Competition and Performance in the Marketplace for Religion:

A Theoretical Perspective

by

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ABSTRACT

This paper, which contributes to the literature that rigorously models religious markets, offers a theoretical framework that incorporates demand *and* supply sides. The model can accommodate Adam Smith's view that competition may possibly improve on monopoly's performance and also David Hume's opposite view that, because the clergy have an incentive to distort the message of religion, monopoly might possibly improve on competition. Impacts on religiosity of greater diversity and of increased competition in the marketplace for religion are isolated. It is shown that, while greater diversity benefits the devout (as claimed by 'supply-side' theorists), increased competition dilutes spiritual standards by encouraging monetary donations at the expense of genuine piety. These opposing effects of diversity and competition help reconcile apparently contradictory empirical findings on the American religious market and also those suggesting European 'exceptionalism'. Furthermore, the theory offers strong support for the suggestion made in the literature that competition within a monopoly (as in Roman Catholicism) could improve performance.

Keywords: religion, competition, monopoly, supply-side theory, Adam Smith
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1. Introduction

Does competition increase the efficacy of the religious market? Some researchers focusing on the supply-side of the market for religion argue that competition is good: religious pluralism increases variety, it avoids the laziness of monopolies, etc. [Finke and Stark (1992), Stark and Finke (2000), Stark and Iannaccone (1994)]. Proponents of secularization theory in sociology, on the other hand, have argued that participation in religion is fostered by monopoly and that free market competition in religion will only serve to undermine religious belief [Berger (1967), Wilson (1966)]. In a comprehensive survey of the evidence on the relationship between religious pluralism and religious participation, Chaves and Gorski (2001) conclude that there is little support for the claim that there is a positive relationship between the two.[1] In this paper we offer a rigorous framework which demonstrates, among other things, why we cannot expect an unambiguous relationship between competition and performance even theoretically.

In a chapter of his *Wealth of Nations* Adam Smith suggested that competition in the realm of religion would better serve society than would a monopoly [Smith (1776, V.i.g)]. He has been interpreted in the recent literature as endorsing competition in the religious market as in other markets [Anderson (1988), Ekelund et al (2005)]. Other researchers have argued that Smith's endorsement of competition in religion was qualified; he spoke highly of the Presbyterian Church, for example, which was an established church in Scotland, Holland, and Switzerland [see Leathers and Raines (1992, 2008)]. It is debatable whether Adam Smith was entirely consistent in his views on the role of competition in religious markets, but it is certainly the case that he recognized the clergy as self-interested and held that competition would promote discipline in the religious market.

Ekelund et al (2005) claim that Adam Smith premised his views on the efficacy of competition in the religious market on the assumption of consumer sovereignty. Adam

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[1] Voas et al (2002) have demonstrated that many of the empirical findings are suspect because there is a mechanical, algebraic relationship between the dependent and independent variables employed that produces a correlation between them which says nothing about the causality implied by theory.

Smith was clearly aware that this assumption in the realm of religion was a contentious issue. He quoted at great length from David Hume's (1762) *History of England*, in which Hume favored a religious monopoly established by the government. Hume's essential reason for this position was the belief that the clergy would distort the message of religion for personal advantage and so wise government should seek to thwart 'diligence' on the part of the clergy and render them indolent:

> But if we consider the matter more closely, we shall find, that this interested diligence of the clergy is what every wise legislator will study to prevent; because in every religion, except the true, it is highly pernicious, and it has even a natural tendency to pervert the true, by infusing into it a strong mixture of superstition, folly, and delusion. Each ghostly practitioner, in order to render himself more precious and sacred in the eyes of his retainers, will inspire them with the most violent abhorrence of all other sects, and continually endeavour, by some novelty, to excite the languid devotion of his audience. No regard will be paid to truth, morals, or decency in the doctrines inculcated. Every tenet will be adopted that best suits the disorderly affections of the human frame. Customers will be drawn to each conventicle by new industry and address in practising on the passions and credulity of the populace. And in the end, the civil magistrate will find, that he has dearly paid for his pretended frugality, in saving a fixed establishment for the priests; and that in reality the most decent and advantageous composition, which he can make with the spiritual guides, is to bribe their indolence, by assigning stated salaries to their profession, and rendering it superfluous for them to be farther active, than merely to prevent their flock from straying in quest of new pastures. [*History of England*, Chapter XXIX, p. 337]

This insightful statement of the problem that arises when those supplying information about a good are also the ones who supply the good was not lost on Adam Smith. Though he asserted that governments established churches for a different reason, as Leathers and Raines (2008) have argued persuasively, Smith qualified his endorsement of competition by espousing a role for government regulation on grounds related to the unreliability of consumer sovereignty.

A great deal has been written in recent decades arguing that religious monopoly induces lethargy in the clergy and that the deregulation of religion increases religious participation by forcing religion to cater to the needs of the people. Almost no attention has been paid, however, to the nature of the products transacted in the religious marketplace. Some essential aspects of the nature of the spiritual good are peculiar and

these induce behaviors that have an important bearing on whether it is monopoly or competition that better delivers the benefits of religion. Furthermore, there are special aspects even of the suppliers of religion that warrant attention. As we show here, by eschewing an examination of the peculiarities of the religious market and applying off-the-shelf economic theory can lead to questionable conclusions about the efficacy of competition in the religious marketplace.

One peculiar aspect of religion has already been alluded to above as a concern of Hume's (1762) that Adam Smith, too, took seriously: the preachers are also the suppliers of religious services. This introduces a strong incentive on the part of the (self-interested) clergy to distort the message of religion in a manner that would be beneficial to them; the suppliers are in a position to create their own demand [Leathers and Raines (2008)]. Furthermore, we think it plausible that this incentive to distort may well depend on the extent of competition a religious denomination faces. If this is so, it is necessary to investigate precisely how the distortion occurs and what its consequences are. This is one of the aims of this paper.

This brings us squarely to the issue of what exactly the goal of a church is. Very little research in the social sciences seems to have been directed at this crucial question.[2] They have usually been assumed to be profit-maximizing firms. This assumption, to be sure, has been highly fruitful in generating insights about the behavior of religious organizations [e.g. Finke and Stark (1992), Ekelund et al (1996), Iannaccone (1991, 1998)]. Nevertheless, religious organizations are better viewed as non-profit organizations than as neoclassical firms but with an eye on the profit. Whether fully profit-maximizing firms would generate precisely the same behavior as these would in the market for religion is a matter to be investigated.

One goal that we may attribute, at least partly, to any church—and which no church is likely to disown —is that of imbuing piety in its members. This is, in effect, what empirical analysts seek to capture when they use data on religious beliefs, church attendance, frequency of prayer, etc. Barro and McCleary (2003) and McCleary and Barro (2006a, 2006b) view church attendance as productive of beliefs. We go further: not

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[2] Hull and Bold (1989) are an exception. They have argued, however, that the goal of churches is the establishment of property rights, a highly debatable hypothesis.

only do religious organizations generate and entrench beliefs, they also urge the devout to live their lives in accordance with these beliefs. Beliefs without commensurate actions would have few consequences for society; beliefs matter because they elicit resources that have alternative uses. A quantifiable measure of piety, then, is the amount of time members devote to religious activities (prayer, contemplation, charitable works, etc.). Promoting piety may be taken as a priority of churches. But, as mentioned above, churches also pay some attention to profit. One may construe the church as a non-profit organization that maximizes a measure of its members' piety and also its own profit. In this maximization, however, the church has to also ensure that its profit is not negative, for violation of this condition will make the organization economically unviable. Thus, in the view that we adopt here, profit is not an objective that a religious organization maximizes (at least, not entirely); rather, the non-negativity of its profit is a constraint that it has to satisfy.

How exactly can a religious organization distort the message of religion? As we have argued above, its true purpose lies in promoting the piety of its members. The genuineness of its spiritual message may be measured by the extent to which the denomination urges its members to devote time to this end. However, time is not the only resource that consumers of religion expend; they also spend money. This is particularly important for churches because they do not charge for their services—they survive on members' donations, which are voluntary. The time that members devote to religious activities contributes to their piety, but the money they donate to their church contributes to the latter's survival. It is here that the clergy has considerable latitude in distorting the message of religion: they can manipulate the mix of their members' expenditures of these two resources, time and money. Greater emphasis on the latter is advantageous to the organization, while greater emphasis on the former would be spiritually beneficial to the member. It may well be in the self-interest of the ministry to blur the distinction between devoting time and donating money, affecting that the latter *is* piety.[3] This mix, which we may refer to as the 'spiritual content' or 'quality' of the message, is chosen by religious organizations to maximize their objective. This is the key variable that we focus on here to identify the effects of self-interest among the clergy. We then investigate how the

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[3] Those who are skeptical that religious denominations might do this may wish to consult Kenneson (1993).

spiritual content of the religious message varies in response to market competition. We are thus able to capture how the degree of competition that prevails in the religious marketplace either facilitates or thwarts the accomplishment of the stated goal of religion: enhancing piety.

In contrast to the approach of supply-side and secularization theories, however, we model *both* the supply and the demand sides. As mentioned, the supply comes from religious organizations that survive on donations. The demand for religion ultimately comes from consumers who maximize their perceived wellbeing. The presence of competing denominations imposes a discipline on each denomination for, in the framework we adopt, consumers choose the denomination they embrace. This explicitly models Adam Smith's view on the possible role of market discipline in enhancing performance even in the religious market. There are, however, limits to consumer sovereignty in reality and also in our model. In the face of competition, religious denominations choose the spiritual content of the religious message they communicate to the laity. By giving denominations this latitude, we allow for Hume's concern that the clergy are in a position to distort the message of religion for private gain. This model can thus assess the competing claims of supply-side and secularization theories without ruling out either a priori.

