Institute for Strategy and Business Economics

University of Zurich

Working Paper Series
ISSN 1660-1157

Working Paper No. 42

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October 2005

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Version October 27, 2005

Abstract

Since the middle ages celibacy is a necessary commitment when considering becoming a priest in the Roman Catholic Church. In the ongoing discussions about reforms, a wide range of church members ask for the abolishment of celibacy in order to meet believers' changed social and moral standards and to increase the quality and the quantity of priests. However, this paper shows that from a rational 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 signal credibly its religious orientation to believers. Based on a game theoretic model this paper analyses the optimal use of celibacy in the market for religious services. Additionally we discuss the relevant impacts of higher income levels, higher opportunity costs, increasing aging or changed moral standards related to homosexuality.

Key Words: Religion, celibacy, strategic positioning
JEL Classification: D23, D83, L89

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** Thanks to Reto Foellmi and Matthias Benz, IEW/University of Zurich, for helpful comments.

1 Introduction

Celibacy directly concerns only a small fraction of the people in the Catholic Church, the priests. However, it 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 the celibate urge the Catholic Church to hire high quality human resources as priests. Living celibate 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 respectively liberal orientation. The more fierce critics directly link celibacy to priest misconduct. Recent cases of paedophilia in U.S. catholic dioceses fuelled this second discussion and gave rise to a new wave of questions about priest celibacy. Despite the facts that there seems to be no scientific evidence whatsoever that paedophilia is related to celibacy itself and that the likelihood of paedophilia is lower among Catholic priests than among married men[1], there is a widely-spread belief in society that priestly celibacy contributed to the abuse problem.[2] Hence, the application of celibacy has severe drawbacks for the Catholic Church, while potential benefits are not obvious. So why does the Catholic Church not simply get rid of celibacy? A first and popular answer is that celibacy has simply become a dogma in the Catholic Church over time. However, this is not true. Asked about the role of celibacy the Pope Benedict XVI, Cardinal Joseph Ratzinger (1998, p. 185), clearly states: "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." "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. But I think that given the whole history of Western Christianity and the inner vision that lies at the basis of the whole, 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."[3]

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

[1] See e.g. Jenkings (2001). For an overview of the Roman Catholic Church sex abuse scandal see also Wikipedia (2005).
[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 (1998), p. 187.

repeatedly deliberated on the issue and, in contrast to Protestant and other churches, has decided to keep up celibacy until today. Obviously, the Catholic Church concluded that there still are potential benefits of celibacy. In our opinion this conception of celibacy as a strategic variable of the Catholic Church literally invites an economic analysis. Basically, we argue that celibacy is an efficient resource selection device, which allows the church to signal credibly 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 that selects relatively more conservative priests. And considering the believers' willingness to contribute voluntarily to a denomination, it turns out to be useful to signal relatively more conservative values. Based on a game theoretic model this paper analyses the optimal use of celibacy in order to maximise the aggregated contributions to the church. Additionally we try to analyse the impact of hiring individuals that do not have personal costs from living celibate. And finally we analyse the impacts of social changes such as increasing personal costs occurring from living celibate, the increased age of the population, higher income levels or changed moral standards related to homosexuality.

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 about the relevant literature. An overview about the literature addressing religious economics in particular is given by Iannaccone (1998). However, there is no literature that analyses the use of celibacy under economic aspects. This paper tries to close this gap.

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 for religious goods. Section 4 is devoted to the development, analysis and interpretation of the model. Section 5 considers modifications stemming from changes in society. The paper ends with a summary and 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 the solemn promise of celibacy. Before their

deacon consecration, the priest aspirants promise to forbear from getting married and to live in absolute sexual abstinence. However, from the church's point of view, celibacy is rather a voluntary promise than a legal requirement. Nevertheless, de facto celibacy is a compulsory requirement for being member of the Roman Catholic priesthood. Only in some oriental and orthodox parts of the Catholic Church the role of celibacy is less strictly defined – for instance by applying it only to some parts of the clergy such as the bishops.

Within the church celibacy is usually justified by the symbolic value of a total commitment to the service of the Lord. Additionally celibacy is seen as a practical measure: the unmarried status frees priests from additional tasks that are related to their family. Instead, they are able to devote themselves entirely to the concerns of the Catholic Church (see also Frazee 1972, p. 149).

Celibacy did not play an important role in the very early Christianity when ministers had rather teaching than liturgical tasks. [4] The increased liturgical role and the growing number of people within the church raised discussions about the necessity of celibacy for those now specialized on liturgical tasks. According to the Old Testament sexual activities were seen as unclean and therefore not adequate for people performing any act of worship. The requirement for cleanness 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.

In the dispute within the Catholic Church during its first three centuries both views were represented. Monks and also some parts of the priesthood voluntarily followed a celibate life while a main part of the priests was married. During the fourth century the Catholic Church for the first time tried to introduce celibacy by law, for instance at the Synod of Elvira in 306. However, Elvira was a local council which affected only the Iberian part of the church. A more general legislation was firstly introduced in 325 on the occasion of the first ecumenical council at Nicea. The relevant law – which forbade priests to marry *after* ordination and forbade any cleric from having a non-relative woman in his household – was basically not very strict and still allowed priests to be married.

