CHARLES UNIVERSITY IN PRAGUE

FACULTY OF SOCIAL SCIENCES

INSTITUTE OF ECONOMIC STUDIES

Economics and Religiosity

Author:

Pavol POLAČKO

2008/2009

Supervisor:

PhDr. Martin GREGOR, PhD.

Prehlásenie

Prehlasujem, že som bakalársku prácu vypracoval samostatne a použil iba uvedené pramene a literatúru.

Praha, 2009   Pavol Polačko

Poďakovanie:

Abstract

In this thesis I describe the behavior of religious markets and some of their specifics. I try to describe the effects of inclusion of labor into the price of religious goods, religious human and social capital, product bundling and religious portfolio diversification. I present a microeconomic model to demonstrate some of these characteristics. I also describe the religious market structures and consequences of their presence. Moreover, I present four econometric models for verification of some of the assumption. It also gives me an opportunity to go deeper into the properties of religious markets and confront my findings with the findings of other researchers in this area and with the presumptions of secularization hypothesis.

V tejto práci popisujem fungovanie náboženských trhov a niektorých ich špecifík. Pokúšam sa analyzovať dôsledky zahrnutia práce do ceny náboženských statkov, náboženského ľudského a sociálneho kapitálu a rizika spojeného s náboženskými statkami. Prezentujem mikroekonomický model na demonštráciu niektorých týchto charaktistických vlastností. Naviac, predkladám štyri ekonometrické modely pre overenie niektorých mojich predpokladov. Taktiež popisujem trhové štruktúry náboženského trhu a dôsledky ich existencie. To mi taktiež dáva možnosť hlbšie preskúmať vlastnosti náboženských trhov a konfrontovať moje zistenia so zisteniami iných výskumníkov v tejto oblasti a s predpokladmi sekularizačnej hypotézy.

Contents

Introduction

The economics of religion can be traced back to 1776, when Adam Smith laid their foundations in a chapter of his Wealth of Nations.[Smith, 2005] In contrast to other chapters, his studies of religious markets have not attracted much interest for a long time. The interest in this subject began to emerge in the first half of the 20th century encouraged with the formulation of secularization hypothesis, which has allured a lot of intellectual and scientific interest.[Iannaccone, 1998]

However, an opposition against this approach has been growing from the very beginning of its existence. For instance, scholars have argued that the incentives for becoming a member of a church does not have to be basically religious or supernatural. The history of (at least partly) secular offer of the religious firms can be reliably traced back to the ancient Egypt and Mesopotamia. The consequences of selling religious goods along with secular ones will be discussed in detail in Section 1.1.

Religious firms tend to form similar market structures as the firms on the secular market. I will also try to describe these market structures on religious markets and the process of their formation. I will especially focus on the impact of religious monopolies. I will try to describe the impacts of various religious monopolies. Moreover, I will concentrate on the consequences of state regulations. On the other hand, I will also try to describe the influence of free religious markets on the levels of religiosity. I will as well describe the process of religious deregulation and abolishment of a state religion.

I will also try to use econometric means for verification of the suggestions concerning supply side (and also for some suggestions concerning demand side that are not included into the model).

The parts that were not incorporated into the mathematical model, will be dealt with in the fifth chapter. An econometric model will be used to verify these hypotheses. Data collected between years 1994 and 2002 from World Values Survey will serve as means to accomplish this task. However, data had to be adjusted before the employment of econometric methods. These adjustments are more deeply described in the beginning of Section five.

However, data for many points presented in this thesis are not covered by World Values Survey. As a consequence, I had to add further data in order to be able to find evidence for the examination of secularization hypothesis. Secularization hypothesis postulates a significant decline in religious involvement due to improvements in secular life. These improvements include for example higher

salaries and higher life expectancy.[1] Other factors that, according to secularization hypothesis, should have a negative effect on the levels of religiosity include education and literacy. Accordingly, I have added variables dealing with the advancement of a society. For this objective I use figures from CIA Factbooks. [CIA, 1994-2002] I will try to compare some of the results to the findings presented in [Barro and McCleary, 2003]and [Barro and McCleary, 2003]

There are many other factors that determine the levels of religiosity. The first of the objectives of this paper is to describe the influence of some of these factors more deeply in sections dedicated to each factor and formulate implications for a consumer model of religious market, which will also be a part of this paper and to present an econometric model for verification of the hypotheses made in this paper. Many of these factors have already been studied on the secular markets and are only adapted to their religious counterparts.

Many studies have observed an increasing demand for religious goods with increasing age. I will try to explain this effect by examining the impact of one of the factors - human and social religious capital. This part is based mostly on '*Religious Practice: Human Capital Approach*' and '*Household Production, Human capital, and the Economics of Religion*' by Laurence R. Iannaccone. [Iannaccone, 1995c]

Another examined element of religious market will be the labor that is a part of the payment for the religious goods, which gives religious firms the opportunity to discriminate its customers. In Section 2.2 we will focus on the differences between exclusive and inclusive religious firms. This part will be mostly based on '*Voodoo Economics? Reviewing the Rational choice Approach to Religion*' by Laurence R. Iannaccone. [Iannaccone, 1995b] Moreover, we will also examine the sources and consequences of the risk associated with religious portfolios. The section dealing with diversifications of religious portfolios is based mostly on '*Risk, Rationality, and Religious Portfolios.*' [Iannaccone, 1995a]

In the fourth chapter, I will try to introduce a consumer model derived from the basic microeconomic model for the explanation of my proposals and suggestions I present here. First of all I would like to add a simplified implementation of religious human capital into the model.

---

[1]Due to better living conditions and science advancements. The forecasted causes and expectations of declining religiosity have been described for example in [Stark, Iannaccone, and Finke, 1998, 1996].

1 Demand side of religious markets

1.1 Money and labor

The payment for every religious good includes a certain amount of financial resources and a certain amount of labor.[Iannaccone, 1997] Collected financial resources serve as a source for buying inputs needed for the production of the goods and other needs of the firm, that can be acquired on the market. The consequence of including labor into the payment for a good is that the price is individual for every customer. There are two reasons why these prices are individual. First of them is the human capital accumulation (human capital accumulation is a reason itself, why religious firms include labor as a part of the payment for their religious goods). The effective amount of labor required can be defined as a certain amount of work with certain experience and abilities. Therefore, less amount of work will be required when the individual has accumulated some human capital. The second reason is that the price depends on the ability of religious firms to discriminate.

When the secular opportunities improve, the wage will rise. Consequently, the value of the labor for an individual will increase. As a result, religious firms tend to lower the amount of labor required as payment for the good with increasing secular opportunities. The labor does not have to be used for the production of goods it was earned for. Let us consider two goods – one that requires only a small financial payment, but a lot of invested time and another one with higher price, but less time-demanding. The former good would be naturally more attractive for people with lower wage and thus lower cost of time while the latter would be more appealing for consumers with more expensive time.

Another reason for implementing labor as a part of the payment is the income tax. If the labor is acquired on the religious market, a firm must pay a tax, what is not profitable for both, customer and the firm. So acquiring the labor outside religious labor market gives the opportunity to avoid taxation. But all labor will not be retrieved through the payment, because it could discourage potential customers with higher secular opportunities (another point of view is discussed above). On the other side, a firm must also consider potential subsidies for their goods, that lower the price of the labor.

The utilization of gathered labor varies substantially from religious firm to religious firm. It could be singing or playing instruments at masses, tidying up churches, helping with the construction of churches or vicarages, proselyting or administration work in the mainstream western churches. In the eastern churches,

the voluntary work is similar to the that of the westerns in the past. It also includes working on the estates of the churches or teaching. The reward has often the form of insider information concerning other religious goods.

Strict denominations and sects usually require more labor, what is consistent with their target group. They often include involvement in proselytism, working in the administration, sometimes even in insuring production of their own food supplies. We can find similar results for the religious militia, which also require a substantial amount of time devoted to the needs of the militia. Moreover, they also require time dedicated to military operations or training.

We can now summarize the implications for the model. The payment may be in the form of labor, money or their combination. The consequence of involvement of labor into the payment is that the price is different for each customer due to the different amount of accumulated religious human capital of each customer of a religious firm. This is because of opportunity costs [Iannaccone and Everton, 2004], because instead of using the labor as a payment for the religious goods, consumers can offer their labor on the secular labor market. Naturally, the wage for the labor offered on the secular market can differ very much from customer to customer.

1.2   Human and social capital accumulation

Labor is one of the most heterogeneous of all inputs. The productivity of the labor varies highly from one worker to another and crucially affects the level of output produced by an input of labor. There are many factors influencing the productivity. One of them is the work experience, that grows up by performing certain tasks. These tasks need to follow certain procedures and one needs time to memorize them. The circumstances are also very important, because it is very unlikely that a person will encounter all possible states of the world during a single period of his work time. Thus even when a certain state of the world is encountered several times, one can still learn from the experience and his productivity will grow. Another important factor is the establishment and development of social networks among the fellow workers. A social network can enhance the team work, thus increasing the output per a unit of labor. These are some of the facts among others, that have laid the basis of the concept of human capital.

However, human capital is very content-specific and as a consequence, the accumulated human capital in one work region cannot be used in another one. As a result, the switch to a job in other sector will induce exit costs in the amount of the value of accumulated human capital. The concept of human capital can

also be extrapolated to the religious markets. One of other factors, that alter the productivity of religious labor is the companionship of fellow worshipers - the social capital. This companionship is mostly an outcome of time spent together in shared activities and shared beliefs. Another factor is religious knowledge of some kind,[2] that can be increased by studies and also during religious activities like mass attendances. Other element boosting religious capital is the familiarity with traditions, rituals and doctrines, which can also be improved during religious activities.[Iannaccone, 1995c]

There exists a lot of supporting evidence for this concept. One of them is denominational mobility. People of a certain religion usually stay with one religion all their life. By abandoning a religion, one looses or damages not only the social network, that has been built since he joined the specific church, but also his religious experience becomes unusable. These facts affect the willingness to switch the religious firm, consumer is buying religious goods from.[Iannaccone, 2004]

Another evidence can be found after examining the conversion ages. Children are often encouraged in religious practice with their parents, what is often stimulated by the religious firm, because children tend to preserve the faith, there were raised in. In the early stages of life (till the teenage period), children usually have only little possibilities to choose the religious firm for themselves and lack the responsibility to choose a religious firm by themselves. But when they reach the age, when they become capable of such decisions, they already have a stock of religious capital specific for a certain religious firm. This is the time[3], when most of the conversions tend to occur. The probability of conversion falls by the age, because the accumulated capital rises with the years of devotion to a specific religious firm. [Iannaccone, 1995c][4]

Involvement in religious activities and the demand for religious goods also rises with age. This fact has been confirmed by many previous studies.[5] Religious capital seems to be one of the causes, because the rising experience in religious activities reduces the relative prices of religious goods that require religious labor as a part of the payment for them.

The production of religious goods is encouraged, when both spouses share the same religion. One of the reasons is that such couples will benefit from "economies of scales". A single-faith family can spare money spent on religious literature, transport

---

[2]In fact, we consider mostly non-scientific knowledge. Most of the human religious capital generating activities are not aimed at the objective study of church history or doctrines.

[3]Between 15th and 17th year of life.

[4]Moreover, results of Catholic American survey from 1974, 1963 Church Member study and General Social Surveys show that church attendance and religious upbringing have significant impact on contributions to the church and mass attendance. [Iannaccone, 1990]

[5]Some data concerning the dependence of the age of adherents on mass attendance can be found in Section 5 (see also Figure 1).

costs or various religious commodities. Sharing a religion may lower the tension between spouses, strengthen their faith (as a consequence of reducing the differences in view of many aspects of faith), simplify the religious upbringing of a child and so on. As a result, it is common that a person would switch his faith to the faith of his or her spouses. Hence, the religious firms tend to encourage their members to marry people, who are members of the same religious firm. Some of these firms even prohibit marrying people of other religion, often under the threat of exclusion from the services provided by the religious firm. The spouses with a shared religion tend to contribute more resources, attend church more often and pray more often. [Iannaccone, 1990]

Another proof can be found, when we examine the effects of the demand shocks that happened in the past. Religious wars during reformation are an excellent example. These wars did not occur in all places, where the Reformation began, due to historical circumstances. They seem to had a significant impact on the loss of demand in countries, where the wars were more violent and lasted for a longer time. The contractions between the pronouncements and actions may have lowered the credibility of religious firms. Bloodsheds and credibility gap have thus increased the risk associated with religious portfolios. The resulting lost of demand seems to be a result of raising risk associated with the goods of particular religious firm. As a consequence, the children were not building their religious capital along with their parents and later remained only with little or no demand for religious goods. This has repeated generation after generation and was one of the factors leading to current lower church attendance.

Especially collective[6] religions lay a great emphasis on building social capital. In the past, many church events were also family very much oriented and offered a great opportunity for families to meet and enhanced the production of social capital in the families themselves. Better secular opportunities, labor mobility and other factors have strongly reduced the effects of these events in the Western (Christian) world[7], but they still play an important role in Islamic countries.

One of the causes of success of radical groups is their interest in activities for children, thus insuring the broadening of their member base. Radical movements have often established their own madrasas,[8] especially in the areas with weak educational opportunities. However, majority of these schools also provide education along with their own sight of Qur'an, thus shaping religious beliefs of their pupils

---

[6][Iannaccone, 2002] makes a distinction between collective *"which emphasize exclusive membership, employ sacrifice and stigma, maintain high levels of participation and view all members as co-workers"* and private religions *"which obtain little or no brand loyalty, permit diversification, average low levels of participation and focus on fee-for-service transactions."* For more information about sacrifice and stigma see [Iannaccone, 1992].

[7]Especially in the cities.

[8]Madrasah is an Arabic word for school.

and building their religious human capital. Hamas has founded many youth clubs or even nurseries and kindergartens, where children can get a free meal. Moreover, there is also a website and a TV show dedicated to children, where religious teachings are combined with secular ones. [AP, 2007]

Now, we are able to formulate the assumptions for the mathematical model. Firstly, we can assume that the wage will mirror the productivity of the labor. For the sake of simplification, we will consider only a linear improvement in productivity in a time period. We also assume that the amount of accumulated capital during a time period does not depend on the amount of goods bought in that time period. Moreover, we will presume, that individuals are identical in the ability to gain new experience. The time needed for accomplishment of certain tasks will thus fall by each time period according to the experience coefficient c. Lastly, we will consider the experience coefficient c to be a constant in time (it will not change by time).

