university of groningen

University Medical Center Groningen

University of Groningen

A commercial gift for charity

Soetevent, Adriaan R.; Bao, Te; Schippers, Anouk L.

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Publication date:
2016

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Soetevent, A. R., Bao, T., & Schippers, A. L. (2016). *A commercial gift for charity*. (SOM Research Reports; Vol. 16002-EEF). University of Groningen, SOM research school.

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment.

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Download date: 04-06-2022

university of groningen

faculty of economics and business

16002-EEF

A Commercial Gift for Charity

Adriaan R. Soetevent
Te Bao
Anouk L. Schippers

SOM is the research institute of the Faculty of Economics & Business at the University of Groningen. SOM has six programmes:
- Economics, Econometrics and Finance
- Global Economics & Management
- Human Resource Management & Organizational Behaviour
- Innovation & Organization
- Marketing
- Operations Management & Operations Research

Research Institute SOM
Faculty of Economics & Business
University of Groningen

Visiting address:
Nettelbosje 2
9747 AE Groningen
The Netherlands

Postal address:
P.O. Box 800
9700 AV Groningen
The Netherlands

T +31 50 363 9090/3815

www.rug.nl/feb/research

A Commercial Gift for Charity

Adriaan R. Soetevent
Faculty of Economics and Business, Department of Economics, Econometrics & Finance
a.r.soetevent@rug.nl

Te Bao
Nanyang Technological University

Anouk L. Schippers
Faculty of Economics and Business, Department of Economics, Econometrics & Finance

A Commercial Gift for Charity

Adriaan R. Soetevent*
University of Groningen
Tinbergen Institute

Te Bao†
Nanyang Technological University

Anouk L. Schippers‡
University of Groningen

February 8, 2016

Abstract

Commercial firms are increasingly tying the sales of their products with donations to a charitable cause. Apart from a charitable motive, offering these charity-linked bundles could be a strategic instrument for firms to increase profits. We report the results of an experiment that investigates for different of these schemes whether they are able to increase profits net of the donation, and which donation scheme is most profitable. From a theoretical perspective, given rational agents, complete markets, and absent transaction cost, selling charity-linked bundles should not be profitable even when consumers are altruistic. We find however that sellers who donate 5% of their gross revenues or an equivalent absolute amount do attain significantly higher profits. No such effect is observed when the donation is limited to 2%. Offering charity-linked bundles considerably crowds out private donations by buyers.

JEL classification: D4, L2, L31.
Keywords: Market competition, Firm behavior, Charity-linked bundling, Charitable giving, Cause marketing.

*Corresponding author: University of Groningen, Faculty of Economics and Business, Nettelbosje 2, 9747 AE Groningen, The Netherlands, a.r.soetevent@rug.nl.

†Nanyang Technological University, 14 Nanyang Drive, Singapore 637332, baote@ntu.edu.sg

‡University of Groningen, Faculty of Economics and Business, Nettelbosje 2, 9747 AE Groningen, The Netherlands, a.l.schippers@rug.nl.

1 Introduction

Research on charitable giving has been focused on identifying the different motives for people to donate to charitable causes and on how charities could use these insights in designing optimal fund raising schemes. Less attention has been paid to the question whether and how commercial firms may benefit from tying the sale of their products with donations to charity. This despite the fact that many firms have introduced these schemes. ING bank has for example introduced the "savings account for UNICEF", committing themselves to annually donate 0.1 percent of accumulated savings to UNICEF.

Firms differ in their disclosure of how much of each sale is donated to charity and whether a fixed amount is donated for each sales transaction or a percentage of the sales revenue. Whereas ING's donation is a percentage, SurveyMonkey instead donates \$0.50 for each completed survey, IKEA donates €1 for every soft toy or children's book sold in participating IKEA stores around Christmas, and Prime Five Homes does not specify the portion of sales revenue that goes to its non-profits arm.[1] Do these efforts originate purely out of altruistic motives or do they partly result from a firm's commercial gift for charity, i.e. a talent to use charitable causes as a strategic tool to increase profits?

This paper reports the results of a lab experiment that investigates exactly this: which of the schemes above, if any, is able to increase firm profits net of the contribution to charity? Given consumer rationality, complete markets and absent transaction cost, the theoretical prediction is clear-cut: none of these schemes is expected to raise profits. Consumers may be willing to tick up their payment when this benefits charity, but this increment never exceeds the transfer the seller has to make to the charity. Section 2 formally shows this. We however hypothesize that in practice, firms may benefit from these schemes for the following reason. Consumers may be myopic in the sense that they overestimate small percentages, that is, they perceive the fraction of their payment that benefits charity to be larger than it actually is. This effect is akin to the overweighing of small loss probabilities that is observed in experimental insurance markets and is enshrined

[1] `https://www.surveymonkey.com/`; `http://www.ikeafoundation.org/programmes/soft-toys-for-education/`; `http://www.primefivehomes.com/`.

in prospect theory.[2]

Our experimental market design is a game where matched pairs of one buyer and two sellers (one subject-seller and one computer-seller) repeatedly interact. In each period, the buyer has unit demand and his valuation for the private good is common knowledge. In supplying the private good, both sellers face a given marginal unit cost which is unknown to the buyer. In the treatment conditions the subject-seller has to donate to charity whereas the computer-seller does not. A profit-maximizing firm will simply take the donation as an additional cost such that this situation is akin to Bertrand competition with asymmetric cost. The subject-seller (henceforth seller) sets his price, after which the buyer decides whether to buy or not. If the buyer does not buy from the seller, the seller earns zero profits. The buyer earns the difference between her fixed endowment and the price paid to the selected seller. Note that for any price set above marginal cost, the buyer's payoff is maximal when she buys from the computer-seller.[3] Next to the transaction decision, the buyer is able to make a private donation decision in each period. This design feature serves two purposes. First, by offering an alternative way for altruistic buyers to donate to the same charity at low transaction cost, we ensure that buyers are not willing to pay a premium for the 'one stop shop'-service offered by the subject-seller. Absent such an alternative, altruistic buyers may prefer buying the bundle at the premium to making an separate donation after the experiment. This would increase a seller's net profits. As we wish to prevent this mechanism from driving the results, we shut down this channel by offering buyers the opportunity to make a separate donation in each period.[4] In this way, our experimental design gives the theoretical prediction its best shot. Second, a between-treatment comparison of average private donations allows us to test to which extent the offering of bundles by firms crowds out private donations (Andreoni, 1993). Research on the optimal fund-raisers scheme for

[2]Greene (1963); Kahneman and Tversky (1979); Barberis (2013).

[3]Another reason of introducing an automated computer-seller instead of a second subject-seller that offers the unbundled private good is that Boone *et al.* (2012), in a comparison of their results with Dugar and Mitra (2011), suggest that a design with fixed-roles may lead to the result that the low-cost firm (in our case the seller that does not donate to charity) will set a price higher than the rival's marginal cost. We wish to give the Nash equilibrium prediction its best shot and prevent possible biases towards finding supracompetitive prices.

[4]Note that in the lab, the opportunity cost of time spent making a private donation is small because subjects cannot leave before the end of the session.

charities has identified that government grants to private charitable organizations crowd out individual donations (Andreoni, 2011). In investigating whether the crowding out effect of charity-linked products on private donations is similar to that of government grants, we hope to contribute to this research on the determinants of crowding out.[5]

Our experimental design consists of one control and three treatment conditions. In our control condition (CONTROL), the seller supplies only the private good. In the treatment conditions the seller is forced to offer the private product in combination with a donation to charity. By comparing the control and the treatment conditions, we can trace out the effect of bundling the private good with a donation to charity. The treatment conditions differ in how much of each sale will be donated to charity and whether this amount is a fixed part of the sales revenue or a percentage. In treatments ASYM-2 and ASYM-5, the donation to charity will be a percentage of revenues, either 2 or 5 percent. In case overweighing of small percentages plays an important role, we expect that smaller percentages will result in relatively higher profits to the seller.[6] In treatment ASYM-ABS, the seller will donate an absolute amount per unit sold to the charity. If the donation is an absolute amount, there is less reason to suspect a biased assessment of the actual donation. Hence, compared to treatments ASYM-2 and ASYM-5, this treatment should yield lower average prices and profits to the seller if overestimation of the part donated via the bundle is expected.

We are not the first to study the question whether bundling a private good with a charitable cause leads to an increased willingness to pay. Using data from eBay, Elfenbein and McManus (2010) find that the winning bids for otherwise identical goods are 6% higher when linked to a charity. Despite this premium, the increase is however not sufficient to increase seller profit. We hypothesize that this is because in their case the share of revenues donated to charity is too high to profitably benefit from any consumer bias: at least 10 percent of revenues in all transactions is donated to charity, and in 60 percent of the observed cases it is the full 100 percent of revenues. Dubé *et al.* (2015)

[5] See also Imas (2014).

[6] We use "Asym" as a shorthand to describe these treatments because only subject-sellers bundle their good with a donation, resulting in an asymmetry in their profit functions. In CONTROL, neither the human or the computer sells a charity-linked bundle.

set up a field experiment in cause marketing. They focus on consumers' behavioral responses to different combinations of discounts on the consumption good and donations to the charitable cause. They find that for large discounts, larger donations may create non-monotonicities in demand. Dubé *et al.* (2015) attribute this to price discounts crowding out consumer self-perception of altruism. They do not address how different combinations affect net firm benefits because they lack information on the specific cost structure of their corporate partner. In addressing the question whether charity-linked bundles is profit-increasing in a competitive market exchange, our research also adds to the literature on the compatibility of markets and social concerns (Henrich *et al.*, 2010; Falk and Szech, 2013). Whereas charity-linked bundles can be considered consumption goods with a positive externality, Bartling *et al.* (2015) report robust experimental results showing that buyers are willing to pay a price premium for products that avoid negative externalities for third parties not part of the transaction.