Furthermore, the model is capable of addressing another interesting issue in the economics of religious market structure. It is a well-established empirical fact that, after controlling for monopoly power, Roman Catholics exhibit a higher level of church attendance than do members of Protestant denominations [Chaves and Gorski (2001)]. In an intriguing argument Iannaccone (1991) and, more recently, Diotallevi (2002) have proposed that Roman Catholicism retains its vitality by allowing competition to exists within the Church. In other words, competition from within may substitute for that without. Our model is easily adapted to examine this issue, and we do so in this paper.

The theoretical framework we set out generates interesting predictions that make sense of numerous empirical findings. It enables us to understand how consumers respond (in terms of time and money) to changes in their economic condition, particularly in the structure of the religious market. We are able to offer independent reasons for the patterns of donations by members to religious denominations without invoking the

standard view that points to free-riding by members [e.g. Iannaccone (1992, 1994), Zaleski and Zech (1992)]. The model also demonstrates that state subsidization of monopoly religion, if anything, tends to *increase* the spiritual content of its message by alleviating the constraint that its profit be non-negative. We are able to introduce entry of denominations and can separate out the effect in religious markets of increased diversity per se (pluralism) from that of increased competition. We show that increased pluralism, in accordance with the claims of supply-side theorists, raises the level of piety in the population. Increased competition, on the other hand, has deleterious effects: it dilutes the quality of the spiritual message. The net effect of the entry of new denominations on piety is positive when market concentration is high and negative when it is low.

The fact that the clergy who provide instruction in religion are also the suppliers of religious services, we find, can indeed result in perverse incentives—and this even when religious organizations are non-profit firms. (The effect would be even greater if they were profit-maximizing firms.) This finding suggests that we should be more cautious about advocating free competition in the marketplace for religion. The results of this paper also potentially reconcile conflicting claims of supply side and secularization theories; our theory is able to explain the divergent empirical findings on the American religious market and on the 'European exceptionalism' in response to market competition. Finally, we find that the argument for thinking of Roman Catholicism as a near-monopoly with competition from within has much to recommend it, though only partly for the reasons suggested by Iannaccone (1991) and Diotallevi (2002). Greater diversity within the Church confers benefits to be sure, but adding to this is the elimination of the race to the bottom in spiritual standards that can be spurred by external competition. A multi-order monopoly, in other words, can deliver the benefits of diversity without the distortion in the message of religion that accompanies competition.

2. The Model

In the theoretical model we construct here, we represent the demand side of religion as arising from the population with preferences defined over religion and the supply side as comprising various religious denominations with well-defined objectives. The

equilibrium in the religious market is obtained as a scenario in which each individual entity—be that a consumer or a denomination—maximizes its perceived objective and cannot do any better, given the actions of others. By incorporating both the demand and the supply sides, our model is equipped to assess the relative merits of arguments that emphasize only one of the two sides.[4]

The Demand Side

We model religious competition using Hotelling's (1929) spatial setting that captures product differentiation. In this approach, we follow Barros and Garoupa (2002) who, in turn, acknowledge that they are formalizing the views of Stark and Bainbridge (1987) and Finke and Stark (1988, 1992). Montgomery (2003) and McBride (2008) also employ analogous models of product differentiation. As in Barro and McCleary (2005), we assume that consumers of religious products have different tastes that are spread out uniformly over a circle whose circumference is of unit length. As we move across the circle, we encounter consumers with different (one-dimensional) preferences regarding their most desirable characteristic of the spiritual good. In contrast to Barros and Garoupa (2002) and McBride (2008), this characteristic is *not* strictness (which we shall consider subsequently); rather, this characteristic is some feature of religion like its practical implementation in daily life that appeals to a person's mindset or is most conducive to her cultivation of spirituality. These practices are very different for Hinduism than for Pentecostal Christianity, for example. A consumer located at a point at distance z from some arbitrary origin would prefer the spiritual product to possess an amount z of the characteristic. A denomination that enters the spiritual marketplace must locate at a specific point on the circle. If a consumer at one location in product space embraces the spiritual product of a denomination located elsewhere, her valuation of the product declines with the distance between the two locations. Consumers who are further away in either direction from a given denomination value its product less. Among the existing

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[4] For recent papers that emphasize the need to incorporate both the demand and the supply sides into the analysis of religious markets, see Montgomery (2003) and McBride (2008).

denominations, a consumer will naturally embrace the one that delivers the highest value to her.

Each person is endowed with one unit of time and consumes three goods: a spiritual or religious good (*S*), leisure or "rest" (*R*), and a composite product (*X*) of all materialistic goods. There is diminishing marginal utility with respect to each good. For analytic convenience, we assume that preferences are Cobb-Douglas and write the utility function in the log-linear form

(1) $$U(x,r,s) = \alpha \ln(x) + \beta \ln(r) + \gamma \ln(s),$$

where *x*, *r*, and *s* denote, respectively, the amounts of the composite materialistic good, leisure, and spiritual good she consumes. The parameters α, β, and γ, all assumed positive, capture the respective weights the consumer places on these goods. The logarithmic functions on the right hand side of (1) imply that the consumer deems all three goods essential. As is well-known, if the prices of the three goods were fixed, with Cobb Douglas preferences of this sort, the fraction of income spent on the three goods would be proportional to α, β, and γ, respectively. (But in the model to follow, the implicit prices will not be fixed.)

We posit that the consumption of the spiritual good requires the consumer's time. Indeed, what she deems to be the amount of the spiritual good she consumes, $s(t,p)$, depends in part on her time commitment to it, *t*, and in part on the proportion of her income, *p*, that she donates to her church. The variable *t* should not be identified merely with church attendance—it would include the time spent in private prayer, in doing charitable works, in reading scriptures, etc. In our model, therefore, religious activity requires resources (time and money). Furthermore, consumers' preferences for material goods and for leisure are explicitly accounted for. These are all features of our model that are absent in those of Barros and Garoupa (2002), Montgomery (2003), and McBride (2008).

We find it convenient to presume that the production of the spiritual good requires time and money in a fixed proportion:

(2) $$s(t,p) = \min\{kt, p\},$$

where *k* is a parameter. Since it is the smaller of kt and *p* that determines the quantity of the spiritual good produced, a person will always set $kt = p$ so as not to waste resources.

The highest level of spiritual good that can be produced occurs when $kt = p = 1$, and this requires a time input of $1/k$. So we may interpret k as an inverse measure of the time required to generate piety.

In an empirical investigation using data from the U.S., Gruber (2005) found that donations and time devoted to church attendance are substitutes, not complements. This does not undermine the implications of our assumption that they are complements. As we shall see, if the two inputs time and money are allowed to be substitutes, the essential results of our theory are only strengthened. By assuming complementarity for analytical tractability, we are in fact biasing the case against ourselves.

Note that, while the church merely supplies the member with an appropriate vent for her spiritual yearnings, the amount of spiritual good she consumes (receives, in her perception) depends on the inputs that she herself provides. This is consistent with the universal view in all major religions that spirituality requires the active involvement of the faithful. The message and mission of the denomination determine the parameter k. Different denominations may pick different values for k, reflecting the emphasis they place on the time devoted by their members to the cultivation of piety. We could refer to k as the denomination's degree of laxity, with denominations having higher k being identified as more lax since a given proportion of income needs to be accompanied by a *lower* time commitment. This parameter k, then, may also be interpreted as an inverse measure of strictness. Conservative or strict denominations require substantial time commitments in the pursuit of piety and this corresponds to lower values of k. Denominations with low k may also be viewed as offering high quality spiritual products or as preaching religion with greater spiritual content.

There is, of course, the possibility that members may free ride and avoid making contributions that are expected by the norms established by the church. We finesse this aspect of the economics of religion here because it has already been the focus of a considerable amount of research [e.g. Iannaccone (1992, 1994), Zaleski and Zech (1992)]. We abstract from free riding in this model also because we wish to examine what stylized facts about resource deployment in religious activity can be explained without invoking this aspect.

As mentioned, each person is endowed with one unit of time, which she can split between leisure, consuming materialistic goods, and cultivating piety. The price of the composite materialistic good is normalized to unity. Suppose y denotes the consumer's income. (We take the amount of time devoted to work as fixed here; if we fix this also at one unit, say, we can then interpret y also as the wage rate.) So if the consumer devotes an amount of time t to her spiritual good, she will donate a proportion kt of her income to her church and consume an amount of materialistic good given by

(3) $$x = y(1 - kt).$$

It is a routine finding in the empirics of religion that rich people devote less time to religious activity than do the poor. The standard explanation for this in neoclassical economics is that, when the opportunity cost (wage rate) of this time increases, people spend less time in religious endeavors because they work more [e.g. Azzi and Ehrenberg (1975)]. It is also undoubtedly true, however, that higher incomes facilitate greater consumption of materialistic goods, and consumption of these goods *also takes up time*. Thus people with higher incomes face greater constraints on their time. We capture this by assuming that each unit of the materialistic good requires an amount of time $\tau \, (> 0)$ to consume. We shall maintain the assumption that $\tau << 1$ throughout this paper so as to ensure that we do not lean too heavily on this deviation from the standard, if implicit, assumption that $\tau = 0$.

