Anonymity in giving in a natural context

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Anonymity in Giving in a Natural Context —

An Economic Field Experiment in Thirty Churches

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Abstract

The role of anonymity in giving is examined in a field experiment performed in thirty Dutch churches. For a period of 29 weeks, the means by which offerings are gathered is determined by chance, prescribing for each offering the use of either 'closed' collection bags or open collection baskets. When using baskets, attendants' contributions can be identified by their direct neighbors, and attendants can observe the total amount given by the people who preceded them.

Initially, contributions to the services' second offerings increase by 10% when baskets are used, whereas no effect is found for first offerings. The positive effect of using baskets peters out over the experimental period. Additional data on the coins collected show that in both offerings, people switch to giving larger coins when baskets are used.

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1 Introduction

How does anonymity affect giving? Recently, this question has been addressed in some experimental public good games (Andreoni and Petrie, 2002; Rege and Telle, 2001). These studies find that contributions increase when subjects are unmasked, indicating that – besides economic motivations – there is a role for social incentives in giving. Subjects act on the circumstance that they can see what others give and that their giving decisions are observed and potentially evaluated by other subjects. Intuition suggests that the extent to which subjects care about this evaluation by others is dependent on the social ties that exist between them.

Van Dijk *et al.* (2002) prove that social ties can indeed form between subjects participating in public good experiments, which validates the presence of social ties as a potential explanation for the observed increase in contributions. However, the ties formed between subjects in the laboratory are fundamentally different from the ties that exist between individuals in repeated real-life interactions. Consequently, it is not clear to which extent laboratory findings on the effect of anonymity on giving decisions can be extrapolated to real-life situations. Ideally, one would like to observe the effect of removing anonymity on contribution decisions made by individuals in their natural habitat.

The field experiment reported on in this paper tries to accomplish exactly this, by implementing a change in the anonymity of giving to offerings in thirty Baptist churches in the Netherlands. In this particular environment, one expects social ties to exist between congregation members and moreover, that these ties are natural and relatively strong and stable. In the churches considered, it is common to collect offerings at least two times during service by means of 'closed' collection bags that are passed by the attendants. These bags are closed in the sense that attendants cannot infer the total amount already given by the attendants who preceded them and the amount given

by their nearest neighbors.

To examine the role of anonymity, the following treatment is imposed. For a period of 29 weeks, the collection bags are randomly replaced with open collection baskets. For each offering, baskets are assigned with probability 0.5 (treatment group), bags are assigned otherwise (control group). By using baskets, attendants can see both the amount given by their nearest neighbors as well as the total amount given by the people who preceded them.

I test the hypothesis that anonymity affects contribution levels by comparing the proceeds in the treatment group with the proceeds in the control group. Using nonparametric tests I find the interesting effect that the replacement of bags by baskets significantly increases contributions to the second offering, whereas no treatment effect is found for the first offering. This finding is corroborated by subsequent econometric analysis of the data. Estimates indicate that the treatment increases proceeds of the second offering by as much as 9.6 percent, although this effect peters out over time.

This difference in effect is not expected on basis of experimental evidence on public goods experiments. A possible explanation for this phenomenon may be that the first offering's proceeds are always earmarked to the parish itself, whereas the second offerings are mostly gathered for specific purposes outside the own parish. For this reason, the first offering has mainly a public good character and the second bears more resemblance to a charity good. This conjecture is sustained by additional analysis on subsets of the data.

Three churches provided detailed information on the coins that were collected in each offering. These data show that when baskets are used, the portion of small coins (up to 20 eurocent) declines as churchgoers shift to giving larger coins (1 and 2 euro). Though at odds with economic theory, the result compares to a finding in Burnham (2003) who reports an upward shift in modal gift in an experimental dictator game when the anonymity of

subjects is removed. It further supports the hypothesis that social incentives like receiving approval from others play an important role in giving and are triggered by the removal of anonymity.

Van Dijk *et al.* (2002, p. 277) note that "it is difficult to test the dynamics of social ties and economic interaction by observing behavior in actual life." I believe that the particular setup of this field experiment goes some way in circumventing these problems by using the methodology of experimental economics to study a real-life economic interaction. The interaction of passing bags or baskets by churchgoers is well-defined and takes place periodically in a more or less fixed environment. Which channel of intermediation – bags or baskets – is used for the interaction is completely under control of the experimental leader, who determines this by using a randomized scheme. However, admittedly, some interactions between parishioners, like for example the interactions that take place between services, are not controlled.

One disadvantage as compared to laboratory experiments is that explanatory variables other than the means of gathering are liable to change during the experimental period. Examples are weekly changes in the number of attendants and their seating pattern (although some regularities are common), changes in the purpose of the offerings and the minister leading the service. Fortunately, information on most of the covariates that possibly influence offering proceeds is available. I account for them in an econometric analysis of the data, of which results are given in Section 6. Another drawback is that individual contributions cannot be observed because for each offering only aggregate amounts are reported. This makes it for example impossible to pin down precisely the number of people that make non-zero contributions to the offerings.

On the other hand, this field experiment in parishes has also some

advantages relatively to laboratory experiments. First note that church attendants do not primarily choose to participate in an experiment; they choose whether or not to go to church. The assumption that no-one alters this decision due to the introduction of baskets seems reasonable. Second, attendants have made for years the contribution decision that is under investigation. As a result, there is no doubt that they understand the procedure and moreover, pre-experimental data are available for analysis. A third advantage is that in their contribution decision, church attendants allocate money they earned in their daily life and not money given to them as an endowment by the experimenter or received by performing an artificial task. Finally, the context of the church is credible in the sense that attendants will not doubt that their and the other attendants' contributions will indeed be used for the specified objective.[1]

One caveat should be kept in mind in deriving general policy recommendations for fund-raising institutions from the results presented here. Parishioners may not be representative for the population of interest to fund-raisers. Joining church services may correspond to an attitude to giving that differs from that of the population at large.[2] However, it is likely that the behavior of parishioners is at least suggestive of the response of a more general population.

The paper proceeds as follows. Section 2 gives the experimental setup together with an outline of the institutions that are in force in the participating churches. Section 3 discusses which social incentives may drive the effect of the basket-treatment. Furthermore, I review experimental results

[1]For this reason, the setup is not subject to the critique of Frohlich, Oppenheimer and Moore (2001). These authors argue that the role of self-interest of individuals in dictator game experiments is systematically overstated through subjects doubting either the existence of other subjects or the disposition of the money shared, or because they view the experiment as a game.

[2]Eckel and Grossman (2003) report that active membership in religious organizations is one of the most important determinants of charitable giving. Iannaccone (1998) on the other hand notes that religion seems to matter but that its impact is far from uniform.

and results from field studies on the role of anonymity in giving behavior and the (small) existing literature on giving in churches. Data are presented in Section 4 and they are analyzed in Section 5 till 7. First, the effect of the basket-treatment is identified nonparametrically in Section 5. In Section 6, a panel data model is estimated to quantify the treatment effect. Section 7 analyzes the effect using baskets on the type of coins given. Section 8 concludes.

2 Experimental design

2.1 Selection procedure

An invitation letter was sent to all 89 Baptist parishes in the Netherlands. This letter stated in general terms that the University of Groningen intended to start a research project on church offerings and that participating parishes could each receive a compensation of €300. Parishes should return a reply form if they were interested to participate in the project.[3] The questionnaire and the instructions that were sent to the local church councils used a neutral language. In particular, no reference was made to the role of anonymity in giving.

45 parishes reacted positively; 30 of them were selected for participation, based on the number of offerings during service and geographical dispersion.[4] The selected parishes are geographically dispersed across the country, with an overrepresentation of parishes in the – rural – northern part of the country, reflecting the fact that a large number of Baptist parishes are located in this region. The sample is not biased toward particular small

[3]The amount of €300 is not unreasonable, since in order to receive this amount, parishes not only had to implement the experimental design, but they also had to collect historical information on the proceeds and purpose of each individual offering held from 1995 onward and furthermore answer a questionnaire with general questions about the parish and the parishioners. Examples are questions concerning the demographics of the parishioners and the number and type of seats in the church building.

[4]For example, one parish dropped out because it did not have offerings, another because it only had one offering per service.

or large parishes.

Most of the selected parishes have two offerings per service. Commonly, collection bags like the one depicted in figure 1a are used to gather the proceeds.[5] Two parishes have standard an exit offering, and one parish only rarely has a second offering.[6] Celebration of the Lord's supper – which in most parishes takes place monthly – results in an additional (third) offering during service in 21 parishes.[7] At the Sunday of Easter and Pentecost, 3 respectively 2 churches have only one offering with a special purpose. The proceeds of these so-called 'gratitude offerings' are as a rule far above average.

In each selected parish, an individual (in most instances the treasurer) was appointed to coordinate the research project. Besides filling out the questionnaire and gathering historical data, his or her task during the experimental period was to act as experimental leader, looking after the correct implementation of the setup. He instructed the deacons by which means (bags or baskets) they had to gather the offerings and he made sure that in each service the number of attendants was counted. After service, he filled out a form with questions regarding the particularities of the service and the offerings.

Baptists form a relatively small denomination in the Netherlands. With the first parishes already being founded around 1840, they now form an integral part of Dutch society.[8] All parishes have service on Sunday morning during which one or more offerings take place. The parishes considered

[5] An exception is formed by the extra offering gathered after having celebrated the Lord's supper, which is sometimes gathered by means of a plate (10 churches) or a mug (one church).

[6] This was only noticed after the beginning of the experimental period.

[7] 20 churches celebrated the Lord's supper after the regular service and of these churches, 15 gave the possibility to leave the service in between. 2 celebrated the Lord's supper in an additional evening service.