The experimental study most related to ours is Frackenpohl and Pönitzsch (2013) who also address the question whether bundling the sale of a consumption good with a contribution to charity leads to an increased willingness to pay for the consumption good, which they call "superadditivity". They find strong evidence of this in an experiment where subjects face multiple choice situations between buying a consumption good (a mug), a bundle of the same consumption good with a donation of €2 to a charity, or buying nothing. They suggest but to do not test that this type of bundling may enable commercial firms to increase their profits. Our research can be seen as a complement to their work in the sense that we explicitly aim to identify the potential of bundling as a strategic device to increase profits. Also, we vary the way the charity is bundled with the private good – an absolute amount or a percentage – whereas in the experiments by Frackenpohl and Pönitzsch, the donation always is a fixed sum.

Our experimental results indicate that offering bundles is profitable. If we focus on those cases where sellers set a price above the break-even point, we find that positive profits are attained in all treatments. Compared to offering the product without the donation to charity (average net profits of 0.58 ECU), donating five percent of revenues to charity increases net profits significantly by 0.75 ECU, while donating two percent does

not lead to higher profits. Donating a fixed amount is just as profitable as donating 5 percent: a donation of 0.43 ECU increases net profits significantly by 0.86 ECU relative to the control condition. This is surprising given our theoretical prediction that net profits could result from the overestimation of small percentages; it is less surprising when one notes that the equivalent amount of 5 percent of revenues is 0.43 ECU. In their study, Bartling *et al.* (2015) find that the average price premium is about half of the additional cost of providing the fair product such that profits of sellers who decide to offer the fair product are lower than the profits of those offering the unfair product.[7] One likely reason for the difference in findings is that they implemented a different, less competitive, market structure that givers sellers of the unfair product better opportunities to earn positive profits.[8]

It thus seems that offering charity-linked bundles can serve as a strategic instrument for firms to increase profits, but does this lead to the crowding out of private donations of buyers? On the subject level, we find evidence of crowding out: in periods where subjects buy the bundle, they significantly decrease their private donations compared to periods in which they buy from the computer-seller. Only in treatment Asym-5, we find that average total donations (private donations by buyers plus the donations via the bundle) are significantly higher.

Motives other than altruistic preferences have been brought forward to explain why consumers are on average willing to pay a premium to charity-linked products.[9] Elfenbein *et al.* (2012) construct a model showing that non-altruistic consumers are willing to pay a premium for buying from charitable sellers when there exists a given positive relation between a seller's altruistic utility and his disutility from behaving opportunistically towards consumers by providing low quality. In that case, consumers' willingness-to-pay for the charity-linked product is higher because it provides a credible signal of the seller's trustworthiness. Elfenbein and McManus (2010) provide empirical support for the rele-

[7]The experimental design of Bartling (2015) is different in a number of dimensions. One other difference is that sellers can decide on which type of product they want to offer for sale.

[8]In their case, production of the fair product comes at an additional cost of 10, whereas the average transaction price was 24.2 for the fair product and 19.1 for the unfair product. See Bartling *et al.* (2015) for further details.

[9]Elfenbein and McManus (2010) cite evidence collected by Meyer (1999) that "two-thirds of consumers report that they would favor retailers or brands associated with a good cause, all else equal."

vance of this mechanism. Even if one abstracts from the correlation with product quality, consumers' may prefer to buy from sellers that bundle sale transactions with donations to charity just because they believe these sellers are more deserving. In our experimental design, we shut down this signalling channel by imposing upon sellers the share of revenues that will be donated to charity. This design feature however cannot preclude that buyers develop altruistic feelings for charitable sellers and are willing to pay an additional amount because they wish to reduce the seller's financial burden. This is a common caveat in experiments trying to isolate the consequences of warm glow (see e.g. Crumpler and Grossman, 2008).

In its design, our study is related to several experiments on Bertrand competition that have appeared since Dufwenberg and Gneezy (2000) (Bruttel, 2009 ; Bigoni *et al.*, 2012; Apesteguia *et al.*, 2007; Hinloopen and Soetevent, 2008). Boone et al. (2012) is one of the few experimental studies on Bertrand markets with asymmetric constant unit cost. They find that play is in line with the Nash equilibrium prediction of the low cost firm setting price equal to the second lowest marginal cost.

This paper proceeds as follows. Section 2 presents our theoretical model and introduces our research hypothesis. Section 3 provides details on the experimental design. Section 4 presents the descriptive statistics of the data and the experimental results. Section 5 provides results on the altruistic preferences of the participants. Section 6 concludes.

2 Theoretical framework

This section develops a simple duopoly model describing profit-maximizing firms' equilibrium pricing strategy when consumers have altruistic preferences and one of the firms sells either a private good or a bundle that combines a private good with a donation to charity. Given our experimental design, we refer to this seller as the "subject-seller". The other seller sells the private good at marginal cost. This seller is referred to as the "computer seller". First we describe and solve the buyer's decision problem for given prices. Then we consider the subject-seller's problem in the pricing stage. We also show that if the pricing stage is preceded by a product stage where sellers can simultaneously decide whether or not to offer a bundle, the unique strong sub-game perfect Nash-equilibrium in

pure strategies is the one with no firm offering the bundle. Finally, Section 2.4 explores how sellers offering the bundle can make a profit when buyers have a biased perception of the amount the seller donates to charity.

2.1 Buyers

Assume that buyers' utility can be represented by the following utility function that incorporates altruistic and warm-glow preferences (Andreoni 1990).

$$U_i(x - p - g^U, g^T, G) = x - p - g^U + \alpha_i\sqrt{g^T} + \beta_i\sqrt{G}. \tag{1}$$

In this utility function, x denotes the consumption utility the buyer derives from buying the private good and p the price paid such that $x - p$ is her net consumption utility from buying the private good at price p. g^S is the amount the agent donates to the charitable good in a separate transaction. The second component reflects the warm-glow utility she derives from the act of giving a total amount of $g^T = g^B(p^B) + g^U$: $g^B(p^B)$ is the donation through buying the charity-linked bundle at price p^B, $g^U \geq 0$ the amount of a separate donation. Indeed, we implicitly assume that giving directly and indirectly via the intermediary of the consumption good are perfect substitutes in terms of warm-glow. The sum of all donations to the charity is denoted G. The final component represents how much the agent cares about the charity *per se*. Individuals with $\alpha_i = \beta_i = 0$ only care about private consumption; if $\alpha_i = 0$ and $\beta_i > 0$, the agent is purely altruistic; when both $\alpha_i, \beta_i > 0$, the agent is impurely altruistic.

A well known implication of this model that the donations of pure altruists are completely crowded out: if a third party increases her donation, a pure altruist will respond by reducing her donation by the same amount. Experimental evidence shows great support for the presence of warm-glow (see Andreoni, 2006, and Crumpler and Grossman (2008) and the references therein). We do not expect crowding out to drive our results because in all of our treatments, subjects stay uninformed about the donations by others. Because of this and for ease of exposition, we abstract from the impact of pure altruistic motives on donations and set $\beta = 0$ in what follows. In our experimental market, buyers make two choices simultaneously:

1. The transaction decision: Whether to buy from the subject-seller or from the computer-seller;

2. The donation decision: Whether to make a separate donation to the charity.

The treatments differ in the nature of the good offered by the subject-seller. In CONTROL, she sells the private good separately at price p^U. In the other treatments (ASYM-2, ASYM-5 and ASYM-ABS), she sells the bundle of the consumption good combined with a charitable donation at price p^B. An alternative for buyers in all treatments is to buy the private good from the computer-seller at a price p^{MC} equal to marginal cost; on top of this, buyers in all treatments have the possibility to make a separate donation to the charity without any transaction cost.

Donations to charity Individuals who do not buy the bundle will optimally donate an amount $g^{U*} = \max\{\alpha_i^2/4, 0\}$ to the charity in a separate transaction.[10] Individuals who buy the bundle donate $g^B(p^B)$ indirectly through their purchase of the bundle. Apart from that, they will donate $g^{U*} = \max\{\alpha_i^2/4 - g^B(p^B), 0\}$ in a separate transaction to make up for the difference between their optimal donation and the amount donated through the bundle.

Transaction decision If $p^{MC} < x$, individuals will strictly prefer buying from the computer-seller over buying nothing because only the former action generates positive utility. We impose this assumption in our experimental design such that buyers only have to decide whether to buy from the subject-seller or the computer-seller.

If both sellers offer the private good, the buyer will decide as follows:

$$\begin{cases} \text{buy from the subject-seller} & \text{if} \quad p^U \leq p^{MC}; \\ \text{buy from the computer-seller} & \text{if} \quad \text{otherwise.} \end{cases} \tag{2}$$

That is, the subject-seller will only have positive demand if she sets a price p^U that is equal to or lower than marginal cost.

