them to martyrdom. On a more profane level, most religious groups seem to believe in tithes: they coax the flock of faithful to hand over substantial parts of their incomes and wealth in exchange for the supply of social and religious benefits.

Our paper makes several contributions to the economic theory of religion: First, by including both spiritual and social services, we emphasize the multidimensionality in the output of religious groups. Many empirical studies advise us that knitting social networks and making friends are among the major motivations for membership in religious groups. Rational religious groups will view the extent to which they serve this motivation as one of their strategic variables. Given that markets for friends are missing, religious groups fill an important gap.

Second, we analyze how the development in the demand side of the market, in the number of people willing to join purely religious sects or sects offering also friendship services, affects career choices of potential sect leaders. This extends previous literature on the economics of religion, in which the supply side is taken largely as given. We establish how an increase in the number of people willing to join either type of sects affects the average sect size and membership costs in both types of market. We find an intriguing asymmetry: An increase in the number of people demanding both religious and friendship services reduces expected membership cost in both markets. An increase

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[8] Viewing religious groups as driven by monetary incentives dates at least back to Adam Smith (1999[1776], pp. 376f); also see Iannaccone, 1991. Empirical evidence ranges from the medieval Catholic church to US "televangelist" Jim Bakker who diverted money collected from his followers to pay for private luxuries, including an air-conditioned dog-kennel. See Iannaccone (1998, pp. 1484f) for a brief survey on entrepreneurial models of religious groups.

in the number of people demanding only spiritual services, on the other hand, attracts less talented sect leaders away from the friendship-active market segment, increasing average membership costs there. We also derive comparative statics for a population shift between those demanding also friendship services and those interested in a purely religious group.

Our third contribution is to provide a formal model for the upsurge in friendship-active religious groups that can be observed around the globe over the past decades. As further outlined in Section II, in many parts of the world the demand for social contacts and, potentially, ethical orientation has been steadily increasing. If per-member set-up and operating costs of religious groups are decreasing in the number of members, such a shift in the demand structure of the religious market does not only lead to higher overall participation but also to a reduction in membership costs. This, in turn, would make sect membership even more attractive for people who were previously religiously inactive. The recent rise of radical Christians, Hindus, and Muslims in emerging countries as well as the ascent of, say, Born-again Christians and their kindred in the United States may be explained along these lines. While we do not analyze dynamic adjustments, our comparison of initial (relatively secular) and final (more religious) equilibria in the religious market captures the essence of such processes.

Our paper is organized as follows. Section II briefly surveys the role of religious groups as intermediaries for social contacts. Section III sets up a model of a religious market where sects not only provide religious service but potentially also social networks. Section IV analyzes how the equilibrium in the religious market is affected by changes in the population structure. Section V relates these theoretical observations to recent empirical trends in religious participation and concludes. All proofs are collected in an Appendix.

II.   Religion and Social Interaction

Our analysis is rooted in an extensive sociological and empirical literature. It is well documented that religious groups not only serve the demand for spiritual experiences,

codes of conduct, and systems of faith, but also the demand for social contacts. There exists ample empirical evidence that religious groups build up and maintain extensive social networks for their members (see, e.g., Ammerman, 1997; Wuthnow, 2002, and the references therein). This particularly holds for radical religious groups (see, e.g., Berman, 2003). It is also well documented that in campaigns to recruit new members sects assume that there is a clientele whose religious, therapeutic and other needs could be covered by sect activities. Sects exploit what sociologists of religion call the availability thesis (see König, 1999, for an overview and discussion): People join a sect or religious movement because they are structurally available and not yet rooted in dense social networks. In this respect, religious movements differ largely from political movements that recruit members mainly through pre-existing network channels (so-called network thesis). Dominated by the lack of social contacts, religious motivation might only be a second-order reason why individuals turn to sects. As a recent scientific report to the German government on sects succinctly put it:

> "[T]he reason why individuals turn to new religious and ideological communities and psychogroups has to do with personal problems which tend to be secular problems from today's perspective. Such motives include the departure from parental homes, conflicts with one's parents or partner, professional problems, unfulfilled wishes. Usually it is not until later that explicitly religious motives come to the fore." (Enquete Commission, 1998, pp. 45f.)