The discussions and disputes about the necessity of 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 part

[4] For a broad overview about the origins and the history of celibacy see for instance Frazee (1972), Partner (1973), Denzler (2002) or Heid (2003).

of it. And this status did not change before the beginning of the middle ages. At the synod of Pavia in 1022 pope Benedict VIII ordered the priesthood to follow a strict celibate life. Again, this rigorous step was mainly justified by the argument of cleanness. However, in fact, pragmatic reasons also played a very important role.

Up to the fifth century Roman culture dominated the Catholic Church. The bishops who lived in large cities were mere administrators of the churches and their properties. After the German invasions and, hence, the increased relevance 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). Now, married bishops could leave the church with all its property to their children. They could even pass over the bishopric, so that sons inherited the property and the position from their fathers. As a result, church property was not set aside for the use of the Christian community no more, but was in danger of being privatized by a 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 strict application of celibacy within the Catholic Church was a powerful 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, from an economic perspective, the necessity of celibacy is less obvious. The property rights related to churches and additional assets are well defined. Diffusion of the church's properties is no more a relevant reason for celibacy. Nevertheless, the Catholic Church and its latest Pope Benedict XVI strictly hold on to celibacy. This decision may be surprising, since, as also stated by the Pope, celibacy is not seen as a dogma. It follows from this statement and from the analysis of the church's history, that celibacy is rather the result of a strategic decision. Economically expressed, celibacy is actively chosen by the church in order to maximise a defined objective. But in which way would this strategic variable work? And what objective does the Catholic Church pursue with the application of celibacy? And finally, is the application of a strong celibacy optimal when considering changing structures within a modern society?

Of course, defining an optimal church's strategy requires the assumption of a rational and self-interestedly acting denomination. In fact, this assumption is widespread in the economic literature dealing with religion. A wide range of recent work emphasises 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 maximisation has been analysed, for instance, by Stark and Bainbridge (1985), who also emphasised the role of entrepreneurship in the formation of new religions; Finke and Stark (1992) analysed the role of effective marketing and Ekelund et. al. (1996) analysed the Catholic Church as a monopoly firm. However, when considering a rational acting denomination it is difficult to find good reasons for the application of celibacy at first sight. As mentioned in the introduction, a casual economic analysis would indicate to reduce 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, many people may increasingly feel uncomfortable with the church's rules and orientation since celibacy is not adequate in a modern society with liberal views regarding sexual behaviour. However, it is useful to apply a more sophisticated analysis. In fact, the church still applies celibacy.

In order to define the church's strategic decisions we need to analyse the consumer's behaviour first. When he considers participating actively in a denomination a believer basically tries to figure out if the church's offered religious goods match with his own perception of religion. For good reasons one can assume that believers basically have a stronger or a weaker belief in God and in the existence of an afterlife. The latter is considered to be a crucial element of Christianity[5] having significant influence on the real life behaviour of a believer. Behaving well – which is usually set equal to a more ascetic and conservative life – is usually seen as a key to reap the fruits of paradise in the afterlife. Hence, more conservative believers are highly attracted by churches that offer strict rules and guides. Since they have a higher belief in the existence of an afterlife, following the stricter rules incurs higher utility levels. We analyse more or less conservative believers' willingness to contribute and participate in a church in Section 4.2.

The Catholic Church will consider the choice of its customers and their willingness to contribute when defining its strategy. It is rational to position in a way as to address the most valuable consumer segment. However, religions are credence goods that are difficult to evaluate by customers. Believers may need

[5] 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).

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 from the character of the priest. People match with churches where ministers signal the preferred values. Finke and Stark (1989) emphasise the role of the clergy in the period 1776 to 1850, when Babtists 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 higher match between their priests and the people. They had little education, they received little pay, they spoke in the vernacular and they preached from the heart. Hence, Babtists and Methodists imposed a signal, which indicated a higher match with the people's values. The role of the priests in the signalling process is also emphasised by Gill (2005) who mentions that religion is a credence good. Hence, consumers tend to be sceptical about purchasing such goods unless they have a credible signal about the good's 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 superior mechanism to signal credibly (a more conservative) religious orientation has also been emphasised by Pope Benedict XVI. Priests reveal their belief in the existence of the afterlife through their choice to live celibate (see Ratzinger 1998, p. 208). The abandonment of family is a very strong commitment: priests forego to enjoy the sweets of this life because they strongly expect the paradise in the afterlife.[6] This view is not new. Celibacy was already applied successfully by the 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 which was given to admiring the life of extreme self-denial, made the clergy look poor by comparison."

The application of celibacy may be a direct signal about the conservativeness of the Catholic Church. However, in practice the signal is rather indirect. Celibacy imposes significant personal costs on a priest. Several empirical studies show that celibacy is the principal consideration in determining whether a

[6] 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 from their members survived longer than less demanding denominations. Sosis and Bressler define the strictness of the rules imposed by the commune as an indicator for 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 respectively the application of celibacy.

priest will withdraw or continue in the active ministerial priesthood (see Section 4.3.1). Hence, celibacy is a strong *selection mechanism*. Obviously, a stronger application of celibacy in the resource selection process is a signal of an increased conservative orientation of the church. The broad and strict application of celibacy attracts relatively more conservative people as priests. These people commit a very strong belief in God and the afterlife; otherwise they would not be willing to forego the fruits of the real life. In order to signal a more liberal orientation, the church reduces or abandons the role of celibacy and hires pastors without ordination. 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. However, we did not evaluate so far *which* position (more or less conservative) is optimal. In the next Section we set up a model which should help to understand the basic mechanisms related to the described signalling function and also related to the optimal positioning decision.