[10] This value of g^{U*} equates the marginal cost and benefits of increasing one's donation. Take the partial derivative of equation (1) w.r.t. g^S and solve for g^S to obtain this result.

If instead the subject-seller offers the bundle at price p^B, we distinguish between two cases based on the value of the warm-glow parameter α_i. In case of strong warm-glow ($\alpha_i^2/4 > g^B(p^B) > 0$), the buyer will append any indirect charitable donation through the purchase of the bundle with a separate donation of $g^{U*} = \alpha_i^2/4 - g^B(p^B)$, giving her a total utility of

$$U^B = x - p^B + g^B(p^B) + \frac{1}{4}\alpha_i^2.$$

The alternative is to buy the private good from the computer-seller at price p^{MC} and to donate $g^{U*} = \alpha_i^2/4$ to charity in a separate transaction, giving utility $U^A = x - p^{MC} + \alpha_i^2/4$. A comparison between U^B and U^A shows that the buyer will decide as follows:

$$\begin{cases} \text{buy from the subject-seller} & \text{if} \quad p^B - p^{MC} < g^B(p^B); \\ \text{buy from the computer-seller} & \text{if} \quad \text{otherwise.} \end{cases} \tag{3}$$

In this case, the bundle will be bought if and only if the premium $p^B - p^{MC}$ is less than the donation g^B made by the seller to the charitable cause. In other words, the seller's revenues net of the donation will be less than p^{MC}, generating negative profits.

In case of moderate warm-glow ($0 \leq \alpha_i^2/4 \leq g^B(p^B)$), the buyer will not make a separate donation next to buying the bundle. In this case, her total utility equals the utility from buying the bundle:

$$U^B = x - p^B + \alpha_i \sqrt{g^B(p^B)}.$$

The utility U^A from buying from the computer-seller is the same as before so the buyer's optimal decision in this situation is to:[11]

$$\begin{cases} \text{buy from the subject-seller} & \text{if} \quad p^B - p^{MC} \leq \alpha_i \sqrt{g^B(p^B)} - \alpha_i^2/4; \\ \text{buy from the computer-seller} & \text{if} \quad \text{otherwise.} \end{cases} \tag{4}$$

Also in this case of moderate warm-glow, buyers will not buy the bundle from the subject-seller if the premium $p^B - p^{MC}$ exceeds the amount $g^B(p^B)$ the sellers donates to the charity. This follows from the fact that the right-hand side of the inequality in equation

[11] We assume that when indifferent between the bundle and the private good, the agent will buy the bundle. This can be justified by a convenience one-stop shop argument.

Treatment	Condition	Price	Buy from	Donation:
CONTROL		$p^U \leq p^{MC}$	S-seller	$g^{U*} = \alpha^2/4$
		otherwise	C-seller	$g^{U*} = 0$
ASYM-2, ASYM-5, ASYM-ABS	$\alpha^2/4 \leq g^B(p^B)$	$p^B - p^{MC} \leq \alpha\sqrt{g^B(p^B)} - \alpha^2/4$	S-seller	$g^{U*} = 0$
		otherwise	C-seller	$g^{U*} = \alpha^2/4$
	$\alpha^2/4 > g^B(p^B)$	$p^B - p^{MC} < g^B(p^B)$	S-seller	$g^{U*} = \alpha^2/4 - g^B(p^B)$
		otherwise	C-seller	$g^{U*} = \alpha^2/4$

Table 1: Equilibrium predictions for the transaction and donation decision in different treatments for altruistic buyers ($\alpha \geq 0$).

(4), $\alpha_i\sqrt{g^B(p^B)} - \alpha_i^2/4 \leq g^B(p^B)$.[12] The maximal value is therefore attained when α_i is set equal to its upper bound $2\sqrt{g^B(p^B)}$ and equals $g^B(p^B)$.[13]

In sum, we have the following result

Result 1. *Buyers with altruistic preferences ($\alpha > 0$) will never buy the bundle if the premium $p^B - p^{MC}$ for the bundle exceeds the indirect donation $g^B(p^B)$ made to the charitable cause.*

This result implies that without additional assumptions such as super-additivity or altruism towards the seller, offering the bundle is never profit-increasing for a seller. Table 1 summarizes the predicted equilibrium decisions of altruistic buyers in the different treatments.

2.2 Sellers

We now turn to the seller's decision problem. We focus on the price-setting behavior of subject-sellers offering either the private good or the charity-linked bundle. A subject-seller competes in prices with a computer-seller who sells the private good at price p^{MC}. Throughout we assume that, apart from the possible donation to charity, sellers' marginal cost MC of supplying an additional unit is constant and identical. In each period, sellers compete for the unit demand of a representative consumer with consumption utility x and

[12] To see this, note that for $\alpha_i^2/4 \leq g^B(p^B)$, $\alpha_i\sqrt{g^B(p^B)} - \alpha_i^2/4$ is non-decreasing in α_i.

$$\frac{\partial[\alpha_i\sqrt{g^B(p^B)} - \alpha_i^2/4]}{\partial\alpha_i} = \sqrt{g^B(p^B)} - \alpha_i/2 \geq 0 \text{ for } g^B(p^B) \geq \alpha_i^2/4.$$

[13] Inserting $2\sqrt{g^B}$ for α_i in $\alpha_i\sqrt{g^B} - \alpha_i^2/4$ gives $2g^B - g^B = g^B$.

warm-glow parameter α. From Result 1 in the previous section we know that as long as the computer-seller prices at p^{MC}, subject-sellers are never able to reap positive profits. For this reason, we focus on deriving the subject-seller's minimally acceptable price in the different treatment conditions. This willingness-to-accept price p^B_{WTA} is the break-even price that just covers the unit cost including the transfer to the charitable cause.

Note that whether the computer-seller maximizes profits by setting his price at marginal cost depends on the altruistic preferences of the buyers. When buyers are not altruistic ($\alpha = 0$) and thus do not care for the charitable component of the bundle, the computer-seller can attain positive profits by setting a price a fraction below p^B_{WTA}. This holds more generally: sellers of a unbundled product that compete with a seller of a bundle can make positive profits in case buyers exhibit moderate warm-glow and the constraint $\alpha^2/4 \leq g^B$ is non-binding. Because the altruistic preferences of sellers are unobserved, our experimental design forces the computer-seller to offer the unbundled good at marginal cost. Admittedly, this is a conservative approach since it ensures that the wedge between the price of the computer-seller and any price $p \geq p^B_{WTA}$ the subject-seller may charge is sufficiently wide for all buyers to prefer buying from the computer-seller, independent of their value of α.

2.2.1 The subject-seller offers the private good [Control]

When both the subject-seller and the computer-seller offer the private good, we are in the classic situation of Bertrand competition with homogenous products. In this case, the seller's p_{WTA} equals marginal cost and theory predicts that competition with the computer-seller will drive the equilibrium price down to marginal cost:

$$p^U = MC; \pi = 0.$$

2.2.2 The subject-seller offers the charity-linked bundle

Suppose the seller offers the bundle at price p^B and the computer-seller sets a price $p^{MC} = MC$ at which buyers can buy the *unbundled* consumption good. Because of the donation made to charity, the unit cost of the seller now equals $MC + g^B(p^B)$, while the unit cost of the computer-seller is MC. This situation is akin to Bertrand competition

		Seller 2	
		private [U]	bundle [B]
Seller 1	private good [U]	0,0	$g^B(p_{WTA})$, 0
	bundle [B]	0, $g^B(p_{WTA})$	0,0

Table 2: Game situation and equilibrium payoffs in the product-stage.

with asymmetric cost since buyers can combine buying the private good with a separate donation to charity to achieve the same outcome as when buying the bundle. Theory predicts that the price of the bundled good will be driven down to the point where

$$p^B = p^B_{WTA} = MC + g^B(p^B_{WTA}); \pi = 0.$$

Proportional and lump-sum donations [Asym-2, Asym-5, Asym-Abs]

When the donation takes the form of a proportion τ of revenues, the subject-seller's willingness-to-accept p^B_{WTA} equals

$$p^B_{WTA} = MC + \tau p^B_{WTA} \Rightarrow p^B_{WTA} = \frac{MC}{1-\tau}. \tag{5}$$

When the donation is equal to a lump-sum T, p_{WTA} simply is

$$p^B_{WTA} = MC + T.$$

2.3 Endogenous bundle choice

When the pricing stage is preceded by a stage in which sellers can simultaneously decide whether to offer a bundle or a separate consumption good, they face the situation as in Table 2. In case the sellers offer the same product, none of them is able to make positive profits in the pricing-stage; in the asymmetric case the seller that offers the unbundled private good can make positive profits in the pricing stage by setting price a fraction below p^B_{WTA} generating profits of $p_{WTA} - MC = g^B(p_{WTA})$. In sum, the product-stage has three Nash equilibria, (U, B), (B, U) and (B, B) but only the latter is a strong equilibrium.

2.4 Biased perception of charitable donation

As has become clear in the previous subsections, offering the bundle is never profit-increasing unless one makes additional assumptions about how bundling the consumption

and charitable good increases demand. Frackenpohl and Pönitzsch (2013) propose that bundling a physical consumption good (a mug) with a charitable good increases subjects' willingness to pay. This amounts to $x^B > x^S$ in the utility function of equation (1). Their evidence shows that subjects are indeed willing to pay more for the bundle than for the two goods separately, but the increase is not sufficient to make bundling profit-increasing for the seller.[14]

Our objective is to explore whether offering bundles can be profit-improving if consumers have a biased perception of the part of revenues that is transferred to charity. We hypothesize that the likelihood of such a perception bias is higher when the amount of revenues given to charity is not presented as a fixed sum but as a fixed fraction of revenues. In these cases, the relation to the price paid and the donation is less straightforward. This leaves buyers more freedom to misperceive their contribution to charity and we expect that this leads agents to overestimate their actual donation, thereby increasing their willingness-to-pay for the bundle.