Targeting vulnerable and socially isolated individuals is not restricted to abusive sect leaders. Even sect leaders who are generally deemed sincere and benevolent use this strategy. E.g., the New Testament reports that when preaching his doctrine and recruiting disciples, Jesus primarily addressed to the socially ostracized (tax collectors, the poor, the sick, individuals pursuing allegedly immoral life-styles) and not to the religiously seeking.

In Africa and Asia, urbanization has strengthened radical Christians, Hindus and Muslims, allowing them to capture a considerable following from previously less committed

churches, temples and mosques. Before the phase of rapid growth, these groups were viewed by many with suspicion, had only low membership and high demands by the few highly charismatic leaders. The rapid growth of these groups may have been triggered by an increased demand by new migrants to cities or urban sprawl, lacking social contacts and, potentially, ethical guidance and orientation in their new environments.

Evangelical Christianity has spread rapidly in the United States and in some Latin American countries. There has not been similar upsurge of religion in Europe, Canada, Australia or New Zealand; if anything, religious participation rates have decreased in these areas.[9] Higher levels of religious participation in the United States than in other rich nations correspond to more volatile social networks outside religious groups: Americans are more mobile both geographically and in terms of employment than Europeans. In contrast to the United States, socially more stable and geographically less mobile European societies have become more secular. An exception to this trend is the development in some former Soviet republics and in Poland: Rapid social change has, in addition with greater religious freedoms, been associated with increased religious participation in these countries.

III. A Model of Socio-Religious Markets

There is a given number of consumers who might be interested in joining a sect. As mentioned earlier, they can have two types of motivation for this: First, all potential sect members are to some extent motivated by intrinsic religious or outworldly considerations, like receiving spiritual help and rewards in after-life. Second, some of the potential members are also motivated by the lack of meaningful or satisfying social interaction. They therefore also demand for social activities and a network of contacts, henceforth called "friendship services". Generally, consumers have a positive willingness to pay for religious services and a non-negative willingness to pay for friendship services.

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[9]Exceptions are the increase of Buddhist activities in Australia as a consequence of immigration from traditionally Buddhist countries and the rise of politicized Islam among disillusioned second-generation immigrants.

We assume that there are only three types of consumers: those not willing to join any sect, those willing to join a purely religious sect, and those willing to join a friendship-active sect. The sorting of consumers into sects is then fully determined by this exogenous demand structure: Those demanding for religious and friendship services join a sect offering those while those with only religious needs join a sect which has not invested in friendship services. Finally, those with a low willingness-to-pay for sect membership will stay outside religious circles.

There is a continuum of potential sect leaders who can offer to their customers religious services as well as friendship services. They operate as profit maximizers and earn their revenues by charging contributions from their members, but only long after having attracted them to their sect. Unlike for other social groups, the ability of sect leaders to charge contributions from members does not derive from a binding contract, signed upon entrance into the sect, but from associating exit or expulsion from the sect with certain religious or social costs (after-life punishment, loss of the social network etc.) that sect members wish to avoid.

Sect leaders differ in their "charisma" which we use as a generic term for all attributes of a sect leader that make membership in his or her sect attractive for potential targets: personal charm, negotiating skills, telegenic appearance, sermonic fervor, and convincingness of both the doctrine and of the sect leader. Charisma determines how much the sect leader can request from sect members.

If a potential sect leader establishes a sect, he or she has to incur a fixed entry cost d, consisting of the costs of fabricating (or leasing) a doctrine, using time to convince members of it, and opening a church or temple. The entry cost is net of any psychological or spiritual satisfaction that a sect founder might gain from establishing a sect. We therefore need not model religious motivations of sect leaders explicitly. Sect leaders also decide whether to invest in providing an extensive social network for members. This investment requires a fixed cost s, and it entails all measures of initiating the process of socializing (e.g., by setting up meeting facilities, organizing gatherings etc.). Once sect

members socialize, current members provide friendship services for the new members by their presence, thereby not requiring the sect leader to pay additional costs when new members are integrated into the sect.

