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Secularization, tax policy and prosocial behavior

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Secularization, tax policy and prosocial behavior

March 1, 2015

Abstract

Using German administrative income tax data we investigate economic consequences of an increasingly secular society for prosocial behavior. For this purpose, we establish initially a simple household model to formalize the relationship between religious giving in form of the German church tax and other tax deductible donations. We test the model hypotheses empirically and compare how income and the tax-price of giving differ as incentives to give between individuals leaving church and church members. While we find evidence for crowding in between religious giving and other donations for church members, we do not observe such a relation for church leavers. Moreover, donation behavior of church-leavers is much more responsive to tax incentives of charitable giving compared to church members. Moreover, we find that non-donors have a significantly increased probability of leaving church compared to donors. We trace this results back to the fact that non-donors are not able to compensate higher church taxes by reducing their donations.

JEL-Classification: H24, H41, Z12

1 Introduction

The influence of religion on economic behavior is a topic that has a long tradition in economic research. While, it has been neglected for a long time it gained importance again in the last few decades (Iannaccone 1998[15]). As religion is widespread and influential in the daily live of many people and given its importance for economic decision making, this is not astonishing. Then again, many countries of the so-called “Western-World” experience a strong process of societal and cultural change which becomes inter alia manifest in the process of secularization.¹ This trend translates on a micro-level into a transformation of habits of daily life as expressed in the theory of modernization (see Inglehart 1997a and 1997b). For the individual, growing self-control and growing opportunities of choice (Kaufmann, 1997 [17]) form a central aspect of this process. A consequence of increasing alternatives in shaping one’s life are rising opportunity costs of religious behavior due to secular competition. This in turn has been found to decrease religious participation as well as religious spending (Gruber and Hungerman, 2008 [9]). However, as religious adherence has been related to different kinds of desirable social behavior (Iannaccone 1998 [15]) the question emerges whether such a trend is first and foremost a concern for the affected religions and their leaders, or whether policy makers should be equally concerned about spillover effects of increasing secularization.

As huge macro-trends like secularization and its consequences are notoriously elusive to grasp we narrow our research question to one realm of live where religious and secular habits cross, namely charitable giving. For instance, in many religious communities it is common that the members give a certain amount of their income to their religion. A prominent example is tithing, which can be traced backed to traditional Jewish law and which is still practiced by orthodox Jews and some Christian communities. The German church tax is a form of tithing, as it transfers a fixed share of a persons income, albeit not a tenth, towards the church. This tax is institutionally anchored in the German Income Tax system and allows us therefore to observe a taxpayers religious affiliation in administrative tax data. Moreover, as Germany is strongly hit by the process of secularization, our setting is well suited to study the consequences of income and thus Church tax variation on church membership as well as effects of evanescent religious ties on charitable giving. Based on a simple household model we derive hypotheses on the relationship between religious giving in form of the German church tax and other tax deductible donations. These hypotheses suggest that a rational acting tax unit decreases its donations when their church tax liability increases. Dependent on the model specification this leads to a full or partial crowding out of other donations when the church tax increases. Thus, the inability to compensate higher church taxes by reduced donations makes non-donating

¹Whether secularization is taking place at all is intensely debated among sociologists of religion. For instance, Stark (1999)[23] refutes entirely the relevance of the concept of secularization, when taking the decline of a personal belief in God as the basis of the secularization concept. However, our concept of secularization rests on the notion of an increasing deinstitutionalization and augmentation of individual choice, a fact that is also acknowledge by the critics of the secularization thesis (see Swatos and Christiano, 1999 [24]). Such a definition has been used previously in economics (Becker and Woessmann, 2013 [2]) and circumvents statements about a decline in personal belief. Therefore, throughout the paper the term “non-religious” is meant to convey such a deinstitutionalization process and not as a statement about personal belief.

church members also more likely to resign from church.

Moreover, charitable giving is a field where secularization meets tax policy. That is, charity is not only a religious canon but also a publicly subsidized behavior. Insofar, the decreasing importance of religious reasons of charitable giving, especially the commitment to give fixed shares of income, can have policy consequences as it may come along with an increasing impact of tax incentives to give. Thus, we will additionally compare how religious and non-religious individuals differently react to tax incentives for charitable giving.

Our results reject the crowding out hypothesis and instead show a crowding in between the church tax and other tax deductible donations for church members. In contrast, donations of people deciding to leave the church during our observation period exhibit no statistically significant relation to other donations. However, the decision to leave the church increases significantly with a rising church tax and for non-donors. Rising income alone, however, as some forms of the secularization hypothesis would suggest does not influence the decision to leave the church. In contrast, we find that increasing income reduces substantially the probability of exiting the church. Concerning the differences in giving behavior between religious and non-religious, we observe that the donations of church-leavers compared are strongly influenced by tax incentives, whereas for church members these tax incentives are irrelevant.

2 Religion and charitable giving

Many religions view prosocial behavior as an important part of leading a life agreeable to God and the central texts of the three major Western religions, Judaism, Christianity, and Islam, point to the obligation of charitable giving (Eckel and Grossman, 2004 [6]; Norenzayan and Shariff, 2008 [20]; Queen 1996). This obligation corresponds with the amounts of money given to religious causes. In the US religion receives approximately a third of all charitable giving which is the largest share among all charitable causes (Giving USA Annual Report 2013). In Germany, despite being much stronger secularized, still 24% of all German donors gave to religion in 2009, making it the fourth most supported charitable item (TNS Infratest Spendenmonitor 2011 [16]).

As religious giving rests on a strong normative basis, it appears consequential to investigate the influence of religion on giving in general, and especially concerning its relationship to other donations. Regarding the influence of religion on charitable giving, a broad literature across all disciplines of social science exists that frequently concludes that religion, specified as affiliation, attendance, preference, denomination, beliefs or socialization, is an important determinant of giving (Bekkers and Wiepking, 2011 [3]). However, the questions remains whether this result can be causally traced back to religion and whether the increased likelihood of giving is confined towards (one's own) religion or if it also spills over to secular causes. Concerning the first point, concerns have been raised that results of self-reported surveys simply reflect socially desirable behavior, i.e. that religious persons are more concerned about maintaining a prosocial reputation than the nonreligious and thus report higher levels of charitable giving (Norenzayan and Shariff, 2008 [20]). While it can be seen critical whether making false statements can indeed sustainably manage self-reputation of religious people, further arguments in this direction can

be put forward. From Tullock (1966) onwards economist made the argument that donors take reputational effects of giving into account. Glazer and Konrad (1996) [8] provide a theoretical signaling explanation for charity where observable donations serve as a wealth or income signal and Harbaugh (1998a, 1998b)[11, 10] investigates theoretically and empirically the importance of prestige considerations for charitable giving. A stronger influence of reputational effects on religious compared to non-religious individuals might thus explain their higher giving levels. Closely related, social norms can provide an additional explanation for higher giving by the religious. Sugden (1984) introduces the principle of conditional commitment where contribution levels are determined by the (minimum) contributions in a reference group. Holländer (1990)[13] extends this research and develops a theory how such norms may evolve. His model suggests that individual giving is motivated by social approval and approval in turn depends on the deviation between individual donations and average donations from the peers. While these arguments can be labeled as “supplied side” driven, there may also be “demand side” reasons for differences in giving between religious and nonreligious. For instance, if fundraisers assess the religious as more generous, irrespective of the validity of this assessment, they will consequently address them more often with charitable solicitations, an effect described by Bekkers and Schuyt (2008) [3].²

Relating to spillovers from religious to secular causes, a survey by the Independent Sector (2002) revealed that religious givers (i.e. giving to religious congregations, such as churches, temples, and mosques) are more generous than nonreligious givers. Interestingly, donors who give to both religious congregations and secular organizations make higher donations to secular organizations than those who give only to secular organizations. Hence, giving to religious causes is not negatively related with giving to secular causes.

However, Eckel and Grossman (2004)[6] challenge this finding as the Independent Sector’s religious organization category does not differentiate religious and non-religious receivers of some charitable causes such as schools or hospitals. Moreover, using experimental data they find the greater generosity of religious givers being confined to churches and church-based institutions. In addition, many other experimental studies demonstrate that the influence of religion on pro-social behavior is mostly exiguous (Hoffmann 2013 [12]), strengthening the point that in a controlled environment with fixed levels of solicitation and no possibility for reputation management the prosocial effects of religion vanish. On the other hand, experimental studies have well known difficulties in establishing external validity and furthermore the design of many experimental studies may lack statistical power to identify reliably differing effects in giving between religious and non-religious.³

A few more recent papers can be related to our study. Hungerman (2013) [14] investigates church exit decisions by Catholics as well as their donation behavior triggered by the sexual abuse scandal of minors by Catholic clergy revealed in 2002. His results show that this shock

²Vesterlund (2006) [27] gives an excellent general review on giving motivations.

³For instance, the study by Eckel and Grossman (2004) [6] draws its conclusion on comparisons between religious and non-religious with group sizes of 66 and 102 individuals respectively. In the donations categories labeled as “Christian” this drop than to group sizes as low as 7 (religious) and 5 (non-religious).

caused a decline of two million members of the Catholic Church and an increase in non-Catholic participation as well as non-affiliation. Concerning donations he suggests an increase of donations to non-Catholic denominations by about \$2.8 million for half the decade following the scandal. Another paper on the abuse scandal and its consequences (Bottan and Perez-Truglia, 2014 [4]) indicates that while the scandal affected religious participation it had no influence on religious beliefs or other forms of prosocial behavior. This finding favors the evidence that an increased charitable giving by the religious is due to social mechanisms such as solicitation and social pressure.

