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Should the Catholic Church abolish the rule of Celibacy?

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Abstract

Since the Middle Ages, celibacy has been a requirement for those becoming priests in the Roman Catholic Church. In the ongoing discussions about reforms, a wide range of church members have asked for the abolishment of the celibacy requirement in order to meet the changed social and moral standards of believers and to increase the quality and quantity of priests. However, this paper shows that from a strategic point of view, there are good reasons for the Catholic Church to keep, or even to increase, the role of celibacy for its priests. Using celibacy as a resource selection device, it allows the church to credibly signal its religious orientation to believers. Based on a game theoretic model, this paper analyzes the optimal use of celibacy in the market for religious services. Additionally, we discuss the relevant impacts of higher income levels, higher opportunity costs, increased aging and changed moral standards relating to homosexuality.

Key Words: Religion, celibacy, strategic resource selection
JEL Classification: D23, D83, J40

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1 Introduction

Celibacy directly concerns only a small fraction of the people in the Catholic Church; i.e., the priests. However, the concept of celibacy seems to enrage many people, even if they are not Catholic priests themselves, or even if they are not involved at all with the Catholic Church. The arguments brought forward against celibacy are manifold. The more moderate critics of celibacy urge the Catholic Church to hire higher-quality human resources as priests. Living under celibacy is not very attractive for a wide range of individuals since it imposes significant personal opportunity costs. Additionally, it hinders the Catholic Church from adapting its internal structure to the changed social and moral standards of modern societies. As a result, the church may be increasingly unattractive for a wide range of believers with a modern liberal orientation. Fierce critics of celibacy directly link it to priestly misconduct. Recent cases of pedophilia in U.S. Catholic dioceses have fuelled this second discussion and given rise to a new wave of questions about priestly celibacy. Despite the fact that there seems to be no scientific evidence whatsoever that pedophilia is related to celibacy itself, and that the likelihood of pedophilia is lower among Catholic priests than among married men[1], there is a widely held belief in society that priestly celibacy has contributed to child sexual abuse.[2] Hence, the application of celibacy has severe drawbacks for the Catholic Church, while the potential benefits are not obvious. So why does the Catholic Church not simply eliminate celibacy? A first and popular opinion is that celibacy has simply become a dogma in the Catholic Church over time. However, this concept is not true. Asked about the role of celibacy, the Prefect for the Congregation for the Doctrine of the Faith, Cardinal Joseph Ratzinger, who became Pope Benedict XVI in April 2005, has clearly stated: "It is not a dogma. It is a form of life that has grown up in the Church and that naturally brings with it the danger of fall."[3] "One ought not to declare that any custom of the Church's life, no matter how deeply anchored and well founded, is wholly absolute. To be sure, the Church will have to ask herself the question again and again; she has now done so in two synods."[4]

Translated into economic terminology, celibacy remains a matter of strategic choice within the Roman Catholic Church. The Catholic Church has

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[1] See e.g. Jenkings (2001). For an overview of the Roman Catholic Church sex abuse scandal see also Wikipedia (2009).
[2] For example 75 % of respondents in an ABC News poll in June 2002 thought that celibacy played a role in the paedophile scandals. See Religionlink (2005).
[3] Ratzinger (2004), p. 209.
[4] Ratzinger (2004), p. 213.

repeatedly deliberated on the issue and, in contrast to Protestant and other churches, has decided to maintain celibacy until the present day. Obviously, the Catholic Church has concluded that there still are potential benefits to celibacy. In our opinion, this conception of celibacy as a strategic variable of the Catholic Church invites an economic analysis of costs and benefits. Basically, we argue that celibacy is an efficient resource selection device, which allows the church to credibly signal its religious position to believers. Hiring relatively more conservative priests allows the Church to signal more conservative values. We show that celibacy is an efficient rule to select relatively more conservative priests. Considering that the willingness to contribute voluntarily to a denomination tends to increase among more conservative Christians with a stronger belief in the afterlife, it turns out to be useful to signal relatively more conservative values. Based on a game theoretic model, this paper analyzes the optimal use of celibacy in order to maximize the aggregate contributions to the church. Additionally, we analyze the impact of hiring individuals who do not incur personal costs from living celibately. Finally, we analyze the impacts of social changes, such as greater personal costs, of remaining celibate, aging population, higher income levels and changing moral standards related to homosexuality.

The remainder of the paper is organized as follows. Section 2 gives a short overview on the origins of celibacy in the Catholic Church. Section 3 elaborates further on the idea of celibacy as a strategic variable for the Catholic Church, seen as a supplier in the market of religious goods. Section 4 is devoted to the development, analysis and interpretation of the model. Section 5 considers impacts on celibacy from changes in society. The paper ends with a summary and our conclusions in section 6.

2 The origins of celibacy in the Catholic Church

The role and the application of celibacy in the Catholic Church are described in the Catholic code of law, the Codex Iuris Canonici. According to Canon 277, sanctified Catholic priests are required to make a solemn promise of celibacy. Before their deacon consecration, the priest aspirants promise to refrain from getting married and to live in absolute sexual abstinence. However, from the Church's point of view, celibacy is more a voluntary promise than a legal requirement. Nevertheless, de facto celibacy is a compulsory requirement for being a member of the Roman Catholic priesthood. Only in some Eastern (i.e., non-Roman) parts of the Catholic

Church is the role of celibacy less strictly defined – for instance, by applying it only to some clergy, such as bishops.

According to the Old Testament, sexual activities were seen as unclean and therefore not acceptable for people preparing to perform acts of worship. Hence, celibacy in the sense of absolute sexual abstinence did not play an important role within clergy of the Catholic Church in very early Christianity, when ministers performed more teaching than liturgical tasks.[5] However, celibacy was more prevalent among the monks, who were strongly active in evangelizing. With the growing number of Christians and the development of a professional clergy, discussions arose about the necessity of celibacy for those now specialized in liturgical tasks.[6] In the dispute within the Catholic Church during its first three centuries, both views were represented. Monks and some members of the priesthood voluntarily followed a celibate life, while the majority of the priests were married. A general legislation was first introduced in 325 on the occasion of the first ecumenical council at Nicea. The law, which forbade priests to marry *after* ordination and forbade any cleric from having a non-relative woman in his household, was not very strict and still allowed priests to be married. The discussions and disputes about the need for a stricter application of celibacy continued during the following centuries. Nevertheless, married clergy became an accepted fact in the Catholic Church, in particular in the western Church. This status did not change before the beginning of the Middle Ages. At the synod of Pavia in 1022, the advocates of priestly celibacy ultimately gained preponderance, and Pope Benedict VIII ordered the priesthood to follow a strictly celibate life. The following development is considered to have provided the main impetus for this reform.

Up to the fifth century, Roman culture dominated in the Catholic Church. The bishops, who lived in the greater cities of the Roman Empire, were the mere administrators of the churches and their properties, which were owned by the Christian communities. After the German invasions and, hence, the increased influence of rural areas and German traditions, a new concept of church ownership evolved. Now, churches were increasingly owned by the person or institution upon whose land they were built, for example, by kings, nobles or church officials in their own name (see Frazee 1972, p. 158). Married bishops could leave the church, with

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[5] For a broad overview about the origins and the history of celibacy see, for instance, Frazee (1972), Partner (1973), Denzler (2002) or Heid (2003).
[6] The requirement for immaculateness probably has its origins in older religions practiced by the Greeks or the Romans. According to the New Testament, the married state was seen as the normal way of life for all Christians. Even when the New Testament concedes unmarried life as a valid alternative, there is basically no compulsive connection between the ministry and celibacy.

all its property as well as the bishopric, to their children. As a result, church property was no longer set aside for the use of the Christian community, but was in danger of being privatized by married clergy. Moreover, this development weakened the central power of the Catholic Church and its pope. Basically, the church was threatened by a diffusion of power and property. The stricter application of celibacy within the Catholic Church was an obvious action to stop this development. In the years after the synod of Pavia, the Catholic Church introduced additional laws which decreed strict penalties against married priests and their families. Celibacy for priests became a general requirement, which did not change during the following centuries.