Before analysing the church's optimal strategy in more detail, we should have in mind that in practice several conservative denominations exist without the application of celibacy or even without a designated priesthood. However, in most cases such denominations are small (or very locally organised) 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 to control each other may be an efficient alternative to a costly signal through the priests.[7] 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, the group respectively each member of the group is a bearer of the signal. However, a higher level of anonymity increases the role of a professional priesthood. Now, the priesthood is responsible for executing acts of worship or celebrating the mass. Additionally, the professional ministers have tasks related to the implementation and enforcement of the church's values and rules. Obviously, the role of the ministers and their signalling function is mainly relevant in large denominations, such as the Roman Catholic Church or the Buddhist Church, where in fact the celibate life of ministers is of high relevance.

[7] The role of signalling in a very conservative religious environment is for instance analysed by Bermann (2000). He analyses Yeshiva attendance that 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 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.

4 The model

In order to analyse celibacy as a resource selection device and its relevance for a church's positioning decision, we set up a game theoretic model. The model is structured as follows: in a first stage, the church selects its resources by applying a celibacy rule or not; in a second stage, believers observe the religious orientation of the church and its resources and decide about their voluntary contributions to the church. To analyse these two stages, we firstly have to define the individual's utility function. Afterwards we solve the model by backwards induction. Hence, Section 4.2 analyses the individual's contribution decision for a given religious orientation of the church. Section 4.3 analyses individual behaviour regarding the priest selection process. Based on the individuals' behaviour we determine the church's optimal strategy regarding the application of celibacy in Section 4.4.

4.1 Lifetime and afterlife utility

As in many other religions a crucial element of Christianity is the existence of an afterlife. Following the doctrine of the Catholic Church there are basically two different states in the afterlife: a good state which is referred to as the paradise and a bad state which is known as the hell. The expected afterlife state 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: higher involvement and higher contributions to the church are expected to increase the probability of salvation. However, there is an uncertainty about the existence of an afterlife. The degree of the individual's uncertainty can be seen as an indicator for the individual strength of believing in the afterlife and therefore in the existence of God in the sense of Christianity.

We denote the intensity of such belief about the existence of the *afterlife* with β, $0 \le \beta \le 1$. Hence, β is the individual religious orientation – a higher level of β indicates a stronger belief in the existence of the afterlife. We consider heterogeneous people that have different beliefs. For obvious reasons it is assumable that the amount of very strong (fundamentalists) and very weak (hedonists) believers is less than the amount of intermediate believers. We assume a single peaked symmetric distribution $f(\beta)$. Additionally we assume that such distribution is exogenously given. Hence, the church is not able to change the

individual's beliefs, for instance by evangelising.[8] In order to analyse individuals' religious behaviour we basically follow the idea of Azzi and Ehrenberg (1975) who consider a multiperiod model that allows individuals to optimise their behaviour over two periods, the lifetime and the afterlife.

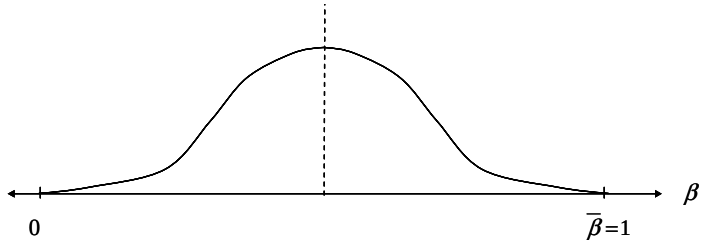

Figure 1 : Distribution of believes

First, we analyse an individual's lifetime utility. The individual derives a positive level of utility from consuming goods and leisure. Practising a religion reduces such individual consumption possibilities since it requires expenditures of time and money. The individual has a *life* utility $u(c)$, with $u'(c)<0$, $u''(c)\leq 0$ and $u'''(c)<0$.[9] The utility decreases with the *general offering* c. Such an offering is assigned to a church, where the believer is practising his creed. Since, in our model, we ignore aspects such as income, $u(c)$ is negative and denotes rather a "disutility function". Basically, a believer can make *voluntary contributions* that are addressed to the church. The individual contribution c may be a donation or a personal involvement in the community of the church. Such involvement may be participating actively in the mess, practicing a liturgical role in the church or freelance for instance. However, both types, donations and involvement, are measured in terms of money. Obviously, contributions reduce the individual's opportunities to consume in his real life. However, there are also good reasons to assume that an individual may have 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. Of course, the consumptive character may be different between people with different religious orientation. Basically, it is obvious that the consumptive character tends to increase with higher affiliation to a denomination. The assumption is appropriate and supported

[8] Of course we could rather assume that the church is able to influence average belief in the population. However, this would basically not change the results of the following model. We would expect a more conservative population and, hence, a church that signals an even higher conservative orientation by using the celibacy rule.
[9] Pratt (1964) showed that it is plausible to assume u"'>0 when u'>0. However, it is easy to show that u"' must be negative when u describes a "disutility function" where u'<0, as described above.