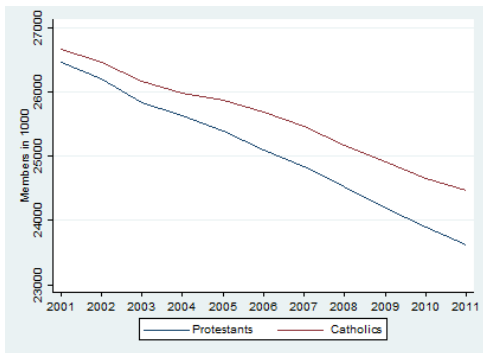
Finally, due to its limited prevalence papers barely address church taxes. One exception is a paper by Lyytikäinen and Santavirta (2013) [19]. The authors investigate the effect of a church tax on church membership in Finland and provide evidence that a one standard deviation increase in church tax leads to a 0.5 to 1 percentage point decline in the likelihood of church membership. Furthermore, a legislative change that made opting out easier led to a significant increase in the decline of church membership.

3 Institutional background

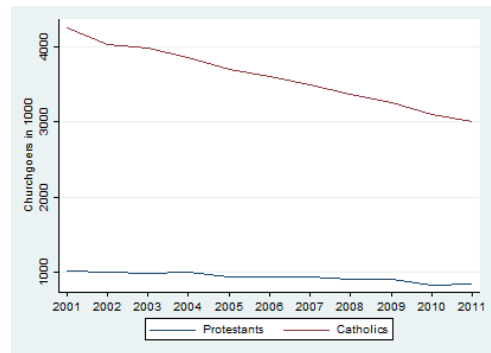
3.1 Secularization and Religion in Germany

The religious landscape in Germany is characterized by a division into three, approximately commensurate parts. 31.2% of the German population belong to the Roman Catholic Church, 30.8% to the Evangelical Church and 33.0% have no religious affiliation (Zensus, 2011 [26]). Moreover, there is a relatively clear geographical division between these three groups. The south and the west are mainly catholic, while the north and the center are mainly protestant. The east, reflecting its recent history of a forced secularization by the communist regime, is mainly populated by persons without religious affiliation. Additionally, beside East-Germany, many urban areas (including the three biggest German cities Berlin, Hamburg and Munich) have a predominately unchurched population (see also Graph 4 in the Appendix). Moreover, as depicted in figure 1 recent years gave rise to a further decline in membership and church attendance in the Catholic and Protestant church.

Figure 1: Decline of religiosity in Germany



(a) Decline of churchmembers



(b) Decline of churchgoers

To sum up, despite a historically high level of secularization Germany experiences currently a strong trend towards even higher levels of secularization. This influences also funding and activities of the churches in Germany as described in the next section.

3.2 The German church tax

Religious communities which are recognized as public law corporations are in Germany entitled to raise a church tax from their members. For an allowance the church tax is computed and collected by the public tax authorities when assessing a taxpayer's income tax and then forwarded to the respective religious community.⁴ In all federal states, the Catholic Church and the Protestant Church have the tax collected by the tax authorities, and in some states the Jewish Communities and some free religious communities do so. The church tax amounts to 8% (in the federal states of Bavaria and Baden-Wuerttemberg) or 9% (in all other federal states) of the so-called fictitious income tax liability, whose computation equals the standard taxable income less child allowances and under disregard of the shareholder-relief system.⁵

Legally, the Church Tax Laws of the sixteen federal states, complemented and further specified by the decrees of the religious communities, provide the guidelines for the collection of the church tax. The federal structure of Germany leads to sixteen distinct church tax regulations, which differ in some aspects for determining the church tax liability. For instance, some communities limit the church tax liability to a certain share of the fictitious taxable income. In some federal states the consideration of this upper limit is guaranteed ex-officio, whereas, in the other states the taxpayer needs to send a request to the respective religious community. Furthermore, some communities demand from each member a minimum amount of church tax, mostly 3.60 Euros per year, if the fictitious income tax was greater than zero.

The church tax payments of individually assessed and jointly assessed couples with the same

⁴Bavaria is the only exemption where churches collect the church tax autonomous.

⁵From 2001 to 2008, the German income tax law stipulated that 50% of the income from shareholdings in corporations (= "partial exempt income") would be exempt from income tax (= "shareholder-relief"). In order to compute the church tax liability, however, this exempt part of the income is added to taxable income and thus taken into account.

religious affiliation are easily calculated and fully benefit their religious community. However, for couples with different religious affiliations the computation of the church tax liability is more complex. Appendix A offers detailed information on the computation of the church tax liability and details about the legal regulations in each of the sixteen German states (Tables A1 to A16).

Church tax payments are regarded as special expenses and can be deducted from overall income. Therefore, the tax price of church membership resembles the tax price of charitable giving and is decreasing with higher marginal tax rates. Thus, church membership is relatively cheaper for high income earners despite increasing absolute church tax payments. For members the church tax payment is obligatory and the only possibility to avoid it is to leave the community, hence, the church tax can be seen as a voluntary tax payment. While leaving the church might still give the opportunity to “free ride” on certain church services, like sending one’s own children to a denominational kindergarten or attending masses, it certainly involves also costs. In fact, administrative fees of the church exit are small, amounting between €5 and €60 to be paid at a civil registry office or by a notary. However, the indirect and social consequences of the church exit can be more severe. For instance, it is not possible to have a church wedding or funeral as well as serving as a godparent for a (child) baptism after exiting the church. Additionally, the church exit would lead to a lay off when being employed at a church institution or will make it impossible to be employed at any institution whose funding body is the church. This can be a difficulty as the church is a large employer in Germany, especially in the social sector. Therefore, leaving church involves certainly costs for those people intending to leave or have left the church and can be seen as the last step in diverging from an institutional system of belief as embodied by a church. Hence, using church membership as an indicator for religion is likely to reveal a lower bound concerning the effects of religion on prosocial behavior.

Finally, in some respects the church tax corresponds charitable contributions. This is not only as both are income tax deductible but also as religious educational institutions and social services benefit from a certain share of the church tax revenues. Despite their similarities, the interrelation of the church tax and private charitable contributions has not been studied so far. For this reason, we develop in the next section a theoretical model how church tax payments interact with other charitable donations and derive consequences of religious membership and prosocial behavior.

4 The model

In this section we establish a simple household model in order to identify some of the determinants that we are convinced to shape the interplay between charitable donations and church tax liabilities. The model relies on the assumption that households rationally decide on how much to donate and on whether being a church member and as such liable to a church tax or not being a church member. We assume that being a church member impinges in two ways on individual utility. First, households derive a direct benefit (possibly negative) from being a church member. We do not rationalize where this benefit might come from. Rather, we take the direct benefit of church membership as given and consider it as an exogenous parameter in

the model. Second, households perceive the church tax liability as a contribution similar to a charitable donation. This is because being a church member and, thus, being liable to a church tax is voluntary. In contrast to other charitable donations, however, the exact amount of the church tax liability is not at the discretion of the household.

Consider a household with a utility function of the form

$$U(X, Z) = \begin{cases} u(X) + v(Z) + \beta, & \text{if a church member} \\ u(X) + v(Z), & \text{if not} \end{cases}$$

where X denotes the amount of private consumption and Z the households contribution to charitable causes. The utility parameter β measures the benefit the household (directly) derives from church membership. We assume that $\beta \in (-\infty, \infty)$, that is, the household may either derive a positive or a negative benefit from being a church member. The functions u and v are assumed to be strictly concave and twice continuously differentiable. The function u satisfies $u'(0) = \infty$, implying that private consumption X is essential. In contrast, for the function v we assume that $v'(0)$ is finite. This allows for the possibility that the household chooses not to make any donations to a charitable cause.

Church members pay a church tax amounting to C , whereas non-members face no church tax liabilities. Since church membership is voluntary, church members perceive the church tax C as a contribution to a charitable cause. Therefore, total charitable giving of a church member amounts to $Z = C + G$, where G measures charitable giving other than the church tax liability. Total charitable giving of a non-member, on the other hand, simply reads $Z = G$.

The households budget constraint is given by

$$X = \begin{cases} Y - PC - PG, & \text{if a church member} \\ Y - PG, & \text{if not} \end{cases}$$

Here, Y is the disposable income of the household and P is the tax-determined price of both the tax liability C and other charitable giving G . The tax-determined price P is normally smaller than 1. This is because both, the church tax liability and charitable donations are tax deductible so that the household only gives away $1 - m$ currency units when contributing an additional currency unit to a charitable cause, with m being the households marginal income tax rate. Like the church tax liability C , we treat the tax-determined price P as exogenously given to the household, although the tax-determined price generally varies with taxable income. The reason is that in the subsequent empirical analysis we treat both, the church tax liability C and the tax-determined price P as independent variables that impinge on the amount of charitable giving G . The next section elaborates on how C and P are implemented as exogenous variables in the empirical study. The household maximizes utility U by choice of church (non-)membership and donations G . Consider first the choice of G , given church (non-)membership. The first order

condition for maximum utility with respect to G reads

$$(1) \quad -Pu'(X_i) + v'(Z_i) \leq 0, \quad \text{with } = 0 \text{ if } G_i > 0,$$

where $i = m, n$ denotes church membership and non-membership, respectively. For $G_i > 0$ the first order condition implies a function $G_i = G_i(Y, P, C)$ with

$$(2a) \quad \frac{\partial G_i}{\partial Y} = \frac{Pu''(X_i)}{P^2u''(X_i) + v''(Z_i)} > 0, \quad i = m, n,$$

$$(2b) \quad \frac{\partial G_i}{\partial P} = \begin{cases} \frac{u' - P(C+G_i)u''(X_i)}{P^2u''(X_i) + v''(Z_i)} < 0, & \text{if } i = m, \\ \frac{u' - PG_i + u''(X_i)}{P^2u''(X_i) + v''(Z_i)} < 0, & \text{if } i = n. \end{cases}$$

$$(2c) \quad \frac{\partial G_i}{\partial C} = \begin{cases} -1, & \text{if } i = m, \\ 0, & \text{if } i = n, \end{cases}$$

Equation (2a) embodies the standard result that charitable giving increases with disposable income. Technically, this result is due to the fact that the additive separability of the utility function guarantees that charitable giving is a non-inferior good. Equation (2b) states that donations decrease when the tax-determined price of giving increases. This result is also standard. Generally, an increase in the price triggers both an income effect and a substitution effect. However, since charitable giving is a non-inferior good both the income effect and the substitution effect have the same sign, so that an increase in the price unambiguously decreases donations. Equation (2c) is about the interplay between the church tax liability and donations. While a non-church members donations are not affected by an increase in the church tax liability, a church member fully neutralizes a higher church tax liability by reducing donations to other charitable causes. This result leads us to our first hypothesis on the interplay between church tax liabilities and charitable donations.