1.3 Time

Despite the popular view of religious firms as conservative organizations with a particularly constant area of supplied goods it would be unwise to analyze religious markets without taking the time into account. Just like a regular firm, a religious firm has to count with many factors influencing the demand for their goods and adjust accordingly its supply, otherwise it may face the threat of loosing its adherents or even bankruptcy. [Iannaccone, 2003]

One of the most influencing factors are the secular opportunities. A religious firms can often offer some of the services, that are not available on the market. One of the grounds for this advantage is that religious environment and communal activities form a great ground for mutual monitoring, thus reducing the probability of deception. This can be a key matter, when a religious firm is offering certain kinds of insurance, which secular firms are unable to offer because of deficient information concerning the interests and will of interested persons. [Postrel, 2005] Another advantage religious firms have is the large number of homogeneous exposure units. However, after a certain development in the society (for examples due to law changes), new secular firms might be able to enter the market and press on the religious firm to change the conditions under which insurance is provided.

Other important element is the accumulation of capital. Typical religious firms exceed the lifetime of an individual and has the ability to collect a large amount of finances. Huge reserves and vast amounts of money and assets give a religious firm the opportunity to carry business in almost every region of the economy. Adam Smith noted in the Wealth of the Nations, that this was one of the crucial causes

of the success of the Roman Catholic Church in the Middle Ages. He also observes that the accumulation of capital in the hand of the entrepreneurs has also immensely reduced its authority. Till that point, no other organization could compete with the resources and influence of the Roman Catholic Church. [Smith, 2005]

We also have to consider the impact of secular opportunities on wages. The wages tend to rise with raising secular opportunities. This means, that consumers can afford more expensive goods and the value of their time increases. As we have discussed before, many goods provided by religious firms require not only a financial payment but also a certain amount of time. Better secular possibilities will thus reduce the willingness to sacrifice time needed for buying these goods.

A great deal of goods supplied by religious firms are centered on "mainstream" consumers. If the prices and the required amount of work does not mirror the evolution of the society and improvement of secular options (and thus also the increase in income as a consequence), the goods may become inferior goods for a greater part of the adherents. This seems to be another explanatory factor for the decay of demand for the religious goods during the fall of the Middle Ages and the beginning of the modern period. Another implication arising is that a religious firm has to choose target audience and adjust its goods to their expectations. Surely, the firm can decide to diversify its offer to fit the need of a larger scale of potential customers (as was also mentioned above).

The progress in the development of secular opportunities will also affect the significance of social capital that is being built during collective religious activities. Firstly, industrial development will lay more emphasis on the labor mobility, which disturbs the social networks (and naturally also the ones magnified during church activities) built during the time before moving to another place, where the individual has better job opportunities. Secondly, a progress in the society and a progress in the economy of a country creates new possibilities for building social capital. With the emergence of the modern society a great scale of organizations, clubs and entertainment possibilities arose driving out their religious equivalents. Thirdly, individualism seems to be screening out teachings of community oriented collective religious firms, thus undermining the principles of their religious goods production.

Another importance of time when examining religious goods is its connection to the religious human capital accumulation and social capital accumulation. Human capital directly depends on time spent on performing certain activities and social capital depends on the time spent performing activities together with the collective. [Iannaccone, 1995c]

As a result, we need to incorporate time in two ways. The first one is the time period, in which religious goods are sold. The second one is the amount of time, consumer is already buying the good.

2 Supply side of religious markets

2.1 Product bundling

Religious markets are usually analyzed as markets of religious firms offering religious goods. The fact is, that religious firms usually do not offer only religious goods, but also offer a plenty of secular ones. What is important is that both kinds of goods are offered together as one bundled good. This prohibits the consumer to choose between the secular or the religious good alone.

Many religious firms can even provide their adherents with goods, that are not available on the market. One of the reasons, why this is possible is that the firm can use the revenues from one country to buy the goods in that country and supply the goods to the country, where the specific goods are missing and thus have an competitive advantage over other religious firms operating in the religious market. A member of a collective religion is not allowed to buy religious goods from other religious firms and as a consequence the consumer is tempted to switch to the religious firms with the comparative advantage. This will probably also affect religious beliefs of the ancestors, because of the stock of accumulated religious human capital.

This means, that during the introduction of a religious firm to the religious market in a certain region, the revenues collected in this region can be lower than the costs for the supplied goods. After a time, religious firm establishes a sufficient member base and the revenues will by time become equal to the costs. Proselytes are offered education, health care, economic promotion in combination with religious activities and goods. Missionaries will often build orphanages, nurseries and youth clubs, thus broadening the base of the believers.

Insurance is a typical secular good shipped along with a religious one. It is provided through the social networks of a church, through charity or even through the church itself. Mutual monitoring provides a very good mean against adverse selection, moral hazard and other asymmetric information problems thus boosting the effectiveness.

Recent research in the United States has shown, that religious participation (measured by the amount of contributions devoted to a religious organization) reduced the impact of income shocks on consumption by approximately 40 %. Moreover, religious attendance provides a significant consumption insurance effect for low-educated, low-wealthy, low-income white people and marginally significant consumption insurance effect for low-educated black people, and it also provides

a happiness insurance against income shocks for low-educated, low-wealthy, low-income blacks.[9] The mutual help seems to be in the form of a financial help or a loan for whites and in kind for blacks.[Dehejia, DeLeire, and Luttmer, 2005]

In the ancient state of Europe, the clergy collected a vast amount of wealth through tithes collection and rents from the estates, that were in the possession of the church. Revenues arising in this way were in a greater part paid in kind (wine, corn, wheat etc.), thus generating reserves in the range that far exceeded the basic needs of clergy. Many people (especially in the time of poor crops or other cases of need), including knights, were reliant on the hospitality of the church, traveling from monastery to monastery showing their devotion in order to exploit the hospitality of the medieval church. There was a network of monasteries, where the monasteries were insuring each other in cases when one (or a couple) of them had a problem with insufficient supplies. The surplus thus served as a base for a kind of insurance (both consumption and happiness) and gave the church a great power and spiritual authority. However, this power diminished by time with the improvement of commerce, but the effects of insurance still exist in present times.[Smith, 2005]

Charitable assistance provided by religious firms is also often bounded to religious goods, and those, who are willing to receive it, often have to show their religious commitment. In church schools, the day begins with a prayer and religious attendance is sometimes obligatory. [Smith, 2005, Iannaccone, 1994b]

Most religious firm encourage their members in charitable contributions and establish a number of charitable organizations or distribute the help to people in need directly through the church. In many countries, where the influence of a religious firm has a considerable impact on the government and society, charitable giving has become a part of the law of a country.[10]

Charity was one of Christian activities from the very beginning. The charitable activities involved building orphanages, hospitals and hospices. Later, these institutions have become a part of the monasteries. Monasteries also provided education or an asylum in the times of barbarian raids. The Catholic Church has thus become one of the central institutions responsible for charity, income redistribution and mutual insurance. [Knight]

For Muslims, it is an obligation to pay $1/40^{th}$ of their income as an aid to the poor, those, who have problems paying their debts etc. People with annual income below a certain level are not obliged to do so. This kind of tithing and alms is

---

[9]Data from National Survey of Families and Households were used as a source of data on subjective wellbeing of individuals. Since the question about happiness was asked in both of the surveys used by the analysis, it gave the researchers the opportunity to study the impact of income shocks on the self-reported happiness of the participants and the impact of religious participation to buffer these shocks.

[10]Surely, the contributions to charity can be established through realization of a secular program, but many countries have established them through religious law.

called Zakat and is one of the pillars of Islam. There are many charitable Muslim organizations and many of them are financed through Zakat. One of them is Muslim Brotherhood, which is disputed in the next paragraph.

Similarities can be found when we examine the success of radical religious militias. Muslim Brotherhood, the parent organization of Hamas, has a long tradition in providing education, health care, mutual insurance, anti-drug treatment, welfare and community services and it has been often used to help humanitarian organizations with the distribution of humanitarian aid in Gaza and West Bank.

People are more likely to associate in groups, when the government is unable to provide enough public goods like education, defense or public safety. These groups are often able to provide their members with these goods and many others, like food, clothing or insurance. [Berman, 2003] For instance, Hamas supplies their members with health care, cares for their children, provides an extensive social network or even support cultural events. It also runs orphanages, soup kitchens, clinics, mosques and sport leagues.[11] Israeli scholar Reuven Paz claims: *"Approximately 90 percent of its work is in social, welfare, cultural, and educational activities."* [cfr, 2007] This means, that the development of the welfare state can heavily diminish the influence of the religious firms.[12]

For comparison, we can examine the cases of their unsuccessful counterparts. Members of Gush Emunim[13] followed a set of behavioral constraints, including dress codes, distinct educational system and longer than average Yeshiva attendance. However, these constraints were not even as strict as those of Ultra-Orthodox Church. They neither had a strong social network, nor provided their adherents with a full-scale of goods except for activities, that were increasing their personal safety.[14] They never had the opportunity to markedly affect the education in the schools, never established a solid base and did not become excessive financial support. They did not even find a rabbinical authority, who would have approved their planed violent actions. Following the murder of six students, members made a revenge by killing and harming several Muslims. However, the Israeli General Security Service has soon investigated the case and prevented the members of Gush Emunin to perform the rest of their planed actions. The findings are straight. Radical groups, that does not meet the specified criteria seem to have limited opportunities

---

[11]The nationalization of Muslim Brotherhood's social services network in Egypt led to a substantial decline in Brotherhood's activities.[Berman, 2003]

[12]An interesting point by Berman, concerning a good anti-terrorist policy: *"The single most important tool in weakening militias may be improving the outside options of members in order to encourage defection. The PLO provides an example. When their Black September cell became a potential liability to the parent organization in the early 1970s, it was successfully retired by providing members with steady jobs, apartments and even brides in Beirut."*[Berman, 2003]

[13] Radical Jewish group.

[14]On the other hand, these activities included violent behavior and implicated a growth of tension.

to become a permanent serious threat. [Berman, 2003]

2.2   Risk and portfolio diversification

People interested in a religious contract face the problem of incomplete information. They must deal with potential supernatural gains, that are not provable during their lifetime. [Iannaccone, 1997] The religious firms tend to overstate the value of their goods, but potential adherents are aware of this and try to diminish the risk of buying overvalued goods. The potential benefits of the club goods provided by a church are thus often not well-known to potential customers if they don't know someone, who is already enjoying the benefits of the particular good. The consequence is, that they seek information from insiders, inspect the credibility and demand guarantees. [Iannaccone, 1995a]

The teachings also tend to be more persuasive, if the salaries of the clergy do not depend on the faith of their followers and are relatively low to the level of education. [15] [Iannaccone, 1999]

A very important factor, that affects the risk associated with religious goods, seems to be the credibility of the religious firm. Every action of the firm, that is not consistent with the teachings may lead to the loss of confidence. Religious wars during reformation have highly affected the trustworthiness of the Roman Catholic Church. Thus the risk associated with their goods as perceived by the consumers rose badly. As a result, these goods become less attractive and the demand fell.[16]

It has also been observed that the credibility of the church is also strongly related to the credibility of its partners and organizations, the church depends on. This fact can be observed for example in the relation between the church and the state. The moral authority of a church will be negatively affected by a strong connection to the state or regime if the moral authority of the state or the regime is low. These factors can also greatly influence the demand for church goods for reasons similar to those discussed above. [Moeller, 2004]

The situation changes radically when the church stands up for a side in a conflict. The popularity of the church will substantially rise in the groups with church support. This is the case of Poland, where the Roman Catholic Church

---

[15]These are also two of the reasons, why volunteer workers are often favored over professionals.

[16]Iannaccone gives another example how churches try to assure the confidence of its followers: *"Testimonials are commonplace in religion and, predictable, are more common in those variants that place greater emphasis on material blessings. Testimonies are more likely to be believed when they come from a trusted source, such as a personal acquaintance or a respected figure. ... This helps to explain why the character of religious organizations is so often congregational. Fellow members are more trustworthy than strangers."* [Iannaccone, 1995a]

was a part of the opposition against the communistic regime, in Ireland, where the Roman Catholic Church supported the Free State, in Malta or in Quebec. [Stark and Iannaccone, 1994] By contraries, the attitudes toward a church may also lead to hostility from groups, whose members are involved in activities, that are prohibited by the church.

Another way to diminish the risk is diversification. But this is usually strictly forbidden by most of the present western 'collective' religious firms in order to avoid free-riding. [Iannaccone, 1992, 1994a] Collective religious also focus on the collective aspect of their religion. The forbiddance of diversification forces the members of a religious firm to buy all the religious goods from the concrete religious firm, thus eliminating the possibility to be a customer of another religious firm. Moreover, the teachings of religious firms associated with certain religious goods are often contradictory, what may lead to lower credibility of the religious firms if one has to obey rules of multiple religious firms.

The punishment for acquiring goods from other religious firm vary from prohibition of access to the goods of the certain religious firm to excommunication or even execution. Typical collective religions are Christianity, Islam or Judaism. The other religions can be denoted as private religions. They usually do not deny their adherents to be also customers of other religious firms. The disadvantage these firms face is that they are more susceptible to free-riders problem, usually do not build as much social capital as their collective counterparts and usually have more problem with generating members' commitment. [Iannaccone, 1997, 1995a]

When examining the religious parts of the goods, we can see that the supernatural segments are very various. Furthermore, the outcomes concerning certain state of the world projected by one religious firm are often in conflict with outcomes projected by another religious firm.[17] It is doubtless, that the consumer would like to choose rather a portfolio consisting of religious good from several religious firm than a set consisting only of goods from one religious firm in order to reduce the overall risk of the supernatural segments of the religious goods, but he doesn't have to opportunity to do so when he is a customer of exclusive religious firm.

Another reason for diversification is that buyer would usually prefers a larger scale of goods over a few ones to choose from. Some firms offer only a limited number of goods, but there are also religious firms[18] that try to satisfy a wide number of people with different preferences. [Iannaccone, 1991]

In the ancient Rome, there was a strong religious competition. People

---

[17]For example, death is perceived by the majority of Christian denominations as the end of life on this world, leading to an afterlife. In Hinduism, death is only a part of the reincarnation cycle.