3 Celibacy as a strategic variable

Today, the threat of property diffusion is less severe than in the Middle Ages. With the evolution of modern states and legal institutions, alternative instruments became available to define and secure property rights related to churches and complementary resources, as the examples of Protestant and other denominations not employing celibacy amply show. But can we conclude that the church should abandon celibacy? Or is it possible that celibacy still has a positive, or even increased, value for the church?

As mentioned above, the Catholic Church has repeatedly deliberated on celibacy and concluded that there still are potential benefits, which make it worthwhile to hold on to this practice. The application of celibacy can be portrayed as the result of a strategic decision. Celibacy is actively chosen by the church in order to maximize a defined objective. But in which way would this strategic variable work? What objective does the Catholic Church pursue with the application of celibacy? Finally, is the application of celibacy still optimal when considering changing structures within a modern society?

Applying economic theories in the fields of religion, sociology, history or politics has become very popular in recent years. Frey (1990) explains the role of economics as a social science and gives a broad overview of the relevant literature. An overview of the literature addressing religious economics in particular is given by Iannaccone (1998). Of course, defining an optimal church's strategy requires the assumption of a rational and self-interestedly acting denomination. A wide range of recent work emphasizes the role of denominations as specialized firms or clubs in the production of religious goods (see also Iannaccone 1998, p. 1482). In this paper, we basically follow the literature that views churches as standard, neoclassical

firms that sell religious goods and services to consumers. The role of clerical profit maximization has been analyzed, for instance, by Stark and Bainbridge (1985), who also emphasized the role of entrepreneurship in the formation of new religions; Finke and Stark (1992) analyzed the role of effective marketing and Ekelund et. al. (1996) analyzed the Catholic Church as a monopoly firm. However, when considering a rational acting denomination, it is difficult to immediately find clear reasons for the application of celibacy. As mentioned in the introduction, a casual economic analysis would suggest reducing the role of celibacy within the church – mainly due to two reasons. First, the application of celibacy reduces the potential pool of priest candidates. Second, given the rather liberal views regarding sexual behavior within modern societies, many people may feel increasingly uncomfortable with the church's rules and orientation, expressed through the celibacy requirement. However, it is useful to apply a more sophisticated analysis to examine why the church still applies celibacy.

In order to define the church's strategic decisions, we need to analyze the consumer's behavior first. When a believer considers participating actively in a denomination, he basically tries to decide if the church's offered religious goods match with his own perception of religious and spiritual needs. For good reasons, one can assume that believers basically have a strong or a weak belief in God and in the existence of an afterlife. This belief in the afterlife is considered to be a crucial element of Christianity[7], having significant influence on the real-life behavior of a believer. Hence, more conservative believers are highly attracted by churches that offer strict rules and guidelines. Since these conservative believers have a greater belief in the existence of an afterlife, following the stricter rules incurs higher utility levels. We analyze more or less conservative believers' willingness to contribute and participate in a church in Section 4.1.

The Catholic Church will consider the choice of its customers and their willingness to contribute when defining its strategy. It is rational to position itself in a way as to address the most valuable consumer segment. However, religions are credence goods that are difficult for customers to evaluate. Believers may need long-term experience with the denomination or they may ask for a credible signal that defines the church's religious orientation. But how can the church send a credible signal to potential customers? In practice, the preaching priests play an important role since they proclaim the word of God in the local communities and since they basically apply the church's rules within the community. As a result, the individual's perception of the church's services is highly dependent on the

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[7] According to a poll in 1995, 96 percent of Americans believe in God, but only 71 percent in the existence of an afterlife (see Iannacone 1998, p. 1471).

character of the church leader (such as a priest, pastor, prayer leader etc.).[8] The role of the church leaders in the production process of religion as a credence good is also emphasized by Gill (2005). Consumers tend to be skeptical about purchasing such goods unless they have a credible signal about the goods' future quality. Suppliers maintain a strong incentive to develop creditworthy reputations – for instance, clergy frequently live austere lives or suffer other sacrifices (e.g., celibacy). The role of celibacy as a mechanism to reveal a strong belief has also been emphasized by Pope Benedict XVI with the following words: "The renunciation of marriage and family is thus to be understood in terms of this vision: I renounce what, humanly speaking, is not only the most normal but also the most important thing. I forego bringing forth further life on the tree of life, and I live in the faith that my land is really God – and so I make it easier for others also to believe that there is a kingdom of heaven. I bear witness to Jesus Christ, to the Gospel, not only with words, but also with this specific mode of existence, and I place my life in this form at His disposal."[9]

In economic terms, the celibate life of a priest is a commitment for a strong belief in God and the afterlife. Only those who honestly believe in the Kingdom of Heaven are able to forego what is considered to be an important element and a pleasure of real life.[10] This view is not new. Celibacy had already been applied successfully by monks in the early years of Christianity. Frazee (1972, p. 155) mentions: "The vast majority of monks were laymen, and the ideals they demonstrated to a Christian population that was given to admiring the life of extreme self-denial, made the clergy look poor by comparison." Hence, celibacy is an important mechanism to signal conservative resources and therefore the overall conservative orientation of the church. In other words, celibacy may be seen as an effective instrument for market positioning. One could object that several conservative denominations exist *without* the application of celibacy. Hence, there may be other rules that supply the same signaling functionality. However, usually such denominations are small and therefore less dependent on the costly production of signals. Instead, they are able to enforce effectively conservative

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[8] People match with churches where ministers signal their preferred values. Finke and Stark (1989) emphasise the role of the clergy in the period 1776 to 1850, when Baptists and Methodists successfully replaced established denominations, such as Episcopalians or Presbyterians, in the U.S. One main reason for this success was due to a better match between their clergy and the people. They had little education, they received little pay, they spoke in the vernacular and they preached from the heart. Hence, Baptists and Methodists issued a signal that indicated a better match with the people's values.

[9] Ratzinger (2004), p. 208.

[10] The role of costly signals in religions has been discussed, for instance, by Sosis and Bressler (2003). They evaluate whether denominations that imposed costlier requirements on their members survived longer than less demanding denominations. Sosis and Bressler define the strictness of the rules imposed by the commune as an indicator of the overall conservativeness of the church. Such rules may be, for instance, related to the consumption of coffee or alcohol, the permitted hairstyle, the family structure or sexual behaviour, notably the application of celibacy.

rules and values within the group. But a higher level of anonymity increases the relevance of a professional priesthood. Hence, the signaling function through celibacy is mainly used in *large* denominations, such as the Roman Catholic Church or Buddhism, due to a lack of alternative signaling devices.

It follows that the role of a strong and credible signal should be of greater importance in competitive religious markets, where people are free to participate in any denomination – since people need information in order to choose between denominations. In fact, celibacy played a more important role in very early Christianity, when monks were evangelizing. The signaling role was less important in the Middle Ages, when the Catholic Church reached almost a monopoly position – then, the role of celibacy was instead justified by the threat of property diffusion. The increased competition between denominations after the Reformation obviously increased the importance of the signaling function again. In this paper, we set up a model that helps to understand the basic mechanisms related to the described signaling function and also related to the optimal positioning decision.

4 The model

In order to analyze celibacy as a resource selection device and its relevance for a church's positioning decision, we set up a game theoretic model. The decision chain of the model consists of three stages: In the *first stage*, the church affects its expected orientation by choosing the frequency of celibacy in the clergy. In the *second stage*, the church's orientation is determined by the priests' self-selection decision. In the *third stage*, the believers perceive the religious orientation of the church and decide on their participation in the church and their voluntary contributions to the church. We solve the model backwards. Hence, Section 4.1 analyzes the individual's participation and contribution decision for a given religious orientation of the church. Section 4.2 analyzes the process for selecting priests. In section 4.3, the church develops its strategy with respect to celibacy frequency.