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 parameter γ. Hence, real life utility can be written as $u(\gamma c)$. γ determines the actual degree of lifetime disutility from contributing to a church. The individual disutility from contributing to a specific church such as the Catholic Church basically depends on the matching of the own belief with the church's religious orientation, i.e. fundamentalists are expected to have less disutility from contributing to a church that signals conservative values. For this reason we introduce a parameter $\hat{\beta}$ which describes the *perceived religious orientation* (more or less liberal respectively conservative) of the church. Hence, the parameter $\hat{\beta}$ can be seen as an indicator for the strictness respectively conservativeness of the rules imposed by the church. We assume that believers receive a signal $\hat{\beta}$ about the religious orientation of the church. Obviously, churches that signal more strict rules attract people with a higher level of β, since only these people are willing to live a more ascetic life in order to receive salvation in the afterlife. Economically written, believers have more utility respectively less disutility from contributing to a church that matches with the own imagination of religion. This basic idea is captured in the following assumption: $\gamma(\beta_1) \geq \gamma(\beta_2)$ for $\left|\hat{\beta} - \beta_1\right| \geq \left|\hat{\beta} - \beta_2\right|$. In other words, the costs of contribution are non-decreasing in the distance of the personal belief from the official church's position, which is described in more detail in Section 4.2. We employ a very simple specification of the distance function:

$$\gamma(\beta) = \begin{cases} \underline{\gamma} = 1 \; if \; \left|\hat{\beta} - \beta\right| \leq \left|z - \alpha\right| \\ \overline{\gamma} > \gamma_0 \; if \; \left|\hat{\beta} - \beta\right| > \left|z - \alpha\right| \end{cases} \qquad (1)$$

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 higher 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. Without loosing

generality we define that people with a low matching with the church's orientation will not contribute to that specific church.[10]

Now, we turn to the afterlife. In the afterlife, there are two possible states for an individual, gone to *heaven* or burning in *hellfire*. Obviously, the former state is preferable to the latter. However, the probability to be in heaven in the afterlife and enjoying the fruits of paradise is not exogenously given. Rather the 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 to receive 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 $\partial p/\partial c > 0$ and $p''(.) < 0$. Now, we can define the individual's utility related to the afterlife. For this reason we define the utility of being in heaven in the afterlife as $\overline{H}$ and the utility of being in the hell as $\underline{H}$ with $\overline{H} > 0 > \underline{H}$ and $\overline{H} + \underline{H} > 0$. Adding the individuals' belief about the existence of an afterlife we write the expected utility from afterlife as follows:

$$\beta \cdot \left[p(c) \cdot \overline{H} + (1-p(c)) \cdot \underline{H} \right] \qquad (2)$$

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

$$V(c) = u(\gamma c) + \beta \cdot \left[p(c) \cdot \overline{H} + (1-p(c)) \cdot \underline{H} \right] \qquad (3)$$

4.2 Believer's contribution decision

We firstly analyse the believers' contribution decision for a given religious orientation $\hat{\beta}$ of the Catholic Church. Since we considered a non-continuous function of $\gamma(\beta)$ we have to distinguish two cases. In a case 1 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 due to the higher level of $\overline{\gamma}$. The higher γ occurs from the higher distance (higher than α) of the believers own religious orientation β with the perceived orientation of the church,

[10] The value of $\gamma_0 > 1$ is explained more detailed in the next Section.

denoted by $\hat{\beta}$. If $\bar{\gamma} > \gamma_0$ respectively $\left|\hat{\beta} - \beta\right| > \left|\hat{\beta} - \alpha\right|$ the first order condition is written as follows:

$$\frac{\partial V}{\partial c} = \bar{\gamma} \cdot u'(.) + \beta \cdot p'(.) \cdot (\overline{H} - \underline{H}) < 0 \qquad (4)$$

Since 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. [11]

In case 2 believers have a higher matching, and therefore a lower $\underline{\gamma}$. Hence, they have lower disutility from contributing to the church – for instance due to a consumptive character of the respective activity. From these people we know that they are basically willing to contribute actively to a church. Now, we can analyse the active members' behaviour. In case 2 where $\underline{\gamma} = 1$ respectively $\left|\hat{\beta} - \beta\right| \leq \left|\hat{\beta} - \alpha\right|$ the relevant first order condition is written as follows:

$$\frac{\partial V}{\partial c} = \underline{\gamma} \cdot u'(.) + \beta \cdot p'(.) \cdot (\overline{H} - \underline{H}) = 0 \qquad (5)$$

Given a believer is an active member of the church, he maximises V at given levels of $\hat{\beta}$ and his own belief β. The optimal contributions are a function of β: $c^* = c^*(\beta) > 0$.[12] The second order condition is negative and defined as: $\underline{\gamma}^2 \cdot u''(.) + \beta \cdot p''(.)(\overline{H} - \underline{H}) < 0$. Assuming that an individual is willing to contribute, he derives utility $V(c^*)$. Using the total differential from the relevant first order condition we analyse how different believers' contributions vary in β:

$$\frac{dc^*}{d\beta} = -\frac{p'(.) \cdot (\overline{H} - \underline{H})}{\underline{\gamma}^2 \cdot u''(.) + \beta \cdot p''(.)(\overline{H} + \underline{H})} > 0 \qquad (6)$$

People with a stronger belief in salvation are also willing to contribute more to their church. However, since contributing to a specific church requires a high

[11] Hence, γ_0 solves $\gamma_0 u'(.) + p'(.)(\overline{H} - \underline{H}) \leq 0$.

[12] We assume, that at any positive level of β it is optimal to contribute a positive c. Hence, $\frac{\partial V}{\partial c}\Big|_{c=0} = \underline{\gamma} \cdot u'(.) + \beta \cdot p'(.) \cdot (\overline{H} - \underline{H}) > 0$.

match with the church's orientation, c is increasing in $\hat{\beta}$. In fact, this result is not surprising and supported by several studies. 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. Similar results are supported by several additional studies – for instance Hoge et. al. (1993), Hoge and Young (1994) or Iannaccone (1994). 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".