[8] The parishes should be distinguished from the younger denomination of so-called Free Baptists.

a. collection bag

b. collection basket

Figure 1: Collection bags and baskets used.

are affiliated to the national Baptist federation, but have a large degree of autonomy in organizing their services. Due to this, changes in aspects of the service like the introduction of baskets to gather offerings are more easily implemented than e.g. would have been the case in e.g. the Dutch Reformed or Catholic churches in the Netherlands, which are more hierarchically organized.

2.2 Treatment

During the experimental period, the treatment imposed is that for some offerings the familiar collection bags are replaced by open collection baskets (see figure 1). This treatment provides attendants with two additional pieces of information. First, nearest neighbors can observe each other's contributions and second, attendants can see the total amount given by the people who preceded him or her.

Before the start of the experiment, the appointed person in each church received a randomized scheme indicating for each offering by which means it had to be gathered. These schemes were constructed as follows. For each offering, the Gauss random number generator drew from a $U[0,1]$ distribution; values larger than 0.5 resulted in the offering receiving the treatment. Note that in this way, it can happen that none, one or both offerings in one service are collected by means of a basket.

Most churches informed their members in advance that offerings could be taken in by either bags or baskets. In some parishes this was communicated during a service or other meeting, and in other parishes a message appeared in the church periodical.[9] The necessary baskets were sent to the churches. Two churches used baskets of their own that were similar to the ones supplied.

2.3 Order of moves

At the beginning of service, one of the deacons announces to the congregation the number and the purpose of the offerings that will be held. Just before the actual gathering, the minister makes an second announcement that an offering will take place.

One of more deacons pick up a collection bag from the table in front of the church, which is then passed in the following way: Each deacon gives his bag to a visitor; (s)he makes his or her contribution and passes the bag to the person next to him or her. This procedure is repeated until the last person in the row has made his contribution. The bag is then passed to the next row, either directly by the last person or indirectly by intervention of the deacon waiting in the aisle. The offering ends when all attendants have had the opportunity to make a donation.[10] A typical scheme is depicted in figure 2. In most churches (26), the second offering directly follows the first, that is, the deacon hands out the first collection bag, waits until the churchgoer has passed the bag and then hands out the second collection bag to the same churchgoer.

[9] In the vast majority of the parishes, visitors did not know in advance for which particular offerings replacement took place. In six churches, visitors were told at the beginning of service whether bags or baskets were used for the offerings in that service.

[10] During the gathering, the organ plays and possibly the congregation sings a song.

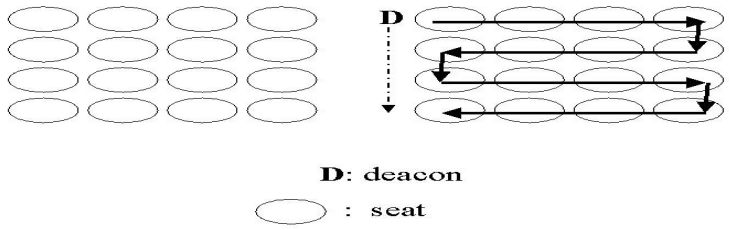

Figure 2: An exemplary offering gathering scheme.

2.4 Offering purposes

The purpose of the first offering in each church is the parish itself; the purpose of the second offering changes weekly and varies from parish to parish. These purposes of the second offering can be divided into four categories. The first category comprises all offerings serving a specific purpose within the own parish. Examples are offerings for church building or renovation; offerings for bearing costs of sending flowers to elderly members; for evangelical work or for buying a new organ. The second category consists of offerings the purpose of which is to fund (one of) the tasks of the national Baptist federation. The third category includes purposes that have an indirect link to the own parish, like partner communities in Eastern Europe or missionaries sent out to developing countries. The last category consists of all purposes outside the sphere of influence of the own parish, like for example offerings for Amnesty International or the Leprosy Fund.

Thus giving to the first offering has mainly a public good character, whereas giving to the second offering either has a public good character (in case of an internal purpose) or more the character of a charity good (in case

of an external purpose).[11]

The offerings represent on average 10 to 25% of total revenues of a parish which further comprise regular bank payments by the members, bequests and rents.[12]

3 The role of anonymity in giving

3.1 Social incentives

Which incentives might induce individuals to contribute more in a non-anonymous context? I briefly discuss a number of incentives relevant for making contribution decisions to public goods or charity and sketch their implications for the expected effect of the introduction of baskets. Notwithstanding the sequential character of the offerings, I will focus on non-strategic, social incentives. By social incentive I refer to an emotion or motive that is affected by (changes in) the social context of an individual decision maker. In order to make things more precise, I will define two kinds of social contexts and subsequently classify social incentives on basis of the minimial context they need to be triggered:

Social context with limited information: Each individual has information on his own contribution and knows how his contribution affects the payoff to others.

Social context with full information: In addition to the knowledge he has in the context with limited information, each individual knows

[11] Notice that in case an individual derives utility from the total amount his/her church donates to the external purpose, his utility is positively affected by the amount donated by others, as in a public good situation.

[12] In some parishes it also happens that a small minority of members makes (for reasons of tax deduction) regular payments by bank explicitly labelled 'offering contribution' instead of contributing to the offerings during service. This lowers the observed average contribution per attendant. This does not affect the non-parametric effects which I will carry out at level of individual parishes; in the econometric estimation, the effect is absorbed by the church-specific fixed effect. The same is true for the possible endogeneity of the church selection decision.

that (some) other individuals are able to evaluate his decision and that he can evaluate the decisions of others.

Stated in this terminology, the basket-treatment signifies a move from the limited information context to the full information context. Examples of social incentives that possibly affect behavior in a limited information context are pure altruism and warm glow. A pure altruist not only cares about the payoff to himself but is also concerned about the benefit accruing to other individuals, without deriving utility from his private gift *per se*.[13] A person induced by feelings of warm glow derives utility from the mere act of giving. Altruism (Andreoni, 1995; Goeree, Holt and Laury, 2002) and warm glow (Palfrey and Prisbey, 1997) have empirically been identified as important incentives to contribute in public good experiments.

Is the contribution of church attendants who are motivated by altruism and warm glow affected by the move from a limited information toward a full information social context? Since most church periodicals provide information on average contributions to the offerings, the extra information on individual contributions as provided by the baskets does not affect the decision of an altruist who only cares about the average benefits to others. The decisions of attendants motivated by warm glow are also unaffected by the basket-treatment, since this incentive is a function of the own contribution only.

Examples of social incentives that can come into play under a full information social context are prestige (Harbaugh, 1998a,b),[14] receiving social approval, avoiding shame, social comparison and fairness. In order to receive prestige, identification of your contribution by others clearly is a necessary prerequisite. Individuals who care about receiving social approval – or the opposite, avoiding shame – are not concerned about whether other

[13] Andreoni (1990).

[14] Harbaugh defines prestige as the utility that comes from having the amount of a donation publicly known.

people *know* how much they contribute but rather how other people *evaluate* their contribution. Elster (1999, p. 149) describes shame as "triggered by the contemptuous or disgusted disapproval by others of something one has done. It is an internal interaction-based emotion: I feel shame in your presence because I know you disapprove of me."[15] Individuals who care about how their contribution compares to the contributions of others are led by motivations of social comparison; fairness considerations influence the decision-making process if individuals value how their contribution relates to some "fair" standard, which itself is some function of the contributions of others.[16] Masclet *et al.* (2003) find that the opportunity for agents to express disapproval of others decisions increases contribution levels and, moreover, that the effect of these nonmonetary sanctions is greater under partner than under stranger matching. In our context, parishioners can be viewed as partners since individual parishioners have made a positive choice for their own parish and, as a corollary, for the people they meet regularly in church to share their faith and the parish's resources with.[17]

In the churches, prestige might lead to higher contributions when baskets are used, since only baskets provide the necessary identification of an individual's contribution by others.[18] Churchgoers searching for social approval may seize the opportunity given by the baskets to show that they "do their part"[19] and increase their contribution. They might however be wary to overdo it for reasons of fairness and social comparison, since deviating

[15] Bowles and Gintis (2003) develop an analytical model which shows that shame can increase the level of cooperation in a group.

[16] See e.g. Bolton and Ockenfels (2000), Fehr and Schmidt (1999) and Fehr and Gächter (2000) for models and experiments on fairness. Andreoni, Brown and Vesterlund (2002) look at fairness considerations in a two-person sequential public good game.

[17] The number of members of the churches in the sample varies from 26 to 384, with the median at 130. In general, an individual member is personally acquainted with a large fraction of the other members.

[18] This is not fully true. Individuals could in fact choose to voluntarily show their contribution to their neighbors before dropping it into the bag. However, it does not seem likely that this plays an important role in practice.

[19] Andreoni and Petrie (2002).

too much from an implicitly agreed upon 'standard' amount may trigger negative reactions. In this way the identification provided by the baskets may increase average contributions when social approval and shame are important motives, but may simultaneously decrease variation in individual contributions when attendants care how their contribution compares to the contribution of others. Intuitively, one expects the use of baskets to have a larger impact on the proceeds of the second offering if individuals care about approval, since the more altruistic character of this offering gives individuals greater opportunity to show their generosity.

3.2 Experimental and field studies

The issue how identification of subjects affects giving has recently been investigated in experimental public good games (Andreoni and Petrie, forthcoming; Rege and Telle, 2001; Gächter and Fehr, 1999). The main finding in these papers is that removing anonymity leads to increased contributions. Gächter and Fehr (1999) observe that the desire for social approval is irrelevant for behavior when the subjects are complete strangers, but when "the opportunity for social exchange is combined with some minimal social familiarity there is a substantial increase in contribution levels." (p. 352). Hoffman, McCabe and Smith (1996) find in a study on dictator games that offers are lowered as the social distance between the experimental experimental subjects and the experimental leader increases.