Hypothesis 1. Charitable donations of church members decrease, when their church tax liability increases.

Consider next maximum household utility of church members and non-members. Substituting for utility maximizing donations G_i as implicitly defined by condition (1) in the utility function U yields the indirect utility function of church members and non-members as

$$\begin{aligned} V_m(Y, P, C) &= u(Y - PC - PG_m) + v(C + G_m) + \beta, \\ V_n(Y, P) &= u(Y - PG_n) + v(G_n). \end{aligned}$$

As a utility maximizer, the household will choose to be a church member if $V_m > V_n$, and a non-member otherwise. If a church member, the household is affected by an increase in the church tax liability as follows

$$(3) \quad \frac{\partial V_m}{\partial C} = \begin{cases} 0, & \text{if } G_m > 0 \\ -Pu'(X_m) + v'(Z_m) < 0, & \text{if } G_m = 0. \end{cases}$$

Thus, as a church member the household only suffers a utility loss from an increase in the church tax liability if she does not donate to charitable causes in addition to her church tax liability. The intuition underlying this result is simple. A church member neutralizes the effect of an increase in the church tax liability by reducing donations in the same amount. The increase in the church tax liability does not affect the total amount she wants to contribute to charitable causes including the church. In contrast, a church member who does not donate, generally contributes more to a charitable cause in the form of the church tax liability than she regards to be optimal. If the church tax liability increases, she is urged to contribute an even higher amount than the one she already regards to be too high. As a consequence, an increase in the church tax liability makes a non-donating church member worse off. Since a non-member is generally not affected by an increase in the church tax liability, its effect on a church member has a straightforward empirically testable implication. We formulate this implication as our second hypothesis.

Hypothesis 2. A church member who does not donate, is more likely to resign from church when the church tax liability increases than a church member who does donate.

Consider next the conditions that determine whether a household is a church member or not and whether a household is a donor or not. Consider first a household with $\beta < 0$, that is, a household who derives a negative direct benefit from church membership. Such a household will not opt for church membership irrespective of the size of the church tax liability. Whether the household donates or not only depends on her disposable income Y and the tax-determined price of giving P . Generally, the household will be a donor, if her disposable income is high and/or the price of giving is low.

More interesting and more involved is the case $\beta > 0$, that is, the case in which the household derives a positive direct utility from church membership. For $\beta > 0$ we have to distinguish between four types of households, namely, a church member who donates to a charitable cause in addition to the church tax liability, a church member who does not donate, a non-member who donates, and a non-member who does not donate. We distinguish between these four types in the (C, Y) -space, that is, in the church tax liability-disposable income-space. Based on the conditions that determine optimal charitable giving and church membership we construct $C - Y$ -loci that separate the four types from one another.

We start with the $C - Y$ -locus that separates donating non-members from non-donating non-

members (the derivations of the properties of all the loci are relegated to Appendix B). Considering condition (1), this locus, denoted as Locus I, is implicitly defined by

$$\text{(Locus I)} \quad -Pu'(Y) + v'(0) = 0.$$

Locus I is a horizontal line in the (C, Y) -space, with a positive intercept with the Y -axis. Above Locus I, non-members donate, and below Locus I, non-members do not donate. In Figure 2, Locus I is only plotted for larger church tax liabilities. This is because for a given disposable income Y , non-donating households will be church members if the church tax liability is low. As a consequence, Locus I does not separate non-donating non-members from donating non-members for low church tax liabilities.

The second locus, denoted as Locus II, separates donating church members from non-donating church members. Considering condition (1), it is implicitly defined by

$$\text{(Locus II)} \quad -Pu'(Y - PC) + v'(C) = 0.$$

As Figure 2 illustrates, Locus II is an increasing curve in the (C, Y) -space with the same intercept as Locus I. Above Locus II households will donate both as church members and as non-members. However, above Locus II households will always be church members. This is because $G_n = C + G_m$ holds when a household donates both as a church member and as a non-member. As church members, however, households receive higher utility than non-members since they enjoy the direct benefit $\beta > 0$ as church members.

The third locus, denoted as Locus III, separates non-donating church members from non-donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = G_n = 0$, which is equivalent to

$$\text{(Locus III)} \quad u(Y - PC) + v(C) + \beta = u(Y) + v(0).$$

Locus III is an increasing curve in the (C, Y) -space. Generally, Locus III springs with infinite slope from the origin and is located above the $C - Y$ -locus defined by $Y = PC$ for all $C > 0$.⁶ As Figure 2 shows, Locus III is only defined below Locus I. This is because above Locus I, non-members are donors so that Locus III cannot separate non-donating church members from non-donating non-members any longer.

The fourth locus, denoted as Locus IV, separates non-donating church members from donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = 0$ and $G_n > 0$, that is,

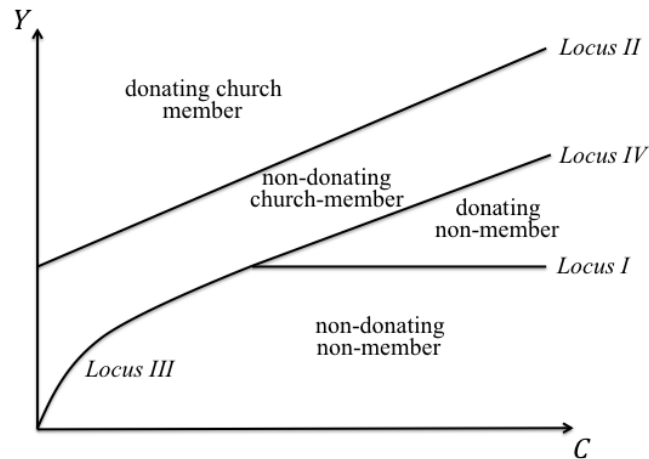
$$\text{(Locus IV)} \quad u(Y - PC) + v(C) + \beta = u(Y - PG_n) + v(G_n).$$

As Figure 2 illustrates, Locus IV is also an increasing curve in the (C, Y) -space. Locus IV is only defined above Locus I, because below Locus I households as non-members do not donate.

⁶ The Appendix also considers the special case that Locus III coincides with the $C - Y$ -locus defined by $Y = PC$.

Like Locus III also Locus IV is located above the $C - Y$ -locus defined by $Y = PC$. Locus III and Locus IV intercept Locus I at the same point and have the same slope in that point. Generally, Locus IV may or may not have an intercept with Locus II.

Figure 2: (Non-)Donating Church (Non-)Members



Below Locus I households are non-donating non-members. Between the Loci I and IV households are donating non-members. Between the combination of the Loci III and IV and Locus II household are non-donating church members. Finally, above Locus II households are donating church members.

Generally, the higher the disposable income Y and the lower the church tax liability C , the more likely it is that the household is both a church member and a donor. With a high disposable income it is likely that the total amount the household contributes exceeds the church tax liability. In this case the household can enjoy the direct benefit from church membership β (provided it is positive) without incurring additional costs. The household just offsets the burden of the church tax liability by reducing giving to other charitable causes. If the disposable income and the church tax liability are such that the household wants to contribute to a charitable cause in an amount lower than the church tax liability, the household will be a donating non-member. However as a donating non-member the household faces a double burden of not being a church member. First, the household forgoes the direct benefit of church membership. Second, the household does not fully save herself the church tax liability by being a non-member as she would offset the church tax liability by reducing other charitable giving when being a church member. Finally, if disposable income is low, the household will either be a non-donating church member or a non-donating non-member. The latter becomes the more likely, the higher the church tax liability.

Figure 2 suggests that either being a non-donating church member or a donating non-member are the most constrained types. With increasing income households not only prefer to become donors but also to become church members (provided that $\beta > 0$). With increasing church tax liabilities, on the other hand, households prefer to become non-members. Thus, non-donating church members and donating non-members are to some extent the most transient among the

four types. Cum grano salis this leads us to our third hypothesis.

Hypothesis 3. Donors are more likely to be church members than non-members.

Strictly speaking, the third hypothesis only applies to those households who do derive a positive direct benefit from church membership. However, to the extent that disposable income Y and the direct benefit of church membership β are independently distributed across households, the hypothesis should apply more generally.

5 Data and research design

5.1 The Taxpayer Panel

The Taxpayer Panel is derived from the yearly German Income Tax Statistics by the Federal Statistical Office (FSO). The unit of observation is the single tax return and not the single taxable individual. If married couples choose a joint assessment, they get the identical tax identification number and are therefore considered as one observation, so in the following the term “tax unit” will be used to label the unit of observation. To construct a panel data set, the FSO linked up the observations of the single years using individual tax identification numbers and other identifiers such as place of residence, religious affiliation, gender, and realization of different types of income. Persons that could not be linked up are typically young professionals or retirees, leading to a higher average income in the panel dimension compared to the cross-sections. In sum, the taxpayer panel contains 16.4 million tax units (Kriete-Dodds and Vorgrimler, 2007 [18]).