4.3 The role of celibacy when selecting priests

Now, we can go back to stage 1 of our model, where the church applies an optimal resource selection and market positioning strategy for a given contribution behaviour of the believers. Up to this point we did not explicitly define 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 believing in the afterlife. Individuals with higher levels of β ask for more conservative rules, since they offer higher levels of utility in the afterlife. As already analysed in Section 3, there are good reasons to assume, that believers evaluate the church's orientation based on the public appearances of the church's exponents, the local priests. Obviously, increasing the amount of conservative priests increases the believers' perceived strictness of the church. 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. By selecting more conservative priests, the church can signal higher conservativeness and therefore attract believers with higher values of β; selecting more liberal priests allows to address believers with a lower value of β. The relevant signal may have two origins. First, if the selecting 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 the contact with the preaching priests with or without ordination. However, both channels work in the same way, since they require a credible way to select priests that have a certain level of conservativeness.

4.3.1 The priest's decision

Of course the church recruits its priests from the population of individuals. 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, we have to study how individuals decide to become a priest 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 individual 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 personal costs. In fact, celibacy can be interpreted as *the main costs* related to the priesthood. According to Verdieck et. al. (1988) who analyse 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.[13] Hence, celibacy can be interpreted as enforced contributions $\bar{c}$. We do not have to define the level of $\bar{c}$ more precisely; we just know that it is significant. Consequently, an individual's utility with β who considers becoming a priest is:

$$V(\bar{c}) = u(\bar{c}) + \beta \cdot \left[p(\bar{c}) \cdot \overline{H} + (1 - p(\bar{c})) \cdot \underline{H} \right] \qquad (7)$$

Obviously, equation (7) determines the relevant utility when considering a high match with the church, $\gamma = 1$. However, in the first stage of the model potential priests basically do *not know* about the church's actual conservativeness $\hat{\beta}$, since it is determined by the individual orientation of its resources, the hired priests. Now, it is useful to set $\gamma = 1$ in equation (7). The reason is straightforward: priests do have the necessary power to influence the design and the religious orientation of a local denomination – hence, they basically have to match with their own orientation.

But which people are willing to become a priest? An individual accepts life within priesthood as long as the utility from being a priest is not lower than when

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

being an ordinary believer, $V(\bar{c},\beta) \geq V(c^*,\beta)$. Hence, we can determine a value $\bar{\beta}$, where an individual is just indifferent at an exogenously given level of $\bar{c}$. But what is the impact of a higher or lower $\bar{c}$? 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 $\partial\bar{\beta}(\bar{c})/\partial\bar{c} > 0$. c^* is always the optimal contribution level, hence, $V(\bar{c}) \leq V(c^*)$. $\bar{c}$ is defined as minimum contribution level to become a priest's 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 $\bar{c}$.

At higher levels of $\bar{c}$ (which denotes the level of personal costs related to celibacy) only people with a sufficient high level of $\beta \geq \bar{\beta}$ would be willing to become a priest. The result is intuitive: only people with a strong belief in the afterlife are willing to bear the costs of living celibate. Additionally, the model does not rule out that people with a low match with the church's overall orientation may become a priest. 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 a theology study. Hence, $\beta \geq \bar{\beta}$ only describes the minimum religious orientation of people in a *potential priest aspirant pool*.

4.3.2 Signalling the church's orientation

Of course, the church can not apply a stronger or weaker celibacy to its priests on an individual level. However, it can decide about the extent to which 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 amount of activities such as pastoral care, spiritual guidance or teaching Sunday school for children would be carried out by ministers and pastors without ordination. In order to ease the analysis, we assume that the Catholic Church needs a constant amount of employees, priests with or without ordination. Additionally, we assume that the amount of priests is very low compared to the entire population. Hence, the distribution of believers is equal in both stages of our model. As mentioned above,

the perceived orientation of the church is due to the perceived conservativeness β of the priesthood. Hence, the perceived orientation of the church's conservativeness $\hat{\beta}$ amounts to the expected average conservativeness of the priesthood. The share (1-s) of pastors and other employees without ordination is expected to have an average religious orientation that coincides with the overall conservativeness within the population – since no selection rule is applied. The share s of priests with ordination has a higher conservativeness, since it is driven from the portion of the population with $\beta \geq \overline{\beta}$.

In practice, such selection process is not expected to be perfect. It is rather plausible to assume, that there exists a fraction $(1-\theta)$ in the population that does not have any costs from living celibate. We assume $\theta \in (0,1)$. For instance, homosexual people are expected to have significant lower levels of disutility from being unmarried and not having children. In fact, in their data Verdieck et. al. (1988, p. 532) find a tendency of 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 argumentation. Celibacy leads to lower enforced contributions $\underline{c} < \overline{c}$ for these people. We normalize $\underline{c} = 0$. Of course the selecting 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.[14] 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:

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

Hence, one part of the priest aspirants is expected to have a $\beta \in [\overline{\beta}, 1]$ since they are selected by the celibacy rule. However, an additional part is *not* selected through celibacy. This part aggregates i) the share (1-s) of non-ordinated priests and ii) the share of priests with ordination but a low level of the enforced celibacy costs, $\underline{c} = 0$. Their religious orientation is $\beta \in [0,1]$. 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:

[14] In order to simplify we do not consider any additional personal costs from effort which is related to the job. Basically, such effort may be compensated by a salary. Without loosing generality we do not consider effort costs or wages in our model. Of course we apply such assumption to both, priests with a high and a low c.