At the time of establishing the sect and of attracting members, charisma of sect leaders is their private knowledge. Only the distribution of types is common knowledge. Upon entering a sect, sect members therefore do not know how much they will later pay as contributions but can only form expectations. The presence of friendship services increases the psychological exit cost from the sect by a common multiplier. For sake of simplicity, we set exit costs from a sect without services to be equal in value to charisma c. If the sect provides friendship services, exit costs amount to $(1 + x) \cdot c$ where $x > 0$ is a known constant. This reflects that the more often sect members meet, the more intra-sect interaction crowds out interaction with people outside the sect. Therefore, the loss of friends and social networks inside the sect is a larger cost for those in friendship-active sects. Potential sect members suffering from the missing social interaction are willing to pay the sect for these services in the form of higher expected contributions in the future.

We assume that the charisma of sect leaders is distributed with continuous density $f(c)$ over a closed interval $[0, \overline{c}]$. By $F(c)$ we denote the attending cumulative distribution function.

The sequence of events unfolds as follows: First, sect leaders, who have private, but non-verifiable information about their charisma decide on whether to establish a sect and, if yes, whether to invest in friendship services or not. Consumers then decide whether to join a sect and which. By experience, those who joined learn the charisma of sect leaders, who then ask for a contribution. Sect members then choose whether to pay what is asked, or to exit the sect suffering a psychological exit cost.

We denote the number of religious consumers demanding for friendship services by n_f, and of those without such demand by n_0. As they do not play any role in the religious market, we do not introduce special notation for non-religious individuals. Observe that while we will treat n_0 and n_f as absolute numbers, in order to allow for meaningful

comparisons they actually have to be understood relative to the number of potential sect leaders – which we normalized to unity.

IV.   Results

Equilibrium

We solve for the market equilibrium by backward induction: In the final stage, sect leaders ask for the maximum contribution they can extract. This is equal to the sect leader's charisma c if the sect has not invested in friendship services, and to $(1 + x)c$ in case the sect has invested in membership services.

Denote the mass of sects offering friendship services by m_f and the mass of sects offering no such services by m_0. Anticipating the behavior of sects in the final stage, only those individuals willing to pay also for friendship services join sects offering those. As charisma of different sect leaders is still private knowledge, those wishing to enter a sect and pay for friendship services are equally distributed amongst all sects offering those services, while those wishing to enter a sect but not feeling sufficient urge to pay extra for friendship services are distributed equally between sects not offering such services. This implies that the size of sects offering friendship services is n_f/m_f, while the size of sects not offering friendship services is n_0/m_0 .

For a sect leader with charisma c, the expected profit from running a sect with friendship services amounts to

$$\frac{n_f}{m_f}(1 + x)c - d - s. \tag{1}$$

Similarly, the expected profit of sect leaders not offering friendship services is

$$\frac{n_0}{m_0}c - d. \tag{2}$$

Next, we analyze how sect leaders of different charisma are distributed across the markets. As there is a continuum of sects, each sect leader takes the action of other sects as given and does not possess market power. A sect leader with charisma c establishes

friendship services if and only if

$$\frac{n_f}{m_f}(1+x)c - d - s > \frac{n_0}{m_0}c - d.$$

If in an equilibrium in the religious market both sects with and without friendship services are active, then there exists a cut-off charisma level below which sect leaders do not provide friendship services, and above which they do. Denoting the cut-off charisma level by $\widehat{c}$, we can write the equal-profit condition for a sect leader with this charisma as

$$\frac{n_f}{m_f}(1+x)\widehat{c} - s = \frac{n_0}{m_0}\widehat{c}. \tag{3}$$

A potential sect leader with charisma c finds entry into the sectarian market profitable if and only if

$$\max\left\{\frac{n_f}{m_f}(1+x)c - d - s, \frac{n_0}{m_0}c - d\right\} \geq 0.$$

Observe that the participation constraint is binding only for low-charisma types, implying that a minimum level of charisma exists such that a potential sect leader enters the religious markets; it is given by

$$\frac{n_0}{m_0}\underline{c} - d = 0. \tag{4}$$

Invoking the distribution F of charisma, we can write $m_f = 1 - F(\widehat{c})$ and $m_0 = F(\widehat{c}) - F(\underline{c})$. Alternatively, $1 - F(\underline{c})$ is the total mass of sects that choose to enter into the religious market while $1 - F(\widehat{c})$ represents the mass of sects in the market that supply friendship services to their members.