Two differences between these public good experiments and the current setup have to be mentioned. First, in the studies mentioned, identification in the non-anonymity condition is *global*, in the sense that a subject's contribution is revealed to *all* other participants. The current study only provides *local* identification because identification of an individual's contribution is restricted to his or her nearest neighbors. Second, the order of moves in the basket offerings is inherently sequential instead of simultaneous. Sequential

play may help to sustain cooperation when a when a substantial fraction of the subjects are conditional cooperators (Houser and Kurzban, 2003).[20]

Further evidence for the role that information on others' contributions and identification of contributors plays in giving behavior is provided by field studies. Field data on fund raising show the effect of category reporting (Harbaugh, 1998a, b) and the effect of publicly announcing amounts of 'seed money' (List and Lucking-Reiley, 2002). The former points out that a prestige motive may affect an individual's contribution decision; the latter study provides evidence that individuals take the amount already given by others into account in making their own contribution decision. Finally, Haan and Kooreman (2002) analyze data on honor systems for the sale of candy bars within firms. Their evidence suggests that in settings where subjects are free to choose their contribution, they may experience a strong moral obligation to pay the price asked.

3.3 Literature on giving in churches

The number of studies dealing with giving in churches are relatively few. Most of the existing studies focus on group-size effects by looking at per-member rates of annual giving. Sullivan (1985), Stonebraker (1993) and Zaleski and Zech (1994) all report a negative relationship between the number of members and per-member rates of annual giving.[21] Yet it is hard to interpret these results as evidence that free riding increases in group size.[22] Zaleski and Zech (1996) for example put forward that for small parishes, members may agree to collectively share congregation costs. Since these costs do not increase proportionately with membership, an increase in membership leads to a drop in per capita giving. Iannaccone (1998) argues

[20] Vesterlund (2003) provides a theoretical model on sequential fundraising showing that announcement of contributions can be optimal when there is imperfect information about the value of the good.

[21] Reported in Iannaccone (1998).

[22] Lipford (1995) found no evidence of a group size effect on giving, but was criticized by Zaleski and Zech (1996) for using a flawed specification.

that congregation size may be endogenous. Church members may also feel that the services their church offers are of lower quality as the number of members increases. Finally, Tullock (1996) argues that in giving, members "make a bargain with God" by buying a special type of fire insurance, and that public good considerations are for this reason minor in giving decisions of congregation members.

A notable difference between the present study with previous studies is that the data I examine are weekly contributions to offerings by church *attendants* instead of annual contributions by church *members*. This gives the opportunity to use intra-church variation in the number of attendants to assess a possible group size effect. In addition, I get rid of a host of confounding factors like e.g. the above mentioned cost sharing argument.

4 Data

The experimental period lasted for 29 Sundays, in the time period from March 3, to September 15, 2002. In one parish, the experiment ran till September 22 and in another till September 29, since in these parishes a few services were cancelled. One parish left the sample after three weeks[23] and was replaced by another in which the experimental period started at May 5 and ended at November 17.

INSERT TABLE 1 ABOUT HERE

For the first offering 834 observations are available and for the second 791. Tables 1 contains summary statistics on the first and second offering. The table shows that per-attendant proceeds are on average 23% higher for the first offering and that the distribution is skewed to the right for the first as well as the second offering. The mean values of the dummy variables show that — as a result of the randomization — about half of the first as

[23]This parish ceased participation because the treasurer of this parish had to quit his job on personal grounds and could not find a successor.

well as the second offerings is gathered by means of bags, and the other half by means of baskets. The table further shows that in about 20% of the services an additional third offering is held ("is 3rd"); and in about 12% of the services an exit offering ("is exit"), which in half of the cases is meant for missionary work. These variables are included in the empirical analysis to account for the possible effect of additional offerings on the proceeds of the first two offerings. Exit offerings meant for missionary work are taken up separately, since they are often announced one week in advance.

The dummy "simultaneous" indicates whether the first offering is directly followed by the second, which is true in about 81% of the services. Simultaneity means here that there is no time lag between the two contribution decisions. This may affect the amount given in each of the two offerings.[24] A few offerings receive a special recommendation or have a relationship with the character of the service. Since recommendations are directly aimed at increasing the proceeds of an offering and a relation between the sermon and the offering purpose increases the attendants awareness of the offering, both are included in the empirical analysis.

The dummy "music" equals one if additional musicians are present in the service. "Own minister" is a dummy that equals one if the own minister leads the service and the dummy "coffee" indicates if attendants have the possibility to drink coffee – for free – after service. The music and coffee dummy will be included to pick up a possible "good mood" effect of hearing music and having the prospect of coffee. One's mood may also be affected by the amount of sunshine on a given day. "Sun" gives the daily hours of sunshine as a percentage of the maximum amount of possible sunshine one could obtain.[25] The "own minister" dummy is included to pick up possible

[24] In non-simultaneous offerings, the first offering commonly takes place before the preaching and the second after the preaching.

[25] This maximum amount increases as days get longer. To take into account the geographical dispersion of the parishes, information was gathered from five different weather stations in the Netherlands.

effects of the preacher on the perceived quality of the service, resulting in more or less generosity. The "special services" dummy equals one if the service has a special character, like e.g. baptizing services and services in which a new minister is installed. These services are characterized by a relatively large number of guests. The dummy for family services takes on the value one if a service has the character of a low-threshold family service. Due to this character, these services are attended by an above average number of children, which is likely to have a downward effect on average per-attendant contributions. The "evening service" dummy equals one if on the same Sunday a service is held in the evening hours. The opportunity to visit an evening service is seized by some parishioners – especially youth – to opt out for the morning service, with the effect that having an evening service may change the composition of the parishioners present in the morning service.

The dummy "Chr. celebration" equals one if the service is held on Christian celebration days like Easter and Pentecost. Besides affecting the number of people who go to church, attendants consider these days as special days which may influence their contribution decisions. So-called gratitude offerings are collected at special days like Easter and Pentecost to give attendants the opportunity to express their gratitude. The purpose of these offerings can be internal as well as external. In general, the contributions to these offerings are far above average. Offerings held following the celebration of the Lord's Supper are also possibly used by attendants to express their gratitude. For these reasons, a "gratitude" and a "Lord's Supper" dummy are included in the empirical analysis. A complete list on the dummy variables defined is given by table A.1.

With regard to the offering purposes, the table makes clear that almost all (99.4%) of the first offerings have the own parish as purpose; of the second offerings, 30% serves specific internal purposes, 56% the Baptist federation

and 7% other purposes outside the own parish.

Figure 3 shows the per-week development of per-attendant contribution to the first and second offering averaged over all parishes during the experimental period. Gratitude offerings and offerings held after celebration of the Lord's Supper are dropped from the sample because of their special character. The figure shows that the average contribution to the first offering is clearly higher than to the second. The two exceptions are week 12 and 14, of which week 12 coincides with Pentecost for the vast majority of the parishes.

INSERT FIGURE 3 ABOUT HERE

Table 2 presents the average per-attendant contributions to the first and second offerings for all parishes in the sample. Moreover, a distinction is made in offerings gathered by means of bags and offerings gathered by means of baskets. Large differences in average contributions are observed between different parishes. The last column gives the difference in average proceeds between open and closed offerings.

INSERT TABLE 2 ABOUT HERE

5 Removing anonymity: nonparametric tests

To assess the effect of using baskets on average offering proceeds, I first calculate Wilcoxon rank sum statistics. I distinguish between the effect on first and on second offerings. The null hypothesis of no treatment effect is rejected for the second offering but not for the first offering.[26] Figure

[26]The p-values are 0.000014 and 0.1800, respectively, and are calculated as follows: For each parish separately, consider all first offerings and denote the total number of times a bag is used by m, the number of times a basket is used by n and the sum of the ranks of the basket observations by R_n. Since the total number of $n+m$ observations per offering per parish exceeds 10 in all cases, the asymptotic normality of R_n can be used such that $p(R_n \leq k) \equiv \Phi\left(\frac{k+1/2-n(m+n+1)/2}{\sqrt{mn(m+n+1)/12}}\right)$ under the null hypothesis of no treatment effect. p-values for the general effect are obtained

4 shows a frequency plot of the calculated standard normal z-values (one value for each parish). At the level of individual parishes, large differences are observed. For the second offering, all significant differences (8 parishes on a 5% level) point to a positive effect from the introduction of baskets on average proceeds. For the first offering, significantly more is raised by the basket offerings in three parishes but in one parish the baskets have a strong negative effect on average proceeds.

INSERT FIGURES 4 AND 5 ABOUT HERE

I also calculated for each parish t-statistics for the difference in average contributions between open and closed offerings for the first and the second offering separately.[27] Results are shown in figure 5. The patterns found are roughly similar to those found by using the Wilcoxon rank sum test, except for parish nr. 5 in table 2. For this parish, the effect of treatment is found to be strongly negative when estimated by the difference in mean test.

Both the Wilcoxon rank sum test and the difference in mean test assume that the observations are independent. One could object that in practice there might be a dependence between offerings held in the same parish, because from week to week more or less the same people visit service and, moreover, these regular visitors tend to take the same seats. The Wilcoxon signed rank test is an alternative that does not assume independence. The test uses for each parish the observed paired percentage difference of average basket offering proceeds and average bag offering proceeds. According to this test (two-sided), the p-values of no treatment effect are 0.2096 and 0.0727 for the first and second offering, respectively.

by summation of the R_n values over all parishes. The procedure is the same for the second offerings.

[27] For each parish, the t-statistics were calculated as $t_j = \frac{\overline{y_{j,basket}} - \overline{y_{j,bag}}}{S_p\sqrt{\frac{1}{n}+\frac{1}{m}}}$ with $S_p = \frac{(n-1)S_n^2+(m-1)S_m^2}{n+m-2}$ and $j = 1, 2$ denoting whether the offerings are first or second offerings, and $\overline{y_{j,bag}}$ ($\overline{y_{j,basket}}$) per-attendant proceeds averaged over all $j$ths offerings gathered by means of bags (baskets) during the experimental period.