We posit that time devoted to the spiritual good takes away time available for leisure or for the consumption of materialistic goods. However, the more distant the denomination's ideology is to the member's natural temperament, the more difficult she finds it to cultivate a given amount of piety. A person who is best suited by temperament for Zen Buddhism will be spinning her wheels if she embraces Pentecostal Christianity, which is theologically a very distant substitute. We capture this idea by positing that devoting t 'effective hours' of time to the spiritual practice requires $td(z)$ hours of actual time (leisure), where z is the distance of the member's ideal denomination from the one she embraces. The function $d(z)$ is posited to be increasing in its argument, with $d(0) \geq 1$. So consuming a spiritual good that is deemed less than ideal is costly, and the function $d(z)$ represents this 'distance cost'. We may interpret $d(0)$ as the efficiency of

converting leisure time to piety when the denomination embraced is ideal for the person. We may take $d(0)$ as a measure of the degree of alienation of the population from religion; when this is high, cultivating piety in even the ideal denomination is onerous.

We presume that time devoted to the consumption of the composite materialistic good, to spiritual practice, and to leisure are mutually exclusive. The amount of leisure, r, consumed by the individual is then given by

(4) $$r = 1 - td(z) - \tau x.$$

The consumer maximizes her perceived wellbeing by solving

(5) $$\max_{x,r,t,p} U(x,r,s) \quad s.t. \quad (2),(3), and\,(4).$$

Denote the solution to the above optimization problem by $\{x^*, r^*, t^*, p^*\}$. These choice variables, which define the consumer's demand for the three goods, will naturally depend on the preference parameters α, β, γ, the technology parameters k and τ, the distance z, and income y. The maximized utility of the person will be given by $U(x^*, r^*, p^*)$, and will be denoted by U^* for brevity. The following proposition, proved in the Appendix, records the behavior of the consumer's optimal choices with respect to changes in some of these.

Proposition 1: When the consumer maximizes her perceived wellbeing,
(a) an increase in the preference parameter α and/or β decreases the member's time devoted to piety and her monetary donation to the church; an increase in γ raises them,
(b) an increase in the distance z from the location of her ideal spiritual good reduces the amount of time devoted to piety and also the monetary donation to the church, and
(c) an increase in the denomination's laxity k decreases the member's time allocated to religious activity, increases the proportion of income she donates to the church, and raises her maximized utility.

It is useful to recall first that the proportion of income a person donates to her church, p^*, and the proportion of her time she devotes to piety, t^*, are related through $p^* = kt^*$. When the time devoted to cultivating piety rises in response to an exogenous

change, she also donates a higher proportion of her income. This follows from the complementary nature of these two resources employed in religious activity, as in (2).

The results stated in part (a) of the proposition above are intuitive. If a person puts more weight on the spiritual good, she will devote more resources—time and money—to it; the reverse is true if she puts more weight on the composite materialistic good or on leisure. So anything that causes γ to increase will simultaneously increase time and money donations. These results enable us to make sense of the effects of many changes on the demand side that we observe in the religious marketplace in contemporary times. The explosion of consumer goods that have been becoming available since the beginning of the 20th Century can be translated as an increase in the parameter α, for the weight on materialistic goods can be expected to increase when it embodies a greater variety of consumer goods. This, according to part (a) of the above proposition, would divert time and money away from spirituality. This would result in effects akin to those predicted by the secularization thesis [Berger (1973), Wilson (1966)], since modernization is invariably accompanied by the appearance of new consumption goods. McCleary and Barro (2006a) find that urbanization impinges negatively on church attendance. Their argument is that urban areas offer more leisure activities (symphonies, museums, etc.) that are unavailable in rural areas. One way of interpreting this is that urbanization increases the utility weight, α, on materialistic goods that compete with the spiritual good for the consumer's time and money. This empirical finding is consistent with the prediction in part (a) of the above proposition.

It is worth pointing out that the result in part (a) of the above proposition provides an explanation that is complementary to the received one for the banning of innocent pleasures and secular activities in many conservative denominations. Some researchers have argued that these restrictions serve the purpose of screening members of a denomination so that would-be free riders are dissuaded from joining strict churches [e.g. Iannaccone (1991, 1992, 1994)]. The argument that is suggested by our model is more direct: joining a strict church is a commitment device for an individual. By eliminating even innocent (but resource diverting) activities for her, strictness facilitates greater devotion by effectively lowering the weight α on materialistic goods. Strictness, in this argument, is a vehicle for putting people outside the reach of time-consuming

distractions. This explanation is also consistent with the empirical finding of Gruber and Hungerman (2008) that the repeal of 'blue laws' (which placed restrictions on Sunday shopping) in the United States has had adverse effects on church attendance and church contribution. It is also in line with the argument of McBride (2008) that restrictions placed on secular activities can have important consequences for religious activity.

Part (b) says that the more distant the church's product is from a person's ideal one the less time and money would she devote towards spiritual ends because the less attractive she finds the spiritual good. This is because cultivating piety requires greater effort (time) on her part. We may interpret this theoretical result as a formal rendition of one aspect of the supply-side argument that greater pluralism spurs religious activity. An increase in the number of denominations in the religious market will lower the average distance of a member to her closest denomination and thus stimulate piety.

Part (b) of Proposition 1 is an implication of the model that appears to resolve a puzzle in the literature on denominational contributions: it offers one explanation for the persistent finding that monetary contributions among members of a denomination are highly skewed [see e.g. Hoge (1994)]. The phenomenon occurs simply because different members have different preferences over what the ideal church is—the less ideal it is deemed, the lower the valuation a member places on its product. Since those closer to their ideal denominations contribute more, skewness in the distribution of donations among members follows.

Part (c) informs us that if, in the production of the spiritual good, the ratio of the proportion of income donation to the proportion of time devoted to piety rises (that is, k increases), the member will devote less time to piety. Since the proportion of income donated is given by $p^* = k t^*$, it might appear that an increase in k, which induces a decline in t^*, would give an ambiguous prediction on p^*. Part (c), however, demonstrates that when k increases the consumer definitely donates a *higher* proportion of her income to the church. An increase in k, in effect, offers the consumer the illusion of consuming more of the spiritual good and makes her better off. This is because she can reduce the time allocated to piety in proportion to the increase in k and yet consume the same amount of spiritual good as before. The released time she can consume as leisure— thereby raising her utility. Lax standards of piety set by the church 'benefit' the

unknowing consumer (according to her metric, the utility function) and also raise the revenues of the church. It is this fact that provides perverse incentives to religious organizations for distorting the message of religion for their private gain.

The Supply Side

The supply side of the religious market in our model comprises one or more denominations providing religious services. Each denomination offers a spiritual good characterized by a specific location on the unit circle. Once chosen, the denomination cannot change its location (that is, its practical approach to spirituality). But apart from location, there is also the important feature of 'quality' of the good. Different denominations can and do offer spiritual goods of varying spiritual quality, where quality is (inversely) defined by the parameter k. In other words, the messages to their congregations differ in the implied ratio of the proportion of income offered to the church to the proportion of time devoted to piety. Members take the k of a denomination as given, but each denomination chooses its own value of k. This choice is of primary interest in what follows, for it captures a denomination's trade-off in the tension between its own self-interest and its concern for the wellbeing of its members. Recall that, by part (c) of Proposition 1, an increase in k increases a member's monetary donations to her church and also increases her *perceived* wellbeing.

The content of the spiritual message is what separates denominations offering genuine spiritual products from those that merely seek rents by appealing to their members' self-interest and self-love. But even the former, however, can only accomplish their goals provided they earn sufficient profit to stay viable. Whether this is possible will depend, in general, on the competition they face in the religious marketplace. The revenues churches receive in a free market are from monetary donations of the faithful. Suppose M is the average money donation per member belonging to the denomination. We posit that the marginal cost, c, of providing the spiritual good to an additional member is constant. If Q denotes the size of its membership, the profit, Π, of the church may be written

(6) $$\Pi = Q(M - c) - F ,$$

where F is the sunk cost required for entry into the religious marketplace. This cost will depend, among other things, on the extent of government regulations.

Religious denominations can promote an appreciation of true spirituality by communicating the right message to its members. However, the self-interest of the clergy, which David Hume and Adam Smith referred to, intervenes here. We have seen above that by choosing lax standards (that is, a high value of k), the church can induce its members to offer monetary donations to it as a substitute for the time they devote to the pursuit of piety. The church can do this because of asymmetric information in the domain of religion: the members do not quite know what a genuinely pious life comprises and take their cue from the preachers of the denomination they embrace.

In contrast to much of the literature in the economics of religion[5], we do not claim that profit is the entity that churches seek to maximize. What do religious organizations maximize? The basic message that religion communicates is that our true wellbeing lies not in the consumption of materialistic goods but elsewhere; that self-interest—the principle that motivates almost all humans—is not the truth of one's existence. It is not possible for a religious denomination to credibly communicate this message if the institution is itself driven entirely by the profit motive. Credible religious institutions, therefore, have to be non-profit organizations if they are to succeed in their mission. So in writing down the objective function of a church it would be unreasonable to presume that it is motivated purely by profit, as would a neoclassical firm. But it would be equally unreasonable to presume that it pays no attention at all to profit. It seems to us that the most reasonable option available to us is to model it as a non-profit organization and posit that its objective function is a weighted average of its profit and a measure of the genuineness of its spiritual product. Since the managers or owners of a non-profit organization cannot distribute any positive profit it makes, we assume that they consume it in kind in the form of perks, etc.