Let $\hat{g}^T(g^U, g^B)$ denote a buyer's perceived total contribution to charity. We assume that the perceived contribution is additively separable in the part of the donation made via the bundle and the part that is donated in a separate transaction. Moreover, we assume that the separate donation is perceived without bias such that $\hat{g}^T(g^U, g^B) = g^U + \hat{g}^B$. Assume that the bias function $\hat{g}^B = f(g^B)$ has the following properties: $f(0) = 0$, $f(g^B) > g^B$ for $g^B > 0$ $f'(g^B) > 0$ and $\lim_{g^B \to \infty} f(g^B) = g^B$. That is, a bias only happens when the donation via the bundle is positive, the perceived contribution is strictly increasing in the actual donation, and the bias disappears in the limit.

The upwardly biased estimate of the donation increases the utility from buying the bundle for all individuals with $\alpha > 0$. Moreover, due to the bias less individuals will make a private donation next to buying the bundle: at a given price p^B, only buyers with $\alpha > \hat{\alpha} = 2\sqrt{\hat{g}^B(p^B)}$ will make such a donation next to buying the bundle. These buyers will buy the bundle instead of the private good if and only if $p^B - p^{MC} \leq \hat{g}^B(p^B)$. This implies that the seller of the bundle will receive positive demand and can make positive profits if she sets $p^B = p^{MC} + \hat{g}^B(p^B)$ and the bias is such that $\hat{g}^B(p^B) - g^B(p^B) > 0$.

[14] When a donation of €2 is made to charity, willingness to pay for the private good increases from €0.67 to €1.38 (Frackenpohl and Pönitzsch 2013) (p. 13).

Profitable sales are also possible to buyers with $\alpha \leq \hat{\alpha}$. These buyers will prefer the charity-linked bundle to the private good if and only if $p^B - p^{MC} \leq \alpha\sqrt{\hat{g}^B(p^B)} - \alpha^2/4$. Setting the price of the bundle at $p^B = p^{MC} + \alpha\sqrt{\hat{g}^B(p^B)} - \alpha^2/4$ will therefore just induce buyers to buy. This generates positive profits if the gross margin $\alpha\sqrt{\hat{g}^B(p^B)} - \alpha^2/4$ exceeds the donation $g^B(p^B)$ to be made to the charity. Equating the two expressions and solving for α shows that this holds true for $\alpha \in [\hat{\alpha} - 2\sqrt{\hat{g}^B(p^B) - g^B(p^B)}, \hat{\alpha}]$. The important thing to notice here is that the lower bound is negatively dependent on the wedge between the perceived and the actual donation. In other words, if the divergence between the actual donation made by the seller of the bundle and the buyer's belief about this donation is sufficiently wide, the seller can profitably sell the bundle even to buyers with moderate altruistic preferences.

In sum, we arrive at the following research hypothesis.

Hypothesis Selling the bundle is expected to create opportunities to generate positive profits net of the donation to charity. Net profits are expected to be larger when the donation is framed as a percentage rather than as a fixed amount, and when the percentage donated is smaller:

$$\pi_{ASYM-2} > \pi_{ASYM-5} > \pi_{ASYM-ABS} > \pi_{CONTROL} = 0,$$

with π denoting the mean profits of the subject-seller net of the donation to charity.

3 Experimental Design

3.1 Design

In each 'market' one buyer is matched with two sellers, one subject-seller and one computer-seller. As in Abrams *et al.* (2000), the buyer's valuation for the private good is common knowledge. Buyers do not know the marginal cost of supplying a unit of the private good, but it is common knowledge that – apart from the donation to charity – these unit costs are constant across periods. In all treatments, this cost is set at 8 per unit provided.[15]

[15]The unit cost is set at a strictly positive level to ensure that in equilibrium, the total cost of providing a unit will be strictly higher for charitable sellers.

Whether or not part of the price goes to charity is exogenously determined in order to prevent sellers using the charity as a signalling device to receive higher prices. The percentage donated to charity and the fact that this percentage is imposed is known to buyers. The charity selected for this experiment is the Red Cross, because it is an internationally renowned charity with the mission to protect human life and health. A letter signed by the Red Cross was provided to participants as part of the instructions to increase the credibility that any donations by the participant will be transferred to the Red Cross.

The subject-seller's task is to set a price between zero and an imposed maximum (15) with increments of 0.01 ECU. The computer-seller will set a price equal to the marginal cost of the subject-seller in all periods. In the control condition, both types of sellers sell the private product and they do not donate to the Red Rross. In the treatment conditions, the subject-seller offers the bundle consisting of the private product and a donation to charity, while the computer-seller does not donate to charity. This difference between the sellers in the treatment conditions is known to buyers. Buyers will also be notified which seller is the subject-seller and which one is the computer-seller. Comparing the control and the treatment conditions enables us to detect the effect of tying the sale of a product with a donation to charity.

After the sellers have set their prices, the buyer's decision task in each period is twofold:

- Transaction decision: Whether to buy from the subject-seller or the computer-seller.
- Donation decision: Buyers can make a separate donation to the Red Cross.

In each period, buyers receive an endowment of fifteen ECU, which is the maximum they can spend in total on the purchase of the product and on the donation. Buyers have unit demand. In each period, after making the buying decision, buyers can decide on a private donation to the Red Cross by typing in the amount they would like to donate. This donation is on top of potential indirect donations via purchasing the bundle. The transaction costs of the private donation to the Red Cross can be regarded as (close to) zero, because the effort buyers need to make in order to make this donation is minimal.

Any private donations are transferred to the Red Cross by the experimenters immediately after the experiment has ended.

Buyers do not observe the transaction and donation decisions of other buyers, which effectively rules out social-signaling incentive for altruism and also precludes the possibility that donations by other subjects will lead to crowding out. Another channel that could play a role in the crowding out of private donations is the self-signaling motive. However, Dubé *et al.* (2015) do not find evidence that self-signaling plays a role in case the charity-linked bundle is offered without a price discount. Lastly, by including the opportunity for buyers to make a private donation, we are able to study the crowding out effect of offering bundles. Overestimation of the amount donated via the bundle can lead to higher profits for the firm, but total donations to the charity may decrease if the increase in the actual amount donated via the bundle is less than the decrease in private donations. Our design enables us to test this crowding out effect.

The payoffs of the buyers and the sellers depend on the purchasing decision of the buyer. If the buyer buys from the subject-seller, the payoffs are as follows:

- Buyer's payoff: Total surplus gained from the transaction minus potential donations to the Red Cross (15 minus the price paid and the donation).
- Seller's payoff: Price received minus marginal cost and private donations to the Red Cross.

If, instead, the buyer buys from the computer-seller, the payoff for the buyer is the same as when she buys from the subject-seller, but the subject-seller's payoff is zero.

3.2 Treatments

The following treatments were run: Control, Asym-2, Asym-5, and Asym-Abs. Table 3 shows the parameter choices of the experiment and the equilibrium predictions of the experimental design. All prices stated are multiples of 0.01 ECU. The table shows the characteristics of the buyers and the subject-sellers for each treatment. The marginal costs (MC) for the sellers are set at 8 in each treatment. The donations (a fraction τ and a lump-sum T) differ per treatment: the seller does not donate to charity (Control),

the seller donates two percent of the price received (Asym-2), five percent of the price (Asym-5), or a fixed sum of 0.43 ECU (Asym-Abs). The buyer's maximum amount to spend in each period (x) is fifteen ECU for each treatment.

Table 3: **Parameter choices and equilibrium predictions.** (Prices in ECU).

Treatment	Control	Asym-2	Asym-5	Asym-Abs
Seller characteristics				
MC	8	8	8	8
τ	–	0.02	0.05	–
T	–	–	–	0.43
Buyer characteristics				
x	15	15	15	15
Equilibrium predictions				
p^S	8	–	–	–
p^B	-	8.17	8.43	8.43
π^S	0	–	–	–
π^B	–	0	0	0

The equilibrium prediction is that sellers are not able to make profits in any of the treatments. In Control, competition with the computer-seller will drive the price of the separate product (p^S) to marginal cost such that no profits (π^S) are earned. In the treatments where the subject-seller needs to donate part of the price received to the Red Cross, we expect buyers to increase their willingness to pay for the bundle (p^B). However, this increase should not exceed the donation such that profits of selling the bundle (π^B) will be zero.