4.1 Stage three: individuals' participation and contribution decisions

4.1.1 Lifetime and afterlife utility

As in many other religions, a crucial element of Christianity is the existence of an afterlife. The expected afterlife utility is often viewed by individuals as being at

least partially related to their lifetime allocation of time and resources to religious activities. In other words: greater involvement and more contributions to the church during lifetime are expected to increase the probability of salvation and/or rewards in heaven.[11] However, there is uncertainty about the existence of an afterlife. The degree of the individual's uncertainty can be seen as an indicator for the individual's strength of belief in the afterlife and, therefore, in the existence of God in the sense of Christianity. We denote the intensity of this belief in the existence of an *afterlife* by β. Hence, β is the individual's religious orientation – a higher value of β indicates a stronger belief in the existence of an afterlife. We consider heterogeneous people who have different intensities of belief. For obvious reasons, we assume that the number of very strong (fundamentalists) and very weak (hedonists) believers is less than the number of intermediate believers. We assume a single peaked symmetric density function $f(\beta)$, with $\beta \in [0,1]$ and $f(0) = f(1) = 0$. Additionally, we assume that this distribution is exogenously supplied. Hence, the church is not able to change the individual's beliefs, for instance by evangelizing.[12] In order to analyses individuals' religious behavior, we basically follow the idea of Azzi and Ehrenberg (1975), who consider a multiperiod model that allows individuals to optimize their behavior over two periods, the *lifetime* and the *afterlife*.

First, consider an individual's *lifetime utility*. For simplicity, utility from consumption and leisure is normalized to zero. Practicing a religion reduces his individual consumption possibilities since it requires expenditures of time and money. Basically, a believer can make *voluntary contributions c* to the church where the believer is practicing his creed.[13] These contributions consist of donations and involvement, and are measured in terms of money. The creates utility cost $v(c)$, with $v'(c) > 0$, $v''(c) > 0$, and $v'''(c) \geq 0$.[14] Obviously, contributions reduce the individual's opportunities to consume in his life on earth which decreases lifetime utility. We keep income constant and assume that the individual offerings are sufficiently small compared to income as to be able to ignore wealth effects.

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[11] This formulation encompasses the belief of some Christian denominations (such as Calvinism) that salvation is by faith not by works. In that context, a higher contribution to the church signals grace of god..

[12] Of course, we could instead assume that the church is able to influence average belief in the population. However, this would not substantively change the results of the following model. We would expect a more conservative population and, hence, a church that signals an even more conservative orientation by using the celibacy rule.

[13] The individual's contributions may consist of donations or personal involvement in the community of the church. Such involvement may include, for instance, participating actively in the mass, or practicing a liturgical role in the church or freelance.

[14] In the context of risk aversion, Pratt (1964) showed that it is plausible to assume $v''>0$ when $v'>0$.

However, there are also good reasons to assume that an individual may derive direct utility from contributing to a church. Religious activities may have a consumptive character, for instance, due to social involvement, entertainment or just good feelings. The assumption is appropriate and supported by empirical data. As shown by Heineck (2001), who analyses data from Germany, religious participation is positively correlated with denominational affiliation. To capture this idea, we introduce a *preference matching parameter* $\gamma > 0$, which enters the utility cost multiplicatively as $\gamma \cdot v(c)$. We assume the individual disutility from contributing to a specific church to depend on the matching of the individual's own belief with the church's *perceived religious orientation* $\hat{\beta}$.[15] The individual disutility from contributing is non-decreasing in the distance of the personal belief from the church's perceived religious orientation. We employ a very simple specification of the distance function with $\bar{\gamma} > 1$:

$$\gamma(\beta) = \begin{cases} 1 \; if \; \left| \hat{\beta} - \beta \right| \leq \alpha \\ \\ \bar{\gamma} \; if \; \left| \hat{\beta} - \beta \right| > \alpha \end{cases} \qquad (1)$$

where α is exogenously given and describes the relevant matching range. In this range, people feel comfortable with the church's orientation – their disutility from contributing remains constant at a low level. At a greater distance from the relevant $\hat{\beta}$, people do not feel comfortable with the church's orientation. Hence, the disutility from specific contributions to this church is high. Note that assuming a more general matching function where $\gamma(\beta)$ is continuous in β, $\gamma''(\beta) > 0$ and $\operatorname{argmin} \gamma(\beta) = \hat{\beta}$ would not change our qualitative results.

Now, we turn to the *afterlife utility*. Following the doctrine of the Catholic Church, there exist a good and a bad state in the afterlife: going to *heaven* or burning in *hellfire*. However, the probability of being in heaven in the afterlife and enjoying the fruits of paradise is not exogenously given. Rather, believers are able and willing to influence the probability by practicing religion in their real life. As a result, voluntary contributions c will increase the probability of receiving salvation. We define the probability of joining paradise in the afterlife as $p(c)$ and the probability of being in hell as $1 - p(c)$, where $p'(c) > 0, p''(c) < 0$ and

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[15] Hence, $\hat{\beta}$ can be seen as an indicator for the strictness, i.e., conservativeness, of the rules imposed by the church (position on the spectrum of liberal vs. conservative). The detailed determination of the perceived orientation is discussed in section 4.2.

$p'''(c) \geq 0$. The utility of being in heaven in the afterlife is given by $H > 0$, and the utility of being in hell is normalized to zero. Adding the individuals' belief about the existence of an afterlife, we write the expected utility from afterlife as follows:

$$\beta \cdot \left[p(c) \cdot H + (1 - p(c)) \cdot 0 \right] \qquad (2)$$

After defining the real life utility and the afterlife utility we can define the individual's overall utility $V(c)$:

$$V(c) = -\gamma v(c) + \beta \cdot p(c) \cdot H \qquad (3)$$

Finally, we make the following assumption on the exogenous parameters

Assumption 1 $\bar{\gamma} > \beta \cdot p'(0)H / v'(0) > 1$

This assumption guarantees that we have a well-defined problem, specifically, that individuals within the matching range are willing to contribute a positive amount.

4.1.2 Believer's contribution decision

We firstly analyze the believer's contribution decision for a given religious orientation $\hat{\beta}$ of the Catholic Church. We have to distinguish two cases. In a first case, $\gamma = \bar{\gamma}$ people have a low matching with the perceived religious orientation of the church. In this case, disutility from contributing to this church tends to be high. If $\gamma = \bar{\gamma}$ and $\left| \hat{\beta} - \beta \right| > \left| \hat{\beta} - \alpha \right|$, the first-order condition is written as follows:

$$\left. \frac{\partial V}{\partial c} \right|_{c=0} = -\bar{\gamma} \cdot v'(0) + \beta \cdot p'(0) \cdot H < 0, \qquad (4)$$

where the negative sign follows from assumption 1. Since it is negative, it is optimal for an individual to reduce c to a level of zero. People with a low match with the Catholic Church are obviously not willing to contribute voluntarily.

Let us turn to the case where $\gamma = 1$. These people have lower disutility from contributing to the church – for instance, due to a consumptive characteristic of the respective activity. The relevant first order condition is written as follows:

$$\frac{\partial V}{\partial c} = -v'(c*) + \beta \cdot p'(c*) \cdot H = 0 \qquad (5)$$

Given that a believer is an active member of the church, he maximizes V for given levels of $\hat{\beta}$ and his own belief β. The optimal contributions are a function of β: $c* = c*(\beta) > 0$. The second-order condition is negative in the optimum and is given by: $-v''(.) + \beta \cdot p''(.)H < 0$. Assuming that an individual is willing to contribute, he derives utility $V(c*)$. Using the total differential from (5), we analyze how different believers' contributions vary in β:

$$\frac{dc*}{d\beta} = -\frac{p'(.)\cdot H}{-v''(.) + \beta \cdot p''(.)H} > 0 \qquad (6)$$

People with a stronger belief in salvation are also willing to contribute more to their church. In fact, this result is not surprising and is supported by several studies.[16] Iannaccone (1998, p. 1472) mentions that "virtually every measure of religious involvement or commitment – beliefs, attendance, and contributions – correlates positively with the denomination's overall level of conservatism or strictness".