From (3) and (4) the distribution of sects in the equilibrium is characterized by the following set of equations:

$$\left(\frac{n_f(1+x)}{1 - F(\widehat{c})} - \frac{n_0}{F(\widehat{c}) - F(\underline{c})}\right) \cdot \widehat{c} - s = 0 \tag{5}$$

$$\frac{n_0}{F(\widehat{c}) - F(\underline{c})} \cdot \underline{c} - d = 0. \tag{6}$$

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We will henceforth characterize equilibria in religious markets by the charisma levels that separate the various market segments (here: $\underline{c}$ and $\widehat{c}$). Independently of the distribution of charisma, we find that

Proposition 1 *Equilibria in the religious market are unique.*

All proofs are relegated to the Appendix. The uniqueness result of Proposition 1 deserves mention as multiplicity of equilibria in religious markets seems to be the rule rather than the exception (see Poutvaara and Wagener, 2004).

Knowledge of the charisma levels $\underline{c}$ and $\widehat{c}$ that determine the equilibrium enables us to retrieve further equilibrium features. Entering into a sect that offers only religious services comes at an expected cost C_0 of

$$C_0 = E\left(c | \underline{c} \leq c \leq \widehat{c}\right) = \frac{1}{F(\widehat{c}) - F(\underline{c})} \int_{\underline{c}}^{\widehat{c}} c f(c) \mathrm{d}c,$$

while joining a friendship-active sect with a leader of not-yet-known charisma is expected to cost an amount of

$$C_f = (1 + x) \cdot E\left(c | c \geq \widehat{c}\right) = \frac{1 + x}{1 - F(\widehat{c})} \int_{\widehat{c}}^{\bar{c}} c f(c) \mathrm{d}c.$$

In equilibrium, the sizes of a religious-cum-friendship sect and a purely religious sect are, respectively,

$$\frac{n_f}{1 - F(\widehat{c})} \quad \text{and} \quad \frac{n_0}{F(\widehat{c}) - F(\underline{c})}. \tag{7}$$

Sect sizes crucially determine sect profitability since all costs are fixed costs. Using (7), the equilibrium profits of sects of different types can be directly computed from (1) and (2).

Comparative Statics

Since equilibria in the religious market are unique, meaningful comparative static effects of changes in the exogenous parameters on the various equilibrium features in the religious markets can be derived.

From equations (5) and (6) we obtain:

Proposition 2   *1. An increase in the number n_f of people who are interested in both spiritual and friendship services increases the number $1 - F(\widehat{c})$ of sects that provide friendship services and the total number $1 - F(\underline{c})$ of sects. It decreases, however, the number of purely religious sects.*

2. An increase in the number n_0 of people who only demand for spiritual services (but not for friendships) increases the overall number $1 - F(\underline{c})$ of sects, decreases the number $1 - F(\widehat{c})$ of sects that provide friendship services, and increases the number of purely religious sects.

These results are quite intuitive: A higher number of individuals in either market segment increases the equilibrium size of that segment and of the whole religious market. In the case of an increase in the number of purely religiously motivated consumers, this reduces the market size for friendship-active sects since the purely religious segment becomes more attractive also for some of the high-charisma sect leaders. Hence, the number of friendship-active sects will decrease. In case of an increase in the number of individuals who are interested in social interaction relatively uncharismatic sect leaders newly enter into the purely-religious segment. In order to ensure that these sect leaders still make non-negative profits, the average sect in the purely religious segment must become larger. Consequently, their number decreases.

The comparative statics of expected membership costs are strongly associated with those of the number of sects since the costs C_0 for sects without friendship services increase both in $\underline{c}$ and $\widehat{c}$. The expected membership costs C_f of friendship-active sects increase in

$\widehat{c}$.[10] Hence,

Proposition 3   *1. An increase in the number n_f of people who are interested in both spiritual and friendship services reduces average membership costs in both markets.*

   2. An increase in the number n_0 of people who only demand for spiritual services (but not for friendship services) increases the average membership costs in friendship-active sects. Its effect on average membership costs in purely religious sects is, however, unclear.

The intuition for these effects is as follows:

A larger demand for friendship services (n_f increases) makes establishing a sect of any type attractive for less charismatic leaders, thereby reducing average charisma and expected membership costs in either market segment.