3.3 Implementation

In June, September and October 2015, the study was run with treatments Control, Asym-2, Asym-5 and Asym-Abs in the GrEELab of the University of Groningen. Two sessions each consisting of fifteen trading periods were scheduled for each treatment, except for Control, which was run with three sessions. As Table 4 shows, a total of 102 participants participated in our experiment. On average, participants were 22.35 years old and 59 percent was female (see Table 5).[16] There are no significant differences in the

[16]In Asym-Abs and in Control, one participant did not provide information regarding age and gender, and in Asym-2, one participant did not provide information regarding gender. These participants were subsequently excluded from the summary statistics.

gender proportions of buyers and sellers between treatments. The average age of buyers in Asym-Abs (p=0.048) and of sellers in Asym-5 (p=0.049) is somewhat higher compared to Control.[17]

Table 4: **Summary of the treatments.**

Treatment	Name	Donation to charity	Nr. rounds	Nr. participants
I	Control	0	15	28
II	Asym-2	2%	15	30
III	Asym-5	5%	15	24
IV	Asym-Abs	0.43 ECU	15	20
Total			60	102

Table 5: **Summary statistics subjects.**

	Control	Asym-2	Asym-5	Asym-Abs
Female (in %)				
Buyers	85.71	53.33	66.67	60.00
Observations	14	15	12	10
Sellers	61.54	42.86	33.33	66.67
Observations	13	14	12	9
Age (in years)				
Buyers	22.07	22.07	22.17	23.70**
	(1.64)	(2.55)	(3.30)	(2.95)
Obervations	14	15	12	10
Sellers	21.92	21.67	23.83**	21.78
	(2.29)	(2.82)	(3.21)	(1.20)
Observations	13	15	12	9

Values in percentages or in years over the observations in the respective treatment. Standard deviations in parentheses. ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level).

Upon arrival in the lab, participants were placed in cubicles and randomly allocated the role of buyer or seller of the product. They kept this role for the entire experiment. The experiment started after participants had carefully read the instructions and correctly answered the control questions. In each of the fifteen trading periods, participants assigned the role of seller had to indicate their pricing decision, while participants assigned the role of buyer had to indicate their buying and donation decisions. The conversion rate was set at: 1 ECU=€ 2.

[17] We use t-tests to compare all means, unless otherwise noted.

After the participants finished the fifteen trading rounds they played a one-shot dictator game to elicit altruistic preferences.[18] To obtain a more complete picture of the charitable behavior of participants and their altruistic preferences, subjects were asked to fill in a questionnaire after the dictator game. Participants were asked about their charitable behavior (how many charities and the Red Cross specifically they donate to on an annual basis; how they would rank the Red Cross in terms of reputation and how much the Red Cross deserves their donation).

Participants were paid out one random period in the market game and their allocations of the dictator game. Any donations made to the Red Cross on behalf of the participants in the selected payment period were transferred to the Red Cross by the experimenters immediately after the experiment finished.

4 Experimental results

4.1 Market prices

First we consider market prices. Figure 1 presents for each treatment the average market price for each of the 15 periods. By and large, average prices are above 8, except for some markets in the first few and final periods where some subject-sellers price (and sell) considerably below marginal cost.[19] Note that rational agents can simply avoid losing money by never pricing below marginal cost. We suspect that sellers in the experiment sometimes price below cost because of the experimental feature that they compete with a computer-seller selling at marginal cost. This makes it hard for subject-sellers to sell. They then occasionally price below cost to find out whether they are at least able to sell at below-cost prices and/or because they are just eager to be part of a transaction. To abstract from this, we also present the analysis for the subset of observations where the price paid at least equals marginal cost in what follows.

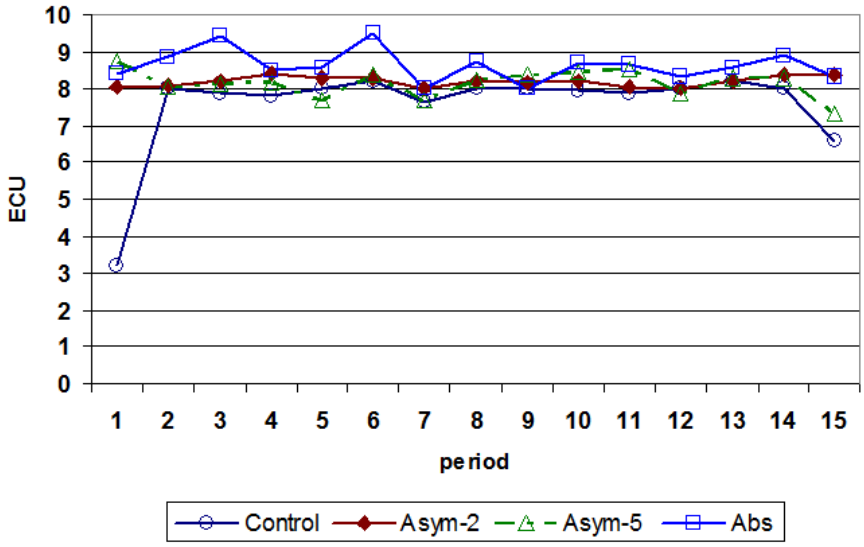
Table 6 shows the average market prices of the subject-seller.[20] We observe that the

[18] We are aware of the limitations of using the dictator game to measure altruism, e.g. behavior in dictator games is found to be confounded by experimenter demand effects (Davis and Holt 1992). However, we use it as a relative measure of the degree of altruism of the participants.

[19] In total, 68 out of the 240 transactions by subject-sellers are at a price below marginal cost. For Control 15/60 (= 25%); Asym-2, 19/73 (26%); Asym-2, 20/68 (29%) and Asym-2, 14/39 (36%).

[20] Table A.1 provides more elaborate descriptive statistics.

Figure 1: **Per-period average market prices** (in ECU).



average market price (as a mean of the average market price per subject-seller) shown in column (1) is lowest in CONTROL, but not significantly lower than marginal cost ($p = 0.282$, two-sided t-test). Compared to CONTROL, the average market price is significantly higher in ASYM-ABS ($p = 0.035$, one-sided t-test)[21]. This implies that buyers increase their willingness to pay for the private product if it is combined with a fixed-amount donation.[22] After controlling for below marginal cost pricing, we find that average market prices are significantly higher both in ASYM-5 and in ASYM-ABS ($p = 0.002$ and 0.009, respectively, one-sided t-tests). Hence, sellers are able to obtain a higher price if they offer the product in combination with a donation of five percent or a fixed amount of 0.43 ECU.

4.2 Profits

Table 7 shows per treatment the subject-sellers' average profits net of the donation. We observe from column (1) that across all periods and including all sales, only average profits in ASYM-2 are significantly positive at the 10%-level. We report for all between-

[21]Due to differences in marginal cost between treatments, we report p-values from one-sided t-tests, except for the comparison between ASYM-5 and ASYM-ABS, for which we perform a two-sided t-test.

[22]For ASYM-2 a significant effect is found at the 10%-level.

Table 6: **Average payments to the subject-seller** (in ECU).

	All	Difference			p ≥ MC	Difference		
		Control	Asym-2	Asym-5		Control	Asym-2	Asym-5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control	7.18				8.58			
Asym-2	8.44	1.26*			8.63	0.05		
Asym-5	8.43	1.24	–0.01		9.82	1.24***	1.19***	
Asym-Abs	9.29	2.11**	0.85**	0.87	9.87	1.28***	1.24***	0.04

Notes. Cells give mean values (in ECU). (1) denotes the average price paid by the buyer to the subject-seller (including periods without sales). (2) − (4) show the difference in the average price paid. (5) denotes the average price paid conditional on buying at a price at least equal to marginal cost. (6) − (8) shows the difference between treatments in the average price given in (5). ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level). p-values based on one-sided t-tests, except for comparison between Asym-5 and Asym-Abs.

Table 7: **Average profits** (in ECU).

	All	Difference			p ≥ MC	Difference		
		Control	Asym-2	Asym-5		Control	Asym-2	Asym-5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control	–0.06				0.58**			
Asym-2	0.10*	0.16			0.46***	–0.13		
Asym-5	–0.01	–0.05	–0.11		1.33***	0.75*	0.87***	
Asym-Abs	0.27	0.33	0.18	0.28	1.44**	0.85*	0.98**	0.11

Notes. Cells give mean values (in ECU). (1) denotes the average profits of the subject-seller (including periods without sales). (2) − (4) show the difference in the average profits. (5) denotes the average profits conditional on receiving a price at least equal to marginal cost. (6) − (8) shows the difference between treatments in the average profits given in (5). ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level). p-values based on two-sided t-tests.

treatment comparisons of profits p-values based on two-sided t-tests. None of these is significant.

The picture changes when we focus on sales that make non-negative contributions to profit. Columns (5)-(8) show that in this case, sellers in all treatments attain significantly positive profits and that, compared to the control group, sellers in Asym-5 and Asym-Abs significantly benefit (at the 10%-level) from bundling their product with a charitable donation, with average profits of 1.33 and 1.44 ECU profit per transaction, respectively. For Asym-2 we do not find such an effect.[23] Hence, compared to selling only the private product, offering the bundle seems profitable when donating five percent of the sales price or an equivalent absolute amount. The reason for the difference between columns (1) and (5) is that mean profits reported in column (1) are, especially for Asym-5, distorted by some negative outliers, see Figure 2.