[18]In particular the Roman Catholic Church.

could choose if they would worship Greco-Roman gods, a school of philosophy, Caesar, or someone else, eventually a combination of them.[19] [20] Judaism and Christianity demanded its followers to participate in a single religion. This kind of intolerance led to prosecution of their members. However, in the beginning, the situation was a far from the desired condition (at least for the first few centuries) - people used to worship the Christian God along with the pagan Greco-Roman gods, philosophers or admired people. The community-oriented faith of Christianity conducted to establish institutions promoting social security, including caring for orphans, disabled, unemployed and old, what seems to be one of the causes of its success. [Iannaccone, 1995a]

---

[19]For instance, Emperor Alexander Severus had a picture of Jesus Christ in his private temple along with pictures and statues of Abraham, Orpheus, Apollonius of Tyana and others or Gnostic sect of Carpocratians honored Christ along with Pythagoras, Plato, Aristotle, and others. [Iannaccone, 1995a, Schaff, 1953]

[20]In fact, the situation was very similar to Japan, where many people consider themselves to be a member of more than one religious group [Iannaccone, 1995a, 1994a])

3 Religious market structure

3.1 Three major periods of a church

The financing of the religious firms changes rapidly throughout the existence of a religious firm. A typical religious firm is about to go through three major periods of being financed during its whole existence or its existence in a certain region or country. A religious firm can skip one or more of these steps if it originated from a separation from an existent religious firm.

During the first period, religious firm has to choose its focus group, choose the adequate output and find a supporter. The supporter is usually the same firm already operating in another region. It can also be an organization or a group, seeking its own interests by using a religious firm to help accomplish them. Taliban will serve as a perfect example. The impulse towards its formation were the interests of 'Afghanistan Transit Trade' trade road to the Central Asian republics. [Berman, 2003]

If the supporter is the same firm operating with established member base in other country, it simply has to shift the resources from local markets to the target market. Sometimes, the government of the target country encourages the religious firm to operate on their market awaiting the inflow of know-how or capital into the country. A typical method of proselytism is missionary work.

The second period begins, when the religious firm acquires enough finances to operate on the market without external support. The religious firm becomes self sufficient, proselytism and goods production is administered and financed through from the revenues from the market.[Iannaccone, Olson, and Stark, 1995]

The member base is broadening and tend to consolidate. The teachings incline to stabilize and the church usually becomes an official recognition (if there is no monopoly or prohibition of religious activities). The religious firm is counting on the accumulated religious capital of its adherents, goods are gradually loosing their proselyte character and new religious goods are produced in order to broaden the focus group.

The third period starts, when the religious firm has a stabilized membership and the demand for its goods is saturated. The costs for proselytism of another potential consumers become high so the religious firm usually uses its profits to finance proselytism in other countries, where these costs are lower. The authority of the religious firm is rising and the government or an interest group may use its influence to put through a certain law or a special privilege for the religious firms

awaiting support from it. This kind of rent-seeking behavior may be focused on efforts to capture monopoly privileges, state support or even the introduction of a special religious tax.

As a consequence, many teachings or religious contracts can be thus incorporated into the law. The terms, only members were subjected to, may thus become a part of the state law, so everyone will become a subject to it.[21] As one of the results, the right to choose will often be restricted. These laws may remain a very long time valid, even when the authority of the religious firm diminishes or the state church is abandoned. Moreover, a religious monopoly can attempt to suppress other religions. The tolerance will be deteriorating and the situation may sometimes even lead to the prohibition of other religious firms.

In the ancient Rome, the initial suppression of Christianity by emperors as Trajan Decius changed progressively to the suppression of paganism with the raise of popularity of Christianity.[22] [Nathan and McMahon, Woods, Pohlsander] Similar repressions against Jewish population were mostly common in the Middle Ages and continued to the Modern Times. Another example is the prohibition of entrance for Jews in Norway in the past or prohibition of changing faith in many present Islamic countries.

3.2   Religious monopolies

The self-interest motivation of clergy is similar to that of secular producers. In contrast to a free religious market, where religious firms depend only (or mostly) on the voluntary contributions of their adherents, religious firms that have a monopoly in certain country benefit from state support. State support is financed through taxes, what gives monopolies a stable source of financial resources, thus leading to lesser effort of monopolies to enrich their offer. Religious monopolies lead to inefficiency, deadweight losses and higher prices.

The abolishment of state monopoly doesn't straightly mean the withhold of privileges. Iannaccone [Iannaccone, 1991] notes: *"Even in countries where the dominant church no longer enjoys a special legal status, it is common for that church to benefit from de facto establishment in the form of special subsidies, potential*

---

[21]There is a vast number of example, concerning this issue: prohibition of divorce in Ireland, prohibition of homosexuality under death penalty, compulsory mass attendances, ban of abortion etc.

[22]The suppression was done by emperors Constantine I, Theodosius I and others.

access to public facilities, favorable legislation and court rulings and on-going political favors." It may take decades for the market to become fully competitive.[23]

Moreover, established privileged churches will tend to increase their subsidies through lobbying state representatives, thereby taking part in wasteful rent-seeking behaviors. Lower quality of religious goods in monopolized markets may lead to lower consumption, even when the goods are supplied for free. Furthermore, a monopoly usually can't satisfy all kind of demands of the market.

A recent study has shown, that Protestant attendance rate depend strongly on the market structure, while Catholic attendance rates are almost independent of it. Other reason, why Catholic monopolies seem to be more effective is a broad supply of goods, that is a consequence of tolerated diversities inside the church.

The impact of a monopoly on the quality of the supplied goods also depends on centralization of the religious firm. Centralized religious firms[24] seem to be more resistible to the backward pressure on them from the government or interest groups. Decentralized religions (like Protestantism) seems to be much more vulnerable. Decentralized religions usually become over-bureaucratized, thus becoming much more dependent on the representatives of the state. As a result, members of the clergy often resembles civil servants.[25]

Moreover, central authority of the centralized religions appears to prevent the clergy from loosing their interest in quality of their offer. As a result, market competition on the religion markets tends to raise religious attendance especially among Protestants substantially. [Iannaccone, 1991, Stark and Iannaccone, 1994] After a time, monopolistic religious firm might become only a part of state bureaucracy and while still enjoying the benefits of a state religion, the impact on the state law may diminish significantly. This seems to be the fortune of all Protestant monopolies.[26]

---

[23]Other reason, why it takes time to adjust to opening religious market is the religious human capital discussed in other section.

[24]As for example the Roman Catholic church.

[25]Iannaccone [Iannaccone, Finke, and Stark, 1997]gives an example: "*State intervention is, of course, the price that the Church must pay for state protection. Numerous special laws regulate the Church's role, and the king as the head of the Church names the archbishops and bishops to their positions. And though the Swedish Church has always served as organ of the state, its dependence has grown since the Social Democratic Party came to power in the 1930s. From its traditionally atheistic party, which had originally called for disestablishment, the Church appears to have purchased support by subjugating its religious concerns to political demands.*"

[26]In some countries, as for example in Sweden, one obtains the membership in the church with his birth. Furthermore, the attendance at church used to be compulsory in past. Besides, citizens, who became Catholic were exiled. The clergy is integrated to bureaucracy and the salaries are very high. In Sweden, the religious contract for the priests does not require any religious qualification, baptism or confirmation. High significant impact of the state on the religion may lead to a case, where in fact the state takes the dominant control of religious contracts over the church. This is also the case of Sweden, where the parliament passed a law authorizing female pastors despite the disapproval of the bishops. [Stark and Iannaccone, 1994]

The development of secular opportunities seems to have a significant effect on the fate of the monopoly. With improving secular opportunities, religions have to keep up with the trends and accordingly change their offer. However, the incentives to adjust the offer to new requests are clearly lower, when the main part of the income of the clergy does not depend on the satisfaction of the costumers but rather on the goodwill of the state. Obviously, this will lead to a lesser attractiveness of the goods, what will put on to the loss of demand. [Stark and Iannaccone, 1994, Iannaccone, 1991]

3.3   Religious competition

There has been a lingering discussion between secularization theorists and their opponents about the influence of religious competition on the demand for religious goods. Secularization proponents suggest, that the differences between the teachings of the religious firms will lead to a loss of demand, because of the diversity and because of the contrariness of the doctrines. On the other side, the opponents argue, the competition will generate a strong incentive of the religious firms to adjust to the needs of the customers, what will also raise the demand for religious goods. Both of these positions have their point and it would be unwise to dismiss neither one of them. The final effect will thus depend on the outcome of both contradictory influences.

Supporters of secularization hypothesis argue that monopolies profit from the uniformity of the teachings available on the market. If there is a plenty of religious teachings in a certain area, the trustworthiness of a church decreases (for the reasons mentioned above), thus generating a higher risk that is associated with certain religious goods. Furthermore, monopolized markets are associated with high levels of subsidies. If the religious firm loses its subsidies, it would be no longer capable of producing goods at the quality demanded by consumers.

Opponents often state, that market competition press on religious firm to evolve and supply goods with parameters that will suit the market conditions. In a strong religion competition, the churches depend only on the contributions of their adherents and the inadaptability will cause low demand for their goods or even the bankruptcy of a religious firm.

Many economists consider low religious participation in the western Europe 'a supply-side' problem, that is strongly related to the regulation of the religious firms, that hinders market competition.[Stark and Iannaccone, 1994] Many scholars argued that deregulation of religious markets will lead to secularization. Secularization can

be characterized as the loss of interest for the supernatural what will become evident as the fall of demand for religious goods. However, experience has shown, that deregulation of a highly regulated religious market will lead to desacralization, not secularization. This desacralization seems to be temporary and the market powers will force religious firms to alter their contracts to attract new customers. Recent surveys have shown, that the situation in countries that were considered secularized is somewhat different.[27] The deregulation is often only apparent, because of the high entry costs and connections of the churches to the state. Moreover, new churches can only hardly compete with churches with governmental support in such cases.

An excellent occasion to study the impact of religious competition came along with the end of the second World War in Japan. Before the end of the war, the market was strongly regulated by the state. Japanese emperor was declared to be a living God (Arahitogami), Shinto priests were officially organized by the state and involvement in ceremonies was mandatory. Officially, freedom of religion existed since 1889, but in fact religions that existed without official recognition[28] were strongly suppressed. The situation changed radically when the Allied Occupation forced the Emperor to grant real religious freedom. The number of officially recognized religions rose from 31 before the occupation to 434 in 1949 and rose further. Of course, it was also a consequence of the war itself, but the growth of new religions continued long after the end of the war. [Iannaccone, Finke, and Stark, 1997]

Another example can be found when we examine the impact of American revolution in 1776. Before the revolution, adherence in USA and Great Britain were similar. From 1776 to 1850, Congregatorionalists', Episcopalians' and Presbytarians'[29] religious market share fell from 55% in 1776 to 19% in 1850 and reversely the Baptists and Methodists religious market share rose from 19% in 1776 to 55% in 1850. Important fact is also, that church membership rose from 16% of the population to 34% in 1850, 51% in 1906 and 62% nowadays. The differences between religious attendance and church membership in the USA and Great Britain rose steadily throughout the centuries and the situation on both market is now markedly different. [Iannaccone, Finke, and Stark, 1997]

---

[27]We can take Iceland as an example, where about 2 % attends weekly, but 66 % of Icelanders consider themselves a religious person, 75 % claim to believe in God and only 2 % claim to be atheists. Similar findings apply also for Sweden, Norway, Finland, Denmark, France and other countries.

[28]Which was very had to obtain.

[29]These were the churches, that used to enjoy the benefits of state support.

4 Mathematical model of religious market

4.1 Consumer model of religious markets

Now, we can put the entire model together. The model is a basic microeconomic model based on [Varian, 1995] extended for religious markets. Extentions to religious market are based on my interpretation of [Iannaccone, 1997]. From Section 2.1 we know that religious goods are sold along with the secular ones. Let i denote the number of ith secular good or service, j denote the number of the jth religious good or service and let e be the number of the consumer. Let there be P customers, M secular goods and N religious goods. Moreover, we presume that secular firms sell only secular goods. Let $\mathbb{S}_e = (s_1, \cdots, s_i, \cdots, s_M)$ be a vector, that represents the quantity of goods, consumer e buys on the secular market, where s_i represents the quantity of secular good i. Let $\mathbb{R}_e = (r_1, \cdots, r_j, \cdots, r_N)$ be a vector, that represents the quantity of goods, the consumer e buys on the religious market, where r_j represents the quantity religious good j. Let T be the time period consumer is buying the goods in.

Let $\mathbb{X}_e = (s_1, \cdots, s_i, \cdots, s_M, r_1, \cdots, r_j, \cdots, r_N)$ be the package, consumer is choosing to buy in the time T.

Now, we can move to the assumptions from Section 1.2. Lets assume that the labor costs will reflect the marginal productivity of the labor as a production factor, i.e. the wage increases accordingly to the increase productivity of the labor. We can moreover presume, that every time a consumer buys a religious good j that requires an amount of labor, he will have to work less for the production of his religious good j because of the difference in the accumulated human and social capital accumulated for religious good j.

Every price of a secular or religious (considering only the part of the payment in money) good can also be expressed in the amount of the labor of a certain consumer, that he has to work in order to be able to acquire exactly one unit of good. Lets assume that w_e is the wage of the consumer e and the price of the ith secular good is p_i. We can write $p_i = l_{e,i}.w_e$ and thus $l_{e,i} = \dfrac{p_i}{w_e}$.

Let religious good j require a input of ℓ_j units of labor with no accumulated human religious capital, that is equal to w_j. Let moreover C_j be the coefficient of accumulated human and social capital of religious good j. If consumer e has bought religious good j in the past and has accumulated human an social religious capital for that good, which can be expressed as $C_{e,j}$ then the supply of labor he has to carry out for the religious good j is equal to $\dfrac{\ell_j}{C_{e,j}}$.

In Section 1.1 we have discussed the fact that the payment has its financial and labor part. For simplification, we can assume that religious good j requires a financial payment of ψ_j and ℓ_j units of unskilled labor of an individual with no accumulated religious human capital or experiences usable on the labor market.[30] Let w_e denote the wage per unit labor of the eth consumer. This means that by selling the labor needed for a unit of good j, he could possibly receive income that equals $\ell_{e,j}.w_e$. The total price of the religious good j for this customer will be

$$\mathbb{p}_{e,j} = \psi_j + \ell_{e,j}.w_e = \psi_j + \frac{\ell_j}{C_{e,j}}.w_e.$$

Let $\mathbb{M}_e$ be the potential income of the eth individual for all his offered labor in the time period T and $\mathbb{M}_e = w_e.\mathbb{L}_e$, where $\mathbb{L}_e$ is the total amount of labor consumer offered by consumer e. Let the amount of the labor performed by the consumer as a part of the payment for all acquired religious goods be equal to $\displaystyle\sum_{j=1}^{N} r_j.\frac{\ell_{e,j}}{C_{e,j}}$.