The last step in deriving the aggregate contribution function is to sum up the individual contributions over the relevant population range $\left[\hat{\beta} - \alpha, \hat{\beta} + \alpha\right]$:

$$\Gamma(\hat{\beta}) = \int_{\hat{\beta}-\alpha}^{\hat{\beta}+\alpha} c*(\beta) f(\beta) d\beta$$

4.2 Stage two: the priests' self-selection decision and the church's perceived orientation

Up to this point, we have not explicitly defined the variable $\hat{\beta}$, which denotes the believers' perceived orientation of the church. However, we know that $\hat{\beta}$ is a signal about the church's strictness, which addresses the degree of belief in the afterlife.

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[16] See, for instance, Hoge et. al. (1993), Hoge and Young (1994) and Iannaccone (1994). Hoge et. al. (1998) show in their empirical analysis that levels of volunteering to support church programs are higher in conservative and evangelical churches, while volunteering for community programs is higher in mainline Protestant churches. Additionally, they show that the value of volunteers to most churches is roughly two-fifths the value of their monetary contributions.

Individuals with higher levels of β ask for more conservative rules, since they offer higher levels of utility in the afterlife. Believers evaluate the church's orientation based on the public appearances of the church's exponents. The perception has two origins. First, if the selection procedure is public and credible, the process itself is a direct signal about the church's conservativeness. Second, the believers directly perceive the church's orientation through their contact with the preaching priests, with or without ordination. However, both channels work in the same way, since they require a credible procedure for selecting priests who have a certain level of conservativeness. Loosely speaking, increasing the number of conservative priests in the clergy increases the believers' perceived strictness of the church. By selecting more conservative priests, the church can signal greater conservativeness and therefore attract believers with higher values of β; selecting more liberal priests allows the church to address believers with a lower value of β. Hence, the believers build an expectation regarding the church's orientation and decide whether they want to contribute, and how much they want to contribute, as derived in section 4.1.

4.2.1 The priests' self-selection decision

Of course, the church recruits its priests from the general population. Hence, recruiting more-conservative priests requires the selection of people with a higher level of β; recruiting less-conservative priests requires the selection of low β-level types. Hence, it is important to study how individuals decide to become priests and how the church selects its priests from that pool of aspirants. In section 4.1, we introduced a typical believer's utility. In this utility function, we denoted c as the individual's contributions to a church. Such contributions can be interpreted as donations, personal involvement and engagement or volunteering. Basically, c describes costs that are related to the religious engagement. Of course, living celibate must also be interpreted as a personal cost. In fact, celibacy can be interpreted as *the main cost* related to the priesthood. According to Verdieck et. al. (1988), who analyzes the role of celibacy in the American priesthood, the cost of celibacy, as measured by the desire to marry, is the principal consideration in determining whether a priest will withdraw or continue in the active ministerial priesthood. This result is supported by several additional studies.[17] Hence, celibacy can be interpreted as an enforced (high) contribution $\bar{c}$. Consequently, an individual who considers becoming a priest has utility as follows:

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[17] See for instance Schoenherr and Greeley (1974) or Fichter (1970).

$$V(\bar{c}) = -v(\bar{c}) + \beta \cdot p(\bar{c}) \cdot H \qquad (7)$$

Equation (7) is written for the relevant case when the individual has a high match with the church, $\gamma = 1$. People with low match optimally contribute zero, so they would never choose celibacy anyway.

But which people are willing to become priests? An individual accepts life within priesthood if he wants to contribute at least $\bar{c}$, $c^*(\beta) \geq \bar{c}$. Hence, there is a value $\bar{\beta}$ with $c^*(\bar{\beta}) = \bar{c}$ where an individual is exactly indifferent at an exogenously given level of $\bar{c}$. The impact of a higher or lower $\bar{c}$ is then easy to grasp. From equation (6) we know that c* is increasing in β. Additionally, we know that the indifferent individual would be willing to bear costs equal to his own voluntary contributions, hence $c^*(\bar{\beta}) = \bar{c}$. It follows that $d\bar{\beta}/d\bar{c} = 1/c^{*\prime}(\bar{\beta}) > 0$. We summarize our discussion in the following proposition.

Proposition 1 The introduction of celibacy implies that only people with a sufficiently high level of belief in afterlife $\beta \geq \bar{\beta}$ would be willing to become a priest. Strengthening the celibacy requirement $\bar{c}$ raises $\bar{\beta}$ even further.

Proof: See above.

The result is intuitive: only people with a strong belief in the afterlife are willing to bear the costs of living celibate. Note that $\bar{c}$ is defined as the minimum contribution level to become a priestly candidate. Very conservative priests contribute even more (e.g., by living an even more austere life). Individuals with β larger than $\bar{\beta}$ voluntarily contribute more than $\bar{c}$. However this is not observable and therefore not relevant for the church's signaling of conservativeness.[18]

4.2.2 Derivation of the church's perceived orientation

Of course, the church cannot apply a stronger or weaker celibacy requirement on its priests at an individual level. However, it can decide the extent to which

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[18] Of course, not *every* individual with $\beta \geq \bar{\beta}$ will become a priest. There may be additional individual issues that influence the personal decision, such as alternative job offers. Additionally, the church may apply additional selection mechanisms such as the requirement of theology study.

celibacy is applied to the pool of its human resources. Basically, the church can increase or reduce the share *s* of employees with ordination, or the share (1-*s*) of employees without ordination. In the latter case, an increasing number of activities such as pastoral care, spiritual guidance or teaching Sunday school for children could be carried out by deaconswithout ordination. In order to ease the analysis, we assume that the Catholic Church needs a constant number of employees, priests with or without ordination. Additionally, we assume that the number of priests is very low compared to the entire population. Hence, the distribution of believers is equal in the three stages of our model. As mentioned above, the perceived orientation of the church is due to the perceived conservativeness β of the priesthood. It follows that the perceived orientation of the church's conservativeness $\hat{\beta}$ amounts to the average conservativeness of the priesthood. The share (1-s) of pastors and other employees without ordination is expected to have an average religious orientation, which coincides with the overall conservativeness within the population, since celibacy as a selection rule is not applied. The share s of priests with ordination has a higher conservativeness, since it is drawn from the portion of the population with $\beta \geq \overline{\beta}$.

In practice, this selection process is not expected to be perfect. It is plausible to assume that there exists a fraction $(1-\theta)$ in the population that does not have any costs from living celibate. For instance, homosexual people are expected to have significantly lower levels of disutility from being unmarried and not having children.[19] We develop this argument further. Celibacy leads to lower enforced contributions $\underline{c} < \overline{c}$ for these people, so we normalize $\underline{c} = 0$. Of course, the selection condition does not work for these candidates. The normalization implies that these priests do not have to bear any costs from being a priest who lives celibate.[20] Basically, these people may have a higher or a lower β – just as represented by the average individual in the population. The expected orientation revealed by $(1-\theta)$-type priests is:

$$E(\beta) = \int_0^1 \beta \, f(\beta) \, d\beta = 0.5 \qquad (8)$$

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[19] In fact, in their data, Verdieck et. al. (1988, p. 532) find a tendency towards reduced disutility due to celibacy in recent years. They conclude that this finding may also be a result of the supposed increase in homosexuality among the clergy. We consider this argument.

[20] To simplify, we do not consider any additional personal costs from efforts related to the job. Basically, such effort is compensated by a salary. Without loss of generality, we do not consider effort costs or wages in our model explicitly. Of course, we apply this assumption to priests with a high and a low c.