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

Equation (9) considers that the church is not able to differentiate between θ-type and $(1-\theta)$-type people in its priest aspirant pool. Hence, the share $\theta(1-F(\bar{\beta}))/(\theta(1-F(\bar{\beta}))+(1-\theta))$ is of θ-type and a share of $(1-\theta)/(\theta(1-F(\bar{\beta}))+(1-\theta))$ is of type $(1-\theta)$. In order to ease the notation we define the expected religious orientation of priests with ordination as

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

and the expected religious orientation of pastors without ordination as $\Omega^n = E(\beta) = 0.5$. Therefore we can define: $\hat{\beta} = \hat{\beta}(s) = s\,\Omega^o(\bar{\beta}) + (1-s)\,\Omega^n$. The perceived orientation of the church is increasing in the share s of priests with ordination: $\partial\hat{\beta}/\partial s = \Omega^o(\bar{\beta}) - \Omega^n > 0$. The result is not surprising: the Catholic Church is able to change the perceived religious orientation by changing s. However, the overall perceived conservativeness $\hat{\beta}(s)$ is expected to be reduced by the share of pastors without ordination and by the share of priests with ordination that have no costs from living celibate. Additionally, the perceived orientation is strongly determined by the distribution of believers, which basically builds the pool of potential human resources for the church. An increasing conservativeness in the population automatically increases the church's conservativeness given any value of s and θ. Additionally the (expected) perceived conservativeness is decreasing in $(1-\theta)$.

4.4 The church's optimal selection strategy

Up to this point we analysed the priest selection process as a way to signal the church's overall conservativeness. However, we did not evaluate the Church's optimal strategy. In this Section, we define the church's objective function and the consequences for its positioning decision. Basically, we can assume, that a rational acting church maximises its believers' contributions. Hence, we can write the Catholic Church's objective function as follows:

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

where F denotes fixed costs for human resources[15] and capital. By using the rule of Leibniz we are able to derive the first-order condition regarding the share of priests with ordination in the Catholic Church:

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

where $\hat{\beta}'(s) = \partial\hat{\beta}/\partial s = \Omega^o(\overline{\beta}) - \Omega^n(\overline{\beta}) > 0$. We can rewrite:

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

The result is intuitive. In order to maximise its objective function the church equals 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. Hence, we do have to define s* respectively $\hat{\beta}^*(s)$. First, we analyse the church's optimal 'market position' $\hat{\beta}^*$ before we define the necessary s*.

Consider $\hat{\beta}^*$ exactly at the peak of the distribution, where $\hat{\beta}^* = 0.5$. From Section 4.1 we know that believers with a higher level of β have a higher overall willingness to contribute than the members at the lower end of the active range: $c^*(\hat{\beta}(s)+\alpha) > c^*(\hat{\beta}(s)-\alpha)$. Individual contributions are higher at higher levels of β. Additionally, we know that $f(\hat{\beta}-\alpha) = f(\hat{\beta}+\alpha)$ at $\hat{\beta}^* = 0.5$. It follows that the net marginal benefit at the $(\hat{\beta}^*+\alpha)$ border must be higher than at the $(\hat{\beta}^*-\alpha)$ border from the church's member range. Hence, it would be optimal to move to the right. The optimal position of the Catholic Church must be on the right hand side of the single peak of the distribution in Figure 1, or $\hat{\beta}^* > 0.5$. When defining its optimal position, the church faces a trade off: At higher levels of $\hat{\beta}(s)$ the church

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

attracts less members, but on average more high value members. The optimal overall signalled conservativeness of the church tends to be higher when $f(\hat{\beta}-\alpha)$ is close to $f(\hat{\beta}+\alpha)$ (more equal distribution of believers).

But what is the relevance for the church's human resource selection decision? Basically we can ask, if it is useful to apply celibacy or not. To answer this question, we firstly assume that the Catholic Church skips the role of celibacy and chooses $s=0$. Since we assume that the perceived overall conservativeness is determined by the average conservativeness of the priesthood (now not required to live celibate), the church signals a degree of conservativeness of $\hat{\beta}=E(\beta)=0.5<\hat{\beta}^*$. As mentioned above, given the individual's contribution behaviour, this signal will not maximise the church's objective. Not using the celibacy rule would imply that the church is *not able* to signal credibly a level of conservativeness which is higher than average conservativeness in the population – since the church recruits its resources from the whole 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.

However, it does not follow that the other extreme case, $s=1$, is necessarily optimal. In this case the first order condition regarding s writes:

$$\frac{\partial \Pi}{\partial s}\Big|_{s=1}=\Omega^{o}(\overline{\beta})\ \left\{\left[c^{*}(\hat{\beta}(1)+\alpha)\right]\left[f(\hat{\beta}(1)+\alpha)\right]-\left[c^{*}(\hat{\beta}(1)-\alpha)\right]\left[f(\hat{\beta}(1)-\alpha)\right]\right\} \qquad (13)$$

The right hand side of this equation may be negative, if $\overline{\beta}$ is very high, for instance due to a very high level of personal celibacy costs $\overline{c}$. In this case, it may be useful to reduce the level of s. However, the right hand side of the equation may also be positive, for instance due to a low level of $\overline{\beta}$, a high level of $(1-\theta)$ or a very low level of $1-F(\overline{\beta})$. Now, it would be optimal to increase s to an even higher level. However, s > 1 is not possible. Hence, the model shows the limits of celibacy as a signalling device. Basically, for a large denomination such as the Catholic Church it is difficult to signal very high levels of conservativeness. In fact, there are very little denominations, such as sects, that are able to signal such values, rather through direct social interaction respectively control than through the signalling 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 amount 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 that 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 obviously faces problems when hiring young priests that are willing to live celibate in many developed western countries.