The reason for why bundling is profit-increasing in Asym-5 and Asym-Abs is that sellers set higher prices and that a fraction of buyers is willing to buy at prices above cost. In Control, buyers on average complete 29% of all transactions with subject-sellers, but when the subject-seller sets a price above cost, this results on average only in 17% of all cases in a successful transaction. With 19%, the success-rate is comparable in Asym-Abs, despite the on average higher ask-prices. The combination of a high ask price and a success-rate of 27% explains the profitability of Asym-5.[24]

4.3 Crowding out

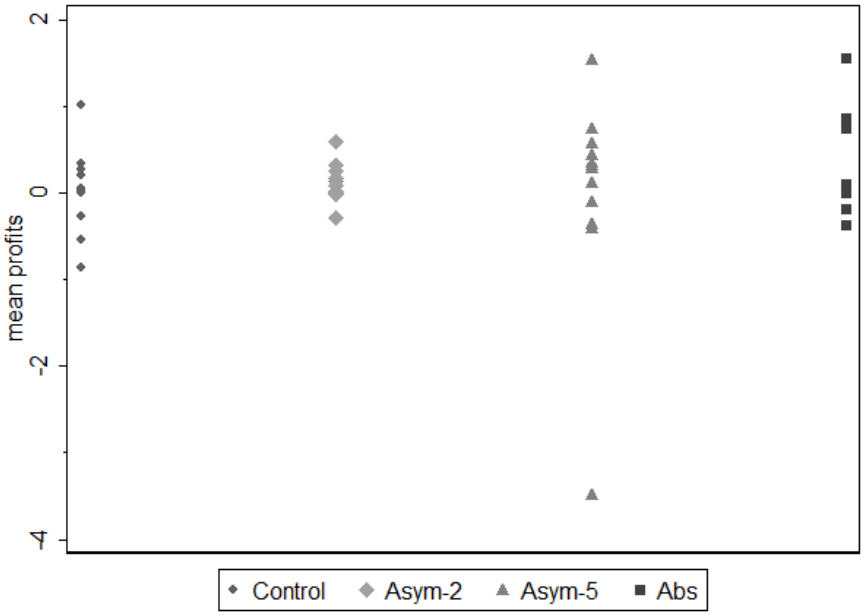
So far we considered the impact of bundling on sellers' propensity to create positive price-cost margins. This subsection redirects attention to the implications for charity revenues. Do donations via the bundle increase charitable donations or do they crowd out private donations by buyers?

Table 8 lists the treatment average of total donations, i.e. the sum of private donations and donations via the bundle and provides the first part of the answer. The first column shows that average total donations are significantly higher than zero in all treatments.

[23] Pairwise nonparametric Mann-Whitney tests lead to slightly different results with $p = 0.020$ and $p = 0.111$ for the comparison of Asym-5 and Asym-Abs with the control group, respectively.

[24] In Asym-2, also 27% of all ask-price above cost lead to a transaction. However, subject-sellers in this treatment set on average narrow price-cost margins such that profits are significant but small.

Figure 2: **Average profits in ECU per treatment, subject-level**.



Average donations are higher in all treatments in which the bundle is offered but only significantly so in Asym-5. In that treatment, average total donations are more than twice the amount in Control. As becomes clear when we split total donations into its two constituent parts, the private donation and the donation via the bundle (Table A.2), it becomes clear that the difference between Control and Asym-5 is driven by the bundle donations (they account for 0.16 ECU or 20% of the total increase) as well as by higher private donations in Asym-5 (1.35 vs. 0.69 ECU on average, including zero donations). This at least suggests that donating via the bundle in this treatment does not crowd out private donations.

Column 5 of Table 8 focuses on the level of donations conditional on buyers donating either in private or via the bundle. The main take away is that, conditional on donating, the total donations are higher in Asym-5 than in any of the other two bundle treatments Asym-2 ($p = 0.088$) and Asym-Abs ($p = 0.073$) but not higher than in Control. This difference between Asym-5 and Asym-Abs is the more remarkable given that donations via the bundle are the same in both treatments (ECU 0.42 vs. 0.43, respectively).

To further investigate possible crowding out, Table 9 splits the transactions into two sets

Table 8: **Total Donations** (in ECU).

	All	Difference			TD > 0	Difference		
		Control	Asym-2	Asym-5		Control	Asym-2	Asym-5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control	0.69***				1.53***			
Asym-2	0.78***	0.09			0.99***	–0.54		
Asym-5	1.50***	0.82**	0.72*		1.72***	0.18	0.73*	
Asym-Abs	0.77***	0.08	–0.01	–0.73*	0.95***	–0.58**	–0.04	–0.77*

Notes. Cells give mean values (in ECU). Total donations in (1) denote the sum of private donations and donations via the bundle. Column (1) includes zero-donations, column (5) only includes positive total donations. Columns (2) – (4) and (5) – (8) present the respective differences in average donations between treatments. ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level). *p*-values based on two-sided *t*-tests, except for comparison with zero-donations in (1) and (5) (one-sided *t*-test).

Table 9: **Private Donations** (in ECU).

	Subject Seller	Difference			Computer Seller	Difference		
		Control	Asym-2	Asym-5		Control	Asym-2	Asym-5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Control	0.76**				0.69***			
Asym-2	0.34**	–0.43			1.16***	0.47		
Asym-5	1.15***	0.38	0.81**		1.32***	0.63	0.16	
Asym-Abs	0.40**	–0.37	0.06	–0.75	0.93***	0.24	–0.23	–0.39

Notes. Cells give mean values (in ECU). Donations in (1) are the buyers' average private donations conditional on buying from the subject-seller; (5) idem, conditional on buying from computer-seller. Columns (2) – (4) and (5) – (8) present the respective differences in average donations between treatments. ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level). *p*-values based on two-sided *t*-tests, except for comparison with zero-donations in (1) and (5) (one-sided *t*-test).

based on whether the transaction was completed with the subject-seller or the computer-seller. The table shows that for all treatments, average private donations (in ECU) for both groups are strictly positive with no significant differences between control and treatment groups. At this point, one might be tempted to use a comparison between columns (1) and (5) to distill an estimate of treatment-specific crowding out. However, such an estimate would be biased because it includes individuals who have self-selected into always buying from either the subject-seller or the computer-seller.[25]

For this reason, we limit attention to buyers that buy at least once from the subject-seller and the computer-seller. For each of them, we calculate the difference between their average private donation when they buy from the subject-seller and when they buy from the computer-seller. Table 10 presents the results for each treatment. We observe that for the CONTROL-treatment there is no difference, which suggests that the difference between the nature of the seller (computer or human subject) does not impact their donation decision. On the within-subject level, crowding out is almost complete in the treatments ASYM-2 and ASYM-ABS. In contrast, crowding out seems absent in ASYM-5.

Table 10: **Within-Subject Difference Private Donations (subject vs. computer seller)** (in ECU).

	DIFFERENCE				
	median	mean	s.e.	p-value	obs.
CONTROL	0	–0.004	0.054	0.946	14
ASYM-2	–0.134	–0.190	0.054	0.005	12
ASYM-5	–0.027	–0.104	0.095	0.294	12
ASYM-ABS	–0.446	–0.476	0.144	0.016	7

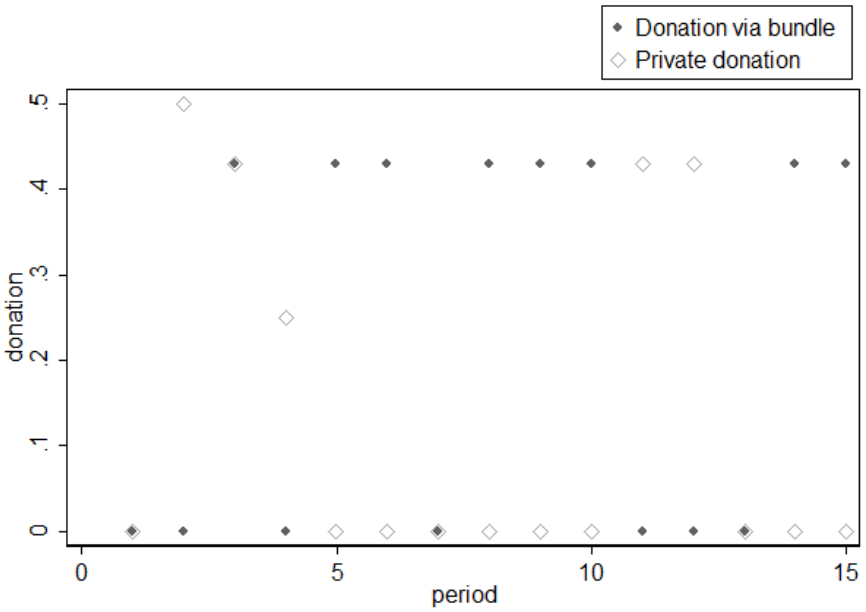
Notes. Cells give mean differences (in ECU). p-values based on two-sided t-test on mean difference being equal to zero. Unit of observation: buyers.

One of the patterns observed at the individual level in ASYM-ABS is depicted in Figure 3. This subject by definition donates 0.43 ECU to the charity in periods in which she buys the bundle. One observes that in those periods, her private donation is mostly zero. However, in periods in which she does not buy the bundle, she instead makes up for the

[25]For example, in ASYM-2, three out of the fifteen buyers buy in all periods from the computer-seller. Their average private donations are a relatively high 1.18 ECU, so their presence explains to a great extent the observed gap between 0.34 and 1.16 for this treatment.

missed revenue by the charity by making a private donation of exactly 0.43 ECU. This suggests that at least for some buyers, the announced donation by the subject-seller acts as a sort of anchor or social norm to which they wish to adhere, even if they do not buy from the seller.[26] We consider this an experimental artefact which is likely to slightly bias upwards our estimates of crowding out presented in Table 10. In spite of this, we believe that the bundle does crowd out private donations, although it is somewhat puzzling that we do not clearly observe this for treatment Asym-5.