The data on which we base our analysis is a 5% random sample of the Taxpayer Panel 2001-2006 and additionally a specifically drawn sub-sample of the Taxpayer Panel containing all persons exiting a religious community between 2001 and 2006. The 5%-sample comprises approximately 825,000 yearly observed tax units stratified by the federal state of residence, the type of assessment, the prevailing type of income, average overall income across all years, and the relative variation of the overall income between years. The data is anonymized by dropping exact information of the state of residence for high income earners and replacing it by an indicator of living in East or West Germany. Further, the twenty tax units with the highest income in each federal state are excluded and all dates of birth are set to January 1st of the respective year.

Besides information on a tax unit’s charitable contributions, the data contains very detailed information on all tax relevant attributes of the tax units (more than 1,300 variables) which allow an accurate computation of taxable income and marginal tax rates. Details on the tax unit’s religious affiliation, available for both partners in case of joint assessment, and information on the federal state of residence are necessary in determining the church tax. Moreover, the Taxpayer Panel provides information on several socio-demographic characteristics of the tax units like gender, marital status, age, and the number of children living with the taxpayer. It

should be kept in mind that only individuals filing an income tax return consecutively from 2001 to 2006 are included in the data.

Using administrative tax data circumvents some of the data problems mentioned in section 2. Relating to the reputation management, a concern in survey data, tax deductible donations are subject to auditing by the tax authorities. Thus, a purposeful higher reporting of donations in order to evade taxes, can result in additional tax payments, fines, and even imprisonment. Therefore, widespread reputation management via misreporting donations appears unlikely for administrative tax data.⁷ Finally, survey data frequently misses information on wealth, whereas tax data allows a rough control for capital and real estate assets via income from these sources.

For the analysis we excluded all tax units with inconsistent socio-demographic information and dropped tax units, which are assessed separately in consecutive years, but nevertheless change their gender. Moreover, we excluded all observations from taxpayers aged below 15 and with restricted tax liability, i.e. taxpayers who earn their income in Germany but live abroad.

5.2 Variables

To analyze crowding out effects and the effects of a church exit on charity we take the sum of declared donations and membership-fees as dependent variable (Giving G).⁸ The variable does not reveal the various charitable causes donations go to, as this information is not tax relevant and therefore it may entail religious giving beyond the church tax. Thus, the crowding out effects between G and the church tax imply an effect on all other charitable contributions or giving in general. To investigate the extensive margin of charitable giving we create additionally a dummy variable, D taking on the value one if a tax unit donates.

The dummy E stands for a taxunit's church exit. In case of joint filing this dummy receives also the value one if a single spouse is leaving church. As the Taxpayer Panel is a yearly statistic we observe the information on church exit in the subsequent year.

C is the church tax liability. As the church tax liability is a function of taxable income which depends on charitable contributions we compute an exogenous measure of the church tax under the assumption of zero donations. Due to the anonymization process no information on the federal state of residence is available for tax units in the two highest income classes with total annual incomes greater than €150,000. Instead, we know whether these tax units live in a Western or Eastern federal state. Therefore, we calculate a hypothetical church tax amounting to the sum that would have to be paid under the regulations valid for the majority of members of a religious community in a certain year in either the Western or the Eastern federal states (see tables 19 and 20 in the appendix). If a tax unit lives in a federal state where the upper limit to

⁷German tax authorities request for donations under €200 a bank account statement from the donor (“vereinfachte Spendenbescheinigung”) and for donations above €200 an official donation receipt from the charity. This makes tax evasion via donations unlikely as it would require a donation retransfer from the beneficiary to the donor. Fack and Landais (2013 [7]) use a reform in third party reporting of donations to investigate tax evasion via misreporting of charitable giving.

⁸The data does not distinguish between membership-fees or charitable contributions. Membership fees paid to sports clubs or cultural activities which are of recreational nature are not tax deductible. Donations to political parties are not included because they underlie a different tax treatment.

the church tax does not automatically come into effect, we assume that the income-maximizing tax unit requests the exercise of this limit. In case of a church exit during the year church tax payments are due only for the months of membership.

Income I is disposable after-tax income of a tax unit. As, income in the data stems from tax law and measures several sources of income (agriculture and forestry, business enterprise, self-employment, employment, capital assets, rent and leasing, other sources) we made some adjustments to obtain a better measure of a tax unit's disposable income. We add to the sum of income from all seven sources tax-free gains, tax exempt income, the tax-free share of pension income and child benefits. Then, we subtract extraordinary expenses, alimonies as well as the income tax and the solidarity surcharge. Due to the tax deductibility of donations higher charitable contributions induce a lower taxable income. To obtain an exogenous income measure, the income tax payments and the solidarity surcharge have been recalculated under the assumption that a tax unit has not made any charitable contributions. Furthermore, income can take on negative values and thus, we follow standard procedures in the literature and drop all negative observations to estimate elasticities in a logarithmic specification. Although, such a selection on independent variables should be econometrically innocuous we additionally include for those income sources that mainly generate a negative income (i.e. for income from rent&lease and capital income) a dummy variable which takes the value 1 if a tax unit receives income from those sources, whether negative or positive.

The tax-determined price of giving P is customarily defined as $1 - m$, with the marginal tax rate m . Hence, P measures a taxunit's opportunity cost of giving in terms of foregone personal consumption. If we take the progressivity of the German income tax system into account, this implies for high income earners a lower price of giving than for low income earners. As the marginal tax rate is a function of taxable income which itself depends on the amount of charitable contributions, we ensure the exogeneity of P by using the so-called "first-dollar price of giving". This means we compute m as the marginal tax rate without donations, a standard procedure in the literature (Triest, 1998 [25]). To obtain the marginal tax rate we apply the tax scales of the years 2001 to 2006 to taxable income plus deductible donations. Furthermore, the German income tax law defines categories of income which are tax exempt but effectively raise marginal tax rates. Depending on the relative magnitude of taxable income and tax exempt income, marginal tax rates equal to or larger than 1 may occur. Tax units facing such expropriating taxation are excluded from the analysis as are tax units that exhibit a combination of extra-ordinary income and tax exempt income which does not permit an unambiguous calculation of marginal tax rates. Furthermore, all tax units whose donations are below the standard deduction for special expenses, i.e. all non-itemizers, are assigned a price of giving of 1. So-called borderline itemizers, who exceed the standard deduction only as a result of the amount of donations they declare in the income tax return, are excluded from the analysis to maintain exogeneity of the price variable with regard to giving. However, as the standard deduction for non-itemizers is low in Germany (€36 for single filers and €72 in case

of joint filing) this procedure changes our database only slightly.⁹

Furthermore, we summarize several socio-demographic variables in the vector X . Information on gender is ambiguous in the data as it depicts the gender of the individual generating the principal income. Therefore, the gender variable is combined with the information on the *filing status*. Married couples do not necessarily have to be jointly assessed but they may opt for separate assessment if this is beneficial to them. Accordingly, dummy variables for single females, single males and separately assessed married individuals are included in the analysis. Married couples serve as the reference group. To account for *age* effects on donations we include several age-group dummies (15 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 and above). Again, in case of joint assessment the identifying information is the age of the principal income earner of the tax unit. The age-group from 45 to 54 serves as reference group. Furthermore, several dummy variables for the number of *children* are included. The dataset contains information on the number of tax-relevant children, i.e. children younger than 18 years and children aged 18 to 26 if they have not yet completed their educational career. Dummies are included for having one child, two children, three children, and more than three children. Tax units without any children constitute the reference group. The information on the federal state of residence is used to construct a dummy variable for all tax units living in *East Germany* (including Berlin).

Time dummies, T , are included to capture common fluctuations influencing charitable donations. During the time-period under study, giving was exceptionally high in 2002 due to a flood along the rivers Elbe and Danube. Similarly, in 2005 high levels of giving are traced back to the earthquake in the Indian Ocean and the following tsunami at the end of the year 2004. Additionally, in 2002 the Euro has been introduced as a means of payment and evidence indicates that money illusion led to an increase in charitable giving (see Bittschi and Duppel, 2014).

Finally, all monetary values are converted into constant 2006 Euro values using the consumer price index by the German Federal Statistical Office. An overview for all described variables for both the 5% sample and the specifically drawn exit sample can be found in section 5.4.

5.3 Empirical design

Firstly, we will test the crowding out hypothesis derived from the theoretical model, which implies that church members' donations decrease with a raising church tax liability. To do so we estimate the following equation:

$$(4) \quad G_{it} = \beta_0 + \beta_1 C_{it} + \beta_2 I_{it} + \beta_3 P_{it} + \beta_4 X_{it} + T_t + \nu_i + u_{it}$$

In equation (4) β_1 reveals possible crowding out effects of donations by the church tax.

⁹Moreover, this implicates also that the Taxpayer Panel comprises a large amount of overall donations. Although, no statistic documents the overall amount of charitable donations in Germany available survey-based projections on the amount of charitable giving in Germany (GfK Charity Scope or Infratest-Spendenmonitor), are regularly below the sum of all charitable donations listed in the Taxpayer Panel. Therefore, we are confident that a large part of charitable donations is represented in our data, holding especially true for big donations from high income earners.