We define the expected religious orientation of priests with ordination as

$$E(\beta|o) \equiv \frac{\theta(1-F(\bar{\beta}))}{\theta(1-F(\bar{\beta}))+1-\theta}E(\beta|\beta \geq \bar{\beta}) + \frac{1-\theta}{\theta(1-F(\bar{\beta}))+1-\theta}E(\beta) > 0.5$$

and the expected religious orientation of pastors without ordination as $E(\beta) = 0.5$. Now, we are able to define the overall orientation of the church by considering the religious orientation of its human resources. The overall expected orientation of the church becomes:

$$\hat{\beta} = s\left[\frac{\theta(1-F(\bar{\beta}))}{\theta(1-F(\bar{\beta}))+1-\theta}E(\beta|\beta \geq \bar{\beta}) + \frac{1-\theta}{\theta(1-F(\bar{\beta}))+1-\theta}E(\beta)\right] + (1-s)E(\beta) \qquad (9)$$

Equation (9) takes into account the inability of the church to differentiate between θ-type and $(1-\theta)$-type people in its priest aspirant pool. Hence, the ordained clergy consists of the share $\theta(1-F(\bar{\beta}))/(\theta(1-F(\bar{\beta}))+(1-\theta))$ of θ-type priests and the share $(1-\theta)/(\theta(1-F(\bar{\beta}))+(1-\theta))$ of $(1-\theta)$-type priests. Obviously, the perceived orientation of the church is increasing in the share s of priests with ordination because the average pool of priests becomes more conservative: $\partial\hat{\beta}/\partial s = E(\beta|o) - 0.5 > 0$.

4.3 Stage one: the church's optimal celibacy strategy

Now, we can go back to stage 1 of our model, where the church determines the frequency of celibacy in its human resources. Hence, we define the church's objective function and the consequences for its positioning decision. The rationally acting church maximizes its believers' contributions. Therefore, we can write the Catholic Church's objective function as follows:

$$\Pi(s) = \int_{\hat{\beta}(s)-\alpha}^{\hat{\beta}(s)+\alpha} c*(\beta)f(\beta)d\beta - F \qquad (10),$$

where F denotes fixed costs for the human resources and the real capital. [21] Using Leibniz's Rule, we derive the first-order condition for the share of priests with ordination in the Catholic Church:

$$\frac{\partial \Pi}{\partial s} = \frac{\partial \hat{\beta}}{\partial s}\left[c*(\hat{\beta}(s)+\alpha)\cdot f(\hat{\beta}(s)+\alpha) - c*(\hat{\beta}(s)-\alpha)\cdot f(\hat{\beta}(s)-\alpha)\right] = 0 \qquad (11)$$

where $\partial \hat{\beta}/\partial s > 0$ from above. We can rewrite as:

$$\frac{c*(\hat{\beta}+\alpha)}{c*(\hat{\beta}-\alpha)} = \frac{f(\hat{\beta}-\alpha)}{f(\hat{\beta}+\alpha)} \qquad (12)$$

This is intuitive. In order to maximize its objective function, the church equalizes marginal benefits from the upper and the lower bound of its believers. In other words: the group of most conservative members contributes as much as the group of most liberal members.

Proposition 2 (i) The optimal position of the church is from the right wing of the population, $\hat{\beta}* > 0.5$. (ii) The optimal position can only be achieved at a positive level of celibacy frequency, $s* > 0$.

Proof: The first result follows directly from previous sections. Consider $\hat{\beta}*$ exactly at the peak of the distribution, where $\hat{\beta}* = 0.5$. Due to the symmetry of $f(\beta)$, it follows that $f(\beta + \alpha) = f(\beta - \alpha)$. From (6) we know that believers with a higher value of β have a higher willingness to contribute. Hence, expression (12) becomes $c*(\hat{\beta}+\alpha)/c*(\hat{\beta}-\alpha) > 1$. The net marginal benefit at the $\hat{\beta}*+\alpha$ boundary is higher than at the $\hat{\beta}*-\alpha$ boundary from the church's member range. Hence, it would be optimal to move to the right.

The second result follows immediately from the definition of the church's perceived orientation (9). Suppose $s* = 0$; then (9) becomes $\hat{\beta}* = E(\beta) = 0.5$ and cannot be optimal. It follows from $ds/d\hat{\beta} > 0$ that the celibacy frequency must be positive at the optimum, hence $s* > 0$.

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[21] Since in our model the total number of employees is fixed and we do not assume any wage differentials between priests with or without ordination, the church's costs are constant at a level F. Additionally, we do not have to consider any marginal costs from applying the celibacy rule. Basically, the application of such a rule can be seen as costless for the church – the relevant cost c instead occurs on an individual level.

Figure 1

Figure 1 depicts the optimal celibacy choice. Panel a. shows the monotonic relationship between contribution c^* and belief in afterlife β. Combined with the density function, panel c. shows that the optimal position of the church $\hat{\beta}^*$ lies to the right of the median. At the optimum, total contributions Π are given by the shaded area.

Not using the celibacy rule would imply that the church is *not able* to communicate a level of conservativeness which is higher than average conservativeness in the population – since the church recruits its resources from the entire range of the population. Moreover, not applying celibacy at all hinders the Catholic Church from skimming the highest aggregated willingness to contribute. This result implies that it is useful for the Catholic Church to impose at least some positive level of s.

The model shows the limits of celibacy as a signaling device. Basically, for a large denomination such as the Catholic Church, it is difficult to signal very high levels of conservativeness. If $s = 1$, (9) becomes

$$\hat{\beta}(1) = \frac{\theta(1 - F(\overline{\beta}))}{\theta(1 - F(\overline{\beta})) + 1 - \theta} E(\beta | \beta \geq \overline{\beta}) + \frac{1 - \theta}{\theta(1 - F(\overline{\beta})) + 1 - \theta} E(\beta) > 0.5$$

The church can reach a maximum perceived orientation $\hat{\beta}(1)$ which is smaller than 1. In fact, there are very small denominations, such as sects, that are able to signal such highly-valued orientations through direct social interaction and control rather than through the signaling function of their resources.

5 Discussion

5.1 The lack of priests

In our analysis above, we assumed that the Catholic Church needs a constant number of priests (for instance, N) in its production function. Since this amount is very small compared to the whole population, it should not be difficult to hire enough employees who are willing to work for the Catholic Church. In fact, for a long time, the church did not face resource problems. However, in recent years, the

Roman Catholic Church has faced problems in hiring young priests who are willing to live celibate in many developed western countries.

This issue can be explained in two ways. First, the number of potential priests who have a sufficient high level of β may have decreased during the past few centuries. As a result, the population share $1 - F(\bar{\beta})$ would decrease. However, statistics do not support the assumption of an overall reduced belief in the afterlife. Presumably, $1 - F(\bar{\beta})$ did not significantly change during recent centuries.

As an alternative, it is useful to consider that $\bar{c}$ changed. $\bar{c}$ can be interpreted as opportunity costs. Today, not living with a family, not having sex and not having children may impose higher costs than in former times. Greater wealth, higher consumption levels, social security and day-nurseries have made the family life relatively more attractive than, for instance, in the Middle Ages. Hence, $\bar{c}$ may have increased during the last years. As a result, $\bar{\beta}$ increases since $\left(d\bar{\beta}/d\bar{c} \right) > 0$. Again, it is more difficult to hire priests who are willing to live celibate. Moreover, if the Catholic Church still hires (s N) priests with ordination, an increasing proportion of priests is of type $(1-\theta)$, which reduces the overall perceived conservativeness of the church. This result occurs because the pool of θ-type priest candidates decreases while the pool of $(1-\theta)$-type candidates increases. This result is supported by the empirical analysis of Verdieck et. al. (1988, p. 532), who assessed a tendency towards reduced personal costs due to celibacy in recent years amongst the American Catholic clergy. The reduced disutility occurring from celibacy may be an indicator for the increased share of $(1-\theta)$-type priests. In practice, this increased share may be a result of the increased $\bar{c}$.