Figure 3: **Per-period average donations** (in ECU).



Note. Private donations and donations via buying the bundle of subject #8002 in treatment Asym-Abs.

4.4 Regression Analysis

Table 11 presents the estimation results of the regression analysis. The dependent variable in the second column is the price paid by the buyer to the subject-seller, including all prices paid ('All') and excluding all prices paid below marginal cost ('$P \geq MC$'). We observe that offering charity-linked bundles is only price-increasing if the private product

[26]The histograms B.1 and B.2 in Appendix B show this type of norm formation only for the absolute amount treatment Asym-Abs but not for the percentage treatments. For those treatments, the mode is at 0.50 ECU, as for the control treatment.

Table 11: **Estimation Results**

	Price Paid		Net Profits		Total Donations	
	All	$P \geq MC$	All	$P \geq MC$	All	$TD > 0$
Constant	11.18***	11.47***	1.76	3.39***	0.12	0.48
	(2.71)	(0.90)	(1.33)	(0.89)	(0.62)	(1.13)
Asym-2	1.31*	0.15	0.17	–0.02	0.16	–0.60
	(0.73)	(0.25)	(0.13)	(0.25)	(0.19)	(0.40)
Asym-5	1.60	1.55***	0.23	1.05***	0.50**	–0.24
	(0.96)	(0.29)	(0.26)	(0.28)	(0.24)	(0.41)
Asym-Abs	2.15**	1.33***	0.35	0.90*	0.10	–0.64
	(0.92)	(0.48)	(0.24)	(0.48)	(0.18)	(0.39)
Age	–0.18	–0.13***	–0.08	–0.13***	–0.00	0.03
	(0.13)	(0.03)	(0.06)	(0.03)	(0.03)	(0.05)
Gender	–0.18	0.10	0.06	0.10	0.44***	0.52**
	(0.61)	(0.27)	(0.17)	(0.22)	(0.14)	(0.21)
N	645	495	720	495	1485	1110
N Clusters	43	33	48	33	99	74

Notes. In the second column, the dependent variable is the price paid by buyers to the subject-seller. We include all prices paid (subcolumn 'All') as well as only the prices paid that are at least equal to marginal cost (subcolumn '$P \geq MC$'). In the third column, the dependent variable is the profits net of the donation to charity. We include all transactions (subcolumn 'All') as well as only the transactions in which the buyer bought from the subject-seller (subcolumn '$P \geq MC$'). In the last column the dependent variable is the total donations to the charity (bundle donations via the seller and private donations of the buyer). We include all donations (also zero amounts) (subcolumn 'All') as well as only positive total donations (subcolumn 'Positive'). In all models, the independent variables are the treatment variables Asym-2, Asym-5 and Asym-Abs, where Control is the benchmark, and the control variables are age and gender (1 if female). ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level). Robust standard errors are in parentheses and are clustered at the subject level.

is coupled with a fixed amount donation. Compared to offering only the private product (CONTROL) donating an absolute amount increases prices paid by 2.15 ECU, which is an increase of almost 20 percent. Including only prices that are at least equal to marginal cost leads to a significant increase in prices by 1.55 ECU in ASYM-5 (an increase of 13 percent) and by 1.33 ECU in ASYM-ABS (an increase of 11 percent) relative to CONTROL. Age seems to negatively impact average prices paid.

The dependent variable in the third column is profits of the subject-seller net of the donation to charity, including periods without transactions with the subject-seller ('All') as well as only periods in which the price paid to the subject-seller was at least equal to marginal cost ('$P \geq MC$). We observe that none of the donation schemes is able to increase profits if all periods are included – also those in which no transaction with the buyer took place. Excluding transactions with the computer-seller and prices paid below marginal cost leads to significantly higher net profits in ASYM-5 and in ASYM-ABS. Hence, compared to selling only the private product, a donation of 5 percent increases profits by 1.05 ECU (an increase of 30 percent), while an absolute amount donation increases profits by 0.90 ECU (an increase of 26 percent). Age seems to negatively impact net profits.

In the last column the dependent variable is total donations to the charity, in which all donations are included ('All') as well as only positive donations ('$TD > 0$'). The five percent donation scheme is able to raise total donations by an amount of 0.50 ECU, which is more than four times the average total donations raised in CONTROL, when comparing all total donations (including zero amounts). Hence, crowding out does not seem to take place, as average total donations in case sellers offer the bundle are not significantly different from or even significantly higher than when sellers offer only the private product. In order to maximize donation revenues the charity should opt for the bundle with the five percent donation scheme.

Including only positive total donations leads to insignificant results (final column). Gender seems to impact total donations positively, suggesting that females donate on average 0.44 to 0.52 ECU more than males do.

5 Altruistic Preferences

5.1 Dictator Game

Conditional on the market price being set at or above marginal cost, we find that the average market price and average profits are significantly higher when the subject-seller donates five percent or a fixed part of the sales price received. This in contrast to the predictions of our theoretical model. One possibility is that buyers in the treatment conditions are willing to pay a higher price because they are more altruistic than the buyers in the other treatments.

Table 12: **Average allocations by Dictators** (in ECU).

	Sellers	Buyers
	All	All
Control	2.48 (2.15)	3.57 (1.79)
obs.	14	14
Asym-2	2.30 (2.10)	2.90 (1.79)
obs.	15	15
Asym-5	3.08 (2.24)	3.25 (1.76)
obs.	12	12
Asym-Abs	2.53 (2.53)	2.99 (2.20)
obs.	10	10

Notes. Values are in means (in ECU) and reflect the part dictators (buyers or sellers in the market game) allocated to receivers. Standard deviations are in parentheses. ***(**,*) indicate statistically significant differences at the 1%-level (5%-level, 10%-level).

To test this, we measured the altruistic preferences of participants by their average allocations to the receiver in a one-shot dictator game played after the main experiment. Table 12 shows these average amounts (in ECU). The average allocation by buyers in none of the treatment conditions shows a significant difference with Control.[27]

[27]We are aware that subject decisions in the dictator game are possibly influenced by the outcomes in the main experiment because of moral cleansing (Ploner and Regner, 2013). For example, the higher total donations in Asym-5 might induce less generosity in the subsequent dictator game. However, different from Ploner and Regner (2013) who show such an effect for previous *earnings* on subsequent generosity in a dictator game, subjects in our experiment do not know their earnings (i.e. the round that will be paid out) at the time they play the dictator game. This is likely to attenuate any possible effect of moral cleansing.

5.2 Self-Reported Charitable Behavior

The charitable behavior of the participants was also measured by including a questionnaire at the end of the experiment. Table 13 summarizes the results for the buyers.

Table 13: **Buyer's charitable behavior.**

	Control	Asym-2	Asym-5	Asym-Abs
Charities supported (in %)				
Zero	28.57	33.33	16.67	40.00
One to Two	42.86	46.67	83.33*	50.00
Three to Six	28.57	20.00	0.00	10.00
obs.	14	15	12	10
Red Cross (in %)	7.69	14.29	9.09	0.00
obs.	13	14	11	10
Reputation	7.21	8.73***	6.83	8.80***
	(1.72)	(1.10)	(2.79)	(1.03)
obs.	14	15	12	10
Deserves	6.57	8.13*	7.50	8.40*
	(3.74)	(1.60)	(2.47)	(1.78)
obs.	14	15	12	10

Notes. Values are in means (in ECU) or in percentages. 'Charities supported' reports on an annual basis the number of different charitable causes supported by subjects with the role of buyer in the experiment (in percentages). 'Red Cross' indicates the average percentage of participants that donated to the Red Cross over the last twelve months. 'Reputation' gives the average score given to the Red Cross in terms of Reputation as measured on a scale from 0 (very bad) to 10 (excellent). 'Deserves' shows the average score of the Red Cross in terms of deserving the participant's donation as measured on a scale from 0 (not at all) to 10 (completely). ***(**,*) indicate statistically significant differences with Control at the 1%-level (5%-level, 10%-level). Standard deviations are in parentheses.

The first rows show that in all treatments, the majority of buyers supports at least one charity a year. In Asym-Abs we observe the highest percentage of buyers who does not donate to any charity and in Control we find the largest percentage of buyers reporting to donate to three to six different charities. The differences are however not statistically significant. The column 'Red Cross' shows the percentage of buyers that made a donation to the Red Cross in the past twelve months. No significant differences between treatments are observed.

Buyers in Asym-2 and in Asym-Abs score the reputation of the Red Cross significantly higher than buyers in the other treatments. However, different from the question on actual donations to the Red Cross in the past twelve months, these estimates may be

tainted by buyers' experiences in the main experiment as it may reflect buyers' ex post rationalization of paying higher prices paid for the charity-linked products in the experiment. The same caveat holds for the numbers on the Red Cross deserving a donation, which are also significantly higher (at the 10%-level) in Asym-2 and in Asym-Abs. In sum, we cannot fully rule out that the higher prices paid in Asym-2 and Asym-Abs are to some extent the result of buyers in those treatments having a more favorable opinion of the Red Cross, however, especially for Asym-Abs, buyers actions in terms of actual donations to the Red Cross do not match their stated opinions.