However, in the estimation we face the problem that many tax units report zero donations, which is a common feature of charity data. The high amount of zeros is often used as a justification to estimate Tobit models. Yet, a consistent Tobit estimation relies heavily on the assumption of a normally distributed and homoskedastic error term, a requirement that is mostly not fulfilled with donation data. Additionally, Tobit models assume that the explanatory variables affect the donation decision equally along the extensive and the intensive margin. Further, due to the incidental parameters problem, a fixed effects estimation of the Tobit model is not feasible. As a consequence one needs to assume that the individual fixed effects, ν_i , are uncorrelated with all explanatory variables to ensure consistent and unbiased estimates. In case of charitable donations this is a strong assumption and likely to fail. For instance, considering education as a fixed effect would rule out any correlation with income. Equally, an assumed fixed effect like altruistic attitudes, of importance for a donation model, might be correlated with income or other socio-demographic controls. Finally, to interpret coefficients of Tobit models as elasticities it is necessary to add an arbitrary amount (often 1, 5 or 10) to zero donations in order to take the logarithm of the dependent variable. However, the choice of the amount added is arbitrary and influences estimation results. Due to these econometric problems researchers often estimate simple log-linearized ordinary least squares (OLS) models, which allow for fixed effects and are generally more robust to violations of model assumptions. Yet, also log-linearized OLS models require arbitrary number adding to the dependent variable and furthermore, in the presence of heteroskedasticity the interpretation of log-linearized OLS models can be highly misleading, even when robust standard errors are applied (Santos Silva and Tenreyro, 2006 [22]).

Given all these econometric difficulties it is astonishing that many researchers investigating charitable donations stick to the Tobit model. This is even more so as the fixed effects Poisson model (FEPM) offers solutions to nearly all the indicated problems. The FEPM takes the non-linearity of donations data into account and it controls for unobserved heterogeneity, a crucial step in ensuring a causal interpretation of the regression coefficients, as it does not suffer from the incidental parameters problem. Moreover, the FEPM has many desirable robustness properties for estimating the parameters in the conditional mean that make it also advantageous compared to simple OLS models. In our case, except for the conditional mean, the distribution of G_{it} given the control variables and the fixed effects is completely unrestricted and neither overdispersion nor underdispersion pose a problem in estimation. Moreover, G_{it} needs not to be Poisson distributed and there are no restrictions on the dependence between G_{it} and $G_{ir}, t \neq r$ (see Wooldridge (1999)[28] and Wooldridge (2010), p.763 [29]). Further advantages of the FEPM compared to Tobit and OLS models are that the parameters can be directly interpreted as elasticities and that it is unnecessary to add arbitrary values to zero donations. Simplicity and robustness make the FEPM in our view also preferential compared to more advanced Tobit models, such as correlated random coefficient models, that try to model heteroskedasticity directly by making assumptions about the structural form of the fixed effect (see for instance Brown et al. 2011 [5] or Backus 2010 [1])

Due to these desirable properties the FEPM has been widely used by researchers in the

field of international trade faced with similar data structures of (excess) zeros in the dependent variable and the presence of heteroskedasticity in constant elasticity models (Santo Silva and Tenreiro, 2006). However, despite similarities in the data structure and thus common difficulties in econometric analyses the charity literature still focuses to a large extent to the Tobit model or simple OLS estimation (to the best of our knowledge the only exception using a FEPM with donation data is Reinstein 2011 [21]).

Subsuming all covariates into Z_{it} we can specify the mean of G_{it} conditional on Z_{it} and the fixed effect ν_i as:

$$(5) \quad E(G_{it}|Z_{it}, \nu_i) = \exp(\beta_0 + \beta_1 C_{it} + \beta_2 I_{it} + \beta_3 P_{it} + \beta_4 X_{it} + T_t + \nu_i)$$

Thus, β_1 should now reveal an unbiased and consistent estimate of crowding out effects between the church tax and other donations. Moreover, due to the calculation of exogenous church tax, income and tax-price effects and by controlling for unobserved heterogeneity, we can give our estimates a causal interpretation.

To investigate our second hypothesis whether non-donating members are more likely to resign from church when their church tax liabilities are raising we estimate the following linear probability model (LPM) of church exit:

$$(6) \quad E_{it} = \beta_0 + \beta_1 D_{i,t-1} + \beta_2 C_{i,t-1} + \beta_3 I_{i,t-1} + \beta_4 P_{i,t-1} + \beta_5 X_{i,t-1} + T_t + \nu_i$$

As we do not observe church exits during a certain year, we estimate our model using lagged values of the independent variables in order to circumvent reverse causality.

5.4 Descriptive results

Table 1 offers an overview of the most important variables divided by church members from the 5% sample and the additional sample of church leavers (a full table with all variables used can be found in the appendix).

The descriptive data overview demonstrates that the church members in our dataset dispose of a relatively high mean income of nearly €82,000, in contrast, church leavers only command over €36,700.¹⁰ This probably results from the fact that the decision to leave the church is made at younger ages in the course of starting a professional career. Hence, on average the church members are 10 years older than church leavers. The share of Catholics and Protestants is rather evenly distributed over both datasets, reaffirming figure 2 insofar as church exit affects both denominations similarly. Finally, it is worth to note that singles are more frequent among church leavers than under the church members.

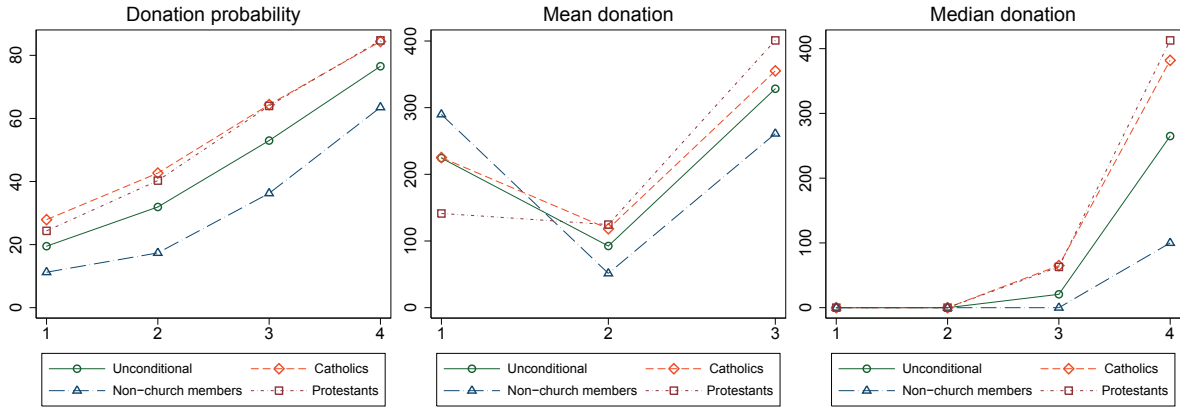
¹⁰These high average incomes are also resultant from many low income households not filing an income tax return at all.

Table 1: Summary statistics

Variable	Church members	Mean (s.d.)	Church leavers	Mean (s.d.)
Dependent variables				
Donations	871.83	49336.89	93.14	2640.48
Donations Dummy	0.45	0.50	0.24	0.43
Exit Dummy	0.00	0.00	0.14	0.34
Independent variables				
Income	81925.68	762653.20	36735.01	113217.40
Income from Dividends	5007.66	165616.10	594.14	35137.08
Income from Rental	1075.23	58018.41	-105.09	18725.51
Price	0.77	0.21	0.82	0.18
Church Tax	1752.50	17407.91	346.09	4468.41
Catholic	0.28	0.45	0.23	0.42
Protestant	0.24	0.43	0.26	0.44
Other rel. denomination	0.00	0.03	0.00	0.03
No rel. denomination	0.37	0.48	0.48	0.50
Eastern federal state	0.21	0.41	0.13	0.34
Single female	0.15	0.36	0.24	0.43
Single male	0.22	0.42	0.34	0.47
Married, separately assessed	0.02	0.12	0.01	0.10
Married couple	0.61	0.49	0.41	0.49
Age	49.17	13.84	39.32	12.94

Source: Research Data Centres of the Federal Statistical Office and the statistical offices of the Federal States, Taxpayer Panel 2001- 2006, own calculations. All monetary values have been converted into constant 2006 Euro values.

Figure 3: Income adjusted donations statistics



The Y axis of the left graph shows donation probabilities. The Y axes of the middle and right graph show donations in Euro. The values on the X axes are income quartiles. Data points represent simple means across all observations and years. Due to huge mean donations in the 4th quartile the scale becomes uninformative, therefore this is only shown in the Appendix 2. Exact monetary values of each observation can also be found in table 2.

As the large deviations in average income between both groups tend to diminish the information content of the descriptive statistics, we provide in figure 3 income adjusted descriptive donation statistics. In particular, we compare church and non-church members from the 5% sample in the same income quartile. The left graph shows that, regardless of income, the donation probability, i.e. the probability of donating at all, is higher for church members than for

non-church members. Moreover, between members of the two big denominations there is hardly a difference in the probability of being a donor. Furthermore, while the donor-probability increases relatively constant across the income quartiles for church members it rises more steeply in the higher quartiles for non-church members.

An U-shaped pattern appears for average donations among the first three income quartiles. Interestingly, the non-church members have the highest average donations in the first income quartile and, in contrast to all other observations, here emerges also an obvious difference in giving between Catholics and Protestants. While, Catholics in the first income quartile donate approximately the same as the unconditional average, Protestants tend to give lower amounts. The picture completely changes when looking at the second income quartile. Here, the non-church members donate the lowest amount (€51), while Catholics and Protestants donate more than twice as much (Catholics, €118; Protestants €125). In the third income quartile charitable giving by Catholics and Protestants is still relatively close and exceeds again the amounts of the first quartile. Strikingly, the donations of the non-church members in the third income quartile are still below amounts given in the first quartile. A complete turnaround of the donor ordering evolves again in the fourth quartile. Here, the non-church members donate on average again the highest amount (€3,222), while Catholics and Protestants give considerably less (Catholics, €2,612; Protestants, €2,790). Noticeable is the fact that the average in the fourth income quartile is heavily driven by a few exceptional high donations. For instance, scrutinizing donations percentiles it becomes evident that up to the 99th percentile church members donate always more than non-church members. This order changes at the 99th percentile with an remarkably similar average donation of €23,010 for church members and €23,023 for non-church members.¹¹ Thus, the difference in the average donation of roughly €500 between church and non-church members is entirely driven by donations in the highest percentile.