Data on the number and type of coins and bank notes show that in parish nr. 5, once a month a note of €100 is contributed.[28] Each time, the note is contributed to an offering which is gathered by means of a bag and whose purpose is the parish itself. Since the note increases the total proceeds with about 200%, the phenomenon leads to a number of outliers for which the difference in mean test is more sensitive than the Wilcoxon rank sum test.[29] This behavior of contributing large bank notes only to bag-offerings indicates that a certain wariness to deviate too much from an accepted 'standard' may affect contribution decisions. When one's contribution is much higher than those of others, one might opt for anonymity since the concern for possible negative reactions ('What a show-off.') outweighs the concern for prestige.

6 Econometric analysis

The field character of the experiment entails that one has to account for a number of covariates other than the treatment variable that potentially influence the offering proceeds and that vary both between services (e.g. the number of attendants) and within services. Variables that vary within services are variables that are offering specific. Examples of such variables are the purpose of the offering and the way in which the offering was recommended to the congregation. In order to assess the effects of identification while accounting for these covariates, the following panel regression is estimated

$$\begin{aligned} \ln y_{it,j} &= \alpha_{i,j} + \beta_j BASKET_{it,j} + \beta_3 BASKET_{it,1} \cdot D_{it,j} \\ &+ \textstyle\sum_{k=1}^{4} (\zeta_k + \phi_{k,j} BASKET_{it,j}) \cdot T_k(t) + \delta_j \ln q_{it,j} \\ &+ \theta' x_{it,j} + (\psi_1'(1 - D_{it,j}) + \psi_2' D_{it,j}) \cdot z_{it,j} + \epsilon_{it,j}, \end{aligned} \tag{1}$$

where the logarithm of the average per-attendant contribution $y_{it,j}$ to the jth offering in week t of the experimental period in parish i is the dependent

[28] This parish is by coincidence on of the three parishes for which this information is available.

[29] Pre-experimental data from this parish show that the act of giving a €100-note once a month already started in the year 2000 and is not a reaction to the introduction of baskets as a means to gather offerings.

variable; $i \in \{1, \ldots, 30\}$; $j \in \{1, 2\}$; $t \in \{1, \ldots, 29\}$.

The coefficients $\alpha_{i,j}$ absorb church specific fixed effects. Moreover, by adding a subscript j, I allow the effect of church specific variables to differ between the first and second offering. $BASKET_{it,j}$ is a dummy variable indicating whether baskets were used to gather the offering. The parameters β_1 and β_2 thus measure the effect of switching from bags to baskets in terms of percentage change in average proceeds of the first and second offering, respectively. The dummy variable $D_{it,j}$ takes on the value 1 if the observation under consideration is a second offering and 0 otherwise, so $D_{it,j} = 1$ iff. $j = 2$. As a result β_3 estimates the effect of using a basket in the first offering on the proceeds on the second offering.[30]

The functions $T_k(t)$ represent non-overlapping time-intervals defined as $T_k(t) = I[6k < t \leq 6(k+1)]$, $k = 1, \ldots, 4$, with $I[\cdot]$ an indicator function. The coefficients ζ_i pick up possible effects of inflation or changes in the income of parishioners during the experimental period. The products of these time intervals with the basket dummy are added to incorporate changes in the treatment effect over time, where again a distinction is made in the first and second offering. The number of attendants is given by $q_{it,j}$ such that $1 - \delta_j$ reflects the percentage increase in total proceeds by a one percent increase in the number of attendants. $x_{it,j}$ is a vector of service specific variables (is 2nd, is 3rd, is exit, mission exit, simultaneous, music, coffee, family service, special service, sun). The variables in $z_{it,j}$ are allowed to have a different impact on the first and second offering, as measured by ψ_1 and ψ_2, respectively,[31] and contains variables that are offering specific (recommendation, relation, federation, external, Eastern

[30] Since in some of the parishes attendants know in advance how the second offering will be collected, one might argue that also a parameter measuring the effect of using a basket in the second offering on the proceeds of the first offering should be added. However, since it turns out that β_3 is insignificant across specifications, the same is likely to be true for the reverse effect.

[31] A specification test did not find such a difference in effect for the variables $x_{it,j}$.

Europe, gratitude)[32] or that might for some reason have a different effect on the first (internal) than on the second offering (own minister, evening service and Chr. celebration). For "own minister" this reason is that the minister receives his salary from the parishes' internal funds. The possibility of an evening service might lead to a selection effect. Since 63% of the evening services have only one offering (usually for the parish itself), parishioners who normally visit the evening service may have another attitude to the second than to the first offering. Christian celebrations might have a larger effect on second offerings that are held after the preaching.

Since the presence of generous people in a service will be beneficial to both the first and the second offering, observations on the first and second offering in a service are likely to be correlated. Another reason for a correlation between these offerings is that attendants may determine in advance the sum of money they bring with them to church, only deciding how to split this sum between offerings during service, thereby inducing a negative correlation. Since the dependent variable is (logarithm of) the average contribution per attendant, the errors terms are heteroscedastic, with variance decreasing in the number of attendants. To allow both for correlation and heteroskedasticity, the error structure is modeled as follows: $var(\epsilon_{it,j}) = \sigma_{jj}/q_{it}$; $cov(\epsilon_{it,1}, \epsilon_{it,2}) = \sigma_{12}/q_{it}$ and $cov(\epsilon_{it,j}, \epsilon_{vw,k}) = 0$ whenever $v \neq i$ or $t \neq w$, $j, k \in \{1, 2\}$.

6.1 Estimates

The results are based on 791 services with at least two offerings, leading to a total of 1582 included observations.[33] Estimates for different versions of the model are given in table 3. The first column contains least squares estimation results for the model without a time trend for the treatment and neglecting

[32] Internal purposes act as reference category.

[33] Contrary to the analysis in Section 5, gratitude offerings and offerings following celebration of the Lord's Supper are included in the sample.

heteroscedasticity in the error terms. Column (2) gives the results of a basic regression with heteroskedasticity taken into account. In this regression, the only explanatory variables added besides the basket dummy are dummies for the offering purposes and a service specific group size effect. In column (3), the same model as in (1) is estimated but now with heteroscedasticity taken into account. The complete model is estimated in column (4), addressing heteroscedasticity and incorporating a linear time trend.

The four specifications provide no evidence of a treatment effect on the average proceeds of the first offering, but they do show a highly significant increase in those of the second. These findings are in line with the pattern revealed by the nonparametric tests in the previous section. For the complete model, the initial increase in proceeds of the second offering by the introduction is estimated at 9.6%. This increase is smaller as in Andreoni and Petrie (2002), who find an initial increase of about 35%. Among other things, one reason for this difference might be in the current setup, identification is local instead of global.

For the second offering, the number of periods since the start of the experimental period has a significant (p-value $= 0.018$) and sizeable negative effect on the treatment effect: The effect of using baskets for the second offering peters out over time. It is unclear what causes the particular large drop in weeks 19 till 24, perhaps it has something to do with the holiday season, during which a sizable fraction of the regular attendants is elsewhere. It is tempting to relate the diminishing effect in time to public good experiments studying the free rider hypothesis. (See e.g. Marwell and Ames, 1979, 1980, 1981.) A major finding in this these type of experiments is that contributions decline with repetition (e.g. Isaac, McCue and Plott, 1985). This relation however is somewhat problematic since there is no final round in the current setup (offerings were still held after the experimental period ended) nor can the second offering be considered as a pure public

good. The Haan and Kooreman (2002) study also lacks a clearly defined final round; they find a similar negative time-effect. In general, contributions increase over time. The estimates imply an annual increase in offering proceeds of about 8.4%.

The means of gathering of the first offering does not seem to have an effect on the proceeds of the second offering. The overall effect of using baskets given in table 3 (calculated by summing $\hat{\beta}_1, \hat{\beta}_2$ and $\hat{\beta}_3$), denotes the change in average proceeds when all bags are replaced by baskets; this effect is significantly positive at the 5-percent level. The hypothesis that the effect of using baskets is the same for the first and second offering is clearly rejected.

INSERT TABLE 3 ABOUT HERE

Looking at the other explanatory variables, one sees a negative group size effect as measured by the δ_j's: a 1 percent increase in the number of attendants leads for both offerings only to a 0.7 percent ($\approx 1 - 0.268$ and $\approx 1 - 0.312$ respectively) increase in total proceeds. This is consonant with earlier empirical studies on giving in churches. A possible explanation is that on Sundays with relatively few attendants, the people who come are the most dedicated and most generous ones. The presence of an additional third offering leads to a reduction in average proceeds of the first two offerings of 8%, but no such effect occurs for additional exit offerings. Average contributions are lower when the service is a family service, which may be caused by the presence of a large number of small children in these services who give less on average. As expected, people give more when a service is held at Easter or Pentecost. The own minister leading the service does not affect contributions.

Interestingly, recommending the offering increases contributions to the second offering by 24% but has no effect on the proceeds of the first offering.

The same goes for the offering purpose being related with the preaching. This shows that parishioners are sensitive to recommendations. Partly this may be caused because an appeal is made to their social obligation to contribute. Gratitude offerings bring in 116% more if held as first offering and 61% more if held as second offering. Having an evening service on the same day does not affect average contributions to the first offering, but increases the average proceeds of the second offering by 10%. One explanation for this is a possible negative correlation between being inclined to attend the evening instead of the morning service and the willingness to contribute to the second offering. This explanation is sustained by the fact that most evening services have only one offering. Finally, proceeds of the second offering are much higher (+37%) when the purpose is in Eastern Europe; higher when the purpose is an external one (+8%) and slightly lower when the offering serves the national federation (−4%).