This issue can be explained in two ways. First, the amount of potential priests who have a sufficient high level of β may have decreased during the last centuries. As a result, $1-F(\overline{\beta})$ decreased. Hence, if the Catholic Church still hires (s N) priests with ordination, an increasing amount of priest is of type $(1-\theta)$. The perceived orientation of the church $\hat{\beta}(s)$ is decreasing. However, statistics basically do not support the assumption of an overall reduced believing in the afterlife. Presumably, $1-F(\overline{\beta})$ did not significantly change during the last centuries.

As an alternative, it may be useful to consider that $\overline{c}$ changed. $\overline{c}$ 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. Higher wealth, higher consumption levels, social security and day-nursery made the family life relatively more attractive – for instance than in the middle ages. Hence, $\overline{c}$ may have increased during the last years. As a result $\overline{\beta}$ increases. Again, it is more difficult to hire priests that are willing to live celibate. Moreover, if the Catholic Church still hires (s N) priests with ordination, an increasing amount of priests is of type $(1-\theta)$, which reduces the overall perceived conservativeness of the church.

Of course, in both cases the model indicates an increasing amount of priests with type $(1-\theta)$ amongst the clergy with ordination. However, this result occurs since the pool of θ-type priest candidates is decreasing while the pool of $(1-\theta)$-type candidates stays constant. Hence, the pool of hired priests with ordination tends to have a higher share of $(1-\theta)$-types. This result is supported by the empirical analysis of Verdieck et. al. (1988, p. 532) who assessed a tendency of 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 $\bar{c}$ or also of the increased share of $(1-\theta)$-types within the population.

But what is the consequence for the church's optimal celibacy strategy? Basically, the increased level of $\bar{c}$ increases the average conservative orientation of θ-type priests with ordination – since it increases $\bar{\beta}$. However, one should note that the increase of $\bar{\beta}$ reduces the *volume* of high-conservative priests, since $1-F(\bar{\beta})$ is decreasing in $\bar{\beta}$. As a result, an increasing share of priests is of $(1-\theta)$-type. The net effect regarding the perceived overall conservativeness is prima facie not obvious: $\partial\hat{\beta}/\partial\bar{c}$ may be positive or negative. Of course in its optimal strategy the church has to compensate any shift in the perceived orientation by adjusting s^* in order to keep its match with $\hat{\beta}^*$. The total differentiation of the church's first order condition (11) with respect to s^* and $\bar{c}$ becomes:

$$\frac{ds^*}{d\bar{c}} = -\frac{\frac{\partial\hat{\beta}}{\partial\bar{c}}}{\frac{\partial\hat{\beta}}{\partial s}} = -\frac{\frac{\theta f(\bar{\beta})}{1-\theta F(\bar{\beta})}\left[\frac{1}{1-\theta F(\bar{\beta})}\left(\theta\int_{\bar{\beta}}^{1}\beta f(\beta)d\beta + (1-\theta)\int_{0}^{1}\beta f(\beta)d\beta + \right) - \bar{\beta}\right]\frac{d\bar{\beta}}{d\bar{c}}}{\Omega^o - \Omega^n} \qquad (14)$$

The left hand side of equation (14) may be positive or negative. At very high levels of $\bar{c}$ respectively $\bar{\beta}$ the effect related to the increased share of $(1-\theta)$-type priests dominates the effect related to the higher conservativeness of θ-type priests. Due to higher opportunity costs the priesthood is relatively less attractive for θ-types. Hence, the increased share of $(1-\theta)$-type priests reduces the expected overall conservativeness of the church. For this reason, it is optimal for the Catholic Church to increase $\hat{\beta}(s)$ by increasing the level of s. Hence: $(ds^*/d\bar{c}) > 0$. But one should note, that if $\bar{c}$ is already very high and induces a $\bar{\beta}$ which is close to 1, increasing the amount of s has very little impact, since only few of the new priests would be seriously of type θ. However, at lower levels of $\bar{c}$ respectively $\bar{\beta}$ the effect related to the increased conservativeness of θ-type priests may dominate. In order to keep its match with $\hat{\beta}^*$ the church has to reduce its conservativeness by reducing s: $(ds^*/d\bar{c}) < 0$.

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

5.2 The impacts of increased income and higher aging

A wide range of changes within society affect religious behaviour and therefore the Catholic Church's optimal strategy. We try to consider some changes and the 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. 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 $\underline{\gamma}$, 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 respectively church attendance, we do not know if income increases or reduces an individual's c. Iannaccone (1998, p. 1470) gives a broad survey about 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.[16] 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, if a

[16] 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).

lower level $\underline{\gamma}$ increases the willingness to contribute stronger at the lower or at the upper end of the church's membership. Using equation (6) we can show:

$$\frac{\partial}{\partial \underline{\gamma}}\left(\frac{dc^*}{d\beta}\right) = \frac{p'(c^*)(\overline{H}-\underline{H})(2\underline{\gamma}u''(\underline{\gamma}c^*)+\underline{\gamma}^2 u'''(\underline{\gamma}c^*)c^*}{\left[\underline{\gamma}^2 \cdot u''(.)+\beta \cdot p''(.)(\overline{H}-\underline{H})\right]^2} < 0 \qquad (15)$$

Hence, the lower level of $\underline{\gamma}$ increases the willingness to contribute stronger at the upper end of the α-range. In other words, it is more attractive to address the more conservative believers. Now, it is useful to enhance the role of celibacy amongst the clergy.