Thus we can calculate the amount of labor for the religious firm worth w_e and the amount of labor carried out for a secular firm (also worth worth w_e) that a consumer would need to carry out in order to be able to buy exactly his chosen set of religious goods:

$$\mathbf{\mathcal{L}}_e = \sum_{j=1}^{N} r_j.\left(\mathbb{1}_{e,j} + \frac{\ell_{e,j}}{C_{e,j}} \right), \text{ where } \mathbb{1}_{e,j} = \frac{\psi_j}{w_e}$$

Now we can also calculate the amount of labor needed to be performed by a consumer to buy his set of secular goods:

$$\mathbf{\mathcal{L}}_e = \sum_{i=1}^{M} s_i.\frac{p_i}{w_e}.$$

This gives us the opportunity to calculate the amount of labor the consumer e needs to carry out:

$$\mathbb{L}_e = \mathbf{\mathcal{L}}_e + \mathbf{\mathcal{L}}_e = \sum_{i=1}^{M} s_i.\frac{p_i}{w_e} + \sum_{j=1}^{N} r_j.\left(\mathbb{1}_{e,j} + \frac{\ell_{e,j}}{C_{j,e}} \right).$$

---

[30]As described in [Iannaccone, 1997]: *"causal observation suggests, that richer congregations opt for a variety of time savigns, money intensive practisess: shorter services, more reliance on professional staff (such as clergy, custodians, choir directors, and paid soloists), larger and more costly facilities (permitting less use of members' homes for special meetings), less reliance on volunteered labor, and more reliance on purchased goods and services (such as catered meals in place of potlucks)."*

Let $u(\mathbb{X}_T) = u(s_1, \cdots, s_M, r_1, \cdots, r_N)$ denote the utility derived from the set $\mathbb{X}_T = (s_1, \cdots, s_M, r_1, \cdots, r_N)$.

Having this information, we can calculate consumer's income including the value of his labor he carries out for the religious firm:

$$\mathbb{M}_e = w_e.\mathbb{L}_e = w_e.\left(\sum_{i=1}^{M} s_i.\frac{p_i}{w_e} + \sum_{j=1}^{N} r_j.\left(\mathbb{1}_{j,e} + \frac{\ell_{j,e}}{C_{j,e}} \right) \right)$$

Moreover, we can assume that the consumer cannot demand negative amounts of goods.

The first way is to evaluate the value of all prices for the consumer for all goods considering the accumulated human capital for every good.

We arrive at maximization problem:

$\max u(s_1, \cdots, s_M, r_1, \cdots, r_N)$ under conditions:

$\forall i \in (1, \cdots, M) : s_i \geq 0$
$\forall j \in (1, \cdots, N) : r_j \geq 0$

$$\mathbb{M}_e = \sum_{i=1}^{M} s_i.p_i + \sum_{j=1}^{N} r_j.\left(\psi_j + \frac{\ell_{e,j}.w_e}{C_{e,j}} \right) = \sum_{i=1}^{M} s_i.p_i + \sum_{j=1}^{N} r_j.\mathbb{p}_{e,j}$$

Lets define the Lagrange function:

$$L(s_1, \cdots, s_M, r_1, \cdots, r_N, \lambda) = u(s_1, \cdots, s_M, r_1, \cdots, r_N, \lambda) +$$

$$+ \lambda \left(\mathbb{M}_e - \sum_{i=1}^{M} s_i.p_i - \sum_{j=1}^{N} r_j.\mathbb{p}_{e,j} \right)$$

(1)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial s_i} = \frac{\partial u(\mathbb{X})}{\partial s_i} - \lambda.p_i = 0 \ \forall i \in 1, .., M$$

(2)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial r_j} = \frac{\partial u(\mathbb{X})}{\partial r_j} - \lambda.\mathbb{p}_{e,j} = 0 \ \forall j \in 1,..,N$$

(3)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial \lambda} = \mathbb{M}_e - \left(\sum_{i=1}^{M} s_i.p_i + \sum_{j=1}^{N} r_j.\mathbb{p}_{e,j} \right)$$

We arrive at:

$$\frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial s_1}}{p_1} = ... = \frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial s_j}}{\partial s_j} p_j = ..=$$

$$\frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial s_M}}{p_M} = \frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial r_{e,1}}}{\mathbb{p}_{e,1}} = ...=$$

$$\frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial r_{e,i}}}{\mathbb{p}_{e,i}} = ... = \frac{\frac{\partial u(\mathbb{S}_e, \mathbb{R}_e)}{\partial r_{e,M}}}{\mathbb{p}_{e,N}} = \lambda$$

However, it is very probable that the consumer will not have any interest for certain goods. Let there be no interest in secular good v_1 and interest in secular good v_2 (it does not matter whether it is a religious or secular good). We can derive, that it will hold, that:

$$\frac{\frac{\partial u(\mathbb{X})}{\partial s_{v_1}}}{p_{v_1}} \leq \frac{\frac{\partial u(\mathbb{X})}{\partial s_{v_2}}}{p_{v_2}}$$

Thus we can introduce the optimum conditions:

(1)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial s_i} = \frac{\partial u(\mathbb{X})}{\partial s_i} - \lambda.p_i \leq 0 \ \forall i \in 1,..,M$$

(2)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial r_j} = \frac{\partial u(\mathbb{X})}{\partial r_j} - \lambda . \mathbb{p}_{e,j} \leq 0 \ \forall j \in 1, .., N$$

(3) $s_i \geq 0 \ \forall i \geq 0$

(4) $r_j \geq 0 \ \forall j \geq 0$

(5)

$$s_i . \left(\frac{\partial u(\mathbb{X})}{\partial s_i} - \lambda . p_i \right) = 0 \ \forall i \in 1, .., M$$

(6)

$$r_j . \left(\frac{\partial u(\mathbb{X})}{\partial r_j} - \lambda . \mathbb{p}_{e,j} \right) = 0 \ \forall j \in 1, .., N$$

(7)

$$\frac{\partial L(\mathbb{S}_e, \mathbb{R}_e, \lambda)}{\partial \lambda} = \mathbb{M}_e - \left(\sum_{i=1}^{M} s_i . p_i + \sum_{j=1}^{N} r_j . \mathbb{p}_{e,j} \right)$$

Definitions of ordinary and Giffen goods are identical to the basic microeconomic model, so we will focus our attention on religious goods. If there is a negative correlation between demand and total price per unit of religious good i, i.e. if $\frac{\Delta D_j(p, \mathbb{p}, M_e)}{\Delta \left(\psi_j + \frac{l_j . w_e}{C_j} \right)} < 0$, good j is an ordinary religious good. There are two differences between secular and religious goods. One is that the price of secular goods changes everytime the consumer buys a religious good due to the inclusion of labor into the price of the good. The other is that the price of a religious good depends directly on the wage of the consumer.

There are two important implications of the model. Firstly, model indicates that prices for religious goods are higher for consumers with higher wage due to inclusion of labor into the price of religious goods. Consumers, who enter the labor market for the first time, usually already have a stock of accumulated human religious capital. Such a behavior can be observed probably due to the effort of churches to encourage parents to raise their religious human capital along with their children. Thus, the inclination to buy religious goods would be higher if they have

already bought religious goods. Consequently, we can presume that the amount of human religious and social capital will rise with age. Therefore we can add age to the econometric model as a proxy for religious social and human capital. A wage depends, among other factors, on education. This is one of the reason why we include education into our model.

5 Empirical evidence

5.1 Data preparation

Data in the first part of the database come from World Values Survey. This part provides us with information about the preferences of the believers, their age, their religious attendance and some other information that helps us to verify some of the assumptions of mathematical model and some of the assumptions in previous Sections. The second part of the database is based on break-up of monopolies[31] by [Barro and McCleary, 2003] and [Barro and Mccleary, 2005] by Robert J. Barro and Rachel M. McCleary. It consists of data dealing with state religion and state regulation. The third part of the database comes from CIA World Factbook. Among other data, it contains demographic data crucial for the assessment of validity of secularization hypothesis. The year when the data for every country were collected for World Values Survey corresponds with the relevant year of issue of CIA World Factbook.

Many social theorists have been attracted by the secularization hypothesis. They[32] postulated that the improvement in living conditions, modernization of the society combined with the development of modern science and better access to information and education will cause a major decline in levels of religiosity. However, many scientists seem to investigate the results without each examination of separate factors. Some of the presumptions are in conflict with the presumptions I have made. Therefore, I have added additional variables to deal with some of these determinants more properly. I have used the data from CIA World Factbook for this task. Every year of issue of CIA World Factbook for a specific country corresponds with the year data were compiled for World Values Survey for the country.[CIA, 1994-2002]

First variable I have added was the age of the respondents. I have also added other variables that deal with the age structure. One of them is the question dealing with retirement. More developed countries tend to have a higher share of older people due to better health care (and other factors).[DESA, 2007] These and other factors (such as birth rate, mortality rate, infant mortality rate, life expectancy or total fertility rate) also indicate the social development of a society. More advanced

---

[31]Religious monopolies, or in other words state religions have been an interest of economists since 18th century. There are two main prepositions concerning religious monopolies. First one presumes that religious monopolies increase religious participation because of unanimity of religious teachings. The other presumes that since religious monopolies are receiving a financial support from state, they have a lesser incentive to satisfy consumers needs.

[32]Supporters of these thoughts include Max Weber, Emile Durkheim, Karl Marx, Sigmund Freud, Herbert Spencer or August Comte.

societies tend to have a lower birth rate. Infant mortality rate is known to be higher in less developed countries than in high developed countries, where people have higher education. By contraries, relatively higher life expectancy is associated with more advanced countries and better educational opportunities.[of Economic and Social Affairs, 2004]

First of all, the questions asked were different for each year of the survey. Moreover, the surveys were not made for all countries in all years, when the survey was held, so I will include a table where I will summarize all the countries used and corresponding years when the surveys were made for these countries. Furthermore, model is restricted to countries that have been examined for state religion and state regulation by Robert J. Barro and Rachel M. McCleary.[Barro and Mccleary, 2005, Barro and McCleary, 2003] However, some of the countries are missing in the database provided by World Values Survey.[33] Moreover, some of the variables and some of the countries had to be omitted because of collinearity, due to inconsistencies in the documentation, some key variables were missing or most of the data was missing.[34] I also had to omit many variables due to a lot of missing observations in order to find a balance between the number of observations and the number of variables.

Other two variables I have added are GDP per capita (PPP) and total area of the land. Countries with a higher level of development tend to have higher levels of log GDP per capita (PPP).

Many variables had to be dummified. This is for example the case of education. Dummy variables are based on the criterion *"This is a three level index recorded from X025 (Highest educational level attained) on a country basis."* generating possible answers: *"1 - Lower; 2 - Middle; 3 - Upper."*[35]

Another question I have added deals with the subjective positive effect of religion. The participants had to answer the question: *"Do you find that you get comfort and strength from religion?"* Possible answers were: *"0 - No; 1 - Yes."*

Religious attendance is based on question: *"Apart from weddings, funerals and christenings, about how often do you attend religious services these days?"* with

---

[33]Namely Cameroon, Cyprus, Ghana, Hong Kong, Israel, Malaysia and Thailand.

[34]This is the case of China.

[35]Question X025 was as follows: *"What is the highest educational level that you have attained? (use functional equivalent of the following, in given society;IF STUDENT, CODE HIGHEST LEVEL HE/SHE EXPECTS TO COMPLETE)."* I have made dummy variables for each alternative according to the questionnaire: *"1 - Inadequately completed elementary education; 2 - Completed (compulsory) elementary education; 3 - Incomplete secondary school: technical/vocational type/(Compulsory) elementary education and basic vocational qualification; 4 - Complete secondary school: technical/vocational type/Secondary, intermediate vocational qualification; 5 - Incomplete secondary: university-preparatory type/Secondary, intermediate general qualification; 6 - Complete secondary: university-preparatory type/Full secondary, maturity level certificate; 7 - Some university without degree/Higher education - lower-level tertiary certificate; 8 - University with degree/Higher education - upper-level tertiary certificate."*

possible answers: "*1 - More than once a week; 2 - Once a week; 3 - Once a month; 4 - Only on special holy days/Christmas/Easter days; 5 - Other specific holy days; 6 - Once a year; 7 - Less often; 8 - Never, practically never.*", which I have dummified.[36] I have also made dummy variables representing religious attendance at least once a week and religious attendance at least once a month.

Religious denomination of the participants is recognized by two questions: "*Do you belong to a religious denomination? In case you do, answer which one.*" in World Values Survey and "*Which one?*" in European Values Survey. The answers are often not concrete enough to distinguish properly between the denominations. I have narrowed down the possibilities to a few joint dummy variables in order to ensure the database would contain as much observations as possible. I have thus implemented dummy variables for Muslims, Protestants, Catholics, Orthodox Christians and for other denominations.

Other variables had to be adjusted just like in [Guiso, Sapienza, and Zingales, 2002]. I have included a question dealing with the importance of religion in life of the participants. The question that investigates this is: "*For each of the following aspects, indicate how important it is in your life. Would you say it is:*" in World Values Survey and "*Please say, for each of the following, how important it is in your life.*" in Europeans Values Survey. The answers may be: "*1 - Very important; 2 - Rather important; 3 - Not very important; 4 - Not at all important.*" The order has to be reversed just like in the upper case.

The next question asked is related to the confidence in churches. The confidentiality is based on the response to the question: "*I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?*". The potential answers are: "*1 - A great deal; 2 - Quite a lot; 3 - Not very much; 4 - None at all.*" I have renumbered the answers in the reverse way.

I have added variables for the state regulation of religious activities and state religion on the basis of research made by Robert J. Barro and Rachel M. McCleary. [Barro and Mccleary, 2005] Moreover, I have further expanded the variables for state religion according to particular state religions, thus generating variables for Muslim, Catholic, Protestant and Orthodox monopolies.

Finally, I have decided to make four models. First two models are dealing with determinants of religious attendance, whereas third and fourth model are focused on the levels of unpaid work for the church as an alternative mean to measure religious participation. First model is a probit model, the remaining models are logistic

---

[36]For the final analysis, I have used only the attendance more times a week, once a week, once a month and once a year.

regressions. In order to assess the impact of religious oppression and attitudes towards churches, what presumably has an effect on the levels of accumulated human and religious human capital, first model is restricted to Europe, because of special properties of European religious markets, what provides a great opportunity to assess the impact of these variables on church attendance. The second model is unrestricted, using mainly data from CIA Factbooks and the distinction of religious monopolies made by Barro and McCleary. Third and fourth model are restricted to countries where the levels of unpaid work for church have been investigated. Third model consist mostly of data from CIA Factbooks and is aimed at examination of secularization hypothesis and assumption presented in Section 2.1. Fourth model examines the effect of various religious monopolies, religious concentration and the effect of communism on the levels of unpaid work for the church.