True spirituality is presumably between an individual and God, and its cultivation depends on the amount of time the former devotes to spiritual ends. The time the consumer devotes to prayer, contemplation, charitable works, etc. contributes to her

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[5] Iannaccone (1992) and Barros and Garoupa (2002) are important exceptions in which a church is assumed to maximize its members' welfare.

spiritual growth; the monetary donation she makes to her church contributes to the latter's survival. Although she presumes her monetary donation also contributes to the spiritual good she consumes, as in (2), the church recognizes that what really contributes to her spiritual growth is only the time she devotes to piety. The parameter k in (2) captures the emphasis the church puts on the importance of voluntarily contributing to the church's coffers. A church that cares only for its members' spiritual wellbeing would set $k = 0$; but in doing this, the church would also be ensuring its own demise because it will receive no monetary contributions. If the church cares only for its own profit, it would communicate to its congregation that k is very large, so as to maximize the monetary contributions it receives. Since time devoted to spirituality alone (not monetary contributions) contributes to piety, we reiterate that we can also think of the parameter k as an inverse measure of the spiritual content of the religious good, or as its 'quality'; the lower the value of k, the greater the content or quality.

In view of the argument above, the objective function, V, we attribute to a religious denomination is one that maximizes a weighted sum of it profits and (the value of) the total time its members devote to cultivating piety. And it maximizes this weighted sum by appropriately choosing the parameter k of the message it delivers to its members. (It is this value of k that the consumers will take as given in their optimal resource allocation choices we described earlier when laying out the demand side.) The church faces a constraint, however: its profit must be non-negative, for otherwise it would become economically unviable. So we may state a religious denomination's optimization problem as:

(7) $$\max_{k} \quad V \equiv \mu\Pi + (1-\mu)QyT \quad s.t. \quad \Pi \geq 0,$$

where the parameter μ (with $0 \leq \mu \leq 1$) characterizes the spiritual orientation of the denomination. Here T denotes the average amount of time a member of the denomination devotes to cultivating piety. (The income/wage rate y has been inserted in the second term of the objective function so as to ensure that the units of the two quantities being weighted are compatible.) For brevity, we have suppressed the dependence of T and Π on the parameters α, β, γ, k, and y. (Recall that the members' choices, which are the solution to the optimization in (5), depend on these parameters.) In the formulation of the church's objective in (7), profit does not constitute an objective to be maximized; rather, its non-

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negativity is a constraint that needs to be satisfied. We shall refer to this non-negative profit constraint hereafter as the NNP constraint. By part (c) of Proposition 1, members' monetary contributions are increasing in k while time devoted to piety is decreasing in it. We take the function V, which is a weighted average of its profit and its members' aggregate piety, to be single-peaked and so will possess a unique maximum in k. (This is confirmed in the simulations of the model.)

Suppose that on the unit circle a denomination's market is of size l, with the most distant subscriber being located symmetrically at a distance $l/2$ on either side. Suppose the density of consumers over the circle is uniform and is unity. The total membership of the denomination will be given by $Q = l$. As we have seen, since members will be located at different distances from the church, their time dedication to piety and money donations will be different. Then the average amount of time per member devoted to spiritual pursuit will be given by

$$T = (2/l) \int_0^{l/2} t^*(z,k)\,dz,$$

and the average money contribution of a member of the denomination by

$$M = (2/l) \int_0^{l/2} y\,p^*(z,k)\,dz = yP,$$

where P is the average proportion of income donated by members. Note that $t^*(z,k)$ and $p^*(z,k)$ are determined by the choices of a consumer located at position z, and obtained by solving the optimization problem stated in (5). (These choices also depend on the exogenous parameters α, β, γ, and y, but these have been suppressed for brevity.) Substituting the above expressions into (6) and (7), we can readily obtain the denomination's profit and objective function in terms the exogenous parameters and of k, which is the degree of laxity the denomination will choose.

A very high degree of piety induced by a relatively low value of k may militate against church survival by reducing monetary contributions. Nevertheless, a religious denomination whose market share is secure might opt for a reasonably low k, provided the weight $(1 - \mu)$ that it places on piety is sufficiently high. When market share is reduced by competition, the NNP constraint in (7) might bind. In that case, the

denomination would have to lean a bit more toward mammon and less toward God. At that point, profit becomes the deciding factor of the extent of the piety the church espouses. This can be seen from Figure 1. In the determination of the optimal spiritual content, k^*, of the church's product in panel (a) the NNP constraint is not binding, whereas in panel (b) it is. In panel (b), in order to stay solvent the denomination is forced to choose a higher level of k than it would have liked.

3. A Monopoly Religion

We first consider the quality choice of the spiritual product of a religion that is a monopoly. This could either be because entry by other denominations is not economically viable or because the religion is the protected from entry by the state. The Roman Catholic Church in Western Europe for around fifteen hundred years until the Protestant Reformation may be a good approximation to such a monopoly. In our model the market is presumed to be 'covered', that is, all people in the market are served. This is because, in our model, all goods in an individual's utility function are deemed essential. The following proposition, proved in the Appendix, characterizes an important property of the monopoly church's optimal choice of k in terms of its profit orientation that is, μ.

Proposition 2: When the religious market is served by a monopoly and its non-negative profit constraint does not bind, the spiritual content or quality of the message gets diluted as the church's weight on its profit increases.

This proposition captures the essential temptation of a religious organization with regard to its members: profit-orientation of a church leads to a dilution of the spiritual content of its message to them.[6] This should lead us to suspect that the religious activity inspired by a church is not incontrovertibly in the best interests of its members. Consumer sovereignty cannot be taken for granted. As we shall see, increasing competition in the marketplace does not necessarily improve matters.

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[6] When the NNP constraint binds, the outcome is independent of the denomination's profit orientation, μ, because it is the NNP constraint that determines the optimal k.

Effect of State Subsidization

How would state subsidization of a monopoly religion affect the religious marketplace? Barro and McCleary (2003), in an analysis across countries of the effect of religiosity on economic growth found, after controlling for a host of explanatory variables (including the extent of religious plurality), that the presence of a state religion increased church attendance. They attribute this to the subsidy that state religions receive, which usually induces greater consumption of the good. There is the contrasting and widely-accepted supply side argument that state subsidization also leads to a lazy dominant firm and undermines plurality [Finke and Stark (1988), Finke et al (1996)]. This conclusion is not inevitable, however, and can be seen from the model presented here.

A subsidy that lowers the marginal cost of serving an additional member by an amount g per person, say, will raise the profit of the monopoly firm by an amount Qg. A fixed subsidy of the amount G, say, given to the church would raise its profit by that amount. As a result, the objective function of the church in (7) would increase either by the constant amount μQg or by μG, depending on the type of subsidy. If the non-negative profit constraint is not binding before the subsidy, the introduction of the subsidy will leave the quality of the spiritual good unchanged because the marginal condition for optimality is unaffected by an additive constant. If the non-negative profit constraint was previously binding, however, the church's constrained spiritual quality (inversely related to k^*) was lower than what the unconstrained level would have been. The government subsidy, by relaxing the profit constraint will *lower* k^*, that is, raise the quality of the spiritual good. (Subsidization in this case would move the church from the situation in Fig. 1(b) towards that in Fig. 1(a).) By enabling the church to meet its NNP constraint more easily, the state in effect encourages the church to focus more on its true purpose.

Proposition 3: State subsidization of a monopoly religion either leaves the quality of the spiritual product unchanged or increases it.

Were the church a purely profit-maximizing entity—as is frequently assumed explicitly or implicitly in recent analyses—the government subsidy in this model would have no effect of the quality of the spiritual good offered. Or, it would have a detrimental effect if we credit the 'lazy church' view (usually not modeled) of the state religion. By recognizing that religious denominations are better conceived of as non-profit organizations with a profit component in their objective, we arrive at different conclusions. A monopoly church or an established one that is close to zero profit would improve its performance if it were subsidized. This would rationalize why the Presbyterian Church, which was a poorly endowed, established church in Scotland, Holland, and Switzerland at the time of Adam Smith, may have functioned well enough to warrant his praise even as he propounded the virtues of competition in the religious marketplace [Smith (1776, p. 813)].

The upshot of the above argument is that our model predicts the presence of a state religion would increase the time devoted to piety. As mentioned above, Barro and McCleary (2003) find that state religions do tend to increase church attendance. This result, which as they point out contradicts supply-side arguments, fits in neatly with the predictions of our model.

4. Entry and its Consequences

If the population density is sufficiently high, if there is a sufficient diversity in consumers' spiritual temperaments, and if the fixed costs of operation are not prohibitive, the market for religion may invite entrants. Let us assume for convenience that all denominations which could potentially enter the market put the same weights μ and $(1-\mu)$, respectively, on profit and members' piety. How would entry impinge on the quality of the spiritual product offered in the marketplace? There are two effects to consider. Firstly, entry of more denominations ensures that the average distance of a member to the denomination she embraces declines. All else constant, this increase in diversity (pluralism) can be expected to bring about an increase in consumers' time allocation to piety. If there is too much diversity, however, each denomination's market

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share may be so low that the NNP constraint binds—in which case the denominations would need to shore up profits by increasing *k,* and piety may decline as a result. Secondly, there is also the effect of competition on spiritual standards. To acquire greater market share, each denomination may alter the quality of its spiritual message. We consider these effects separately.

Introducing Diversity

We isolate the effects of pluralism by allowing for the possibility of entry but with the artificial contrivance that each denomination takes its market share as given. This increases variety but without scope for competition because there is nothing to be gained by competing. If there are *n* symmetric denominations, we assume the market share of each is taken to be $1/n$. Each denomination maximizes its objective taking its market boundaries *as given* but cognizant of the need to ensure that profits are non-negative. If the NNP constraint does not bind the optimal *k* for the denomination simply maximizes the objective function in (7), as illustrated in panel (a) for Figure 1. If at this solution the NNP constraint is violated, however, the denomination will dilute the quality of its product until the constraint is satisfied, as illustrated in panel (b) of the Figure.