How are the results in this and the previous section related to the experimental evidence on anonymity in giving and what do they tell us about the importance of social incentives? The positive treatment effect found for the second offering is in accordance with the positive effect of removing anonymity found by both Andreoni and Petrie (2002) and Rege and Telle (2001). Contrary to these however is the absence of an effect of treatment for the first offering. A possible explanation for this may be found in the fact that the first offering is always meant for the parish self. Most churchgoers make – in addition to the amounts given to the offering – regular bank payments to the parish. Since these amounts are not observed by the other parishioners, one can always defend low contributions to the first offerings by claiming that one compensates for this by making large bank payments. Having an excuse might prevent people from feeling ashamed. Another potential explanation for the difference in effect for the first and

second offering is that, due to the fact that the second offering often serves an external purpose, it gives more possibilities to exhibit unselfish behavior. A third explanation uses the fact that the purpose of the first offering is always equal whereas the purpose of the second offering changes weekly. This might lead to a habit formation where attendants are very used to giving a certain amount to the first offering but are more open to circumstantial variables in their decision what to contribute to the second offering.

To analyze whether the treatment effect is driven by the fact that an offering is internal or external, I estimated equation (1) separately for two subsets of the data. The first subset comprises the services that have a second offering with an internal purpose; the second subset comprises the subset of services that have a second offering with an external purpose. Estimates are given in columns (5) and (6) of table 3, respectively. Interestingly, the estimates show that the significance of the treatment effect for the second offering is persistent for the subset of external second offerings, but not for the subset with internal second offerings. This gives some support to the explanations that external purposes give greater possibilities to exhibit unselfish behavior or that anonymous bank payments are an excuse for low contributions to internal offerings. The third explanation however – that the difference in effect is caused by a habit formation effect in contributing to the first offering – is not sustained by these estimates.

Moreover, the effect of using baskets for gathering the first offering has a modest negative (not significant) effect on the average proceeds of the second offering for the subset of internal second offerings. This makes sense: Both offerings serve the same purpose, which alleviates shifting contributions from one offering to the other.

With regard to the other explanatory variables it is interesting to note that the "Chr. celebration" dummy and the "gratitude" dummy are only significant for the subset of internal offerings. The reason for this may be

that gratitude for the resurrection of Christ finds a natural expression in contributing an extra amount to the own parish, but not in contributing to e.g. Amnesty International. The "recommendation" dummy on the other hand is much larger for the subset of external offerings, lending support to the hypothesis that making an appeal to the moral obligation of the attendants has more effect when the purpose is outside the own parish. Finally, for the subset of internal offerings, the group size effect is greater for the second offerings, whereas no notable difference is observed for the subset of external offerings.

7 Effect on type of coins contributed

As mentioned, for three parishes information is available on the number and the type of coins that are collected. For two parishes this information is available for first as well as second offerings and for the other only for the first offerings. For the latter parish, the same information is available for the pre-experimental period. Histograms and cumulative distribution functions are given in figure 6.

INSERT FIGURE 6 ABOUT HERE

The panels *a*, *b* and *c* all show the same pattern: as compared to closed offerings, collecting offerings by means of baskets leads to a decrease in the frequency of small coins (1, 2, 5, 10 and 20 eurocents) and an increase in the frequency of large coins (1 and 2 euro).[34] For parishes *a* and *b*, the cumulative distribution when using baskets first-order stochastically dominates the cumulative distribution function for offerings that use bags. For parish *a*, also the frequencies for the time period before the outset of the experiment are depicted.[35] As compared to the pre-experimental period, a shift to

[34] A χ^2-test for difference in distributions delivers for parishes *a*, *b* and *c* *p*-values of $9.7 \cdot 10^{-8}$, 0.0559 and 0.0549 respectively.

[35] The pre-experimental period comprises the months January and February 2002; the effect of the experimental period may be confounded with the replacement of the Dutch

giving larger coins occurred in the experimental period.[36] The cumulative distribution function of bag offerings during the experimental period first-order stochastically dominates the cumulative distribution function of bag offerings in the pre-experimental period. In table 4, for each parish p-values are given for the null hypothesis of equality of the fraction of 50 eurocent, 1 and 2 euro coins given in bag and basket offerings.[37] The joint-significance test shows that the increase in 1 and 2 euro coins is significant at the 5%-level.

INSERT TABLE 4 ABOUT HERE

Comparison of the coin distributions of bag offerings with basket offerings shows that people refrain from giving small coins in favor of giving more valuable ones. Feeling ashamed about giving substandard coins or trying to receive social approval by ostentatiously giving large coins might be at least part of the explanation. The fact that some kind of shift is also observed when comparing bag-offerings during the experimental period with bag-offerings in the pre-experimental period indicates that attendants are to some extent aware that their decisions are observed by the university.[38]

The large effect observed for parish a is remarkable, since it results from observations on first offerings only. In light of the analysis in the previous section this effect is unexpected. Apparently, there is yet some role for social incentives in the attendants' decision to give to the first offering; these are not incentives to give more, but to make the contribution look more. The

guilder by the euro in January 2002.

[36] p-value $= 3.3 \cdot 10^{-4}$.

[37] For each type of coin and for each parish, the ratio of the number of coins of a certain type relative to the total number of coins collected was calculated for each offering separately. These ratios were ordered (for parishes b and c a distinction was made for first and second offerings) and significance was tested using a Wilcoxon rank sum test. The reported p-values for parishes b and c encompass both offerings. Looking at first and second offerings separately, the only significant increase is found for the frequency of €2 coins collected in the second offerings of parish b.

[38] One treasurer reported that some parishioners in his parish reacted to the research project by saying: "For what reason does the university interfere in our affairs?"

results in this section form a contradiction to economic theory according to which the particular distribution of coins should be irrelevant.

8 Conclusion

This paper set out to investigate whether removing anonymity affects giving in a real life environment that is still sufficiently controllable to make findings comparable to results of recent laboratory experiments. For a period of 29 weeks, the way in which offerings were gathered in thirty churches was determined by chance. Each offering in this time period was equally likely to be gathered by ordinary collection bags or by collection baskets. The baskets enable local identification of contributors, giving social incentives like prestige, social approval, shame and social comparison the opportunity to take effect.

The main finding is that non-anonymous collecting methods have a positive effect on contributions to charity, whereas no effect is found for contributions to a public good. Moreover, the effect of removing anonymity peters out over time. The difference in effect is distilled from the fact that a division of services into two subsamples – based on whether the second offering serves an internal or an external purpose – shows that the effect of disclosure is persistent only for the subset of external oriented second offerings. One possible explanation for this difference is that external purposes give more possibilities to exhibit unselfish behavior. A second explanation is provided by the fact that most churchgoers, besides giving to the offering, contribute to the parish by making regular bank payments. Since these payments are unobservable to other parishioners, one can defend low contributions to the offerings by claiming that one compensates for this by making large bank payments. The absence of an effect for first offerings is contrary to findings from similar public good experiments conducted in the laboratory.

Another interesting finding is that in both offerings, people switch to giving more valuable coins when anonymity is removed. This indicates that social incentives do play some role in contributing to public goods. The finding is in opposition to economic theory which asserts only the value of an amount of money matters and not the particular set of coins of which it is build up. Feeling ashamed about giving small coins or the desire for social approval by giving larger coins might be a possible factor that drives this shift in coins given.[39] One has to note, however, that this result is based on additional data from three churches only.

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[39] Related is the observation by one coordinator who reported that people added to the initial amount of money they took out of their wallet when they noticed that the offering was to be gathered by means of baskets.

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Table 1: Sample statistics independent variables

	mean	median	st. dev.	min.	max.
1st offering (834 obs.)					
total payment (€)	82.698	73.185	61.683	8.120	791.960
per-attendant payment (€)	1.021	0.867	0.780	0.376	16.429
attendants	96.919	76.500	72.989	7.000	443.000
2nd offering (791 obs.)					
total payment (€)	71.450	59.300	59.229	5.110	878.310
per-attendant payment (€)	0.828	0.707	0.497	0.258	5.179
attendants	98.609	78.000	73.380	7.000	443.000

	1st offering	2nd offering
gathering mode		
bag	0.513	0.507
basket	0.487	0.480
plate	0.000	0.008
mug	0.000	0.005
LS open	0.008	0.018
LS closed	0.000	0.019
offerings		
is 2nd	0.948	1.000
is 3rd	0.193	0.204
is exit	0.131	0.113
mission exit	0.067	0.062
simultaneous	0.795	0.837
recommendation	0.054	0.094
relation	0.019	0.034
service		
music	0.064	0.063
family service	0.024	0.023
special service	0.049	0.048
evening service	0.068	0.069
sun	40.132	39.736
Chr. celebration	0.064	0.063
own minister	0.474	0.472
coffee	0.470	0.455
purposes		
parish	0.994	0.076
internal	0.001	0.295
federation	0.001	0.556
external	0.002	0.063
Eastern Europe	0.002	0.010
Lord's Supper	0.008	0.037
gratitude	0.008	0.010

Notes: The per-attendant payment is calculated as $\frac{1}{NT}\sum_{i=1}^{N}\sum_{t=1}^{T}\frac{y_{it,j}}{q_{it,j}}$, with $j = 1, 2$; $t = 1, 2, \ldots, T$ for the time period and $i = 1, 2, \ldots, N$ as an index for the churches.
The average value of the euro over the experimental period was about $ 0.94.