But what is the consequence for the church's optimal celibacy strategy? To analyze this, we must determine the net effect of an increased celibacy requirement $\bar{c}$ on the church's orientation. Using (9) we get

$$\frac{d\hat{\beta}}{d\bar{c}} = \frac{d\hat{\beta}}{d\bar{\beta}}\frac{d\bar{\beta}}{d\bar{c}} = \theta f(\bar{\beta})\left[\theta(1 - F(\bar{\beta}))\left\{E\left[\beta|\beta \geq \bar{\beta}\right] - \bar{\beta}\right\} + (1-\theta)\left\{0.5 - \bar{\beta}\right\}\right]\frac{d\bar{\beta}}{d\bar{c}} \quad . \quad (14)$$

Interestingly, the net effect is ambiguous. The term in square brackets in equation (14) is positive only as long as $\bar{\beta} > E(\beta|o)$. If the minimal belief of the ordinated θ-type priests $\bar{\beta}$ is higher than the average belief of the ordinated priests $E(\beta|o)$, an increase in $\bar{\beta}$ leads to a decrease in $E(\beta|o)$. Instead, if $\bar{\beta}$ is lower than the

perceived orientation $\bar{\beta} > E(\beta|o)$, a change in $\bar{\beta}$ increases the perceived orientation. The reason lies in the fact that a change in $\bar{\beta}$ has two opposing effects. There is a direct effect: a higher $\bar{\beta}$ increases the average belief of the θ-type ordinated clergy $E(\beta|\beta \geq \bar{\beta})$. On the other hand, an increase in $\bar{\beta}$ worsens the selection process: the share of $(1-\theta)$-type priests rises. This effect reduces the expected conservative orientation $E(\beta|o)$ of the church. Which effect dominates depends on the size of $\bar{\beta}$. At very high levels of $\bar{c}$ or $\bar{\beta}$, when θ, the share of priests having high costs of celibacy, is low, the second effect may dominate. In that case, in order to keep $\hat{\beta}*$ constant, the church has to increase the frequency of celibacy s. On the other hand, at lower levels of $\bar{c}$ or $\bar{\beta}$, the share of θ-type priests in the ordained clergy is relatively high, hence the effect from the increased conservativeness of θ-type priests dominates. Here, the church would have to reduce the frequency of celibacy s for $\hat{\beta}*$ to remain constant.

Of course, the high level of $\bar{c}$ may be a temporary phenomenon. In times of recession, for instance, $\bar{c}$ may be decreasing. Additionally, it is useful to assume that $\bar{c}$ varies between the regions, i.e., continents. If $\bar{c}$ is extremely high, the practice already employed by the Catholic Church of hiring the required priests from other regions and continents of the world, where the personal costs of celibacy remain significantly lower, is a superior strategy for securing $\hat{\beta}*$.

5.2 The impacts of increased income and greater aging

A wide range of changes within society affect religious behavior and therefore the Catholic Church's optimal strategy. We now consider some of these changes and their implications for the church's strategy within our model. In practice, social changes may be related to income per capita, education or the population's age structure. To study this question, assume that the preference matching parameter within the matching range takes the value $\underline{\gamma}$ instead of 1. First, we consider income per capita and education. It is useful to consider both, since they are expected to correlate positively. Higher education and therefore higher income tend to reduce the individual's religious activities: higher religious involvement causes higher opportunity costs. However, there is also an income effect: at higher income levels, disutility from financial donations decreases. In our model, the first effect

may increase $\underline{\gamma}$, while the second reduces $\underline{\gamma}$. Obviously, higher wage levels reduce time-intensive volunteering and church attendance (opportunity cost effect) but increase donations (positive income effect). Prima facie, it is not clear which effect dominates. Since c consists of both, donations and volunteering, i.e., church attendance, it is not obvious if income increases or reduces an individual's c. Iannaccone (1998, p. 1470) gives a broad survey of studies that consider education, income and religious contributions. According to most empirical studies, religious contributions tend *not* to decline with income and education. Education tends to be a weak but positive indicator of religious participation. Income is a strong and positive indicator of religious contributions, but a weak predictor of other measures of religious activity such as church attendance. Azzi and Ehrenberg (1975) mention that at higher wages we would expect individuals to shift towards less time-intensive forms of religious activities. In other words: higher levels of income reduce time-intensive participation, such as church attendance, but increase alternative contributions such as donations.[22] According to the empirical results, the first effect tends to dominate: higher levels of education and income reduce $\underline{\gamma}$ and increase the individual's c. However, it is not obvious whether a lower level of $\underline{\gamma}$ has a greater effect in increasing the willingness to contribute at the lower or at the upper end of the church's membership. Using equation (6) we can show[23]:

$$\frac{\partial}{\partial \underline{\gamma}}\left(\frac{dc*}{d\beta}\right) = \frac{v''(c*)V''(c*) - v'(c*)V'''(c*)}{\left[V''(c*)\right]^2}\frac{dc*}{d\beta} < 0 \quad (15)$$

A decrease in the utility cost of donating, lower $\underline{\gamma}$, leads to a greater increase in willingness to contribute at the upper end of the α-range. In other words, it is more attractive to address the more conservative believers. This underlines the usefulness of enhancing the role of celibacy amongst the clergy.

A further social change concerns population aging. Many developed countries face this problem. How should the Catholic Church react to this evolution? There is some evidence that older people have a stronger interest in religion. Klick and Levy (2001), for instance, show that many Catholics increase their engagement, especially their contributions, in twilight years, when facing a relatively high likelihood of death. Hence, the reason for the additional

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[22] In fact, theologically conservative denominations draw a disproportionate share of their members from among the poorer and less educated members of society (see Iannaccone 1998, p. 1470).
[23] Note that $V'''(c*) \geq 0$ due to our assumptions on the $v(.)$ and $p(.)$ functions.

contributions is not a reduced level of real life disutility from c, but rather it is based on a greater awareness of the afterlife utility. We can introduce this issue by increasing the average β, namely, by shifting the β distribution's peak to the right hand side. The strategic relevance for the Catholic Church is obvious. Now, it is optimal to increase s in order to meet the changed demand structure.

5.3 Changed moral standards regarding homosexuality

Homosexuality is also present amongst members of the Catholic Church and therefore amongst the Catholic priesthood. Some studies estimate the share of homosexual priests at up to 25 percent (see for instance Mueller 1987 or VSSS 1999), which tends to be above the average share of homosexual men within the population. These estimates coincide with the basic results of our model. Within the pool of candidates, the share of people with a low level of costs from celibacy is disproportionately high. Each $(1-\theta)$-type individual may decide to become a priest, since celibacy does not impose any personal costs, $\underline{c} = 0$. However, only a fraction of θ-type individuals will potentially become a priest, since $\bar{c} > 0$ requires $\beta \geq \overline{\beta}$. In our model, celibacy does not sort out homosexual candidates. As a result, a higher fraction of $(1-\theta)$-type individuals within the pool of priest candidates reduces the perceived conservative orientation of the church (see equation 9).

For a long time, homosexuality was seen as abnormal. In many Christian societies, homosexual couples suffer from proscription and social segregation. However, in most liberal societies, homosexuality has become significantly more acceptable in the last few years. Changed moral standards have also influenced legislation. In many European Countries such as Germany or Switzerland, the current partnership law allows for marriage between homosexual couples. But what are the consequences to the composition of the priesthood? It could be the case that the increased acceptability in society also increases the share of homosexual priests within the church. Under these circumstances, the church may compensate for the loss of conservativeness by increasing the share s of priests with ordination (see equation 12). However, there is no serious evidence that the *share* $(1-\theta)$ of homosexuals within the population has increased in the last few centuries. Rather, an increasing share of people now *admit* to being homosexual, due to the greater acceptance. Hence, in our model, $(1-\theta)$ did not necessarily change. Instead, the changed moral standards may have changed the individual costs of living celibate. Today, homosexual people also suffer from not living in an

open relationship and not being married. Therefore, the celibacy rule increasingly imposes opportunity costs for $(1-\theta)$-type individuals as well. In our model: $0 < \underline{c} \leq \bar{c}$. The impact on the pool of priest aspirants is reversed: the higher opportunity costs for the whole range of aspirants increases the average conservativeness of the priesthood.

5.4 Why isn't celibacy a superior strategy for other denominations?

We saw in section 4 that the abolishment of the celibacy rule is unfavorable for the Catholic Church. However, being a superior strategy for the Catholic Church, it could also be useful for other denominations. Similarly, they may have an interest in hiring employees with relatively strong beliefs in order to attract the more conservative clientele. Hence, such denominations may compete directly with the Catholic Church.