Entry in this scenario has the benefit, as we have seen, of offering the devout more variety. The reduction in the average distance to the nearest denomination reduces the time needed to achieve a given level of piety even when the quality of the spiritual goods is held constant. But the quality of each product could increase when there is greater variety (without competition). When there are only a few denominations, the average distance to the nearest denomination is large and the time required to generate a given amount of piety is high. To economize on their members' time, the denominations may emphasize monetary donations relative to time spent cultivating piety. That is, they may choose a relatively high value of *k.* When there are more denominations, there is less need to do this and the chosen value of *k* may decline; there would be more emphasis on piety.

Introducing Competition

To identify the effect of competition, we drop the assumption that the market share is fixed and allow denominations to compete for it. To nail down the intuition for the effects of competition, first suppose there are only two denominations, labeled A and B, in the religious marketplace. They are presumed to be symmetric in every respect, except that they offer different spiritual products. What is the effect of competition on spiritual standards, relative to when they each take their market share as fixed at 1/2? Competition will clearly be for the members who belong to the fringes of the rival denomination (for these are the members who are least committed to their denomination), and this will take place through the choice of k. Let these choices of A and B be denoted by k_A and k_B, respectively. In Figure 2, the two members who define the border between the denominations on the circle are people denoted by I_1 and I_2. Under competition, these persons are indifferent between denominations A and B. When $k_A = k_B$, individuals I_1 and I_2 would be located at a distance 1/4 from the location of denomination A.

When the market borders are fixed, in the choice of k each denomination equates the marginal benefit of the higher profit from raising k with the marginal loss in its members' piety. In view of their symmetry, both denominations will end up choosing the same value of k. Suppose the denominations are at this level of k when the market boundary is made flexible and is allowed to be determined by competition. Denomination A would like to increase its market share at the expense of B, and vice versa. To achieve this, denomination A will have to offer fringe members of the rival denomination a higher utility, and it does this by *raising* k_A. The marginal benefit and the marginal loss from its current members exactly offset each other (by the Envelope Theorem), but there is an additional benefit from *new* members enticed from the rival denomination. The marginal member at the boundary who changes loyalties will decrease the time devoted to spirituality and increase her monetary contribution to denomination A. Her perceived wellbeing, as measured by the metric of her own utility function, will increase as a result. This would establish her in denomination A as a committed and secure member. All else constant, this reduction of its spiritual content by denomination A will garner it greater

market share if the rival denomination does nothing. But denomination B has the same incentives to increase k_B. Given the symmetry between the two denominations, in the Nash equilibrium both denominations would reduce the quality of their spiritual products relative to what they deemed optimal when market shares were fixed. Although it will still be the case that $k_A = k_B$ in the new equilibrium, this common value of k will be *higher* than when market shares were taken as fixed. The endogenously determined market shares, however, would remain at 1/2 in view of the assumed symmetry of the denominations. Competition for market share would have merely accomplished a dilution of the quality of spiritual goods in equilibrium. This argument is summarized in the following proposition.

Proposition 4: Competition between denominations for market share increases the emphasis on monetary donations at the expense of piety; the quality of the spiritual products is diluted in equilibrium.

Proposition 4 establishes the pernicious effect of increased competition on the quality of the spiritual good. Denominations compete for the marginal members of rival denominations by tempering the emphasis on piety (and thereby offering them higher utility). Supply-side arguments in favor of competition hang their theoretical argument on the claim of a 'lazy monopoly' but rule out the possibility that spiritual standards are not set in stone and can be diluted. When this possibility is allowed for, we see that competition can indeed dilute quality in the religious marketplace.

Montgomery (2003) made the important point that supply-side theory presumes that greater effort in serving its members by one denomination will induce greater effort in its competitors. He argued that this is false, in general; it is possible that greater effort by the one could reduce effort by the other; the effort levels of competing denominations, in other words, may be strategic substitutes, not strategic complements as supply-side theorists implicitly assume. This is a compelling critique. Although there is no effort as such applied by denominations in our model, the result in Proposition 4 above is in a similar vein. In effect, Proposition 4 arises because reductions in quality standards by one

denomination (made possible by the self-interest of the clergy in the presence of asymmetric information) induces a reduction in the quality standards of its competitors.

Our arguments on the effect of competition indicate that there are two reasons for why increasing competition could dilute quality in the religious marketplace. Firstly, a decline in market share due to greater plurality reduces profits and the NNP constraint may become binding. Religious denominations would then emphasize donations more (and downplay the time devoted to piety) so as to encourage contributions to the church's coffers. Secondly, even if the NNP constraint were not binding, competition for market share would reduce the degree of piety urged upon the faithful. In this competition, denominations seek to grow by improving the perceived wellbeing of potential members. And in a world in which consumer sovereignty is undermined by asymmetric information between the laity and the clergy, this is accomplished by a dilution of the essential message of religion. Both these forces induce a race to the bottom in the spiritual marketplace. These arguments imply that competition is not necessarily better at promoting piety than monopoly.

The Free Entry equilibrium

To quantitatively determine the effect of competition, we need to be able to determine how many denominations will enter the religious market. To pin down the equilibrium that will prevail under free entry, we assume that the denominations are all symmetric in every respect (except that they differ in their locations in product space) and follow the procedure outlined below. Suppose there are n independent denominations in the market (a unit circle), separated in location by identical distances $1/n$. Focus on one of these denominations, say A, located at the origin. Suppose it picks a value, k, for the laxity of its spiritual product and its two nearest neighbors each choose values denoted by $\tilde{k}$. Suppose a consumer who is located at a distance z from the origin embraces denomination A. Denote the maximized utility of this person by $U^*(z,k)$, where we have suppressed all other exogenous parameters for clarity. This utility is obtained by solving the consumer's optimization problem stated in (5). Had she embraced the rival of A that is closest to her, the distance of this latter denomination from her would have been

$(1/n - z)$ and her maximized utility would have been $U^*(1/n - z, \widetilde{k})$. If she is the marginal consumer in A's denomination, she would be indifferent between A and its nearest neighbor:

$$U^*(z,k) = U^*(1/n - z, \widetilde{k}).$$

This condition defines the coordinate of the indifferent consumer. Let the solution to this equation in z be denoted by the function $Z(k, \widetilde{k}, n)$. Clearly, since higher levels of k make the marginal member better off, Z is increasing in k; when A increases k it captures a higher market share. Likewise Z is decreasing in the laxity, $\widetilde{k}$, of A's rival. The market share of denomination A comprises people living along a circular segment of length $2Z(k, \widetilde{k}, n)$, that is, $Q = 2Z(k, \widetilde{k}, n)$ in (6). The profit and objective function of A may now be readily obtained from (6) and (7); denote these by $\Pi^A(k, \widetilde{k}, n)$ and $V^A(k, \widetilde{k}, n)$, respectively, where for clarity we have suppressed all exogenous parameters inessential to our immediate analysis. Under Nash behavior, denomination A will take the qualities of all other denominations as given and choose the quality of its own product to maximize its objective:

(8) $$\max_{k} \quad V^A(k, \widetilde{k}, n) \quad s.t. \quad \Pi^A(k, \widetilde{k}, n) \geq 0.$$

Let the solution for k to this maximization be denoted $K(\widetilde{k}, n)$. In the symmetric equilibrium, it must be the case that all denominations choose the same quality, that is, $\widetilde{k} = k$. Therefore, the symmetric equilibrium level of church laxity, $\hat{k}(n)$, must be a fixed point of the mapping $K(\widetilde{k}, n)$, that is, $\hat{k}(n)$ must solve the equation:

(9) $$k = K(k, n).$$

This solution, $\hat{k}(n)$, gives us the level of laxity that each denomination will choose in the Nash equilibrium when there are n symmetric denominations in competition.

In a religious market with no entry barriers, positive profit will invite entry and entry will occur until the non-negative profit constraint binds. There may, in fact, be further entry if the new entrants can be accommodated and the NNP constraint satisfied by further increases in k. Entry will only cease when it would violate the NNP constraint for *all possible values* of k. Notice that the objective function V of a denomination in (7)

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is zero when it stays out of the market and is always positive if its profit on entry is nonnegative. Thus if a denomination is assured that its profit will be non-negative in the equilibrium after entry, it will always choose to enter.

Suppose that all entry in this market is simultaneous and entry occurs with full awareness of the equilibrium that will ensue. The equilibrium, then, will be symmetric: all denominations will have the same value of k. In this equilibrium, each denomination chooses its k to maximize its objective function, given that of the other denominations. This value of k is such that the denomination's NNP constraint is satisfied.

In the free entry equilibrium, it must be the case that for no symmetric choice of k can another entrant earn non-negative profits. The free entry equilibrium will be characterized by the *smallest number of denominations*, n_f, such that a potential entrant's profit is negative for all possible common values of k. In other words, an equilibrium with $(n_f + 1)$ denominations is economically unviable because the NNP constraint would be necessarily violated. Let k_f denote the free entry equilibrium value of the laxity of denominations, that is, $k_f = \hat{k}(n_f)$. This free entry equilibrium is illustrated in Figure 3. In the situation depicted, the NNP constraint strictly binds in the free entry equilibrium.