Table 2: Per-attendant contributions at the church level

	closed first offerings						open first offerings						difference
parish	mean	med.	sd.	min.	max.	#	mean	med.	sd.	min.	max.	#	in mean
1	2.411	2.278	0.628	1.570	4.094	*17*	2.766	2.407	0.973	2.007	5.413	*11*	0.356
2	0.765	0.788	0.126	0.556	1.048	*15*	0.802	0.756	0.164	0.561	1.096	*13*	0.037
3	0.858	0.904	0.132	0.648	0.973	*6*	0.945	0.917	0.127	0.726	1.118	*7*	0.087
4	1.005	0.915	0.463	0.617	2.807	*19*	1.316	1.099	0.809	0.829	3.578	*10*	0.311
5	1.665	0.899	1.111	0.746	3.619	*11*	0.879	0.877	0.096	0.739	1.048	*18*	-0.786
6	1.004	1.017	0.070	0.879	1.142	*13*	1.155	1.141	0.243	0.741	1.578	*15*	0.151
7	0.836	0.833	0.157	0.593	1.119	*16*	0.790	0.809	0.057	0.693	0.867	*13*	-0.046
8	0.795	0.764	0.100	0.622	0.957	*19*	0.778	0.764	0.169	0.629	1.282	*13*	-0.017
9	0.934	0.895	0.172	0.623	1.302	*12*	0.964	0.938	0.113	0.805	1.198	*14*	0.030
10	1.171	1.207	0.208	0.809	1.494	*14*	1.168	1.154	0.143	0.925	1.409	*15*	-0.003
11	0.872	0.797	0.142	0.724	1.195	*15*	1.051	0.742	0.869	0.657	4.000	*14*	0.179
12	0.933	0.958	0.118	0.693	1.156	*14*	0.980	1.018	0.156	0.740	1.291	*15*	0.047
13	1.012	0.987	0.217	0.788	1.640	*15*	1.041	0.998	0.141	0.887	1.263	*11*	0.029
14	0.507	0.518	0.058	0.412	0.595	*14*	0.444	0.431	0.061	0.376	0.559	*13*	-0.063
15	0.636	0.633	0.084	0.500	0.785	*12*	0.653	0.663	0.118	0.440	0.947	*15*	0.017
16	0.666	0.661	0.138	0.430	0.965	*14*	0.713	0.717	0.146	0.478	0.914	*14*	0.047
17	0.719	0.699	0.151	0.513	1.091	*16*	0.663	0.698	0.103	0.422	0.798	*12*	-0.057
18	1.387	1.397	0.355	0.541	1.916	*20*	1.378	1.393	0.228	1.083	1.780	*9*	-0.009
19	1.038	1.007	0.137	0.843	1.347	*12*	0.998	0.999	0.106	0.822	1.255	*17*	-0.040
20	0.897	0.867	0.253	0.513	1.512	*20*	0.885	0.835	0.146	0.721	1.224	*9*	-0.012
21	1.468	1.398	0.243	1.260	2.135	*13*	1.494	1.524	0.293	1.129	2.155	*11*	0.026
22	0.806	0.802	0.123	0.659	1.072	*13*	0.949	0.950	0.158	0.688	1.307	*14*	0.144
23	0.737	0.725	0.120	0.598	1.017	*14*	0.783	0.662	0.338	0.538	1.821	*13*	0.046
24	0.511	0.509	0.067	0.438	0.691	*15*	0.513	0.506	0.077	0.388	0.646	*14*	0.002
25	0.625	0.640	0.096	0.382	0.766	*14*	0.651	0.621	0.111	0.500	0.875	*12*	0.025
26	0.927	0.807	0.628	0.502	3.055	*14*	0.805	0.840	0.147	0.507	1.020	*14*	-0.122
27	1.354	1.310	0.288	0.943	1.893	*14*	1.464	1.455	0.212	1.136	1.797	*9*	0.110
28	0.703	0.691	0.095	0.536	0.857	*9*	0.708	0.672	0.072	0.626	0.864	*19*	0.005
29	0.845	0.785	0.328	0.578	1.792	*12*	0.768	0.767	0.118	0.574	1.020	*17*	-0.077
30	1.111	1.025	0.261	0.914	1.925	*15*	1.077	0.939	0.519	0.430	2.598	*13*	-0.034
mean	0.973	0.924				*427*	0.986	0.943				*394*	0.013

Table 2: (continued)

	closed second offerings						open second offerings						difference
parish	mean	med.	sd.	min.	max.	#	mean	med.	sd.	min.	max.	#	in mean
1	—	—	—	—	—	*0*	—	—	—	—	—	*0*	
2	0.642	0.644	0.086	0.449	0.803	*12*	0.688	0.670	0.090	0.522	0.874	*17*	0.046
3	0.911	0.721	0.682	0.472	2.836	*10*	0.910	0.923	0.037	0.868	0.940	*3*	-0.001
4	0.891	0.904	0.187	0.594	1.178	*14*	0.895	0.863	0.283	0.531	1.814	*15*	0.004
5	0.994	0.754	0.691	0.562	3.289	*14*	0.820	0.783	0.132	0.643	1.139	*15*	-0.174
6	0.733	0.740	0.059	0.656	0.850	*12*	0.804	0.831	0.117	0.601	0.965	*16*	0.071
7	0.778	0.722	0.199	0.542	1.327	*13*	0.725	0.701	0.099	0.597	0.906	*15*	-0.053
8	0.630	0.635	0.099	0.465	0.784	*17*	0.786	0.688	0.448	0.550	2.194	*12*	0.156
9	0.823	0.781	0.165	0.589	1.228	*15*	0.861	0.874	0.121	0.611	1.054	*11*	0.038
10	0.981	0.968	0.159	0.611	1.194	*12*	1.133	1.066	0.261	0.788	1.717	*16*	0.152
11	0.684	0.647	0.156	0.360	1.032	*18*	0.654	0.574	0.187	0.531	1.170	*11*	-0.030
12	0.881	0.856	0.181	0.578	1.306	*12*	0.853	0.836	0.147	0.645	1.100	*10*	-0.029
13	0.792	0.795	0.097	0.595	0.963	*18*	0.926	0.842	0.209	0.750	1.302	*8*	0.134
14	0.512	0.416	0.299	0.258	1.335	*11*	0.402	0.410	0.085	0.266	0.542	*16*	-0.109
15	0.514	0.501	0.117	0.362	0.799	*10*	0.547	0.560	0.068	0.451	0.669	*17*	0.033
16	0.501	0.477	0.106	0.360	0.804	*17*	0.630	0.583	0.117	0.525	0.891	*10*	0.129
17	0.808	0.639	0.560	0.430	2.379	*10*	0.717	0.707	0.090	0.593	0.893	*15*	-0.091
18	1.221	1.184	0.444	0.341	2.048	*11*	1.735	1.667	0.649	1.157	3.405	*10*	0.513
19	0.833	0.759	0.231	0.633	1.438	*16*	0.802	0.811	0.112	0.612	1.034	*12*	-0.031
20	0.700	0.661	0.121	0.572	1.091	*17*	0.936	0.921	0.303	0.625	1.631	*11*	0.237
21	1.081	1.011	0.192	0.929	1.434	*6*	1.191	1.128	0.168	1.049	1.509	*6*	0.110
22	0.825	0.783	0.135	0.640	1.073	*14*	0.881	0.900	0.132	0.659	1.167	*13*	0.057
23	0.701	0.613	0.402	0.428	1.868	*11*	0.789	0.702	0.252	0.557	1.390	*14*	0.088
24	0.421	0.424	0.044	0.350	0.516	*14*	0.446	0.447	0.045	0.386	0.536	*15*	0.025
25	0.461	0.444	0.088	0.361	0.646	*13*	0.566	0.573	0.073	0.442	0.683	*15*	0.106
26	0.741	0.646	0.377	0.481	1.951	*13*	0.632	0.635	0.124	0.452	0.908	*15*	-0.109
27	1.218	1.171	0.311	0.962	2.247	*15*	1.128	1.212	0.214	0.697	1.258	*6*	-0.090
28	0.624	0.628	0.091	0.466	0.804	*12*	0.628	0.607	0.111	0.483	0.951	*15*	0.004
29	0.734	0.651	0.314	0.485	1.525	*14*	0.687	0.672	0.129	0.484	0.935	*15*	-0.047
30	0.598	0.580	0.143	0.412	0.920	*14*	0.666	0.675	0.084	0.539	0.860	*13*	0.068
mean	0.767	0.716				*385*	0.808	0.788				*367*	0.042

Gratitude offerings and offerings held during or directly after celebration of the Lord's Supper are excluded.

Table 3: Estimation results (standard errors within parentheses).

	OLS	GLS	GLS	GLS	GLS internal 2^{nd} offering	GLS external 2^{nd} offering
	(1)	(2)	(3)	(4)	(5)	(6)
basket 1^{st} (β_1)	0.007	0.003	-0.006	0.028	0.020	0.007
	(0.015)	(0.012)	(0.013)	(0.023)	(0.034)	(0.031)
basket 2^{nd} (β_2)	0.061**	0.041*	0.038*	0.096**	0.043	0.080*
	(0.016)	(0.017)	(0.015)	(0.028)	(0.043)	(0.036)
basket 1^{st} on	-0.009		-0.022	-0.008	-0.032	0.019
2^{nd} off. (β_3)	(0.016)		(0.016)	(0.016)	(0.025)	(0.021)
			change in effect basket 1^{st}			
week 7-12 ($\phi_{1,1}$)				-0.047	0.012	-0.064
				(0.032)	(0.046)	(0.043)
week 13-18 ($\phi_{1,2}$)				-0.054†	-0.068	-0.036
				(0.031)	(0.045)	(0.041)
week 19-24 ($\phi_{1,3}$)				-0.051	-0.041	-0.026
				(0.034)	(0.051)	(0.044)
week 25-30 ($\phi_{1,4}$)				-0.018	0.016	-0.002
				(0.033)	(0.050)	(0.042)
			change in effect basket 2^{nd}			
week 7-12 ($\phi_{2,1}$)				-0.050	-0.026	-0.009
				(0.036)	(0.050)	(0.047)
week 13-18 ($\phi_{2,2}$)				-0.050	-0.027	-0.046
				(0.037)	(0.054)	(0.047)
week 19-24 ($\phi_{2,3}$)				-0.137**	-0.113†	-0.145**
				(0.041)	(0.059)	(0.053)
week 25-30 ($\phi_{2,4}$)				-0.075†	0.035	-0.091†
				(0.039)	(0.057)	(0.049)
			general time effect			
week 7-12 (ζ_1)	-0.011		-0.024	-0.002	-0.038	0.012
	(0.019)		(0.018)	(0.022)	(0.033)	(0.028)
week 13-18 (ζ_2)	0.004		0.007	0.032	0.081*	0.006
	(0.019)		(0.018)	(0.022)	(0.034)	(0.028)
week 19-24 (ζ_3)	-0.019		-0.017	0.022	0.047	0.003
	(0.021)		(0.020)	(0.024)	(0.038)	(0.031)
week 25-30 (ζ_4)	0.028		0.026	0.044†	0.037	0.031
	(0.021)		(0.019)	(0.024)	(0.038)	(0.030)