The high spread of donations in the highest income quartile results from the fact that tax deductible grants to foundations, up to an amount of €307,000 per year, are included. Therefore, it is useful to take a look at median donations to complete the picture of descriptive donation statistics. For all income groups median donations are zero in the first and second income quartile. In the third and fourth income quartile Catholics and Protestant make similar median donations above the unconditional median (Catholics €65, €382; Protestants, €63, €413). Hence, on the downside the non-church members consistently give lower amounts than church-members in the upper quartiles. While median donations are €0 in the third income quartile they increase to €100 in the fourth quartile.

In line with previous research the descriptive statistics supports the view that the religious, irrespective of income, are more generous than the non-religious. Additionally, we can draw first precautionary inference that while giving by the religious seems to be income dependent, the non-religious appear to react more to tax incentives. This indication is on the one hand supported by the fact that the donation probability rises steeper with higher income, and thus lower prices of giving, for non-church members. On the other hand, the relatively high donations

¹¹Exact distributions of donations across income quartiles can be found in the appendix. Due to data confidentiality we have no access exact values of the highest donations.

of non-church members in the 1st income quartile suggest the assumption that these tax units possess higher financial possibilities for charitable giving as reflected in disposable income, and that these donors may also give in order to retain a low taxable income.

In order to see whether we can give our claims a causal interpretation we will now turn to the regression results.

5.5 Regression results - preliminary and incomplete

	(1)	(2)	(3)	(4)
	Cont. All	All Dummy wealth	Cont. Leavers	Leavers Dummy wealth
Lincome	0.449*** (4.67)	0.512*** (6.45)	0.523*** (5.52)	0.409*** (5.80)
LpriceEnd	-0.142 (-0.67)	-0.113 (-0.72)	-1.048*** (-6.81)	-0.814*** (-7.65)
Lchurchtax	0.0575** (2.75)	0.0430* (1.98)	-0.001 (-0.09)	0.012 (-0.08)
IncCap	0.0176*** (5.05)	0.0517*** (3.96)	0.0181** (2.77)	0.0448 (1.89)
LIncRent_Lease	0.00442 (0.35)	0.0277 (0.31)	0.0118 (1.05)	0.0485 (0.76)
Deast	-0.00216 (-0.02)	-0.0886 (-0.69)	-0.00952 (-0.12)	-0.0635 (-0.87)
Dsinglefemale	-0.219 (-1.15)	-0.263 (-1.88)	-0.320*** (-4.38)	-0.401*** (-5.74)
Dsinglemale	-0.145 (-1.13)	-0.165 (-1.90)	-0.228*** (-3.84)	-0.235*** (-5.31)
Dmarriedseparate	-0.0509 (-0.34)	0.0143 (0.13)	-0.193** (-2.85)	-0.283*** (-5.05)
Dagebis24	0.733*** (3.68)	0.720*** (4.08)	-0.00382 (-0.03)	-0.0118 (-0.08)
Dage2534	-0.0801 (-0.66)	-0.0276 (-0.28)	-0.0697 (-1.01)	-0.0568 (-0.82)
Dage3544	0.00527 (0.07)	0.0118 (0.23)	0.00433 (0.11)	-0.0111 (-0.23)
Dage5564	-0.0713 (-0.51)	-0.101 (-1.23)	0.0283 (0.63)	-0.0167 (-0.39)
Dage65plus	0.208 (1.14)	0.0750 (0.59)	0.0249 (0.31)	0.00540 (0.07)
Dcatholic	-0.223 (-1.11)	-0.249 (-1.66)	-0.0661 (-1.63)	-0.0726 (-1.80)
Dprotestant	-0.300 (-1.27)	-0.224 (-1.28)	-0.105 (-1.96)	-0.119* (-2.43)
Donechild	0.0832 (1.66)	0.199 (1.94)	-0.0366 (-1.34)	0.0174 (0.73)
Dtwochildren	0.143* (2.07)	0.220* (2.05)	0.00881 (0.21)	0.0916* (2.43)
Dthreechildren	0.0588 (0.71)	-0.0837 (-0.47)	0.113 (1.59)	0.202** (2.72)
Dmorechildren	0.239 (1.84)	0.0485 (0.31)	0.104 (1.31)	0.130 (1.53)
2002	0.191*** (3.44)	0.224*** (4.22)	0.128*** (5.23)	0.123*** (4.51)
2003	0.231*** (4.04)	0.238*** (5.50)	0.0788* (2.48)	0.0944** (3.11)
2004	0.215** (2.84)	0.268*** (4.45)	0.201*** (4.13)	0.206*** (4.68)
2005	0.337*** (5.30)	0.372*** (5.50)	0.338*** (5.04)	0.372*** (6.12)
2006	0.319*** (4.32)	0.382*** (6.53)	0.215** (3.15)	0.282*** (5.36)
<i>N</i>	1613520	2292304	1128170	1341868

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

	(1)	(2)	(3)	(4)
	Members	Members dummy setting	Church leaver	Leaver dummy
L.Dnodon	0.001** (2.79)	0.001** (2.74)	0.015*** (11.59)	0.0148*** (12.48)
L.Lchurchtax	0.003*** (21.47)	0.004*** (29.55)	0.0331*** (85.49)	0.0353*** (96.40)
L.Lincome	0.000 (0.15)	-0.001** (-3.20)	-0.034*** (-29.89)	-0.038*** (-34.81)
L.LpriceEnd	0.014*** (10.28)	0.0145*** (12.77)	0.229*** (55.72)	0.222*** (57.46)
L.IncCap	-0.000* (-2.02)	-0.000 (-0.54)	-0.003*** (-8.10)	-0.014*** (-6.50)
L.LIncRent_Lease	-0.001*** (-5.28)	-0.000 (-0.44)	-0.009*** (-13.91)	-0.034*** (-10.78)
L.Deast	0.003 (0.40)	-0.002 (-0.25)	-0.060*** (-6.92)	-0.0664*** (-7.87)
L.Dchildrenyes	0.002*** (4.20)	0.003*** (5.65)	0.007** (2.63)	0.007** (3.17)
L.Dsinglefemale	0.015*** (5.11)	0.0178*** (6.71)	0.271*** (33.36)	0.268*** (35.25)
L.Dsinglemale	0.011*** (10.56)	0.011*** (12.57)	0.197*** (60.19)	0.195*** (64.35)
L.Dmarriedseparate	0.013*** (8.05)	0.014*** (9.95)	0.185*** (29.52)	0.185*** (32.23)
L.Dagebis24	-0.023*** (-12.31)	-0.025*** (-13.80)	-0.023*** (-5.23)	-0.0325*** (-7.88)
L.Dage2534	-0.004*** (-4.15)	-0.004*** (-5.52)	0.0292*** (8.44)	0.0296*** (9.21)
L.Dage3544	0.000 (0.76)	0.000 (0.48)	0.040*** (16.31)	0.0422*** (18.87)
L.Dage5564	-0.004*** (-6.91)	-0.004*** (-9.32)	-0.047*** (-14.46)	-0.054*** (-18.08)
L.Dage65plus	-0.001*** (-9.59)	-0.008*** (-11.91)	-0.038*** (-5.61)	-0.0538*** (-8.62)
Dyear02	-0.018*** (-66.40)	-0.016*** (-71.44)	-0.541*** (-351.99)	-0.520*** (-364.59)
Dyear03	-0.006*** (-22.31)	-0.005*** (-20.81)	-0.375*** (-244.60)	-0.355*** (-249.30)
Dyear04	0.001 (1.95)	0.002*** (7.26)	-0.236*** (-152.39)	-0.217*** (-149.77)
Dyear05	0.005*** (22.82)	0.005*** (24.72)	0.019*** (-12.20)	-0.012*** (-8.05)
_cons	0.00364 (0.71)	0.0120** (2.99)	0.692*** (59.47)	0.714*** (63.53)
<i>N</i>	1847608	2443625	2466328	2718197

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.6 Discussion

- Church tax leads to a crowding in of donations amongst church members, but has no effect, neither positive or negative, on donations of those leaving church.
- Effect size for church members: 10% church tax increase, rises charitable giving by roughly 0.5%
- Increases of donations by church members are solely driven by the income effect. Tax in-

centives play no statistical significant role. In contrast, non-church members react strongly to tax incentives, expressed by the tax price of giving.

- Non-Donors are more likely to leave church and being a non-donor increases significantly the probability to leave the church
- We trace this result back to the fact that non-donors have no possibility to compensate a higher church tax liability by decreasing donations.
- Further, also a rising churchtax increases the exit probability.