Effects of Diversity and Competition

Although we cannot present further analytic results, we can perform some simulations of the model that reveal interesting possibilities. For this we assume that the distance cost increases exponentially with distance from the ideal denomination: $d(z) = \exp(\phi z)$, with $\phi > 0$. Figure 4(a) shows how the equilibrium laxity ($\hat{k}(n)$) of the spiritual products varies as denominations enter into the religious market. (The values of the parameters are indicated in the Figure caption.) The lower (solid) curve represents this equilibrium laxity when diversity or pluralism is increased but competition is suppressed, that is, when the market share of each of n denominations is held fixed at $1/n$. The upper (dashed) curve shows the laxity in the symmetric equilibrium when denominations are allowed to compete for market share. Notice that, when n increases,

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increased diversity without competition first results in lower k (until $n = 3$) and then higher k. The increase in diversity lowers market share and so the profit of each denomination declines, as seen in Figure 4(b). Since the average distance of a consumer from her ideal denomination decreases, however, the denominations are less in need of emphasizing monetary contributions. So the equilibrium value of quality rises (that is, k declines). When $n = 4$, however, the profit of a denomination would have fallen below zero and so to satisfy the NNP constraint each denomination has to increase its k. This accounts for the decline in quality (that is, increase in k) as diversity increases further. The profit remains at zero as n continues to increase because each denomination merely increases k by as much as is necessary to prevent its profit from becoming negative. This explains the behavior of the lower (solid) curves in Figures 4(a) and 4(b).

The behavior of the equilibrium quality and profit of a denomination when competition occurs for market share offers an interesting contrast to the effect of pluralism alone. The upper (dashed) curve in Figure 4(a) shows that, when competition occurs, each denomination becomes more lax (lowers quality) as entry occurs. Competition for market share unambiguously dilutes standards. This, however, is not due to the NNP constraint binding, as the upper (dashed) curve in Figure 4(b) displaying profit shows. In fact, the profit of competing denominations initially *increases* when entry occurs. How is this possible? How can competition increase profit? The reason is interesting but not difficult to see. Each denomination is maximizing an objective that is *not* profit; it gives importance to its members' piety, too. But when forced to compete for members, each denomination increases its laxity. As a *by-product* of this response, the denomination's profit initially rises. So, strangely, competition initially relaxes the NNP constraint in this instance.

The effect on aggregate piety of these changes in equilibrium quality as entry occurs is shown in Figure 4(c). Whether the denominations are prevented from competing (solid curve) or allowed to compete (dashed curve), the dependence of aggregate piety on the number of denominations is an inverted-U. To understand why this obtains, consider the case when we increase diversity but without competition (solid curve). With the addition of new denominations, consumers' average distance to the closest denomination declines. As a result, aggregate piety increases. However, when

there are many denominations each one's market share becomes too small and in order to ensure that profits do not become negative, they increase laxity. This dilution in quality occurs not because of competition (which is disallowed) but because the NNP constraint binds. The effect of diluted quality ultimately overwhelms the reduction in distance cost and so aggregate piety declines with the addition of more and more denominations. So even in the absence of competition, increased diversity is not unambiguously good.

The schedule for aggregate piety when competition is allowed (dashed curve) in Figure 4(c) lies below that which obtains without competition. This is because competition introduces yet another effect: the dilution of quality for the purpose of stealing members from rival denominations. *We see that diversity per se, within limits, can be salutary for piety. But, after controlling for diversity, competition is detrimental to piety*.

Figure 4(b) allows us to identify the number of firms in the free entry equilibrium. The profit of each denomination in equilibrium is positive when $n = 9$, while it becomes slightly negative when $n = 10$. Thus there will be $n_f = 9$ denominations in the free entry equilibrium. Figure 4(c) shows that if there were 9 denominations in the market but competition between them was prevented by arbitrarily fixing their market shares at 1/9, aggregate piety would have been higher. The Figure further shows that, even allowing for competition, piety would have been maximized when $n = 8$. Thus there is *excessive entry* in the religious market if we use piety as the yardstick for measuring performance in this market.

It is well-known that models of product differentiation can generate too much entry.[7] Those results arise from the trade-off between the fixed cost that is incurred with the entry of each new firm and the greater product diversity the firm contributes to. While enriching the market for consumers by adding its unique brand of product, however, each entrant ignores the fact that some of its own market share is coming at the expense of other firms. And this can result in too much entry. The excessive entry in our model, however, is more deleterious in its effects: it is not just that 'too much' diversity is offered from society's point of view at the expense of higher aggregate fixed costs. Rather, the excessive entry dilutes the quality of the very product that provides the reason

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[7] See e.g. Tirole (1988, Ch. 8). Sometimes, there can also be too little entry.

for existence of these denominations. Supply side theory maintains that competition results in a vibrant religious economy [Stark and Bainbridge (1987), Finke and Iannaccone (1993), Finke and Stark (1992), Iannaccone (1991)]. One message that emerges from the analysis above is that the supply side position overstates the role of competition. The increased vitality competition brings about in the religious market can come at the expense of a dilution of the content.

Our findings here might reconcile the contradictory claims made about the efficacy of religious pluralism. In particular, it may explain the puzzling European 'exceptionalism' that is often addressed in the literature. Halman and Draulans (2006) recently examined secularization in Europe for 30 countries using the 1999/2000 European Values Study surveys. In particular, they investigated the effect of religious pluralism on religious belief and religious practice. In a multivariate regression analysis where they controlled for many explanatory variables, they found unambiguous evidence that religious pluralism was negatively correlated with religious beliefs and religious practice. Using data drawn from many countries, McCleary and Barro (2006b) also find some evidence that is inconsistent with the supply-side view that pluralism vitalizes religious activity. They show that pluralism has no effect on personal prayer or on beliefs, even though it positively affects attendance [see their Table 2, p. 60]. Montgomery (2003), using the 1990 census of denominations at the county level in the U.S., found that greater competition reduced religious participation—and this by devising a technique that is not susceptible to the critique of Voas et al (2002).

5. Competition within a Monopoly

We have seen above that free entry does not guarantee the best performance in a religious market; a few denominations may be better at inducing genuine piety than full-blooded competition. The optimal number of denominations from society's point of view would depend on the population density, the costs of operation, the preferences of consumers for spiritual goods, and also importantly on the distance costs incurred by the devout in embracing denominations that are not ideal in their perception. It is conceivable that, under some circumstances, a monopoly might be best. So we cannot dismiss state-

sponsored religions out of hand. Nevertheless, monopolies are prone to problems not explicitly modeled here. Under unchallenged monopoly, for example, there is nothing to counter a particular interpretation of the scriptures. There appears to be no vehicle more efficacious than competition for generating new interpretations, new methods, and new ideas. How can we reconcile the potentially damaging effects of competition in the religious marketplace and the stimulus for innovation that is best provided by competition?

A monopoly religion that harbors competition within its own ranks could be a way out of this dilemma. Iannaccone (1991) has suggested that this sort of 'internal competition' is how the Roman Catholic Church may have maintained its long-term vitality. He uses the argument to make sense of the empirical finding that church attendance in Protestant denominations declines with market share but not in Catholicism, a finding that has been dubbed the 'Catholic Effect'. Diotallevi (2002) has provided some evidence for the claim that competition within the monopolistic Catholic Church in Italy substituted for competition from other denominations. This is an idea that we investigate in this section.

In the context of the present model, a religious monopoly with many orders within its fold would resemble a multi-plant—or, rather, a multi-order—monopoly. The unit circle (which is our product space) may contain several orders of the same church, each order offering a differentiated product. To pursue the Catholic example, some may find that the Carmelite order is best suited to their contemplative temperament; others may find attractive Opus Dei's practice of incorporating actions into one's spiritual life; yet others might find the emphasis on education among the Jesuits to be the most appropriate for them, etc. While different orders belonging to the same religion fill the product space, the average distance of a member from her ideal order decreases. This would encourage spiritual pursuits, as we have seen. Furthermore, since all orders belong to the same monopoly, competition between them can be eliminated and the race to the bottom in spiritual content can be avoided. In other words, a common value of k would be chosen and enforced by the church. Finally, since each individual order within the fold need not be self-sustaining, it may not face an independent NNP constraint. There need be only one overall NNP constraint facing the church. If this constraint does not bind (and it is

not likely to for a monopoly), profit need not be the overriding determinant of the content of the spiritual goods in the marketplace. As long as the church puts some weight on genuine piety (that is, $\mu < 1$), this multi-order monopoly may be more likely to deliver genuine spirituality to the faithful than would competition.

In Figures 5(a)-5(c), we already presented results on the performance of what is essentially a multi-order monopoly without explicitly saying so. These Figures included the case where the existing n denominations took their market share as given at $1/n$ and maximized their objective subject to the non-negative profit constraint. This is precisely what would be done under a multi-order monopoly, for *the monopoly would not allow its various orders to engage in detrimental competition with one another*. Under symmetry, the NNP constraint of the monopoly would translate into identical NNP constraints for each of the orders. How many orders (denoted by n_m, say) would a monopoly choose to have? The answer is, as many as would maximize its objective function (which, here, is a weighted average of its profits and the aggregate piety of the entire population). In effect, the monopoly would pick the optimal k for each value of n as it runs through various values of n to see when its objective is maximized. In Figure 5 we display the maximized value of the monopoly's objective function as the number of orders, n, is increased. (The parameter values are the same as those indicated in the caption for Figure 4.) We see that the monopoly's objective is maximized at $n_m = 8$. Referring back to the solid curve in Figure 4(c) we see that aggregate piety is also maximized when $n = 8$. So if this monopoly were the Catholic Church, it would allow 8 different Catholic orders to serve the people. Were these orders allowed to compete for market share, they would dilute the content of the Church's spiritual message; aggregate piety would be at a lower level, as indicated by the dashed curve in Figure 4(c). A multi-order monopoly can increase diversity and yet prevent the decline in spiritual standards that seems endemic to a competitive free market. By contrast, if independent denominations were allowed free entry, we have already seen that in equilibrium there would be $n_f = 9$ competing denominations in the free entry equilibrium. Figure 4(c) shows that the multi-order monopoly (with $n = 8$ orders) achieves a *higher* level of piety than does the free entry

equilibrium (with $n = 9$ denominations). This observation further undermines any blanket theoretical endorsement of free entry and competition.