To analyze this case, consider the following extension of our model: Assume that there are two denominations, instead of one. If the contribution spaces of the two denominations overlap, each Church may invest in "marketing" activities. The Catholic Church is the first mover. It is the Stackelberg leader since the Catholic Church is a relatively older denomination (e.g., compared to the Protestants). In that case, churches need to consider the relevant strategic interactions when applying celibacy or not. What does the equilibrium look like? Assume that the Catholics chooses to maintain celibacy, i.e., an orientation $\hat{\beta}^*$ to the right of the median. In that case, a larger fraction of people are to the left of $\hat{\beta}^* - \alpha$ than to the right of $\hat{\beta}^* + \alpha$. Hence, it is likely that the second denomination enters to the left[24] (although this depends on the exact parameters, of course). In particular, the late entrant will be deterred from choosing its position such that the potential contributors overlap because the profits from these believers would be small, for two reasons: they would share the market, and marketing activities would decrease profits further. If the contributors do not overlap, however, the Catholics' choice of $\hat{\beta}^*$ in the first place is indeed an equilibrium, as this is contribution-maximizing with only one player.

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[24] Our argument holds for the present time. Arguably, some early Protestants were doctrinally more conservative than Catholics. They believed that they were merely returning to the early practices of the Church, and that they were therefore being more pure (conservative) than the corrupted Catholic Church.

However, there are additional reasons that hinder other denominations from imitating the Catholic Church's celibacy rule. First, as argued above in section 3, many denominations are small (or very locally organized) and are less dependent on the costly production of signals through their priesthood. Instead, these denominations are able to enforce conservative rules and values (such as no sex before marriage) within the group. Social interactions and the possibility of controlling each other may be an efficient alternative to a costly signal through the priests.[25] Often, these conservative denominations do not have any professional ministers. Instead, each member of the community can preach and execute liturgical acts. As a result, each member of the group is a bearer of the signal. In practice, such a niche strategy may allow small denominations to attract even more conservative clientele. However, a higher level of anonymity increases the role of a professional priesthood. Obviously, the role of the ministers and their signaling function is mainly relevant in large denominations that work like franchising systems, such as the Roman Catholic Church, the orthodox parts of the Catholic Church (where celibacy is applied at least to the bishops) or the Buddhist Church, where in fact the celibate life of representatives is of great relevance. However, when considering these denominations, the above-mentioned strategic interactions are not of great importance, since they are strongly differentiated with regard to contents and/or geography.

Second, since the role of the priesthood is defined heterogeneously within denominations, the efficiency of celibacy may vary significantly. There are obvious reasons to assume a relatively important role for the priests within the Catholic Church, which claims to be the owner of the "key" to the Kingdom of Heaven. In fact, the ninth catechism defines faith as an ecclesiastical act: Nobody can enjoy God as a father without accepting the church as a mother (see Schmidtchen 1997, p. 8). The priest then has the strong position of an agent of God, who acts as a kind of broker between God and the people. Due to their strong position within the denomination, priests are an important bearer of the relevant signal about the church's conservative orientation. Of course, this strengthens the efficiency of the celibacy rule. In contrast, the Protestants explicitly abolished the role of the Church and its priests as a necessary key for salvation. The weakening of the church's position and its representatives was a main element of the Reformation.

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[25] The relevance of signalling in a very conservative religious environment has been exposed by Bermann (2000). He analyses Yeshiva attendance, which signals commitment to the community of Ultra-Orthodox Jews. Higher Yeshiva attendance reduces an individual's opportunity to earn monetary income, but it increases the opportunity to consume services (such as insurance) offered by the community. Bermann uses a club good approach. Of course, such an approach is of high relevance in smaller denominations with intensive social interactions. Our model does not follow the literature regarding the club good approach, since we focus on a large and international church.

Hence, the way to God does not require the mother church. In that approach, priests are coaches instead of brokers. Then, the application of the celibacy rule would be an inefficient instrument for the Protestant churches. Of course the Protestant churches may increase the efficiency of celibacy by increasing the relevance of their priesthoods. However, that would require fundamental changes in the church's' orientation, which would be costly, undermine credibility and dilute their main differentiator with the Catholic Church.

6 Summary and conclusions

Applying the requirement of celibacy to a higher or to a lower share of its employees, the church is able to signal an increasing or a decreasing conservative orientation and thus address people with a stronger or a less strong belief in God and the afterlife. More conservative Christians, who have a strong belief in the afterlife, tend to contribute more to a denomination that matches their belief, since voluntary contributions in the real life are supposed to increase the probability of salvation or rewards in afterlife. On the other hand, more hedonistic Christians, lacking a strong belief in salvation, will not only adhere to less conservative denominations, but also contribute less on average.

Without applying celibacy to a positive share of its employees, the church would not be able to address the "high value" group of conservative Christians at all. Only by requiring a celibate life from a significant part of its human resources will a large church be able to signal credibly a level of conservativeness that is higher than the average conservativeness in the population. However, our analysis clearly shows that the Catholic Church has no incentives to take an extremely conservative position. The Church would not maximize contributions by trying to attract the most conservative believers with the highest willingness to contribute. Since high-β believers are rare, the church faces a tradeoff between the number of contributing believers and the magnitude of individual contributions.

An important issue in the public debate on celibacy is the apparent lack of priest aspirants in some of the more developed western countries. Perhaps family life is nowadays perceived as more attractive in these countries due to higher wealth, social security, etc. The personal costs of celibacy imposed as a forced contribution on the individual priest have increased. Since $\overline{\beta}$ (the level of belief necessary to compensate for these higher costs) also increases, it will be more difficult to recruit θ-candidates willing to live celibate. If the church continues to

hire the same number of priests with ordination, the fraction of candidates within the priesthood that do not face high costs when not marrying and having their own children, e.g., homosexuals, rises. When answering the question of how the increased personal costs of celibacy might affect the perceived conservativeness of the church, two effects have to be accounted for. On the one hand, highly conservative candidates enter the priesthood since a very strong belief is suitable to offset the high costs of celibacy. On the other hand, the fraction of candidates who bear little or no costs from celibacy and who therefore do not require high levels of belief to compensate for these costs increases. Both effects may be dominating – depending on the initial level of $\bar{\beta}$.

Moreover, our analysis reveals that social changes leading to increased income, higher levels of education and an aging population, as for instance occurred in many Western European countries, do not require a more liberal orientation of the church, as casual wisdom might suggest. On the contrary, a more conservative orientation of the Catholic Church is rational in order to maximize contributions. In aging societies, a greater fraction of the population is in its twilight years when the awareness of afterlife utility increases. The shift of the β-distribution's peak to the right implies the employment of a higher fraction of priests with ordination and in no case the abolishment of celibacy, as is sometimes conjectured. The same follows from higher income and education levels, which turn out to more strongly increase willingness to contribute among more conservative believers.

Finally, we explored an interesting development stemming from changed moral standards regarding homosexuality. Due to the greater acceptance of homosexuality in western societies, reflected in the newly created legal possibilities of marriage and parenthood, homosexual people face higher opportunity costs from living celibate than ever before. Therefore, priesthood becomes less attractive to homosexual people without a strong belief in God and an afterlife. Presumably, the fraction of $(1-\theta)$-candidates who were not selected by the celibacy rule will decrease within priesthood when a more liberal society takes an open attitude towards homosexuality. As a result of this development, the perceived conservativeness of the Catholic Church will increase at a constant level of s.