5.7 Robustness checks - preliminary and incomplete

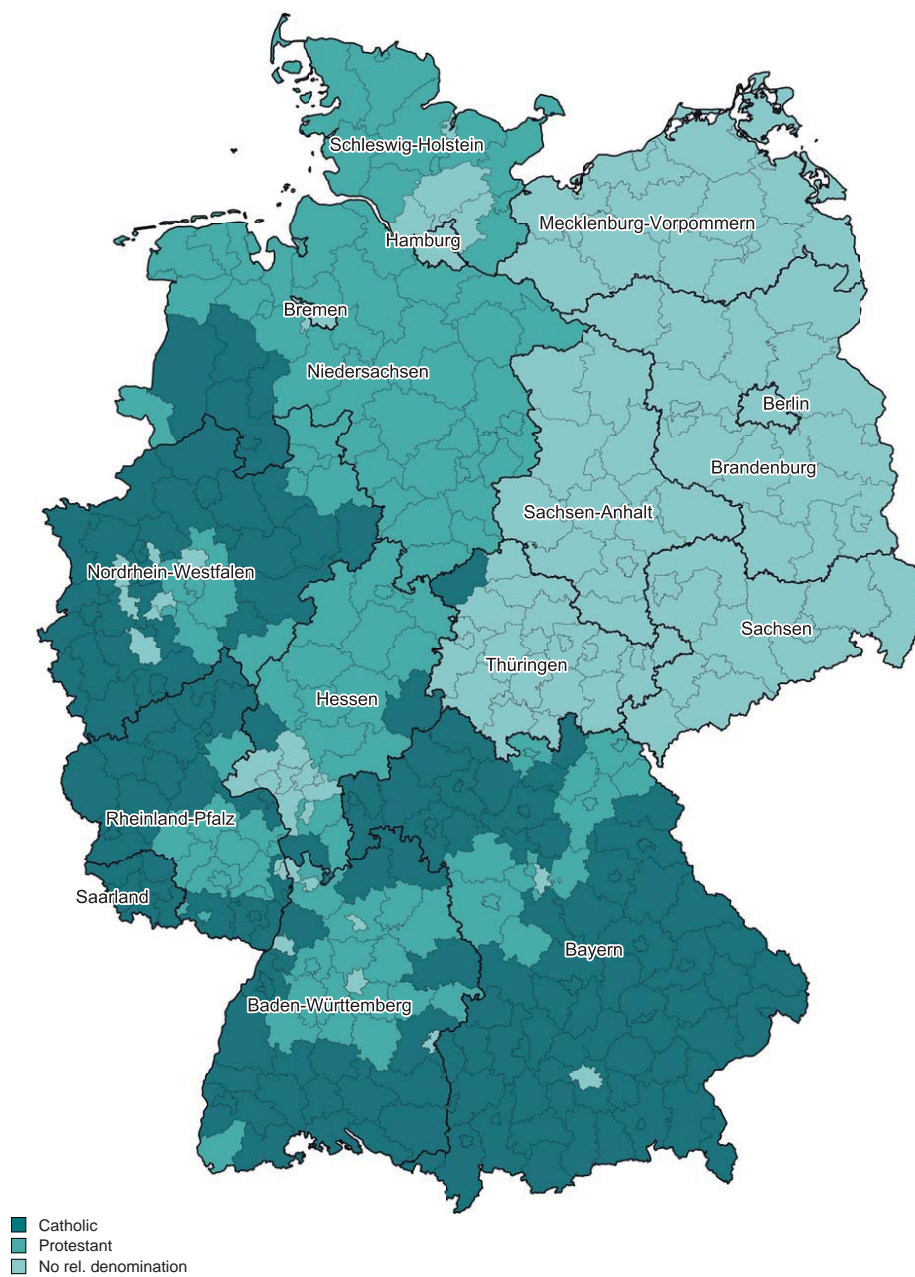
- Additionally, we follow Angrist and Pischke (2009) , who criticize the fragility of Tobit models, and propose to use linear probability models (LPM) to investigate the probability that donations exceed specific amounts. In particular, we create five dummy variables for donations exceeding popular amounts donated €25, €50, €100, €200, and €1000. The LPM has the advantage that its coefficients are direct interpretable as marginal effects, a case that does not hold for the nonlinear models. Moreover, Angrist and Pischke (2009) show empirically that these marginal effects resemble those of the Tobit model and conclude that in their view there is no added value in estimating the more complex Tobit models in comparison with LPM, unless data is truly truncated. Before turning to the regression results we present as a start some descriptive results
- Evidence for single filers only, as intra-household religion may not be determined in case of joint affiliation we additionally conducted the analysis only for single filers...
- Tobit, to make results comparable: For the computation of elasticities, we take the logarithm of G . In case of no declared donations by a tax unit we add five Euros in order to be able to logarithmize the variable.

6 Conclusion

To be written.

7 Appendix

Figure 4: Division of religious communities in Germany

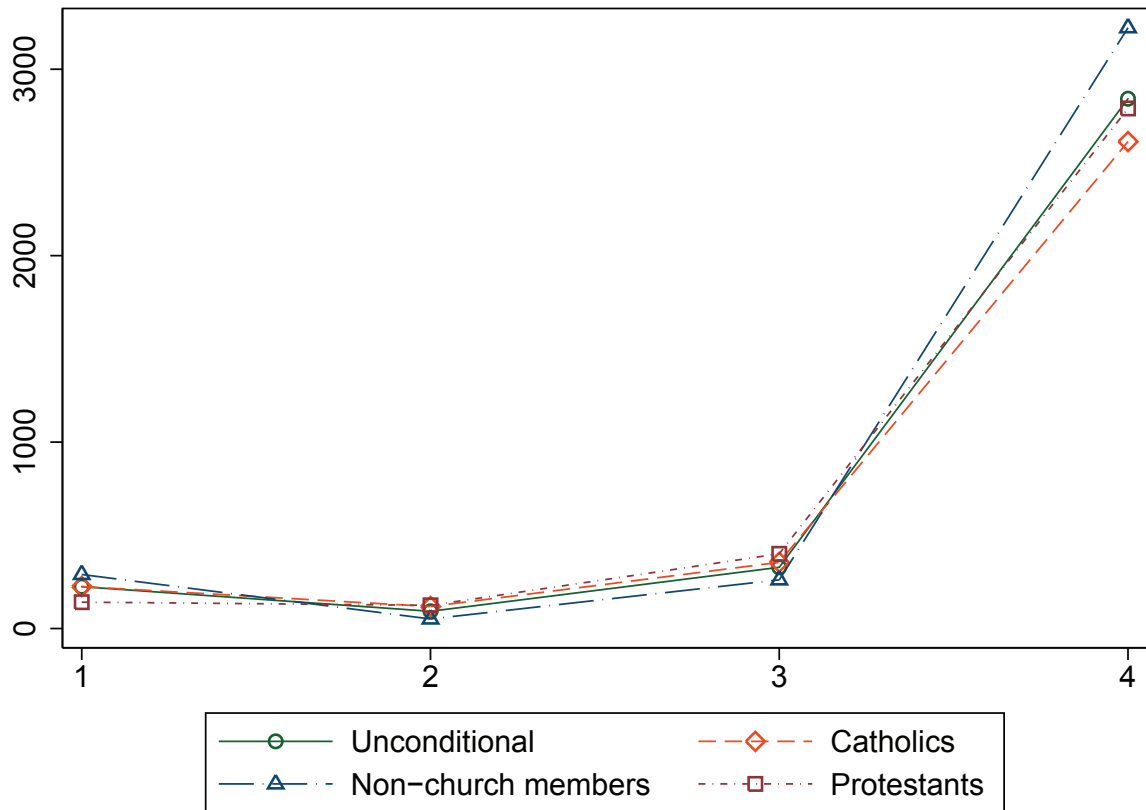


8 Full tables

Table 2: Descriptive donations statistics

	Donation probability	\varnothing Donation	Median donation
Church members	53.74	852.45	26.23
Non church members	30.89	904.56	0.00
Catholic	56.48	883.31	40.92
Protestant	53.59	871.11	25.80
Other	59.13	2943.75	109.96
Inc1 and Church member	25.56	176.37	0.00
Inc1 and Non church member	11.24	289.87	0.00
Inc2 and Church member	40.12	115.69	0.00
Inc2 and Non church member	17.36	51.41	0.00
Inc3 and Church member	62.39	366.25	54.98
Inc3 and Non church member	36.26	261.05	0.00
Inc4 and Church member	83.39	2,641.83	373.56
Inc4 and Non church member	63.54	3,222.47	100.00

Figure 5: Mean donations across all quartiles



The Y axis of the left graph shows donation probabilities. The Y axes of the middle and right graph show donations in Euro. The values on the X axes are income quartiles. Data points represent simple means across all observations and years. Exact monetary values of each observation can also be found in table 2.

Table 3: Church tax in Baden-Wuerttemberg

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	8%	8%	8%	8%	8%	8%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 3.5%	Catholic, Protestant 3.5%	Catholic 3.5% Protestant 3%	Catholic 3.5% Protestant 3%	Catholic 3.5% Protestant 2.75%	Catholic 3.5% Protestant 2.75%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant

Table 4: Church tax in Bavaria

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	8%	8%	8%	8%	8%	8%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	---	---	---	---	---	---
Upon request or ex officio	---	---	---	---	---	---
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	no	no	no	Protestant	Protestant	Protestant

Table 5: Church tax in Berlin

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	- - -	- - -	- - -	- - -	- - -	- - -
Amount per annum	- - -	- - -	- - -	- - -	- - -	- - -
Levying religious communities	- - -	- - -	- - -	- - -	- - -	- - -
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 6: Church tax in Brandenburg

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	- - -	- - -	- - -	- - -	- - -	- - -
Amount per annum	- - -	- - -	- - -	- - -	- - -	- - -
Levying religious communities	- - -	- - -	- - -	- - -	- - -	- - -
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 7: Church tax in Bremen

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Amount per annum	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Levying religious communities	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Catholic, Protestant

Table 8: Church tax in Hamburg

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant, Jewish

Table 9: Church tax in Hesse

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	3.60 DM	1.80 EUR	1.80 EUR	1.80 EUR	1.80 EUR	1.80 EUR
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish

Table 10: Church tax in Lower Saxony

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Catholic, Protestant

Table 11: Church tax in Mecklenburg -Western Pomeria

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of "income tax to be assessed"	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	- - -	- - -	Catholic 3%	Catholic 3%	Catholic 3%	Catholic 3%
Upon request or ex officio	- - -	- - -	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 12: Church tax in North Rhine-Westphalia

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant, Jewish	Protestant, Jewish	Protestant, Jewish