A further social change concerns the age structure. Many developed countries face the increasing problem of obsolescence which is linked with the rapid decline in births starting in the 60s as the pill took effect. 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 respectively their contributions in twilight years, when facing a relatively high likelihood of death. Hence, the reason for the additional contributions is not a reduced level of real life disutility from c, rather it is based on a higher awareness of the afterlife utility. We can introduce this issue by increasing the average β, respectively 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 estimates denote the share of homosexual priests up to 25 percent (see for instance Mueller 1987 or VSSS 1999), which tends to be above the average share of homosexual people 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 occurring from celibacy is disproportionate. 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 $\overline{c}>0$ 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 suffered from proscription and social segregation. However, in most liberalised societies the acceptability of homosexuality increased significantly during the last few years. Changed moral standards also influenced legislation. In many European Countries such as Germany or Switzerland current partnership law allows the marriage between homosexual couples. But what are the consequences to the composition of the priesthood? It could be the case that the increased acceptability also increases the share of homosexual priests within the church. Under these circumstances the church may compensate 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 whole population increased during the last few centuries. Rather, an increasing share of people *admitted* to be homosexual due to the higher 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, also homosexual people suffer from not living in an open relation and not being married. Therefore, the celibate rule increasingly imposes opportunity costs for $(1-\theta)$-type individuals. In our model: $0 < \underline{c} \leq \bar{c}$. The impact on the pool of priest aspirants is reverse: the higher opportunity costs for the whole range of aspirants increase the average conservativeness of the priesthood.

6 Summary and conclusions

The general discussion of celibacy widely ignores its function as a signalling device. This is somewhat surprising since Pope Benedict XVI clearly refers to this function when he states: "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."[17] By living celibate a priest makes a strong commitment for his belief in God and the afterlife; otherwise

[17] Ratzinger (1998), p. 195.

he would not be able to forego what is considered to be an important element and a pleasure of real life. 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 that have a stronger 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. 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. Assuming the abolishment of the celibate (s = 0), the signalled orientation of the church would match with the average orientation within the population – since the church would recruit its human resources from the whole range of the population. Only by requiring a celibate life from a significant part of its human resources, the church will be able to signal credibly a level of conservativeness which 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 trade off between the number of contributing believers and the magnitude of individual contributions. The application of an ever increasing conservative orientation would lead to a loss of great numbers of more liberal members while ultimately gaining only very few conservative "high value" members.

Moreover, our analysis exposes how the positioning decisions of the Catholic Church are restricted by inherent limitations of the employed signalling mechanism. At very high levels of personal celibacy costs and with higher fractions of $(1-\theta)$-type individuals that do not have any celibacy costs to bear, the perceived conservativeness of the Catholic Church will decrease at a constant level of s. Hence, at low levels of $\overline{\beta}$, high levels of $(1-\theta)$ or very low levels of $1-F(\overline{\beta})$ it may be difficult to signal highly conservative values by applying the celibacy rule in the selection of human resources. In a worst case scenario, the church will not even be able to signal the contribution-maximising value of $\hat{\beta}^*(s)$, even if it applied the celibacy rule to all it's employees (s = 1). In addition to these possible limitations in signalling conservative values there are obvious limitations in

signalling liberal values. *Not* applying celibacy means that the church recruits human resources reflecting average population's values. Applying respectively *not* applying celibacy is thus not suited to signal more than average liberal values.

An important issue in the public debate on celibacy is the apparent lack of priest aspirants in some of the more developed western countries. If family life is perceived as more attractive nowadays 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) increases too, it will be more difficult to recruit θ-candidates willing to live celibate. If the church continues to hire the same amount of priests with ordination, the fraction of candidates within priesthood that do not face high costs when not marrying and having own children, like e.g. homosexuals, rises. An increased share of such candidates in the population basically has the same effect. When answering the question 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 some highly conservative candidates may enter priesthood since a very strong belief is suited to offset the higher 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 $\overline{\beta}$. In order to counterbalance these effects and preserve the contribution-maximizing level of conservativeness the church has to reduce or to increase the share of priests with ordination s. However, if the personal costs of celibacy are already very high and can only be offset by the very small fraction of individuals with extremely high levels of belief, further increasing s leads to a higher probability of hiring the unsuited $(1-\theta)$- candidates. In this situation, the practice already employed by the Catholic Church of hiring the required priests in other regions and continents of the world, where the personal costs of celibacy still are significantly lower, is a superior strategy of securing the optimal level of perceived conservativeness.

Moreover our analysis reveals that social changes leading to increased income, higher levels of education and an aging population, as they 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 (s = 0), as it is sometimes conjectured. The same follows from higher income and education levels, which turn out to increase willingness to contribute stronger among more conservative believers.

Finally we explored an interesting development stemming from changed moral standards regarding homosexuality. Due to the higher 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 that 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 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."[18]

[18] Ratzinger (1998), p. 187

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*, Wilhlm Heyne Verlag, München 1998.

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, 30th. 2005.