A larger demand n_0 for membership in purely spiritual sects attracts less talented sect leaders from the market for friendship-active sects. This increases average charisma of those remaining in the friendship-active market and therefore membership costs rise there. On the other hand, the range for purely religious sects is widened both towards the lower and the upper end of the charisma continuum, therefore leaving the effect on average charisma (and payments that can be extracted for that) in the purely religious market unclear.

We are also interested in the effects of changes in the structure of the population. In particular, we investigate what happens if the number of individuals who demand for friendship services increases while the number of purely religious individuals decreases by the same amount:

$$\mathrm{d}n_f = -\mathrm{d}n_0 > 0. \tag{8}$$

From equations (5) and (6) we obtain:

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[10]Using the notation introduced in the proof of Proposition 1, we obtain, e.g.,

$$\frac{\partial C_0}{\partial \underline{c}} \quad = \quad \frac{\underline{f}}{\widehat{F} - \underline{F}} \cdot (C_0 - \underline{c}) > 0;$$

similar for the other effects.

Proposition 4 *The number $1 - F(\widehat{c})$ of sects that provide friendship services increases upon a change in the population structure in the sense of (8).*

A shift (8) in the population structure will lead to an increase in the total number $1 - F(\underline{c})$ of sects whenever purely religious sects are sufficiently larger than religious that provide friendship services. If, on the other hand, sects that provide friendship services are at least as large as purely religious sects, (8) causes the total number of sects to drop.

Regarding membership costs, the following result emerges from Proposition 4 by similar considerations as in Proposition 3:

Proposition 5 *Suppose that friendship-active sects are sufficiently smaller than purely religious sects. Then a shift (8) in the population structure leads to a decrease in expected membership costs both in purely religious and in friendship-active sects.*

V.   Interpretation and Conclusion

In this paper, we argue that religious groups have a specific role in providing sustainable social networks. Their comparative advantage is that the true believers perceive them to have a unique commitment device of divine punishment in case of deviation. This suggests an explanation for the specific time structure for the payment of contributions to sects. Unlike secular organizations working in the market for social contacts, religious groups do not rely on binding contracts and up-front fees. Instead, they ask for "voluntary contributions", the level of which depends on the charisma of the leader and the extent to which the members have been integrated into the group's social network.

Our framework suggests an explanation for why charismatic religious groups are stronger in countries with higher degrees of migration, especially rural-to-urban, and rapid social change. While related arguments have been presented earlier in sociology and other social sciences, we are not aware of any formal analysis of multidimensional religious market. Furthermore, we also analyze how the development in the demand side of the market, in the number of people willing to join purely religious sects or sects offering also friend-

ship services, affects career choices of potential sect leaders. Previous literature on the economics of religion has taken the supply side largely as given.

Endogenizing the supply side of the religious market allows us to evaluate how changes in the number of people willing to join either purely religious or friendship-active sects affects the average sect size and membership costs in both types of market. We find an intriguing asymmetry: An increase in the number of people demanding both religious and friendship services reduces expected membership cost in both markets. An increase in the number of people demanding only spiritual services, on the other hand, attracts less talented sect leaders away from the friendship-active market segment, increasing average membership costs there.

A demand shift within the group of individuals with religious interests from purely religious group towards religious groups that provide also friendship services increases the number of congregations in that market, resulting also in them having lower membership costs. The total number of entrepreneurs in the market for religions may either increase or decrease, depending on relative sizes of friendship-active and purely religious congregations.

Our findings also help to explain why public attitudes towards friendship-active sects are more positive, also among those not belonging to such groups, in countries with higher demand for their services. For the sake of argument, assume that the charisma of potential sect leaders follows the same distribution in different countries. Then the average cost of membership in friendship-active sects is lower the larger the demand for their services. These groups thus appear greedy and potentially "exploitative" in countries with low membership, and more moderate when the demand for their services is high.