5.2 Econometric models

Attendance is examined not only in the standard attendance rates (at least once a week, at least once a month etc.) but in the first model it is examined deeper in at standalone rate of attendance (once a month, once a year, once a week etc.) for better assessment.

First Model

Firstly, we can examine the results concerning age. As presumed, the levels of mass attendance are positively influenced by increasing age.[37] Age is significant at p-value lower than 0.01 for attendance more than once a week, once a week, once a year, at least once a week, at least a month and at least once a year. The results are in compliance with the results of Iannaccone. [Iannaccone, 1990, 1994b] [38]

Now, we can examine the effects of retirement on attendance. The results show statistically significant positive effects on attending religious services once a week, at least once a week and at least at once a month (with p-values equal to 0.05, lower than 0.01). The effect of retirement on attendance is negative for yearly

---

[37]The slope seems to be approximately constant with an exception of the age when most of the people retire and around the age of 80, when the slope declines. This could be probably explained by the deteriorating health condition. However, there is not enough data for people after 90 to draw conclusions from.

[38]For details see Figure 1.

Table 1: Model I - Probit model for religious attendance

Variable	More often	Once a			At least once a		
		week	month	year	week	month	year
Constant	-4.095***	-3.356***	-2.561***	-1.667***	-3.693***	-3.081***	-2.014***
	(0.121)	(0.078)	(0.061)	(0.061)	(0.077)	(0.077)	(0.046)
Age	0.008***	0.004***	0.002*	-0.003***	0.008***	0.008***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Retired	0.065	0.063**	-0.052*	-0.088**	0.092***	0.031	-0.011
	(0.043)	(0.032)	(0.031)	(0.037)	(0.032)	(0.032)	(0.027)
Education level							
-middle	0.069*	0.072***	0.028	0.031	0.102***	0.098***	0.075***
	(0.036)	(0.025)	(0.024)	(0.025)	(0.025)	(0.025)	(0.019)
-upper	0.185***	0.136***	0.092***	0.085***	0.214***	0.229***	0.197***
	(0.044)	(0.031)	(0.029)	(0.030)	(0.031)	(0.031)	(0.024)
Rel. oppr.	-0.301***	-0.410***	0.080***	0.262***	-0.558***	-0.476***	-0.339***
	(0.036)	(0.025)	(0.027)	(0.037)	(0.026)	(0.026)	(0.023)
Get comf.fr.rel.	0.688***	0.821***	0.651***	-0.129***	0.872***	0.913***	0.556***
	(0.067)	(0.035)	(0.028)	(0.026)	(0.034)	(0.034)	(0.020)
Conf.in Church	0.313***	0.288***	0.067***	0.040***	0.402***	0.361***	0.307***
	(0.021)	(0.015)	(0.014)	(0.014)	(0.015)	(0.015)	(0.011)
Imp.child.qual.							
religious faith	0.603***	0.480***	-0.032	-0.425***	0.747***	0.698***	0.576***
	(0.031)	(0.023)	(0.024)	(0.035)	(0.023)	(0.023)	(0.022)
Relig. affiliation							
-Catholic	0.512***	1.097***	0.707***	0.094***	1.106***	1.109***	0.761***
	(0.085)	(0.055)	(0.039)	(0.032)	(0.052)	(0.052)	(0.026)
-Protestant	0.159*	0.312***	0.563***	0.470***	0.256***	0.409***	0.390***
	(0.093)	(0.061)	(0.042)	(0.031)	(0.058)	(0.058)	(0.028)
-Orthodox	0.020	0.384***	0.752***	0.275***	0.234***	0.463***	0.260***
	(0.095)	(0.062)	(0.044)	(0.040)	(0.059)	(0.059)	(0.032)
-Muslim	0.562***	0.428***	0.345***	0.201	0.500***	0.344***	0.100
	(0.149)	(0.122)	(0.116)	(0.127)	(0.112)	(0.112)	(0.089)
-other	1.245***	0.954***	0.560***	0.121	1.395***	1.272***	0.923***
	(0.099)	(0.076)	(0.069)	(0.079)	(0.072)	(0.072)	(0.055)
No.of observat.	31858	31858	31858	31858	31858	31858	31858
McFadden's R^2	0.297	0.338	0.163	0.155	0.431	0.417	0.284
Log-likelihood	-4306.8	-9209.9	-9990.6	-8302.8	-9230.1	-11778.1	-15532.9

* statistically significant at 0.1 level; ** at 0.05 level; *** at 0.01 level;

Note: values in brackets represent the slope evaluated at mean

attendance with p-value of 0.02 and statistically less significant (with p-value of 0.10) for monthly attendance.The retirement provides the consumer with more time, what gives the individual the opportunity to participate more in religious activities, what may be the reason of a jump in the attendance rates.

Other examined factor is education. Results show that attendance rises with the level of education. It applies for all rates of attendance. The highest measured level of education is significant on all rates of attendance with the lowest p-value

Figure 1: Effect of age on attendance at least once a week.
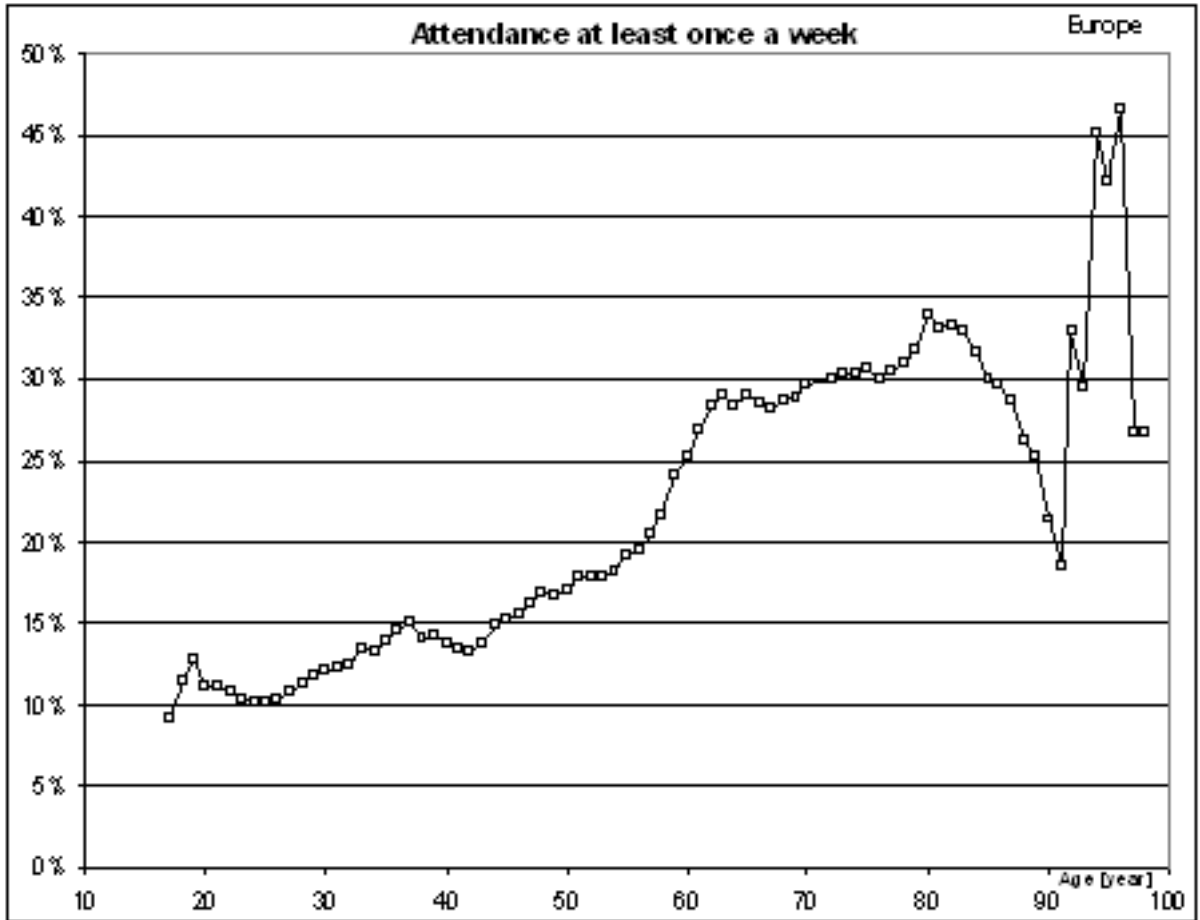
(lower than 0.01) for attendance once a year. 'Medium'[39] education is statically significant for all rates of attendance except monthly (with p-value equal to 0.24) and yearly attendance (with p-value equal to 0.22). 'Higher' education is significant at all rates of attendance. Secularization hypothesis presumes that increasing level of education will cause[40] the share of religious adherents to diminish. The results thus contradict secularization hypothesis. The results are similar to [Barro and McCleary, 2003] and [Iannaccone, 1990, 1994b].

Now, we can investigate the influence of importance of religious upbringing, getting comfort from religion and confidence in churches. All these factors positively affect attendance and are highly statically significant except for religious upbringing on monthly attendance (which has p-value of 0.19). The results support the presumption about the importance of confidence on rates of attendance. Religious upbringing is a crucial factor in the human capital accumulation and is one of the reasons why people are less likely to change religion when they grow up. The happiness insurance can be one of the causes why getting comfort from religion has

---

[39]As denoted in the dataset documentation.

[40]Under the assumption that rationality and scientific knowledge have a negative effect on levels of religiosity.

a positive effect on the rates of attendance.

The variable for religious oppression, religious wars and attitude towards church is negative at all rates of attendance except monthly and yearly.[41] The variable is significant at all rates of attendance. The results support the presumptions made in Section 1.2. The variable may seem to be somewhat controversial. I have tried to take into account the effects such as the frequency of religious wars, attitude of the church towards and invader or involvement of the church in regime changes. By including this variable into the model, we can test the presumption made in Section 2.2. Naturally, we have expected that such affairs will have a negative effect on the levels of attendance and our findings support our expectations.

Now, we can examine the influence of membership in various religious denominations. We have found out that Catholicism has the strongest positive impact on weekly attendance,[42] followed by 'set of joint religions', Islam, Orthodox Christianity and Protestantism. All variables are highly statistically significant (with p-values lower than 0.01).

Set of joint religions also has the strongest effect on monthly attendance, following by Catholicism. As in previous case, all variables are highly statistically significant with the lowest p-value, lower than 0.01, for Islam.

When we investigate yearly attendance, Protestantism has the strongest influence, followed by Orthodox Christianity. However, Islam is significant only at 0.11 and set of other religions significant at 0.13. Other variables are highly statistically significant with p-values lower than 0.01.

The impact of joint variable for other religions than Muslim, Catholic, Orthodox or Protestant turned out to have more positive impact on attendance than these religions at the attendance at least once a week, at least once a month and at least once a year. If we not consider other religions, the most influential impact on attendance more times a week has the Muslim and Catholic religion.

According to results, being a member of one of the joint set of religions has the most positive effect on attendance at least once a week, followed by Catholicism. All variables are highly statistically significant.

The most positive effect on attendance at least once a month has the membership in one of set of joint religions. All variables are highly statistically significant.

Results show, that membership in the set of joint religions has the most significant impact on attendance at least once a year, followed by Catholicism. All

---

[41]It is probably the result of lowering the frequency of attendance.

[42]This is probably a consequence of the fact, that Catholics are obliged to attend masses every Sunday.

variables are highly statistically significant except for Islam, which has a p-value of 0.26. See Table 1 for details.

Second Model

Modernization theory predicts that an improvement in economic development alters also some societal institutions. Secularization hypothesis (utilizing the presumptions of Modernization theory) predicts that as the society becomes richer, it becomes also less religious (measured by religious attendance, levels of unpaid work for church, personal beliefs and other factors). [Barro and Mitchell, 2004] Firstly, we can conclude that levels of log GDP have a negative effect on all rates of attendance with p-value lower than 0.01. This result is in compliance with secularization hypothesis which states that people in countries with lower secular opportunities are more likely to attend church more regularly.

Communism in 1970 also has a negative effect on levels of attendance and is statistically significant with p-value equal to 0.09 for attendance at least once a week and p-value lower than 0.01 for all other rates of attendance. Communist regimes are well known for negative attitude towards religion. This hostility usually leads to religious oppression, forbiddance of religious or church activities, Churches are often persecuted by such regime. Moreover, secular opportunities are often lowered by becoming a member of a church. As a result, the risk associated with religious portfolios notably rises. Naturally, these factors reduce both demand and supply. Thus, the results support our presumption made in Section 2.2.

An interesting variable is possibly the share of the Jewish population. It seems that share of Jewish population is a good indicator of religious freedom and functional religious market in a country (Israel is not a part of a survey), that are usually affected by past conditions on a religious market. Even in countries, where there was relative religious freedom, it usually didn't apply for some religions. For example, even when Catholics and Protestants have arrived at higher levels of mutual tolerance, they may still have oppressed adherents of Judaism. As a consequence, Jews have had a tendency to move to countries, where the oppression of their beliefs was not so extensive. Even in countries where the levels of oppression have decreased, previous religious oppression have caused the share of Jewish population to diminish in past. Thus, the share of Jewish population is influenced to a large degree by path dependency. The variable has a positive effect on all investigated frequencies of mass attendance with p-value equal to 0.02 for attendance more times a week, p-value equal to 0.04 for attendance at least once a week, p-value equal to 0.06 for attendance at least once a month and p-value equal to 0.03 for attendance at least once a year.