As to the initial question, sometimes so fiercely discussed in the media, of whether celibacy should be abolished or not, our analysis strongly supports the statement of Pope Benedict XVI, that "…the Church should not believe that she

will easily gain much by resorting to this uncoupling; rather in any case she will lose if she does so."[26]
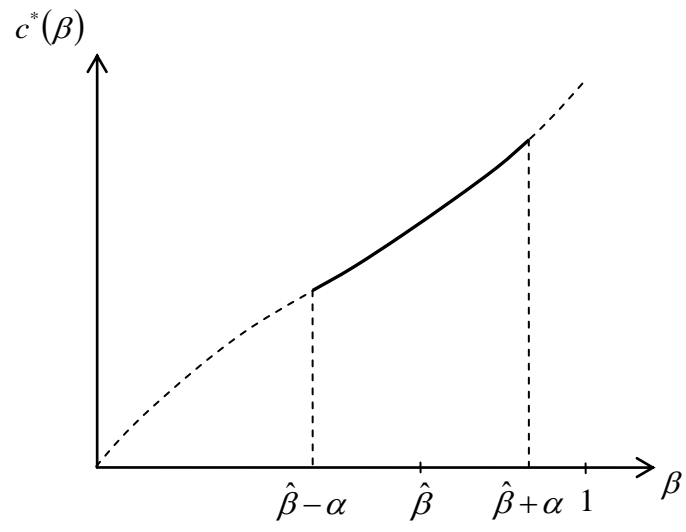
[26] Ratzinger (2004), p. 213.

References

Azzi, Corry; Ronald Ehrenberg: Household Allocation of Time and Church Attendance; *The Journal of Political Economy*, Vol. 83, No. 1, February 1975, 27-56.

Berman, Eli: Sect, Subsidy, and Sacrifice: An Economist's View of Ultra-Orthodox Jews; *Quarterly Journal of Economics*, Vol. 115, Issue 3, August 2000, 905 – 953.

Denzler, Georg: *Die Geschichte des Zölibats*. Herder, Freiburg 2002.

Ekelund, Robert B. Et al.: *Scared Trust: The Medieval Church as an Economic Firm*; New York: Oxford U. Press, 1996.

Fichter, Joseph H.: Catholic Church Professionals; *Annals of the American Academy of Political and Social Science*, Vol. 387, The Sixties: Radical Change in American Religion, January 1970, 77-85.

Finke, Roger; Stark, Rodney: How the Upstart Sects Won America: 1776-1850; *Journal for the Scientific Study of Religion*, Vol. 28, No. 1, March 1989, 27-44.

Finke, Roger; Stark, Rodney: Religious Economies and Scared Canopies: Religious Mobilization in American Cities, 1906; *American Sociological Review*, 53:1, 41-49, 1988.

Finke, Roger; Stark, Rodney: *The Churching of America, 1776-1900: Winners and Losers in Our Religious Economy*; New Brunswick, NJ: Rutgers U. Press, 1992.

Frazee, Charles A.: The Origins of Clerical Celibacy in the Western Church; *Church History*, Vol. 41, No. 2, June 1972, 149-167.

Frey, Bruno S.: *Ökonomie ist Sozialwissenschaft; Die Anwendung der Ökonomie auf neue Gebiete*, Verlag Wahlen, München, 1990.

Gill, Anthony: *The Political Origins of Religious Liberty: Initial Sketch of a General Theory*, faculty.washington.edu, working paper, Washington, 2005.

Hamberg, Eva M.; Pettersson, Thorleif: The Religious Market: Denominational Competition and Religious Participation in Contemporary Sweden; *Journal for the Scientific Study of Religion*, 33:3, 1994, 205-216.

Heid, Stefan: *Zölibat in der frühen Kirche*, Schöningh 2003.

Heineck, Guido: *The determinants of church attendance and religious human capital in Germany: Evidence from panel data*; Discussion Paper No. 263, University of Bamberg, Berlin, October 2001.

Hoge, Dean R.; Johnson, Benton; Luidens, Donald A.: Determinants of Church Involvement of Young Adults Who Grew up in Presbyterian Churches; *Journal for the Scientific Study of Religion*, Vol. 32, No. 3, September 1993, 242-255.

Hoge, Dean R.; Yang, Fenggang: Determinants of Religious Giving in American Denominations: Data from Two Nationwide Surveys, Review. Of Religious. Research 36, December 1994, 123-148.
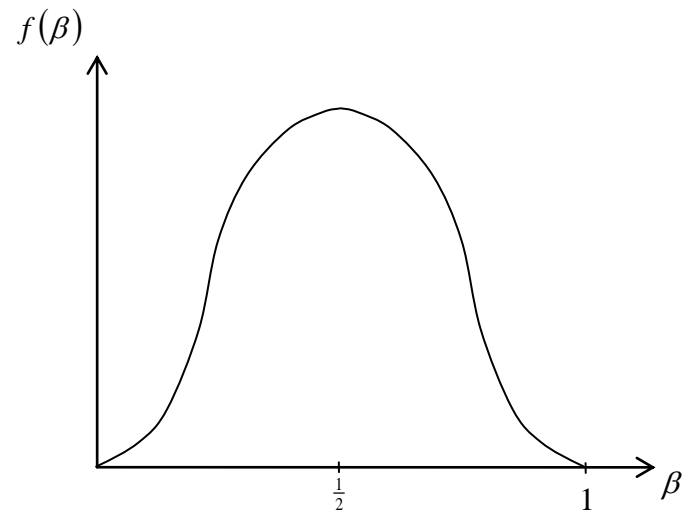
Hoge, Dean R.; Zech, Charles; McNamara Patrick; Donahue, Michael J.: The Value of Volunteers as Resources for Congregations; Journal fo the Scientific Study of Religion, Vol. 37, No. 3, September 1998, 470-480.

Iannaccone, Laurence R.: Intorduction to the Economics of Religion; *Journal of Economic Literature*, Vol. XXXVI, September 1998, 1465-1496.

Iannaccone, Laurence R.: The consequences of Religious Market Structure: Adam Smith and the Economics of Religion, *Rationality and Society*, 3:2, 1991, 156-177.

Iannaccone, Laurence R.: Why Strict Churches are Strong, *American Journal of. Sociology*, 99 (5), 1994, 1180-1211.

Jenkins, Philip: *Pedophiles and Priests: Anatomy of a Contemporary Crisis*, Oxford University Press, 2001.

Klick, Jonathan; Levy, Robert A.: *Salvation as a Selective Incentive: An Olsonian Analysis of the Faith vs. Works Cleavage*; Law and Economics working Paper Series, George Mason University School of Law, 02-14, 2001.

Mueller, Wunibald: *Homosexualität – ein Herausforderung für Theologie und Seelsorge*; Matthias-Grünewald-Verlag, Mainz 2. Auflage 1987.

Pratt, John W: Risk Aversion in the Small and in the Large; *Econometrica*, Vol. 32, No. 1/2, January 1964, 122-136

Religionlink: http://www.religionlink.org/tip_040216.php; visited on August, 30th, 2005

Ratzinger, Joseph: *Salz der Erde, Christentum und katholische Kirche im neuen Jahrtausend*, 5. Auflage,Wilhelm Heyne Verlag, München 2004.

Schmidtchen, Dieter (1997): Kirche, Geld und Seelenheil; Center for the Study of Law and Economics (CSLE), Discussion Paper 97-12

Schoenherr, Richard A.; Greeley, Andrew M.: Role Commitment Process and the American Catholic Priesthood; *American Sociological Review*, Vol. 39, June 1974, 407-426.

Sosis, Richard; Bressler, Eric R.: Cooparation and Commune Longevity: A Test of the Costly Signaling Theory of Religion; *Cross-Cultural Research*, Vol. 37, No. 2, May 2003, 211-239.

Stark, Rodney; Bainbridge, William S.: *The Future of Religion*. Berkeley; U. California Press, 1985.

Verdieck, Mary Jeanne; Shields, Joseph J.; Hoge, Dean R.: Role Commitment Process Revisited: American Catholic Priests 1970 and 1985.

VSSS (Solidaritätskreis Schwule Seelsorger Schweiz): Rundbrief 99/3; 1999.

Wikipedia (Online Lexica): http://en.wikipedia.org/wiki/Roman_Catholic_Church_sex_abuse_scandal; visited on August, 10th. 2009.

Figure 1: The church's optimal celibacy strategy

Panel a.

Panel b.

Panel c.

$c^*(\beta)f(\beta)$