Table 3: (continued)

	OLS	GLS	GLS	GLS	GLS internal 2^{nd} offering	GLS external 2^{nd} offering
	(1)	(2)	(3)	(4)	(5)	(6)
			service specific variables			
is 3rd	-0.074**		-0.069**	-0.071**	-0.035	-0.081**
	(0.017)		(0.015)	(0.015)	(0.026)	(0.019)
is exit	-0.015		-0.029	-0.032	-0.057	-0.020
	(0.044)		(0.039)	(0.039)	(0.080)	(0.050)
mission exit	-0.015		0.035	0.041		0.077
	(0.074)		(0.087)	(0.087)		(0.137)
simultaneous	-0.043		0.007	0.009	0.016	-0.018
	(0.031)		(0.027)	(0.027)	(0.035)	(0.045)
music	0.012		0.014	0.014	0.019	-0.002
	(0.027)		(0.025)	(0.025)	(0.033)	(0.037)
coffee	-0.011		-0.005	-0.005	0.005	-0.016
	(0.016)		(0.014)	(0.014)	(0.023)	(0.018)
family	-0.054		-0.075*	-0.076*	-0.092	-0.072
	(0.042)		(0.037)	(0.037)	(0.062)	(0.048)
special service	0.005		-0.009	-0.010	0.008	-0.015
	(0.030)		(0.023)	(0.023)	(0.041)	(0.028)
sun	0.000		-0.005	-0.006	-0.033	0.001
	(0.017)		(0.016)	(0.016)	(0.027)	(0.020)
$\ln q$		-0.181**				
		(0.027)				
			1st offering specific variables			
$\ln q$ (δ_1)	-0.277**		-0.271**	-0.268**	-0.177**	-0.317**
	(0.035)		(0.034)	(0.035)	(0.054)	(0.045)
recommendation	0.003		-0.021	-0.017	-0.011	-0.017
	(0.061)		(0.049)	(0.049)	(0.066)	(0.068)
relation	0.018		-0.020	-0.019	-0.111†	0.053
	(0.059)		(0.047)	(0.047)	(0.067)	(0.063)
own minister	0.015		0.022	0.024	-0.014	0.042*
	(0.019)		(0.016)	(0.016)	(0.024)	(0.020)
gratitude	1.123**		1.142**	1.163**		1.193**
	(0.203)		(0.180)	(0.180)		(0.257)
Chr. cel	0.082*		0.086**	0.084**	0.087*	0.032
	(0.035)		(0.029)	(0.029)	(0.036)	(0.048)
evening service	-0.008		0.006	0.001	-0.009	0.025
	(0.044)		(0.029)	(0.029)	(0.046)	(0.040)

Table 3: (continued)

	OLS	GLS	GLS	GLS	GLS internal 2^{nd} offering	GLS external 2^{nd} offering
	(1)	(2)	(3)	(4)	(5)	(6)
			2nd offering specific variables			
$\ln q$ (δ_2)	-0.249**		-0.299**	-0.312**	-0.374**	-0.281**
	(0.037)		(0.041)	(0.042)	(0.063)	(0.054)
own minister	-0.003		-0.004	-0.005	0.002	-0.003
	(0.023)		(0.020)	(0.020)	(0.029)	(0.026)
federation	-0.062**	-0.093*	-0.039*	-0.037†		
	(0.020)	(0.022)	(0.019)	(0.019)		
external	0.040	0.118**	0.074*	0.081*		0.083*
	(0.035)	(0.040)	(0.034)	(0.034)		(0.039)
Eastern Europe	0.228**	0.415**	0.367**	0.372**		0.360**
	(0.080)	(0.118)	(0.100)	(0.100)		(0.109)
Lord's Supper	0.214**		0.098	0.102	0.114	-0.037
	(0.051)		(0.068)	(0.068)	(0.121)	(0.098)
recommendation	0.161*		0.238**	0.244**	0.067	0.350**
	(0.067)		(0.056)	(0.056)	(0.077)	(0.079)
relation	0.182*		0.267**	0.265**	0.293**	0.202*
	(0.074)		(0.062)	(0.062)	(0.087)	(0.084)
gratitude	0.567**		0.604**	0.611**	0.738**	0.088
	(0.088)		(0.073)	(0.073)	(0.079)	(0.230)
Chr. cel	0.208**		0.152**	0.145**	0.257**	0.088
	(0.041)		(0.039)	(0.039)	(0.051)	(0.057)
evening service	0.089†		0.117**	0.102**	0.091	0.084†
	(0.047)		(0.036)	(0.037)	(0.056)	(0.047)
overall effect baskets	0.059	0.044	0.016	0.116	0.031	0.106
[p-values]	[0.057]	[0.030]	[0.743]	[0.014]	[0.660]	[0.085]
difference in effect	0.054	0.038	0.038	0.068	0.023	0.073
[p-values]	[0.011]	[0.084]	[0.025]	[0.047]	[0.650]	[0.098]
Prob F-test						
time effect 1^{st} off.	—	—	—	0.364	0.379	0.563
time effect 2^{nd} off.	—	—	—	0.018	0.155	0.038
Sample size	*1582*	*1582*	*1582*	*1582*	*586*	*996*

Notes: † Significant at the 10-percent level; * Significant at the 5-percent level; ** Significant at the 1-percent level.
Empty cells in columns (5) and (6) mean that there is no variation in the dummy variable in the subsample considered or that the variable is the default value (as "federation" is in column (6).

Table 4: Difference in fraction of coins given (p-values).

	type of coin		
parish	€0.50	€1	€2
(a)	0.1413	0.0282*	0.0186*
(b)	0.8790	0.0312*	0.0002**
(c)	0.0836†	0.4687	0.0093**
joint test	0.2400	0.0291*	0.0001**

Note: † Significant at the 10-percent level;
* Significant at the 5-percent level;
** Significant at the 1-percent level
Parish *a*: first offerings only; *b, c*: first and second offerings combined.

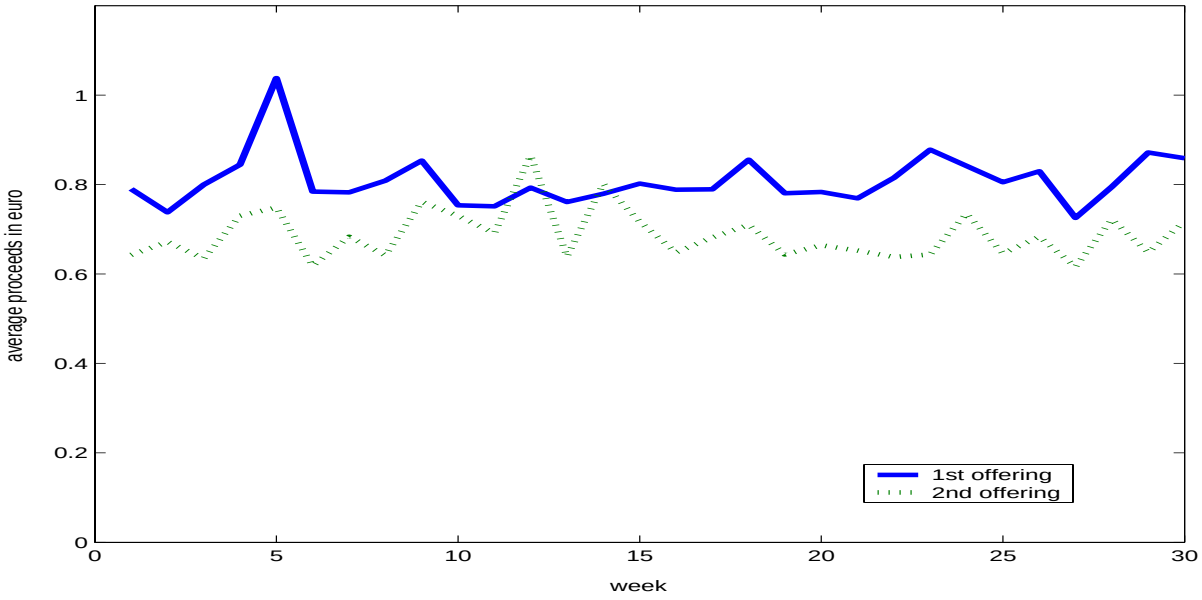

Figure 3: Average payment to the first and second offering over the weeks of the experiment (Gratitude offerings and offering during or directly after celebration of the Lord's Supper are excluded).