Appendix

Proof of Proposition 1

To abbreviate notation, write $\widehat{F} = F(\widehat{c})$ and $\underline{F} = F(\underline{c})$; analogously for the density function $f(c)$. Each of the equations (5) and (6) implicitly defines a function $\underline{c} = \underline{c}(\widehat{c})$. By implicit differentiation, both functions can be shown to be positively sloped:

$$\left.\frac{\mathrm{d}\underline{c}}{\mathrm{d}\widehat{c}}\right|_{(5)} = -\frac{A_1}{A_2} > 0 \quad \text{and} \quad \left.\frac{\mathrm{d}\underline{c}}{\mathrm{d}\widehat{c}}\right|_{(6)} = -\frac{B_1}{B_2} > 0$$

where

$$A_1 := \frac{n_f(1+x)}{1-\widehat{F}}\left(1 + \frac{\widehat{c}\widehat{f}}{1-\widehat{F}}\right) - \frac{n_0}{\widehat{F}-\underline{F}}\left(1 - \frac{\widehat{c}\widehat{f}}{\widehat{F}-\underline{F}}\right) > 0; \tag{9}$$

$$A_2 := -\frac{n_0}{(\widehat{F}-\underline{F})^2}\underline{f}\widehat{c} < 0; \tag{10}$$

$$B_1 := -\frac{n_0}{(\widehat{F}-\underline{F})^2}\widehat{f}\underline{c} < 0; \tag{11}$$

$$B_2 := \frac{n_0}{\widehat{F}-\underline{F}}\left(1 + \frac{\underline{c}\underline{f}}{\widehat{F}-\underline{F}}\right) > 0. \tag{12}$$

The sign of A_1 follows from the fact that $n_f(1+x)/(1-\widehat{F}) - n_0/(\widehat{F}-\underline{F}) \geq 0$, which is the requirement that sects that provide friendship services earn non-negative profits.

It is straightforward to show that $A_1 B_2 - A_2 B_1 > 0$. This implies that the function $\underline{c}(\widehat{c})$ defined by (5) is at every point steeper than its counterpart defined by (6). Hence, these curves can intersect at most once. ∎

Proof of Proposition 2

We will analyze comparative-statics of $\underline{c}$ and $\widehat{c}$ with respect to the parameters n_0 and n_f of the model. Totally differentiating (5) and (6) yields:

$$\begin{pmatrix} A_1 & A_2 \\ B_1 & B_2 \end{pmatrix} \cdot \begin{pmatrix} \mathrm{d}\widehat{c} \\ \mathrm{d}\underline{c} \end{pmatrix} = \begin{pmatrix} -\frac{\widehat{c}(1+x)}{1-\widehat{F}}\mathrm{d}n_f + \frac{\widehat{c}}{\widehat{F}-\underline{F}}\mathrm{d}n_0 \\ -\frac{\underline{c}}{\widehat{F}-\underline{F}}\mathrm{d}n_0 \end{pmatrix} \tag{13}$$

where A_1 to B_2 are defined in (9) through (12). The matrix on the LHS of (13) has a positive determinant (see above) of, say, m. Hence, by Cramer's Rule,

$$\frac{\partial \widehat{c}}{\partial n_f} = m^{-1} \cdot \begin{vmatrix} -\frac{\widehat{c}(1+x)}{1-\widehat{F}} & A_2 \\ 0 & B_2 \end{vmatrix} < 0; \tag{14}$$

$$\frac{\partial \underline{c}}{\partial n_f} = m^{-1} \cdot \begin{vmatrix} A_1 & -\frac{\widehat{c}(1+x)}{1-\widehat{F}} \\ B_1 & 0 \end{vmatrix} < 0; \tag{15}$$

$$\frac{\partial \widehat{c}}{\partial n_0} = m^{-1} \cdot \begin{vmatrix} \frac{\widehat{c}}{\widehat{F}-\underline{F}} & -\frac{n_f}{(\widehat{F}-\underline{F})^2}\underline{f}\widehat{c} \\ -\frac{\underline{c}}{\widehat{F}-\underline{F}} & \frac{n_0}{\widehat{F}-\underline{F}}\left(1+\frac{\underline{c}f}{\widehat{F}-\underline{F}}\right) \end{vmatrix} > 0; \tag{16}$$

$$\frac{\partial \underline{c}}{\partial n_0} = m^{-1} \cdot \begin{vmatrix} A_1 & \frac{\widehat{c}}{\widehat{F}-\underline{F}} \\ B_1 & -\frac{\underline{c}}{\widehat{F}-\underline{F}} \end{vmatrix} = m^{-1} \cdot \left(-\frac{\underline{c}A_1}{(\widehat{F}-\underline{F})} + \frac{\widehat{c}\underline{c}\widehat{f}n_0}{(\widehat{F}-\underline{F})^3} \right)$$