Table 2: Model II - Levels of attendance estimated by logistic regression

Variable	More often	At least once a		
		week	month	year
Constant	2.052	1.923	3.949**	5.298***
	(1.917)	(1.964)	(1.860)	(1.753)
Share of religious adher. in populat.				
-Buddhist	3.525	3.596	3.955*	4.421**
	(2.154)	(2.207)	(2.090)	(1.970)
-Catholic	2.420***	3.967***	3.989***	3.215***
	(0.758)	(0.777)	(0.736)	(0.693)
-Hindu	1.613	1.986	1.778	1.010
	(1.263)	(1.294)	(1.226)	(1.155)
-Jewish	46.034**	41.177**	36.282*	38.555**
	(19.243)	(19.713)	(18.669)	(17.599)
-Muslim	2.774***	3.483***	2.607***	1.700**
	(0.887)	(0.909)	(0.861)	(0.811)
-Orthodox	1.090	1.992*	2.306**	1.720*
	(0.991)	(1.015)	(0.961)	(0.906)
-Protestant	2.684***	3.617***	3.342***	2.626***
	(0.925)	(0.948)	(0.898)	(0.846)
-other	0.738	0.953	0.939	-1.033
	(2.018)	(2.067)	(1.958)	(1.845)
Log of GDP	-0.694***	-0.602***	-0.729***	-0.772***
	(0.184)	(0.189)	(0.179)	(0.168)
Commun. in 1970	-0.901**	-0.680*	-0.813**	-0.852**
	(0.382)	(0.391)	(0.370)	(0.349)
Orthodox monop.	-0.105	-0.126	-0.081	-0.125
	(1.044)	(1.070)	(1.013)	(0.955)
Catholic monopoly	0.146	-0.131	-0.315	-0.345
	(0.355)	(0.364)	(0.345)	(0.325)
Muslim monopoly	0.568	0.327	0.857	1.010
	(0.781)	(0.800)	(0.758)	(0.715)
Protestant monopoly	-1.657***	-1.972***	-1.463**	-0.727
	(0.559)	(0.573)	(0.542)	(0.511)
No. of observat.	53	53	53	53
R-squared	0.7972	0.7226	0.7644	0.7285
F-statistic	10.672	7.070	8.806	7.284

Lastly, we have focused on the impact of monopolies on attendance. Only Protestant monopolies show a negative influence on all rates of attendance. We have anticipated negative effects of Protestant monopolies on the levels of mass attendance and thus we may conclude that results support our predictions made in Section 3.2. The variable for Protestant monopolies are significant at p-value lower than 0.01 for attendance more times a week and attendance at least once a week.

The variable is also significant for attendance at least once a month at p-value lower than 0.05. The results for other monopolies are not statistically significant. For details, see Table 2.

I have added a test for collinearity. According to [Everitt and Der, 2002], variables that have VIF over 10 are suspicious for collinearity so we can consider the model to be correct. Variance Inflation Factors for Model II are in Table 3.

Table 3: Model II - Test for collinearity

Variance Inflation Factors	
Share of religious adher. in populat.	
-Buddhist	2.416
-Catholic	6.282
-Hindu	1.633
-Jewish	1.441
-Muslim	3.518
-Orthodox	3.855
-Protestant	6.548
-other	1.891
Log of GDP	2.416
Commun. in 1970	2.479
Orthodox monop.	2.086
Catholic monopoly	1.999
Muslim monopoly	2.291
Protestant monopoly	3.243
Values > 10.0 may indicate a collinearity problem	

Third Model

Results indicate, that the share of population over 65 has a negative effect on levels of unpaid work for a church. The variable is significant at p-value lower than 0.01. Share of population over 65 is another variable dealing with the social development of a country and secularization hypothesis predicts that higher levels of population share over 65 are associated with lower levels of unpaid work for church. The results thus support secularization hypothesis.

Infant mortality is another factor that determines the advancement of the society. It has a similar (negative) effect as previous factor (with p-value of 0.06).

Table 4: Model III - Levels of unpaid work for church estimated by logistic regression

Variable	Unpaid work for church
Constant	-5.140 (1.934) **
Pop. sh. > 65	-0.114 (0.034) ***
Birth rate	0.110 (0.035) ***
Unemp.	0.070 (0.024) ***
Infant mort.	-0.031 (0.016) *
CPI	-0.025 (0.008) ***
Log of GDP	0.274 (0.219)
No. of obs.	42
R-squared	0.640
F-statistic	10.3644

Secularization hypothesis predicts that higher levels of infant mortality since have positive effect on levels of unpaid work for church, because higher levels of infant mortality are more common in less developed countries. Thus we can conclude, that findings do not support the secularization hypothesis.

Negative effect has also been found for inflation. The variable is significant at p-value lower than 0.01. The results may show that people do not cover the consumption losses caused by inflation by working for the churches, but in fact we cannot draw such conclusions from the results without examining other factors.

On the contrary, rising levels of unemployment seem to have a positive effect significant at p-value lower than 0.01. The results are in a way similar to the results presented in [Dehejia, DeLeire, and Luttmer, 2005]. This supports the premise, made in Section 2.1, that people may be participating in unpaid work for religious firms in order to maintain their wellbeing. However, the reason may also be that an unemployed person has more free time and thus his opportunity costs are lower.

We have found out that unlike the impact of GDP on mass attendance, the effect of GDP on the levels of unpaid work for church is not significant with p-value of 0.22. Thus these results do not support secularization hypothesis.

Last factor, we have examined in the Third Model is birth rate, what is another variable dealing with the social development of a country. Secularization hypothesis predicts that [Norris and Inglehart, 2004] levels of religiosity rises with rising birth rate, what is another proxy for the social development of a society.[43] Our results show, that birth rate has a positive effect on levels of unpaid work for

---

[43] And on the contrary, with the development of the society from agrarian to industrial and postindustrial the interest for religion will decline.

Table 5: Model III - Test for collinearity

Variance Inflation Factors	
Pop. sh. > 65	2.361
Birth rate	3.382
Unemp.	2.039
Infant mort.	6.785
CPI	1.303
Log of GDP	2.615
Values > 10.0 may indicate	
a collinearity problem	

church with p-value lower than 0.01. Thus we can conclude that examination of this factor has supported the secularization hypothesis. Complete results are presented in Table 4.

Similarly as in model two, I have added Variance Inflation Factors for the assessment of collinearity (Table 5). Results indicate that Model III is all right.

Fourth Model

At first, we look at the influence of religious monopolies. Both Muslim and Protestant monopolies have positive and statistically significant (with p-values equal to 0.05 and 0.06) effect on the levels of unpaid work done for the church. We have expected different results for each monopoly. However, the results for Protestant monopolies are very surprising and unanticipated, since many scholars consider Protestant monopolies to be secularized to a large extent and have negative impact on religious participation.[Moberg and Piedmont, 2002, Stark and Iannaccone, 1994]

Other factor, we have examined is the effect of communism. As expected (for reasons previously mentioned in the part dedicated to Model II), communism in 1970 has a negative effect, as expected, and is significant at 0.07. The effect of communism in 1930 is also negative, but only with p-value equal to 0.10. The results thus come up to our expectations.

Next variable we have examined is the concentration of religious firms. The results show that higher concentration has a negative effect and is statistically significant at p-value lower than 0.01. Lower concentration promotes market competition, because religious firms have to compete for their costumers. Religious goods are thus of higher variety and better quality in markets with lower concentration. This supports our predictions, that higher concentration of religious firms promotes market competition, thus generating more interest in religion.

Table 6: Model IV - Levels of unpaid work for church estimated by logistic regression

Variable	Unpaid work for church
Constant	-1.729 (0.399) ***
Orthodox monopoly	0.696 (0.736)
Catholic monopoly	0.032 (0.350)
Muslim monopoly	1.492 (0.728) **
Protestant monopoly	0.794 (0.411) *
Communism in 1970	-0.537 (0.285) *
Communism in 1930	-1.209 (0.720)
Herfindahl index	-2.217 (0.531) ***
Att. at l. once a w.	3.096 (0.701) ***
No. of observations	42
R-squared	0.747
F-statistic	12.167

Last examined variable is attendance at least once a week. The variable has a positive impact and is statistically significant at p-value lower than 0.01. This variable was added just to verify the presumption that levels of unpaid work for the church are also associated with the levels of mass attendance. More detailed results can be found in Table 6.

If we add a dummy variable for Europe, the share of population over 65 becomes insignificant. The variable for Europe is significant at 0.05. The impact of the variable is negative. Therefore, we can say that people who live in Europe are much less likely to work for the church for free. Sweden is an interesting exception, since it is considered by many scholars to be perfect example of a secularized country. Nevertheless, the survey does not investigate the amount of work carried out for religious firms, what as a consequence, prohibit us from deeper investigation. Other outlier is USA, but that was no surprise, since USA is well known for high levels of religiosity.[Frejka and Westoff, 2006] Unfortunately, World Values Survey does not the amount of time spent on unpaid work for the churches. Most studies are aimed only at the church attendance. However, this subject is surely worth a deeper inquiry.

Conclusions

In this thesis, I have tried to describe some aspects and behavior of religious markets. I have presented descriptions of characteristics typical for religious markets, the reason why there are present on the religious markets and I have also tried to analyze their consequences.

In the first three sections I have tried to give a description of some microeconomic characteristics typical for religious markets. These sections also presented some presumption that have later been incorporated in microeconomic model and some that have been verified by econometric models. Beside the common examination of effects of various variables on popular indicator of religiosity - levels of mass attendance, I have also examined the effects of various variables on levels of unpaid work for church, what has yield interesting results.

Presented microeconomic model demonstrates the effect of religious human capital accumulation on the demand of the believers. It also demonstrates the consequences of inclusion of labor to the price of religious goods. Subsequently, I have also tested the influence of age (using the age as a proxy variable for accumulated human capital) on attendance to test the effect of religious human and social capital and found out that the results support my presumptions. Now, I will can sum up all important findings.

First important findings relate to the effects of religious monopolies. I have revealed that the only monopoly that has a negative effect on attendance is a Protestant monopoly. On the other hand, Protestant and Muslim monopolies have positive impact on the rates of unpaid work for religious firms.

Next considerable discovery regards the effects of short-term exposure to communism.[44] I have found out, that short-term exposure to communism has proven to have a negative effect on attendance and the levels of unpaid work for church.

Third notable tested subject is GDP, which serves as one of the means for assessing the validity testing of secularization hypothesis and the impact of secular opportunities, I have found out that logarithm of GDP per capita (PPP) has a negative impact on attendance (what is in compliance with [Barro and Mitchell, 2004]), but no significant effect on the share of population involved in unpaid work for the church and thus the results only partly support secularization hypothesis. I have also discovered that education positively affects mass attendance, what also disaffirms the presumptions of secularization hypothesis.

Another interesting variables are variables concerning risk associated with religious portfolios. In order to verify the influence of risk associated with religious

---

[44]What may (among other factors) cause human capital to be harder to accumulate.

goods I have tested how the confidence in church influences church attendance. As expected, confidence in churches has a positive impact on attendance. I have also tested the influence of religious wars, religious oppression and society attitude towards religious firms on the attendance rates. The findings indicate that these factors have a negative effect on church attendance, what supports presented presumption related to risk diversification and religious portfolios.

Fifth major issue is testing of the effects of concentration of religious firms on levels of unpaid work for the church. Contrary to secularization hypothesis, religious concentration has a negative effect on the levels of unpaid work for the church, but is consistent with the presumptions I have presented. Another factor that contradict secularization hypothesis is the effect of infant mortality, since the results show that a negative impact of unpaid work for church on the levels of unpaid work for the church. has been found, what supports our predictions. Similarly, the share of population over 65 and levels of CPI also have a negative impact. On the other hand, birth rate and unemployment rate have a positive effect.

Finally, we can conclude that findings support our predictions except for religious monopolies. The results also show us that we cannot accept secularization hypothesis as a whole. However, we cannot deny the validity of some of its presumptions. We have also obtained outcomes which show that effects of various variables on mass attendance and for levels of unpaid work for the church may be different. Therefore deeper investigation with more indicators of religious activities and attitudes towards religious beliefs have to be done.

References

Hamas. Council on Foreign Relations, June 2007. URL `http://www.cfr.org/publication/8968/`. Accessed 29 Jun 2007.

AP. The Islamist Mousketeers: Hamas Mickey Mouse Teaches Jihad. *Der Spiegel*, May 2007. URL `http://www.spiegel.de/international/zeitgeist/0,1518,481940,00.html`. Accessed 22 Mar 2007.

Robert Barro and Rachel M. McCleary. International Determinants of Religiosity. NBER Working Papers 10147, National Bureau of Economic Research, Inc, December 2003. URL `http://ideas.repec.org/p/nbr/nberwo/10147.html`.

Robert J. Barro and Rachel M. Mccleary. Which Countries Have State Religions? *The Quarterly Journal of Economics*, 120(4):1331–1370, November 2005. URL `http://ideas.repec.org/a/tpr/qjecon/v120y2005i4p1331-1370.html`.

Robert J. Barro and Joshua Mitchell. Religious Faith and Economic Growth: What Matters Most—Belief or Belonging?, June 2004. URL `http://www.heritage.org/Research/Religion/hl841.cfm`. Accessed 21 Jun 2007.

Eli Berman. Hamas, Taliban and the Jewish Underground: An Economist's View of Radical Religious Militias. NBER Working Papers 10004, National Bureau of Economic Research, Inc, Sep 2003. URL `http://ideas.repec.org/p/nbr/nberwo/10004.html`. Accessed 5 Mar 2008.

CIA. The World Factbook 1994-2002, 1994-2002. URL `http://www.umsl.edu/services/govdocs/alpha_list.html`. Accessed 23 Sep 2007.

Rajeev Dehejia, Thomas DeLeire, and Erzo F.P. Luttmer. Insuring Consumption and Happiness Through Religious Organizations. NBER Working Papers 11576, National Bureau of Economic Research, Inc, August 2005. URL `http://ideas.repec.org/p/nbr/nberwo/11576.html`. Accessed 24 May 2007.

DESA. *World Economic and Social Survey 2007: Development in an Ageing World - 60th Anniversary Edition*. United Nations, New York, 2007. URL `http://www.un.org/esa/policy/wess/wess2007files/wess2007.pdf`. Accessed 7 May 2007.

Brian Everitt and Geoff Der. *A handbook of statistical analyses using SAS*. CRC Press, New York, 2002.

Tomas Frejka and Charles F. Westoff. Religion, Religiousness and Fertility in the U.S. and in Europe. Mpidr working papers, Max Planck Institute for Demographic

Research, Rostock, Germany, May 2006. URL `http://ideas.repec.org/p/dem/wpaper/wp-2006-013.html`. Accessed 9 Dec 2007.

Luigi Guiso, Paola Sapienza, and Luigi Zingales. People's Opium? Religion and Economic Attitudes. *Journal of Monetary Economics*, 50(1):225–282, January 2002.

Laurence R. Iannaccone. The Consequences of Religious Market Structure: Adam Smith and the Economics of Religion. *Rationality and Society, Sage Publications, Inc.*, 3:156–177, April 1991.

Laurence R. Iannaccone. Risk, Rationality, and Religious Portfolios. *Economic Inquiry*, XXXIII:285–295, April 1995a.

Laurence R. Iannaccone. Voodoo Economics? Defending the Rational Choice Approach to Religion. *Journal for the Scientific Study of Religion*, 34:76–88, March 1995b.