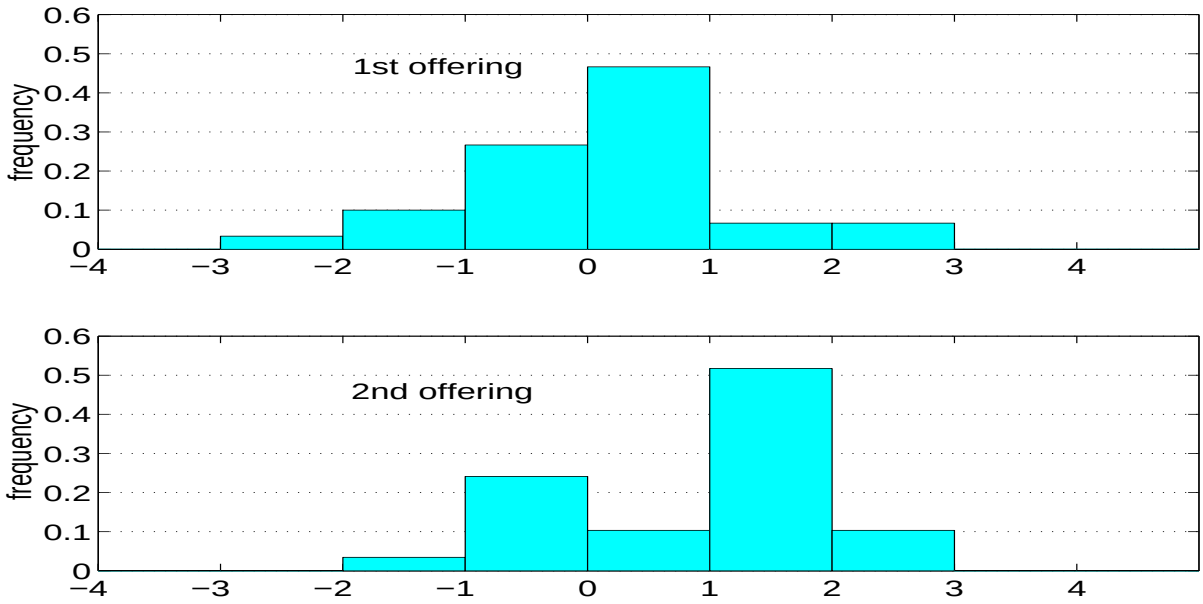

Figure 4: Wilcoxon rank sum test (z-values).

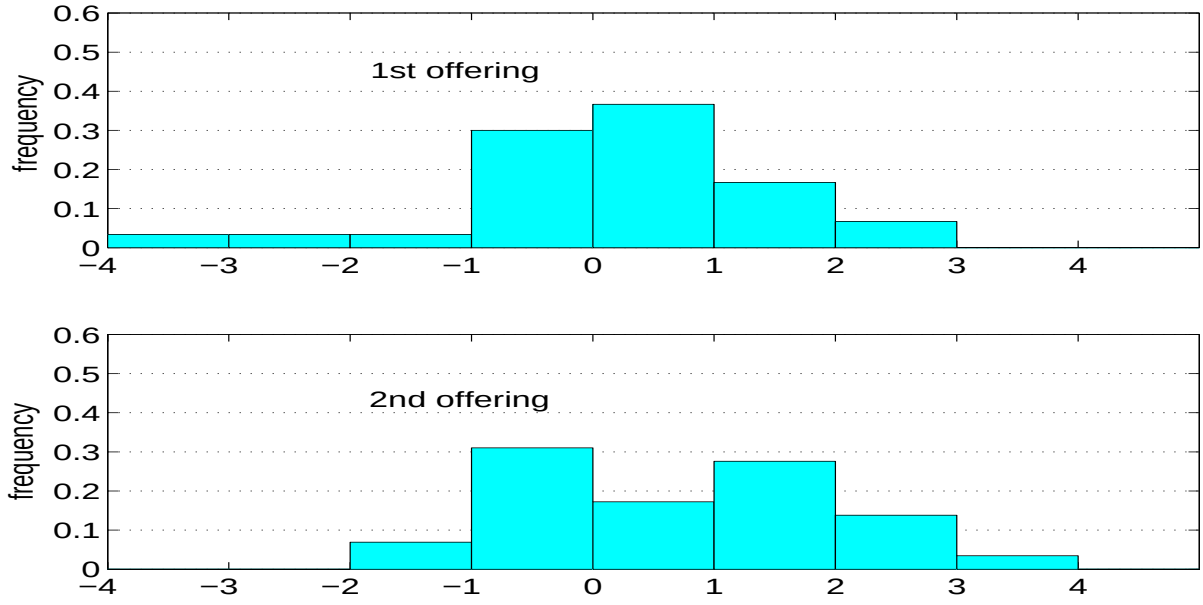

Figure 5: Difference in mean test (t-values).

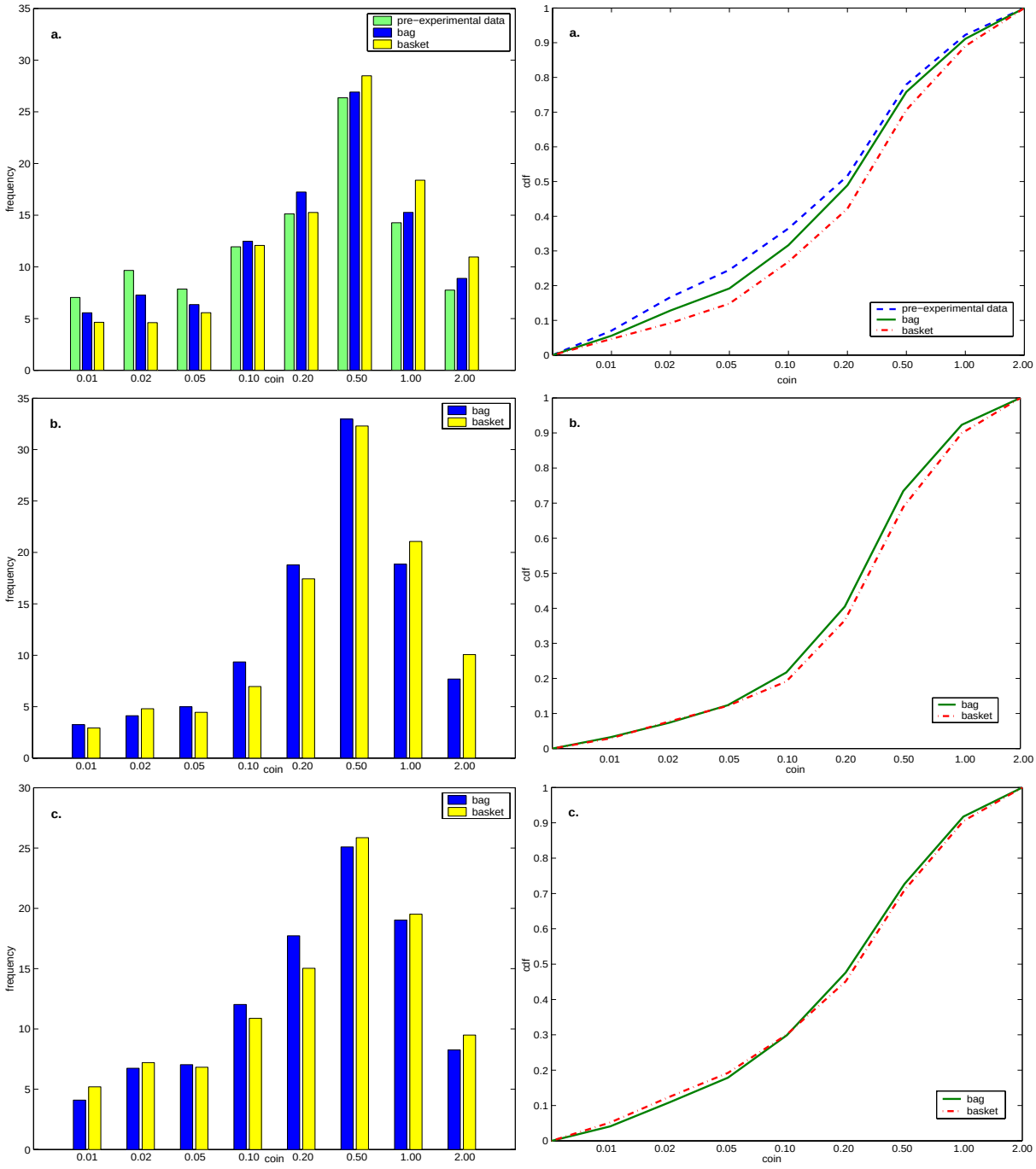

Figure 6: Frequency distributions and cumulative coin distributions for three parishes. Parish *a*: first offerings only; *b*, *c*: first and second offerings combined.

Table A.1: Definition of explanatory dummy variables

gathering mode	
bag	=1 if the offering is gathered by means of bags, 0 otherwise;
basket	=1 if the offering is gathered by means of baskets, 0 otherwise;
plate	=1 if the offering is gathered by means of plates, 0 otherwise;
mug	=1 if the offering is gathered by means of mugs, 0 otherwise;
LS open	=1 if the Lord's supper offering is gathered by means of baskets or plates, 0 otherwise;
LS closed	=1 if the offering is gathered by means of bags or mugs, 0 otherwise;
gratitude	=1 if the offering is a so-called gratitude offering, 0 otherwise;
offerings	
is 2nd	= 1 if a second offering takes place during service, 0 otherwise;
is 3rd	= 1 if a third offering takes place during service, 0 otherwise;
is exit	= 1 if a exit offering takes place after service, 0 otherwise;
mission exit	= 1 if the exit offering is meant for missionary work, 0 otherwise;
simultaneous	= 1 if the second offering directly follows the first offering, 0 otherwise;
recommendation	= 1 if the offering has received a special recommendation in advance, 0 otherwise;
relation	= 1 if the purpose of the offering bears a relationship with the theme of the service, 0 otherwise;
service	
music	= 1 if there are additional musicians during service, 0 otherwise;
family service	= 1 if the service has special attention for children or youth, 0 otherwise;
special service	= 1 if the service has a special character, 0 otherwise;
evening service	= 1 if an additional evening service is held at the same day, 0 otherwise;
sun	= daily hours of sunshine as a percentage of the maximum amount;
Chr. celebration	= 1 if the service takes place at Easter or Pentecost, 0 otherwise;
own minister	= 1 if the service is led by the own minister, 0 otherwise;
coffee	= 1 if there is opportunity to drink coffee (for free) after service, 0 otherwise;
purposes	
parish	= 1 if the purpose of the offering is the parish in general, 0 otherwise;
internal	= 1 if the purpose of the offering is a specific cause within the own parish, 0 otherwise;
federation	= 1 if the purpose of the offering is the National Baptist Federation, 0 otherwise;
external	= 1 if the purpose of the offering is a cause outside the own parish, 0 otherwise;
Eastern Europe	= 1 if the purpose of the offering is a cause in Eastern Europe, 0 otherwise.