Since Catholicism has a history of two thousand years, much of it as a monopoly, the above results seem highly relevant to it. In the context of our model, Iannaccone's (1991) conjecture and Diotallevi's (2002) arguments regarding competition within the Catholicism have sound theoretical justification to recommend them. However, it is not merely the fact that introducing many orders within the Church increases diversity and therefore makes the faithful better off, as their argument suggests. It is also the fact that it is in the interest of the centralized authority of the Church to prevent the sort of competition between the orders that dilutes standards. The authority's interest is in maximizing the objective of the whole Church and not in maximizing that of an individual order. The fact that consumers in the market for religion, in view of their lack of expertise, take their cue from the suppliers does not have as onerous consequences when the market is a monopoly as when it is competitive. The monopoly internalizes the untoward consequences of competition between its orders and thereby garners the benefits of diversity without undermining the spiritual content of its message.

Klick (2006) has recently argued that, as a means to overcoming free-riding by its members, the Roman Catholic Church has emphasized that Christians are justified through faith and works. This is in contrast to Protestant denominations, which hold that salvation is accomplished by faith alone. It is conceivable, however, that the Catholic emphasis on faith and works places greater emphasis on time devoted to pious works than on monetary contributions, that is, it translates into a higher quality in terms of our model. In Weber's (1905) famous thesis, Protestantism released Christians to pursue wealth and fostered capitalism. Consistent with this claim, in their detailed empirical study of the impact of religiosity on economic attitudes using World Value Surveys, Guiso et al (2003) found that Protestantism was more pro-market than Catholicism when it came to incentives. Incentives work by appealing to self-interest. The greater emphasis on spiritual works as a means to piety in Catholicism undermines the role of incentives in eliciting effort and translates quite naturally in our framework into greater conservatism (a smaller k). This would simultaneously explain the higher church attendance of Catholics as well as their lower monetary contributions. The latter may not be due to free

riding or because of the lazy behavior of a monopoly; it may be simply because Catholicism puts more emphasis on piety and less on monetary contributions. This would also explain why it has retained enough vitality to sustain itself in its long history, despite extended periods of decline.

6. Conclusions

In this paper, we have sought to contribute to the literature that formally addresses the question of whether greater competition in the marketplace is beneficial. Supply-side theorists in sociology have written a great deal on the efficacy of competition in this regard. But no attention has been given to the fact (explicitly recognized by Hume and acknowledged by Adam Smith) that the clergy have an interest in diluting the message of religion for private gain. By formally modeling this possibility, we have shown that this problem worsens with competition—the tendency to water down the content of religion in order to increase monetary donations from the faithful is exacerbated by market competition. Thus, while the added diversity from increased entry by new denominations is beneficial to religious consumers the dilution of the spiritual product in the market equilibrium is detrimental. The right balance seems to lie between the contrasting claims of Adam Smith and David Hume. Furthermore, in the context of our model we have formally demonstrated that a multi-order monopoly—a monopoly that harbors competition within its own ranks by allowing multiple orders—is better than either ordinary monopoly or competition.

It is beyond dispute that competition does reduce some excesses of monopoly behavior. Rent-seeking of the Catholic Church prior to the Reformation through indulgences was largely eliminated because of competition from Protestantism, for example. This paper has focused on aspects of the religious market that are not solved— and indeed may be worsened—by competition.

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APPENDIX

Proof of Proposition 1:

On substituting (2), (3), and (4) into the objective function in (5), we recast the consumer's utility maximization problem as

$$\max_{t} \quad \alpha \ln[y(1-kt)] + \beta \ln[1-td(z)-\tau y(1-kt)] + \gamma \ln(kt),$$

the first order condition (FOC) for which is

$$-\frac{\alpha k}{(1-kt)} - \frac{\beta[d(z)-\tau yk]}{[1-td(z)-\tau y(1-kt)]} + \frac{\gamma}{t} = 0$$

When simplified, this condition is a quadratic in t; denote the relevant solution by t^*. The second order derivative (SOD_t) of the objective with respect to t is given by

$$SOD_t \equiv -\frac{\alpha k^2}{(1-kt)^2} - \frac{\beta(d(z)-\tau yk)^2}{[1-td(z)-\tau y(1-kt)]^2} - \frac{\gamma}{t^2} < 0.$$

The negative sign of SOD_t indicates that the objective function is strict concavity everywhere, which ensures that the solution t^* to the FOC is indeed a maximum.

(a) Totally differentiating FOC with respect to α, we obtain

$$SOD_t \frac{dt^*}{d\alpha} = k/(1-kt) > 0$$

from which it follows that $dt^*/d\alpha < 0$. Since $p^* = kt^*$, it follows that $dp^*/d\alpha < 0$. The results with respect to β and γ follow in an analogous fashion.

(b) Totally differentiating FOC with respect to z and simplifying, we obtain

$$SOD_t \frac{dt^*}{dz} = \frac{\beta d'(z)(1-\tau y)}{[1-td(z)-\tau y(1-kt)]^2} > 0$$

where $d'(z)$ denotes the derivative of $d(z)$ and is positive. Since $\tau << 1$ by assumption, it follows that $\tau y < 1$ and so dt^*/dz and dp^*/dz are both negative.

(c) Totally differentiating FOC with respect to k and simplifying, we obtain

$$SOD_t \frac{dt^*}{dk} = \frac{\alpha}{(1-kt)^2} - \frac{\tau \beta y(1-2td(z)-\tau y+2\tau ykt)}{[1-td(z)-\tau y(1-kt)]^2} > 0$$

When $\tau << 1$, the first term dominates on the right hand side and so $dt^*/dk < 0$.

To assess the comparative static effect of k on p^*, we recast the above optimization in terms of p instead of t:

$$\max_{p} \quad \alpha \ln[y(1-p)] + \beta \ln[1-pd(z)/k-\tau y(1-p)] + \gamma \ln(p),$$

the first order condition for which is

$$-\frac{\alpha}{(1-p)} - \frac{\beta(d(z)/k-\tau y)}{[1-pd(z)/k-\tau y(1-p)]} + \frac{\gamma}{p} = 0$$

and the associated second order derivative (SOD_p) is

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$$SOD_p \equiv -\frac{\alpha}{(1-p)^2} - \frac{\beta(d(z)/k - \tau y)^2}{[1 - pd(z)/k - \tau y(1-p)]^2} - \frac{\gamma}{p^2} < 0.$$

Totally differentiating the above first order condition with respect to k and simplifying, we obtain

$$SOD_p \frac{dp^*}{dk} = \frac{(\beta d(z)/k)^2[-1 - (d(z)/k)(1-p) + \tau y(2-p)]}{[1 - pd(z)/k - \tau y(1-p)]^2} > 0$$
.

Since $\tau << 1$, the right hand side is negative. It follows that $dp^*/dk > 0$. ∎

Proof of Proposition 2:

The profit of the monopoly firm is given in (6) and its objective function in (7). Substituting definitions and rearranging, we may write the optimization problem of the monopoly denomination as

$$\max_{k} \quad 2y\{\mu\int_0^{1/2} p^*(k,z)dz + (1-\mu)\int_0^{1/2} t^*(k,z)dz\} - \mu(Qc + F).$$

The first order condition for a maximum is

$$\mu\int_0^{1/2} \frac{\partial}{\partial k} p^*(k,z)dz + (1-\mu)\int_0^{1/2} \frac{\partial}{\partial k} t^*(k,z)dz = 0$$
,

and the associated second order condition for a maximum, assumed to be satisfied, is

$$SOD_k \equiv \mu\int_0^{1/2} \frac{\partial^2}{\partial k^2} p^*(k,z)dz + (1-\mu)\int_0^{1/2} \frac{\partial^2}{\partial k^2} t^*(k,z)dz < 0$$
.