Laurence R. Iannaccone. *Rational Choice Theory and Religion: Summary and Assessment*. Routledge, New York, 1997.

Laurence R. Iannaccone. Sacrifice and Stigma: Reducing Free-riding in Cults, Communes, and Other Collectives. *Journal of Political Economy*, 100(2):271–291, April 1992.

Laurence R. Iannaccone. Progress in the Economics of Religion. *Journal of Institutional and Theoretical Economics (JITE)*, 150:737–744, 1994a.

Laurence R. Iannaccone. *The New Economics of Human Behaviour*, chapter Household Production, Human Capital, and the Economics of Religion, pages 172–187. Cambridge University Press, Cambridge, 1995c.

Laurence R. Iannaccone. A Marriage Made in Heaven? Economic Theory and Religious Studies. In Shoshana Grossbard-Shechtman and Christopher K. Clague, editors, *The Expansion of Economics: Toward a More Inclusive Social Science*, pages 203–223. M. E. Sharpe, New York, 2002.

Laurence R. Iannaccone. Religion Reloaded: Scenarios for Spirituality in the 21st Century. Technical report, September 2003. URL `http://www.religionomics.com/old/erel/S2-Archives/Iannaccone-ReligionReloaded.pdf`. Accessed 20 May 2008.

Laurence R. Iannaccone. Market for Martyrs. Presented at Meetings of the American Economic Association, San Diego, December 2004.

Laurence R. Iannaccone. Religious Extremism: Origins and Consequences. *Contemporary Jewry*, pages 8–29, December 1999.

Laurence R. Iannaccone. Religious Practice: A Human Capital Approach. *Journal for the Scientific Study of Religion*, 29:297–314, 1990.

Laurence R. Iannaccone. Introduction to the Economics of Religion. *Journal of Economic Literature*, XXXVI:1465–1496, September 1998.

Laurence R. Iannaccone. Why Strict Churches Are Strong. *American Journal of Sociology*, 99(5):1180–1211, March 1994b.

Laurence R. Iannaccone and Sean F. Everton. Never on Sun(ny) Days: Lessons from Weekly Attendance Counts. *Journal for the Scientific Study of Religion*, 43: 191–207, December 2004.

Laurence R. Iannaccone, Daniel V.A Olson, and Rodney Stark. Religious Resources and Church Growth. *Social Forces*, 74(2):705–731, December 1995.

Laurence R. Iannaccone, Roger Finke, and Rodney Stark. Deregulating Religion: The Economics of Church and State. *Economic Inquiry*, pages 350–364, April 1997.

Kevin Knight. Catholic Encyclopedia: Charity and Charities. URL `http://www.newadvent.org/cathen/03592a.htm`. Accessed 21 May 2007.

David O. Moberg and Ralph L. Piedmont. *Research in the social scientific study of religion*, 12:82, 2002.

Clark Moeller. *Church-state Separation: A Keystone to Peace*. Pennsylvania Alliance for Democracy, 2004. URL `http://padnet.org/CSSmoeller2.pdf`. Accessed 31 Jul 2007.

Geoffrey Nathan and Robin McMahon. Trajan Decius (249-251 a.d.) and Usurpers During His Reign. URL `http://www.roman-emperors.org/decius.htm`. Accessed 12 May 2007.

Pippa Norris and Ronald Inglehart. *Sacred and Secular: Religion and Politics Worldwide*. Cambridge University Press, Cambridge, 2004.

Department of Economic and Population Division Social Affairs. World Population Monitoring, 2003: Population, Education and Development, 2004. URL `www.un.org/esa/population/publications/2003monitoring/WorldPopMonitoring_2003.pdf`.

Hans A. Pohlsander. Constantine I (306 - 337 a.d.). URL `http://www.roman-emperors.org/conniei.htm`. Accessed 22 May 2007.

Virginia Postrel. Economic Scene; In Times of Stress, Can Religion Serve as Insurance. *New York Times*, September 2005. URL `www.nytimes.com/2005/09/08/business/08scene.html`. Accessed 17 May 2007.

Philip Schaff. *Encyclopedia of Religious Knowledge*, volume Vol. VI: Innocents - Liudger. Baker Book House, 1953. URL `http://www.ccel.org/ccel/schaff/encyc06.html`. Accessed 05 May 2007.

Adam Smith. *An Inquiry into the Nature and Causes of The Wealth of Nations*. The Pennsylvania State University, 2005.

Rodney Stark and Laurence R. Iannaccone. A Supply-Side Reinterpretation of the Secularization of Europe. *Journal for the Scientific Study of Religion*, 33:230–252, 1994.

Rodney Stark, Laurence R. Iannaccone, and Roger Finke. Linkages between Economics and Religion: Religion, Science, and Rationality. *American Economic Review*, 86(2):433–437, May 1996.

Rodney Stark, Laurence R. Iannaccone, and Roger Finke. Rationality and the Religious Mind. *Economic Inquiry*, 36(3):373–89, July 1998.

Hal R. Varian. *Mikroekonomie - moderní přístup*. Victoria Publishing, Praha, 1995.

David Woods. Theodosius I (379-395 a.d.). URL `http://www.roman-emperors.org/theo1.htm`. Accessed 21 May 2007.

Appendix

Table 7: Religious monopolies, state regulation and religious firm credibility

Country	State reg.	Cath. mon.	Musl. mon.	Prot. mon.	Orth. mon.	Relig. oppr.	C25	C75
Argentina	1	1	0	0	0		0	0
Australia	0	0	0	0	0		0	0
Austria	0	0	0	0	0	1	0	0
Bangladesh	1	0	1	0	0		0	0
Belgium	0	0	0	0	0	1	0	0
Brazil	0	0	0	0	0		0	0
Bulgaria	0	0	0	0	0	1	1	0
Canada	0	0	0	0	0		0	0
Chile	0	0	0	0	0		0	0
Colombia	0	1	0	0	0		0	0
Czech Rep.	0	0	0	0	0	1	1	0
Denmark	0	0	0	1	0	1	0	0
Domin. Rep.	1	1	0	0	0		0	0
Estonia	1	0	0	0	0	1	1	0
Finland	1	0	0	1	0	1	0	0
France	0	0	0	0	0	1	0	0
Germany	0	0	0	0	0	1	0	0
Greece	0	0	0	0	1	1	0	0
Hungary	0	0	0	0	0	1	1	0
Iceland	0	0	0	1	0	1	0	0
India	0	0	0	0	0		0	0
Ireland	0	1	0	0	0	0	0	0
Italy	0	1	0	0	0	0	0	0
Japan	0	0	0	0	0		0	0
Latvia	1	0	0	0	0	1	1	0
Lithuania	1	0	0	0	0	1	1	0
Luxembourg	0	1	0	0	0	1	0	0
Mexico	0	0	0	0	0		0	0
Netherland	0	0	0	0	0	1	0	0
New Zealand	1	0	0	0	0		0	0
Nigeria	1	0	0	0	0		0	0
Norway	0	0	0	1	0	1	0	0
Pakistan	1	0	1	0	0		0	0

Country	State reg.	Cath. mon.	Musl. mon.	Prot. mon.	Orth. mon.	Relig. oppr.	C25	C75
Peru	0	1	0	0	0		0	0
Philippines	0	0	0	0	0		0	0
Poland	0	0	0	0	0	0	1	0
Portugal	0	1	0	0	0	0	0	0
Romania	1	0	0	0	0	1	1	0
Russia	0	0	0	0	0	1	1	1
Singapore	1	0	0	0	0		0	0
Slovak Rep.	0	0	0	0	0	1	1	0
Slovenia	0	0	0	0	0	1	1	0
South Africa	1	0	0	0	0		0	0
South Korea	1	0	0	0	0		0	0
Spain	0	1	0	0	0	0	0	0
Sweden	0	0	0	1	0	1	0	0
Switzerland	0	0	0	0	0	1	0	0
Taiwan	0	0	0	0	0		0	0
Turkey	1	0	0	0	0		0	0
U.K.	1	0	0	1	0	1	0	0
U.S.	0	0	0	0	0		0	0
Uruguay	0	0	0	0	0		0	0
Venezuela	1	1	0	0	0		0	0

Source: [Barro and McCleary, 2003, Barro and Mccleary, 2005]

Table 8: Economic Indicators

Country	GDP per cap.	Area	Population	LF ind	LF ser	LF agr	Unemp.
Argentina	10 300	2 766 890	36 737 664	31	57	12	12
Australia	20 720	7 686 850	18 322 231	16.2	76.2	6.2	8.9
Austria	22 700	83 858	8 139 299	29	67.7	0.7	7
Bangladesh	1 750	144 000	131 269 860	11	26	63	35.2
Belgium	23 400	30 510	10 182 034	27.7	69.7	2.6	12
Brazil	6 300	8 511 965	164 511 366	27	42	31	5.2
Bulgaria	4 100	110 910	8 194 772	31	43	26	12.2
Canada	23 300	9 976 140	31 281 092	21	75	3	7.6
Chile	12 400	756 950	15 153 797	27	59	14	9
Colombia	62 00	1 138 910	38 580 949	24	46	30	12.2
Czech. Rep.	11 300	78 703	10 280 513	42.2	50.9	6.9	7
Denmark	23 300	43 094	5 356 845	25	70	5	6.5
Domin. Rep.	3 400	48 730	8 088 881	18	32	50	30
Estonia	5 500	45 226	1 408 523	42	11	47	9.6
Finland	21 000	337 030	5 167 486	28	64	8	10
France	22 600	547 030	58 978 172	26	69	5	11.5
Germany	22 100	356 910	82 087 361	33.7	63.6	2.7	10.6
Greece	13 400	131 940	10 707 135	21	59.2	19.8	10
Hungary	7 400	93 030	10 186 372	26.7	65	8.3	10.8
Iceland	22 400	103 000	272 512	23.6	59.5	16.9	3
India	2 200	3 287 590	1 029 991 145	15	18	67	9.2
Ireland	18 600	70 280	3 632 944	27	62.1	10	7.7
Italy	20 800	301 230	56 735 130	32	61	7	12.5
Japan	23 400	377 835	126 549 976	30	65	5	4.7
Latvia	4 100	64 589	2 353 874	41	43	16	9.2
Lithuania	4 900	65 200	3 584 966	42	38	20	6.7
Luxembourg	32 700	2 586	429 080	14.3	83.2	2.5	3
Mexico	8 500	1 972 550	100 349 766	21	55	24	2.5
Netherland	22 200	41 532	15 807 641	23	73	4	4.1
New Zealand	17 700	268 680	3 625 388	25	64.6	10.4	5.9
Nigeria	970	923 768	123 337 822	6	40	54	28
Norway	24 500	324 220	4 383 807	23	71	6	8
Pakistan	2 000	803 940	144 616 639	17	39	44	6

Country	GDP per cap.	Area	Population	LF ind	LF ser	LF agr	Unemp.
Peru	4 550	1 285 220	27 483 864	18	73	9	7.7
Philippines	3 800	300 000	82 841 518	15.6	37.1	39.8	10
Poland	6 800	312 683	38 608 929	29.9	44.1	26	10
Portugal	14 600	92 391	9 918 040	32	56	12	5
Romania	4 050	237 500	22 334 312	30	60	10	9
Russia	4 000	17 075 200	146 393 569	30	55	15	11.5
Singapore	24 700	647.5	4 300 419	34	44	0	3
Slovak Rep.	8 300	48 845	5 396 193	37.3	53.8	8.9	14
Slovenia	10 300	20 256	1 970 570	39.1	56.1	4.8	7.1
S. Africa	8 500	1 219 912	43 586 097	25	45	30	30
S. Korea	16 100	98 480	47 904 370	20	68	12	4.1
Spain	17 300	504 782	39 996 671	28	64	8	16
Sweden	19 700	449 964	8 911 296	68.6	28.2	3.2	6.3
Switzerland	22 400	41 290	7 207 060	34	60	6	3.3
Taiwan	10 600	35 980	21 298 930	53	29	15.6	1.5
Turkey	6 800	780 580	66 493 970	24	38	38	5.6
U.K.	21 200	244 820	59 113 439	18.7	80.2	1.1	7.5
U.S.	31 500	9 629 091	272 639 608	24.8	72.5	2.7	4.5
Uruguay	7 600	176 220	3 238 952	31	58	11	11
Venezuela	8 000	912 050	23 542 649	23	64	13	18

Source: [CIA, 1994-2002]

Table 9: Demographic Data

Country	over 65	15-64	under 14	Infan mort	Life expe	Lite	Year
Argentina	11	62	27	18.41	74.76	96.2	1999
Australia	11	67	22	7.1	77.78	100	1995
Austria	15	68	17	5.1	77.48	99	1999
Bangladesh	3.36	61.6	35.04	69.85	60.54	56	2002
Belgium	17	66	17	6.17	77.53	99	1999
Brazil	5	65	30	53.4	61.42	83.3	1999
Bulgaria	16	68	16	12.37	72.27	98	1999
Canada	13	68	19	5.08	79.43	97	2000
Chile	7	65	28	9.6	75.74	95.2	2000
Colombia	5	62	33	25.44	70.06	91.3	1998
Czech. Rep.	14	69	17	6.67	74.35	99	1999
Denmark	15	67	18	5.11	76.51	99	1999
Domin. Rep.	4	62	34	47.7	69.06	82.1	1996
Estonia	15	67	18	13.83	68.65	100	1999
Finland	15	67	18	3.82	77.41	100	2000
France	16	65	19	5.62	78.63	99	1999
Germany	16	69	15	5.14	77.17	99	1999
Greece	17	67	16	7.13	78.43	95	1999
Hungary	15	68	17	9.46	71.18	99	1999
Iceland	12	65	23	5.22	78.96	100	1999
India	4.68	62.2	33.12	63.19	62.86	52	2001
Ireland	12	67	21	5.94	76.391	98	1999
Italy	18	68	14	6.3	78.51	97	1999
Japan	17	68	15	3.91	80.7	99	2000
Latvia	15	67	18	17.19	67.3	100	1999
Lithuania	13	67	20	14.71	68.96	98	1999
Luxembourg	15	67	18	4.99	77.65	100	1999
Mexico	4	62	34	26.19	71.49	89.6	2000
Netherland	14	68	18	5.11	78.15	99	1999
New Zealand	12	65	23	6.37	77.55	99	1998
Nigeria	3	53	44	74.18	51.56	57.1	2000
Norway	16	65	19	4.9	77.53	99	1996
Pakistan	4.11	55.42	40.47	80.5	61.45	42.7	2001