$$= m^{-1} \cdot \left(-\frac{\underline{c}}{\widehat{F}-\underline{F}} \cdot \left[\frac{(1+x)n_f}{1-\widehat{F}}\left(1+\frac{\widehat{c}\widehat{f}}{1-\widehat{F}}\right) - \frac{n_0}{\widehat{F}-\underline{F}} \right] \right)$$

$$\leq m^{-1} \cdot \left(-\frac{\underline{c}}{\widehat{F}-\underline{F}} \cdot \left[\frac{(1+x)n_f}{1-\widehat{F}} - \frac{n_0}{\widehat{F}-\underline{F}} \right] \right) < 0 \tag{17}$$

since the square-bracketed term in the final expression is positive.

Recalling that $1 - F(\widehat{c})$ and $1 - F(\underline{c})$ vary inversely with, respectively, $\widehat{c}$ and $\underline{c}$ yields the results for the number of friendship-sects and for the total number of sects.

We can now use (14) and (15) to calculate that the number of purely religious sects decreases with an increase in n_f:

$$\frac{\partial[F(\widehat{c}) - F(\underline{c})]}{\partial n_f} = \widehat{f}\frac{\partial \widehat{c}}{\partial n_f} - \underline{f}\frac{\partial \underline{c}}{\partial n_f}$$

$$= m^{-1} \cdot \frac{\widehat{c}(1+x)}{1-\widehat{F}} \cdot \left[\underline{f}^2 B_1 - \widehat{f}^2 B_2 \right]$$

$$= -m^{-1} \cdot \frac{\widehat{c}(1+x)n_0\widehat{f}}{(1-\widehat{F})(\widehat{F}-\underline{F})} \cdot \left[\widehat{f} + \frac{\underline{c}f(\widehat{f}+\underline{f})}{\widehat{F}-\underline{F}} \right] < 0.$$

Since $F(\underline{c})$ varies negatively and $F(\widehat{c})$ varies positively with n_0, the number $F(\widehat{c}) - F(\underline{c})$ of purely religious sects increases when n_0 increases. ∎

Proof of Proposition 4

We are interested in

$$\mathrm{d}\widehat{c} \;=\; \frac{\partial \widehat{c}}{\partial n_f}\mathrm{d}n_f + \frac{\partial \widehat{c}}{\partial n_0}\mathrm{d}n_0\bigg|_{\mathrm{d}n_f+\mathrm{d}n_0=0} = \left[\frac{\partial \widehat{c}}{\partial n_f} - \frac{\partial \widehat{c}}{\partial n_0}\right]\mathrm{d}n_f$$

which, from (16) and (14), has the opposite sign of $\mathrm{d}n_f$.

For $\underline{c}$ we obtain from (17) and (15):

$$
\begin{aligned}
\mathrm{d}\underline{c} \;=\;& \frac{\partial \underline{c}}{\partial n_f}\mathrm{d}n_f + \frac{\partial \underline{c}}{\partial n_0}\mathrm{d}n_0\bigg|_{\mathrm{d}n_f+\mathrm{d}n_0=0} \\
=\;& \left[\frac{\partial \underline{c}}{\partial n_f} - \frac{\partial \underline{c}}{\partial n_0}\right]\mathrm{d}n_f \\
=\;& m^{-1}\cdot \frac{\underline{c}}{\widehat{F}-\underline{F}}\;\times \\
& \times \left[\frac{n_f}{1-\widehat{F}}\left((1+x)+\frac{(1+x)\widehat{\underline{c}f}}{1-\widehat{F}}\right) - \frac{n_0}{\widehat{F}-\underline{F}}\left(1+\frac{(1+x)\widehat{f\underline{c}}}{1-\widehat{F}}\right)\right]\mathrm{d}n_f.
\end{aligned}
$$

In general, the square-bracketed expression is ambiguous in sign. However, observe that $n_f/(1-\widehat{F})$ and $n_0/(\widehat{F}-\underline{F})$ are the average sizes of friendship-active and purely religious sects, respectively. If the former expression is larger than the latter, then the whole expression is positive and the effect on $\underline{c}$ is equal in sign to the change in n_f. ∎

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