Table 13: Church tax in Rhineland-Palatinate

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 14: Church tax in Saarland

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%	9% Jewish 10%
Levying religious communities	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish	Catholic, Protestant, Jewish
Minimum amount of church tax	- - -	- - -	- - -	- - -	- - -	- - -
Amount per annum	- - -	- - -	- - -	- - -	- - -	- - -
Levying religious communities	- - -	- - -	- - -	- - -	- - -	- - -
Church tax ceiling						
Ceiling as a percentage of taxable income	Protestant 4%	Protestant 4%	Protestant 4%	Protestant 3.75%	Protestant 3.5%	Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 15: Church tax in Saxony

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 16: Church tax in Saxony-Anhalt

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 17: Church tax in Schleswig-Holstein

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	see above	see above	see above	see above	see above	see above
Church tax ceiling						
Ceiling as a percentage of taxable income	3%	3%	3%	3%	3%	3%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 18: Church tax in Thuringia

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Table 19: Church tax regulations valid for the majority of church members in the Western federal states

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish	Catholic, Protestant, Free religious, Jewish
Minimum amount of church tax	---	---	---	---	---	---
Amount per annum	---	---	---	---	---	---
Levying religious communities	---	---	---	---	---	---
Church tax ceiling						
Ceiling as a percentage of taxable income	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic, Protestant 4%	Catholic 4% Protestant 3.75%	Catholic 4% Protestant 3.5%	Catholic 4% Protestant 3.5%
Upon request or ex officio	Upon request	Upon request	Upon request	Upon request	Upon request	Upon request
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant

Table 20: Church tax regulations valid for the majority of church members in the Eastern federal states

	Year of assessment					
	2001	2002	2003	2004	2005	2006
Church tax rate of “income tax to be assessed”	9%	9%	9%	9%	9%	9%
Levying religious communities	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant
Minimum amount of church tax	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0	If income tax to be assessed > 0
Amount per annum	7.20 DM	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR	3.60 EUR
Levying religious communities	Protestant	Protestant	Protestant	Protestant	Protestant	Protestant
Church tax ceiling						
Ceiling as a percentage of taxable income	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Upon request or ex officio	ex officio	ex officio	ex officio	ex officio	ex officio	ex officio
Determination of shares for church tax in interreligious marriage	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income	Total income revised by partial exempt income
Church fee in interreligious marriage	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant	Catholic, Protestant

Computation of the church tax liability in inter-denominational and interreligious marriage

A marriage is called inter-denominational if husband and wife have different affiliations (e.g. Catholic husband and Protestant wife, Protestant husband and Jewish wife) and both religious communities raise church tax. This is different from the case of interreligious marriages where one partner is subject to church tax and the other partner is not (e.g. Islamic husband and protestant wife). In the case of an interreligious marriage, a comparative calculation between the church tax liability and the church fee in an interreligious marriage is conducted whereby the higher amount of both is to be paid. The intention is that the income of the partner without church tax liability should not be drawn on when assessing the church tax liability of the partner who actually is obliged to pay church tax. The fictitious taxable income of the couple is the assessment base of the church fee in an interreligious marriage.

This appendix shows how the church tax liability is computed in case of inter-denominational and interreligious marriage.

In an inter-denominational marriage, both partners belong to a religious community which raises church tax in the federal state of residence. The assessment base for the church tax liability of each partner is half the joint fictitious income tax:

$$\text{church tax} = \text{fictitious income tax} \cdot 0.5 \cdot \text{church tax rate}$$

It may be, however, that the religious community of for example the husband foresees a ceiling for the church tax while the religious community of the wife does not. In this case, the upper limit of the church tax liability is computed as follows:

$$\text{church tax ceiling}_{\text{husband}} = \text{joint fictitious taxable income} \cdot 0.5 \cdot \text{ceiling rate}$$

In an interreligious marriage, only one partner is member of a religious community which raises church tax in the federal state of residence. In this case, the church tax liability of this partner is computed as in the following example for the year 2006:

	Husband	Wife	Total
Total income revised by partial exempt income	€50,000	€20,000	€70,000
Income tax liability on total income in case of single assessment	€13,096.25	€2,850.06	€15,946.31
Share of total income tax liability	82.1 %	17.9 %	

$$\text{church tax}_{\text{husband}} = \text{fictitious income tax} \cdot 0.821 \cdot \text{church tax rate}$$

The upper limit of the church tax of the husband would be determined as follows:

	Husband	Wife	Total
Total income revised by partial exempt income	€50,000	€20,000	€70,000
Share of total income	71.4 %	28.6 %	

$$\text{church tax ceiling}_{\text{husband}} = \text{joint fictitious taxable income} \cdot 0.714 \cdot \text{ceiling rate}$$

The fictitious taxable income of the couple (i.e. less child allowances and under consideration of partial exempt income) is the assessment base of the church fee in an interreligious marriage which is determined as follows:

Table 21: Church fee in interreligious marriage

Fictitious taxable income in Euros	Church fee in Euros
30,000 - 37,499	96
37,500 - 49,999	156
50,000 - 62,499	276
62,500 - 74,999	396
75,000 - 87,499	540
87,500 - 99,999	696
100,000 - 124,999	840
125,000 - 149,999	1,200
150,000 - 174,999	1,560
175,000 - 199,999	1,860
200,000 - 249,999	2,220
250,000 - 299,999	2,940
300,000 and more	3,600

This table displays the regulation valid in the years 2002 to 2006. In 2001, the Deutsche Mark was still the means of payment. How the church fee was determined in that year is shown in Table 22 in the appendix.

9 Appendix B

This appendix derives the properties of the four (C, Y) -loci defined in Section 3.

Locus I

Locus I separates non-donating non-members from donating non-members. It is implicitly defined by

$$-Pu'(Y) + v'(0) = 0,$$

Table 22: Church fee in interreligious marriage in 2001

Fictitious taxable income in DM	Church fee in DM
60,000 - 74,999	180
75,000 - 99,999	300
100,000 - 124,999	540
125,000 - 149,999	780
150,000 - 174,999	1,080
175,000 - 199,999	1,380
200,000 - 249,999	1,680
250,000 - 299,999	2,400
300,000 - 349,999	3,120
350,000 - 399,999	3,720
400,000 - 499,999	4,440
500,000 - 599,999	5,880
600,000 and more	7,200

which can be inferred from condition (1). Obviously, Locus I is a horizontal line in the (C, Y) -space and has an intercept with the Y -axis amounting to $Y = u'^{-1}[v'(0)/P] > 0$.

Locus II

Locus II separates donating church members from non-donating church members. It is implicitly defined by

$$-Pu'(Y - PC) + v'(C) = 0.$$

which again can be inferred from condition (1). Implicit differentiation yields

$$\frac{dY}{dC} = \frac{P^2u''(Y - PC) + v''(C)}{Pu''(Y - PC)} > 0.$$

For $C = 0$ Locus I and Locus II coincide, that is, also Locus II has an intercept with the Y -axis amounting to $Y = u'^{-1}[v'(0)/P] > 0$.

Locus III

Locus III separates non-donating church members from non-donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = G_n = 0$, that is,

$$u(Y - PC) + v(C) + \beta = u(Y) + v(0).$$

Implicit differentiation of Locus III leads to

$$\frac{dY}{dC} = \frac{-Pu'(Y - PC) + v'(C)}{-u'(Y - PC) + u'(Y)} > 0.$$

The numerator is negative as can be inferred from condition (1). The denominator is also negative, since u is strictly concave. Therefore, Locus III is an increasing curve in the (C, Y) -

space. The curve cannot have a positive intercept with the Y -axis for $\beta > 0$. The curve either springs from the origin or has a positive intercept with the C -axis. Let us first consider the case that Locus III springs from the origin. Since $u'(0) = \infty$, it follows that $\lim_{C \rightarrow 0} \frac{dY}{dC} = \infty$. Furthermore, by L'Hospital's rule it follows that $\lim_{C \rightarrow Y/P} \frac{dY}{dC} = P$. Therefore, by continuity of Locus III it follows that Locus III is located strictly above the curve defined by $Y = PC$. Now consider the case that Locus III has a positive intercept with the C -axis. In this case, Locus III is located below the curve defined by $Y = PC$. It then cannot separate between non-donating church members and non-donating non-members because households on Locus III would have strictly negative private consumption. Instead, the curve defined by $Y = PC$ would separate between these two household types. However, this case is only of minor relevance as households on the curve defined by $Y = PC$ have zero private consumption.

Locus IV

Locus IV separates non-donating church members from donating non-members. It is implicitly defined by $V_m = V_n$ for $G_m = 0$ and $G_n > 0$, that is,

$$u(Y - PC) + v(C) + \beta = u(Y - PG_n) + v(G_n).$$

Implicit differentiation of Locus IV yields

$$\frac{dY}{dC} = \frac{-Pu'(Y - PC) + v'(C)}{-u'(Y - PC) + u'(Y - PG_n)} > 0.$$

The numerator again is negative. The denominator is also negative. This is because G_n is smaller than C if the household as a non-member is a donor and as a church member is not a donor. If G_n was larger than C , the household as a church member would be a donor and, thus, could not be located on Locus IV. Thus, also Locus IV is an increasing curve in the (C, Y) -space. Locus IV is only defined above Locus I, because below Locus I the household as a non-member does not donate. Locus III and Locus IV intercept Locus I at the same point and have the same slope in that point. This is because on Locus I, both condition (1) holds with equality for non-members and $G_n = 0$. If Locus III is located below the curve defined by $Y = PC$, then also Locus IV is located below that curve and cannot separate non-donating church members from donating non-members. In this case again the curve $Y = PC$ would separate between these two household types. The line of argument is similar to the one applied to Locus III. Whether Locus IV has an intercept with Locus II or not depends on the specification of u and v , and cannot be determined on a general level.

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