Country	over 65	15- 64	under 14	Infan mort	Life expe	Lite	Year
Peru	4.79	60.8	34.41	39.39	70.3	88.7	2001
Philippines	3.68	59.45	36.87	28.7	67.8	94.6	2001
Poland	12	68	20	12.76	73.06	99	1999
Portugal	15	68	17	6.73	75.88	85	1999
Romania	13	68	19	18.12	70.83	97	1999
Russia	13	68	19	23	65.12	98	1999
Singapore	6.95	75.16	17.89	3.62	80.17	93.5	2002
Slovak Rep.	11	69	20	9.48	73.46	99	1999
Slovenia	14	70	16	5.28	75.36	99	1999
South Africa	4.88	63.11	32.01	60.33	48.09	81.8	2001
South Korea	7.27	71.14	21.59	7.71	74.65	98	2001
Spain	17	68	15	4.99	78.79	97	2000
Sweden	17	64	19	3.91	79.29	99	1999
Switzerland	15	68	17	5.4	77.62	99	1996
Taiwan	8	68	24	5.7	75.25	86	1994
Turkey	6.13	65.45	28.42	47.34	71.24	85	2001
U.K.	16	65	19	5.78	77.37	99	1999
U.S.	12	66	22	6.33	76.23	97	1999
Uruguay	13	63	24	15.4	74.94	97.3	1996
Venezuela	4	63	33	26.17	73.07	91.1	2000

Source: [CIA, 1994-2002]

Table 10: Means and Standard Deviations of Variables

Variable	Mean	St. dev.
Age	45.743	17.216
Retired	0.23759	0.42561
Educational level		
Lower	0.37956	0.48528
Middle	0.42310	0.49406
Upper	0.19734	0.39800
Confidence in Churches	2.5111	0.97285
Get comfort and strength from religion	0.55000	0.47950
Important child qualities		
religious faith	0.20309	0.40230
Religious affiliation		
Catholic	0.39770	0.48943
Protestant	0.19044	0.39265
Orthodox	0.11313	0.31675
Muslim	0.0075962	0.086826
Other	0.023762	0.15231
Log of GDP	9.2995	0.78347
Share of population over 65	11.994	4.7638
Birth rate	12.960	5.6221
Unemployment	9.1643	6.3383
Infant mortality	14.752	17.017
CPI	7.7429	14.859
Herfindahl index	0.70643	0.23796
Mass att. at least once a week	0.25136	0.19055

Source: World Values Survey, [CIA, 1994-2002]

Table 11: Actual and fitted values for Model I

Country	Attendance							
	More often		Weekly		Monthly		Once a year	
	Act.	Fit.	Act.	Fit.	Act.	Fit.	Act.	Fit.
Austria	3.23	4.00	20.79	16.19	20.14	12.94	5.88	6.77
Belgium	4.82	4.29	14.52	13.46	8.87	10.41	5.24	6.88
Bulgaria	2.88	2.03	8.05	5.57	12.02	10.77	5.65	8.36
Czech	2.26	2.10	6.33	7.08	5.05	5.94	8.71	6.78
Denmark	0.60	1.40	2.03	3.64	8.84	8.15	17.20	14.18
Estonia	1.81	1.43	3.06	3.65	8.76	6.08	10.85	8.17
Finland	2.54	2.38	3.26	5.63	8.82	10.43	13.77	12.76
France	1.82	2.58	6.14	10.07	4.79	8.44	6.28	7.25
Germany	1.51	2.50	10.65	7.64	14.38	8.44	4.83	8.63
Greece	3.35	2.44	11.05	9.65	20.49	17.45	7.20	8.98
Hungary	1.33	3.80	9.76	11.67	7.43	9.21	7.43	7.27
Iceland	1.03	2.39	2.52	6.46	8.93	13.14	17.87	13.56
Ireland	17.22	12.06	49.56	37.88	9.00	14.56	3.78	3.35
Italy	10.69	10.39	31.03	34.43	12.68	13.18	3.78	3.60
Latvia	2.11	4.47	5.94	11.64	9.91	11.72	14.00	8.29
Lithuania	3.26	5.92	16.29	22.38	17.42	15.53	5.52	6.83
Luxembourg	3.42	3.73	17.89	14.00	10.45	10.72	6.53	7.10
Netherlands	4.54	3.72	9.59	7.61	11.13	7.47	6.49	7.65
Norway	1.92	1.46	3.11	4.19	7.60	9.01	13.92	14.19
Poland	10.02	13.40	52.35	41.82	17.59	15.04	1.43	3.13
Portugal	8.31	11.38	30.81	37.80	15.88	14.79	3.58	3.74
Romania	4.04	5.97	21.11	17.11	22.73	19.01	6.67	6.92
Russia	1.66	2.14	2.54	6.90	7.68	11.83	10.44	8.21
Slovakia	17.54	7.39	29.64	23.50	8.77	13.90	2.49	6.57
Slovenia	2.36	3.32	15.28	13.66	13.71	10.63	7.08	6.82
Spain	7.61	6.96	18.67	25.51	11.24	11.08	4.87	3.94
Sweden	0.57	1.58	3.77	3.66	6.16	7.52	21.35	13.04
Switzerland	3.28	3.62	13.73	12.52	13.43	11.70	8.26	9.14
U.K.	6.27	3.88	8.95	7.71	3.96	8.51	5.88	11.16

| Country | Attendance at least | | | | | |
| | once a week | | once a month | | once a year | |
	Act.	Fit.	Act.	Fit.	Act.	Fit.
Austria	24.01	20.24	44.16	33.68	50.04	41.60
Belgium	19.35	17.87	28.21	28.63	33.45	35.86
Bulgaria	10.94	7.46	22.96	17.07	28.61	24.70
Czech	8.59	9.18	13.64	14.90	22.34	20.83
Denmark	2.63	5.04	11.47	12.92	28.67	26.83
Estonia	4.87	5.18	13.63	11.67	24.48	20.52
Finland	5.80	8.05	14.61	18.59	28.38	31.93
France	7.97	12.78	12.76	21.57	19.04	29.25
Germany	12.17	10.28	26.54	18.86	31.37	27.35
Greece	14.40	12.18	34.89	29.47	42.09	38.84
Hungary	11.09	15.62	18.51	25.06	25.94	32.73
Iceland	3.55	8.75	12.49	22.03	30.36	36.99
Ireland	66.78	49.39	75.78	63.25	79.56	66.42
Italy	41.72	44.72	54.40	57.37	58.18	61.35
Latvia	8.06	16.19	17.97	28.19	31.97	37.22
Lithuania	19.55	28.81	36.97	44.61	42.49	51.11
Luxembourg	21.31	17.88	31.76	28.89	38.29	36.55
Netherlands	14.12	11.23	25.26	18.80	31.75	26.83
Norway	5.04	5.70	12.64	14.71	26.56	28.65
Poland	62.37	54.34	79.96	67.62	81.39	69.71
Portugal	39.12	49.41	54.99	63.35	58.57	66.12
Romania	25.15	24.17	47.88	45.41	54.55	52.97
Russia	4.21	9.01	11.89	20.79	22.33	29.27
Slovakia	47.18	31.35	55.96	44.71	58.45	50.56
Slovenia	17.64	17.12	31.35	27.98	38.43	35.23
Spain	26.28	32.97	37.52	45.47	42.39	51.28
Sweden	4.34	5.17	10.50	12.09	31.85	24.43
Switzerland	17.01	16.34	30.45	28.34	38.71	38.05
U.K.	15.22	11.62	19.18	19.56	25.06	29.77

Table 12: Actual and fitted values for Model II

Country	More often		a week		a month		a year	
	Act.	Fit.	Act.	Fit.	Act.	Fit.	Act.	Fit.
Argentina	7.89	14.26	24.45	46.95	42.42	62.53	50.94	68.06
Australia	5.96	7.92	16.50	30.50	24.56	44.45	34.96	53.45
Austria	2.97	5.52	22.84	31.68	42.90	49.71	49.04	55.74
Bangladesh	37.00	53.93	56.07	76.02	67.20	87.44	73.13	90.30
Belgium	4.61	3.23	18.71	15.24	27.77	27.11	33.33	34.92
Brazil	12.66	11.04	36.25	43.29	74.85	65.59	83.14	68.27
Bulgaria	2.71	2.41	9.55	9.71	21.91	21.77	28.24	31.61
Canada	7.12	4.44	27.53	19.86	38.34	32.70	48.26	40.97
Chile	11.35	5.54	31.33	23.48	46.06	40.74	56.56	50.97
Taiwan	2.99	5.44	7.03	12.30	14.45	26.56	16.80	30.42
Colombia	10.71	16.69	45.16	54.16	66.46	71.17	73.97	75.52
Czech Rep.	2.12	1.13	8.00	4.62	12.77	8.90	21.68	15.42
Denmark	0.69	1.45	2.65	5.12	11.90	13.01	28.91	28.73
Dominic. Rep.	22.98	15.13	44.25	40.80	55.26	60.40	59.66	69.14
Estonia	1.32	1.34	3.65	3.91	10.84	8.20	21.38	16.17
Finland	2.13	1.44	5.04	4.94	12.50	12.88	26.07	28.41
France	1.74	5.02	7.65	20.18	12.31	33.70	18.91	45.86
Germany	1.38	3.26	10.96	12.69	24.25	21.91	29.88	30.39
Greece	3.27	3.27	13.97	13.97	33.60	33.60	41.47	41.47
Hungary	1.21	2.68	10.65	12.70	17.89	23.03	25.03	32.40
Iceland	0.93	1.66	3.21	6.05	12.02	15.08	29.64	30.67
India	15.34	17.14	32.03	35.15	51.27	54.58	60.27	62.43
Ireland	16.40	8.30	65.41	37.63	74.65	52.59	78.83	56.36
Italy	10.19	6.15	40.44	27.74	53.61	41.10	57.54	47.27
Japan	1.71	2.71	4.10	6.14	12.36	13.49	34.48	29.41
Korea (S.)	13.11	5.31	30.22	16.09	38.23	30.10	45.16	46.08
Latvia	1.73	3.03	6.63	12.07	15.09	24.22	28.34	33.71
Lithuania	2.39	5.41	14.54	31.15	28.88	51.09	35.96	58.90
Luxembourg	3.23	4.08	20.07	16.33	30.36	24.43	37.33	30.90
Mexico	13.14	9.33	54.84	39.88	73.66	61.39	78.63	68.89
Netherlands	4.49	2.23	13.87	7.29	25.05	13.70	31.64	19.99
New Zealand	5.08	6.86	16.67	26.31	22.08	39.71	30.96	47.45
Nigeria	63.75	50.70	92.24	79.82	95.25	88.69	95.70	91.21
Norway	1.96	1.47	4.99	5.36	12.47	13.43	26.45	29.62
Pakistan	50.05	33.45	74.15	53.60	91.20	75.30	94.65	83.80

Continuation of Table 12

| Country | Attendance - at least once | | | | | | | |
| | More often | | a week | | a month | | a year | |
	Act.	Fit.	Act.	Fit.	Act.	Fit.	Act.	Fit.
Peru	16.57	20.29	47.09	58.14	71.34	74.88	77.89	79.54
Philippines	14.17	16.82	60.17	56.08	79.58	76.67	84.00	80.95
Poland	9.27	6.42	59.17	42.23	78.07	61.76	79.91	65.92
Portugal	8.02	8.66	37.41	36.62	53.16	52.36	56.67	57.05
Romania	3.87	3.12	24.82	15.75	46.39	35.96	53.52	43.91
Russia	1.37	1.87	3.43	6.58	9.57	15.55	19.34	25.74
Singapore	14.23	6.29	42.42	19.98	57.78	27.66	60.62	34.00
Slovakia	14.39	4.15	40.47	24.56	49.81	40.13	52.98	48.27
Slovenia	2.22	2.66	17.19	16.69	30.74	29.34	37.92	37.39
South Africa	22.72	12.78	56.84	39.35	71.82	55.29	74.32	62.37
Spain	7.51	7.32	25.71	31.28	36.81	45.73	41.40	51.77
Sweden	0.49	1.06	3.75	3.27	9.08	9.13	30.60	22.84
Switzerland	3.09	6.69	15.72	33.29	28.34	49.20	37.04	54.52
Turkey	14.83	20.63	35.98	50.59	38.34	51.94	43.91	53.99
U.K.	5.56	1.40	14.46	4.57	18.71	12.37	24.77	26.35
U.S.	16.78	15.08	46.16	38.76	61.10	49.47	68.03	55.41
Uruguay	4.00	5.26	13.20	18.44	23.40	35.27	30.30	47.72
Venezuela	8.47	9.40	30.54	31.69	47.90	48.26	57.13	57.40

Table 13: Actual and fitted values for Model 3 and Model 4

Country	Actual levels of unp. work for church	Fitted values for Model III	Model IV
Argentina	8.91	19.29	5.96
Australia	7.23	6.08	5.18
Bangladesh	40.47	36.22	40.47
Belgium	6.12	6.87	5.78
Bulgaria	1.80	3.59	2.52
Canada	19.32	9.27	14.35
Chile	17.08	22.87	9.39
China	4.30	5.25	5.18
Czech Republic	3.04	4.38	2.57
Denmark	3.32	7.09	5.03
Estonia	2.79	3.16	4.02
Finlandia	7.13	8.45	5.75
France	3.47	8.65	3.30
Germany	4.08	6.22	8.24
Greece	6.13	3.91	6.13
Hungary	5.30	4.25	4.17
Iceland	4.65	10.72	5.45
India	14.29	8.66	10.58
Ireland	9.49	11.65	15.28
Italy	6.70	5.62	6.66
Japan	3.23	4.74	3.84
Korea	26.92	15.61	18.86
Latvia	3.85	2.42	6.40
Lithuania	3.54	3.71	2.31
Luxembourg	5.53	5.50	4.62
Mexico	19.41	17.08	13.07
Netherlands	11.37	6.50	11.59
Peru	20.32	17.83	12.25
Philliphines	31.08	35.33	20.91
Poland	3.56	5.22	7.01
Portugal	3.70	4.74	6.76
Romania	3.58	1.47	3.82
Russia	0.52	0.49	0.52
Singapore	15.74	15.63	27.48
Slovakia	12.92	7.28	6.85
Slovenia	4.47	4.36	2.34
S. Africa	36.43	30.60	35.14
Spain	4.47	7.65	4.71
Sweden	22.66	5.84	6.27
Turkey	0.66	3.03	5.67
UK	6.40	6.60	17.15
USA	38.58	11.74	28.02