Let k^* denote the monopoly's optimal choice of k. Taking the total derivative of the above first order condition with respect to μ and recognizing that consumer choices $p^*(k,z)$ and $t^*(k,z)$ do not explicitly depend on this parameter of the church, we obtain

$$SOD_k \frac{dk^*}{d\mu} = -\int_0^{1/2} \frac{\partial}{\partial k} p^*(k,z)dz + \int_0^{1/2} \frac{\partial}{\partial k} t^*(k,z)dz.$$

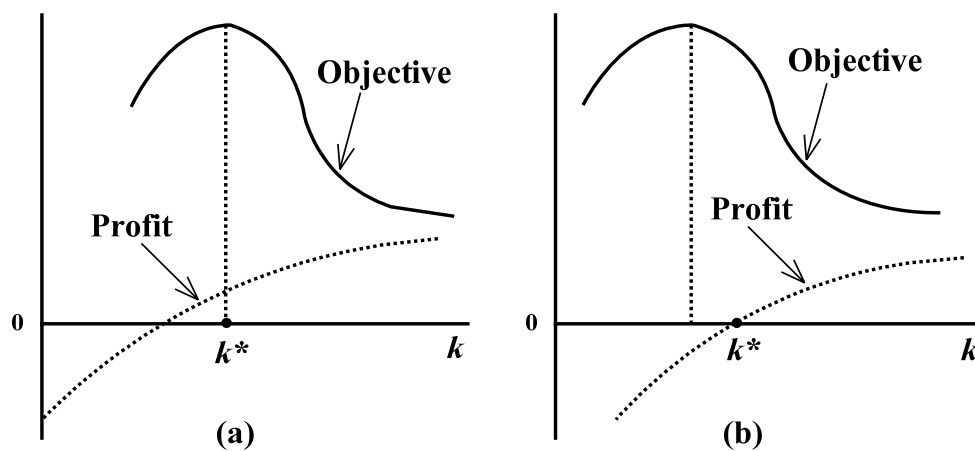By part (c) of Proposition 1, the right hand side is negative. It follows that $dk^*/d\mu > 0$. ∎

Figure 1: Outcomes when the non-negative profit constraint of a denomination is (a) non-binding, and (b) when it is binding.
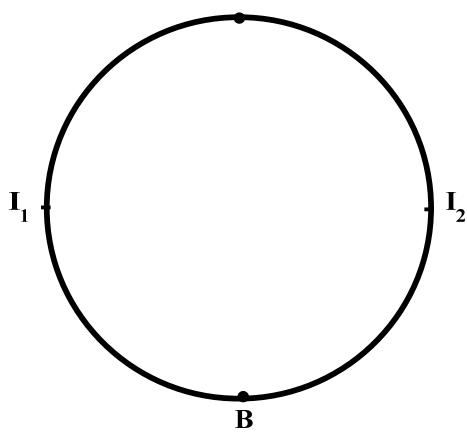

Figure 2: Competition for market share with two denominations.
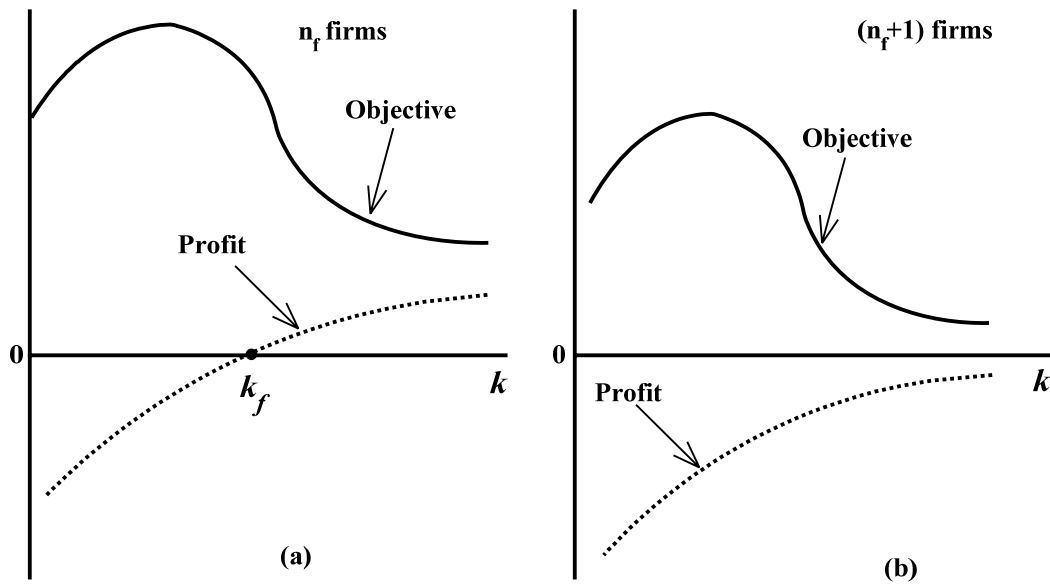
Figure 3: Illustrates the free entry equilibrium with n_f firms. Panel (a) shows the symmetric outcome when there are n_f firms and panel (b) the impossibility of accommodating $(n_f + 1)$ firms.
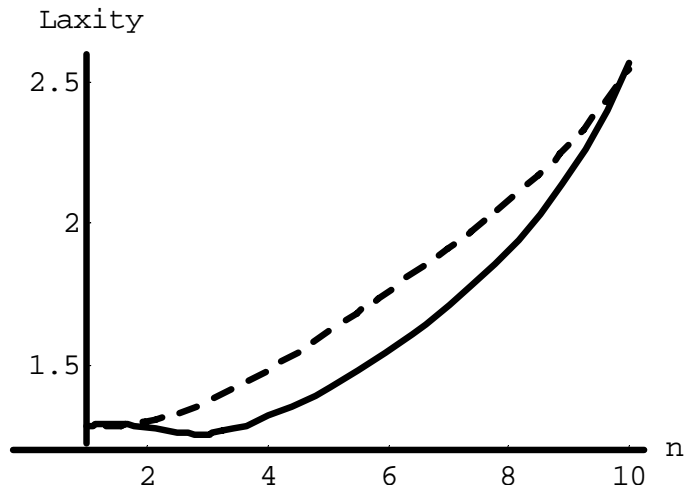

Figure 4(a): Laxity of churches in equilibrium as a function of the number of denominations when competition is not allowed (solid) and when it is (dashed).
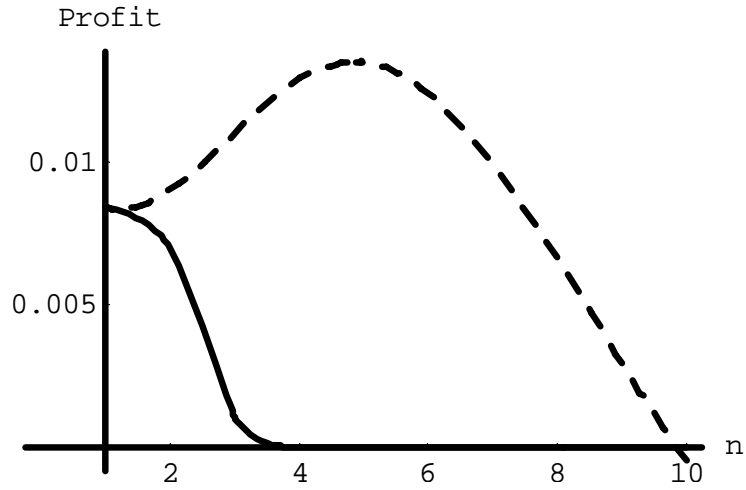
.

Figure 4(b): Profit of a denomination in equilibrium as a function
of the number of denominations when competition is not allowed
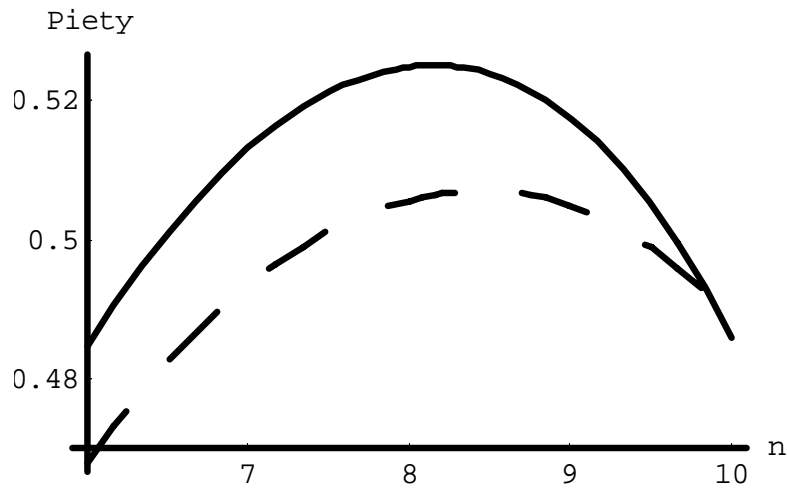(solid) and when it is (dashed).

Figure 4(c): Aggregate piety generated in equilibrium as a function
of the number of denominations when competition is not allowed
(solid) and when it is (dashed).. [Parameter values for all panels:
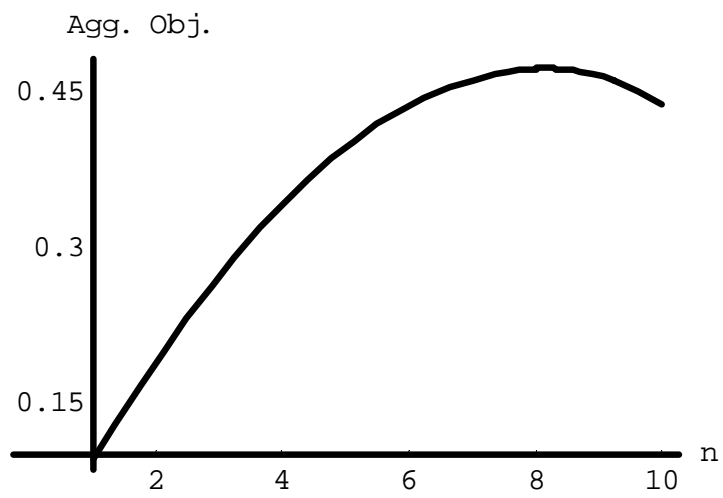$\alpha = \beta = \gamma = 1/3,\ \tau = 0.1,\ \phi = 10,\ \mu = 0.1,\ y = 1,\ c = 0,\ F = 0.025$.]

Figure 5: Aggregate maximized objective function in monopoly as a function
of the number of orders. [Parameter values are the same as in Fig. 4.]