6 Discussion and conclusions

From a theoretical perspective, given rational agents, complete markets, and absent transaction cost, selling charity-linked bundles should not be profitable even when consumers are altruistic. In contrast, our experimental findings indicate that charity-linked bundles have the potential to increase firm profits when the amount the firm promises to donate is 5% of gross revenues or an equivalent fixed amount. When the amount donated is only 2% of gross revenues the effect on the WTP does not exceed the seller's additional cost of the donation. This counters our hypothesis that one possible reason for why charity-linked bundles may work is that people tend to overestimate the amount donated to charity, especially for small percentage donations. Instead, it seems that donations need to be of a certain size in order for buyers to experience affect for the bundle, i.e. "the sense (not necessarily conscious) that something is good or bad" (Slovic, 2007).

Our experiments leave a number of questions open for future research. First, whereas 5% or 0.43 ECU donations prove most effective in raising profits in our experimental setting, these numbers may be different for consumption goods whose base-price differs from the one considered in this experiment. It may be that for expensive items such as cars a percentage of 1% has the same effect on net profits as the 5% in our experiment. Second, we tested only a limited number of specifications. A percentage of 10% may outperform the Asym-5 treatment reported in this paper, although this is not very likely given the evidence in Elfenbein and McManus (2010). We believe that in particular treatments that leave buyers ambiguous about the fraction donated to charity deserve

to be studied. Ambiguity gives buyers the opportunity to adopt a overly optimistic view of the donation they make via the bundle. Previous studies have shown that such self-serving interpretations induced by ambiguity leads to less generous choices in dictator games Haisley and Weber (2010) which suggests that ambiguous schemes are less effective in raising WTP for the bundle than percentage schemes or absolute amounts.

To conclude, our experiments provide rather firm evidence that offering charity-linked bundles may be an effective strategic tool for firms to increase profits via an increase in the willingness-to-pay for the bundle that exceeds the donation. Our findings also show that this leads to considerable crowding out of private donations. Total donations to charity are higher in Asym-5 but this is mainly driven by higher average donations by subjects who buy from the computer-seller. At the same time, the question for the behavioral mechanism behind the effectiveness of particular schemes by and large remains unanswered. To answer that question, further research along the lines described above is needed.

References

Abrams, Eric, Martin Sefton, and Abdullah Yavas, "An Exerpimental comparison of two search models," *Economic Theory*, 2000, *16* (3), 735–749.

Andreoni, James, "Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving," *Economic Journal*, 1990, *100*, 464–477.

——— , "An Experimental Test of the Public-Goods Crowding-Out Hypothesis," *American Economic Review*, December 1993, *83* (5), 1317–1327.

Andreoni, James A., "Philanthropy," in Serge-Christophe Kolm L.-A. Gerard-Varet and Jean Mercier Ythier, eds., *Handbook of Giving, Reciprocity and Altruism*, Elsevier/North-Holland, 2006, chapter 18.

Andreoni, James and A. Abigail Payne, "Is crowding out due entirely to fundraising? Evidence from a panel of charities," *Journal of Public Economics*, 2011, *95* (5), 334–343.

Apesteguia, Jose, Martin Dufwenberg, and Reinhard Selten, "Blowing the whistle," *Economic Theory*, 2007, *143-166*, 143–166.

Barberis, Nicholas C., "Thirty Years of Prospect Theory in Economics: A Review and Assessment," *Journal of Economic Perspectives*, Winter 2013, *27* (1), 173–196.

Bartling, Bjorn, Roberto A. Weber, and Lan Yao, "Do Markets Erode Social Responsibility?," *The Quarterly Journal of Economics*, 2015, *130* (1), 219–266.

Bigoni, Maria, Sven-Olof Fridolfsson, Chloé Le Coq, and Giancarlo Spagnolo, "FINES, LENIENCY, and REWARDS in antitrust," *RAND journal of Economics*, Summer 2012, *43* (2), 368–390.

Boone, Jan, María Jose Larraín Aylwin, Wieland Müller, and Amrita Ray Chaudhuri, "Bertrand competition with asymmetric costs: Experimental evidence," *Economics Letters*, 2012, *117*, 134–137.

Bruttel, Lisa V., "Group dynamics in experimental studies - The Bertrand paradox revisited," *Journal of Economic Behavior & Organization*, 2009, *69*, 51–63.

Crumpler, Heidi and Philip J. Grossman, "An experimental test of warm glow giving," *Journal of Public Economics*, 2008, *92*, 1011–1021.

Davis, Douglas D. and Charles A. Holt, *Experimental Economics*, Princeton University Press, 1992.

Dubé, Jean-Pierre, Xueming Luo, and Zheng Fang, "Self-signaling and Prosocial Behavior: A Cause-Marketing Mobile Field Experiment," *NBER Working Paper Series (21475)*, 2015.

Dufwenberg, Martin and Uri Gneezy, "Price Competition and Market Concentration: An Experimental Study," *International Journal of Industrial Organization*, 2000, *18*, 7–22.

Elfenbein, Daniel W. and Brian McManus, "A greater price for a greater good? Evidence that consumers pay more for charity-linked products," *American Economic Journal: Economic Policy*, May 2010, *2* (2), 28–60.

___ , Ray Fisman, and Brian McManus, "Charity as a substitute for reputation: Evidence from an online marketplace," *Review of Economic Studies*, 2012, *79*, 1441–1468.

Falk, Armin and Nora Szech, "Morals and Markets," *Science*, 2013, *340*, 707–711.

Frackenpohl, Gerrit and Gert Pönitzsch, "Bundling Public with Private Goods," Available at SSRN: http://ssrn.com/abstract=1015507 2013.

Greene, Mark R., "Attitudes toward risk and a theory of insurance consumption," *The Journal of Insurance*, June 1963, *30* (2), 165–182.

Haisley, Emily C. and Roberto A. Weber, "Self-serving Interpretations of Ambiguity in Other-regarding Behavior," *Games and Economic Behavior*, 2010, *68*, 614–625.

Henrich, Joseph, Jean Ensminger, Richard McElreath, Abigail Barr, Clark Barrett, Alexander Bolyanatz, Juan Camilo Cardenas, Michael Gurven, Edwins Gwako, Natalie Henrich, Carolyn Lesorogol, Frank Marlowe, David Tracer, and John Ziker, "Markets, Religion, Community Size, and the Evolution of Fairness and Punishment," *Science*, 2010, *327*, 1480–1484.

Hinloopen, Jeroen and Adriaan R. Soetevent, "RAND Journal of Economics," *RAND Journal of Economics*, Summer 2008, *39* (2), 607–616.

Imas, Alex, "Working for the warm glow: On the benefits and limits of prosocial incentives," *Journal of Public Economics*, 2014, *114*, 14–18.

Kahneman, Daniel and Amos Tversky, "Prospect theory: An analysis of decision under risk," *Econometrica: Journal of the Econometric Society*, 1979, pp. 263–291.

Meyer, Harvey, "When the Cause is Just," *Journal of Business Strategy*, 1999, *20* (6), 27–31.

Ploner, Matteo and Tobias Regner, "Self-image and moral balancing: An experimental analysis," *Journal of Economic Behavior and Organization*, September 2013, *93*, 374–383.

Slovic, Paul, ""If I look at the mass I will never act": Psychic numbing and genocide," *Judgment and Decision Making*, April 2007, *2* (2), 79–95.

A Descriptive Statistics

Table A.1: **Descriptive market statistics** (in ECU).

		Price		Market Price		Profits	
		All	$p \geq MC$	All	$p \geq MC$	All	$p \geq MC$
Control	median	8.94	9.48	8.00	8.14	0.00	0.14
	mean	9.31 (1.39)	9.61 (1.27)	7.18 (2.72)	8.58 (0.84)	–0.06 (0.47)	0.58 (0.84)
	obs.	14	14	14	12	14	12
Asym-2	median	9.29	9.30	8.32	8.45	0.01	0.28
	mean	9.50 (1.50)	9.65 (1.42)	8.44 (0.57)	8.63 (0.42)	0.10 (0.20)	0.46 (0.41)
	obs.	15	15	12	10	15	10
Asym-5	median	9.67	10.40	9.32	9.49	0.29	1.02
	mean	9.57 (1.48)	10.46 (1.00)	8.43 (2.33)	9.82 (0.79)	–0.01 (1.21)	1.33 (0.75)
	obs.	12	12	12	8	12	8
Asym-Abs	median	9.84	9.84	9.24	10.03	0.00	1.60
	mean	9.90 (1.35)	10.14 (1.10)	9.29 (1.33)	9.87 (1.10)	0.27 (0.59)	1.44 (1.10)
	obs.	10	10	7	5	10	5

Notes. Cells give mean values (in ECU). Standard deviations are in parentheses. The unit of observation is the subject-seller. The columns labeled 'All' show mean value over all periods, the columns labeled '$p \geq MC$' only include the subset of periods in which the subject-seller set a price equal to or above marginal cost. 'Price' shows the mean price set by subject-sellers; 'Market price' refers to the average price conditional on the buyer buying from the subject-seller; 'Profits' shows the average profits net of the donation to charity; 'obs.' refers to the number of observations.

Table A.2: **Descriptive statistics donations** (in ECU).

		Total Donations		Bundle Donations		Private Donations	
		All	$TD > 0$	All	$BD > 0$	All	$PD > 0$
Control	median	0.28	1.23	–	–	0.28	1.23
	mean	0.69 (0.92)	1.53 (1.18)	–	–	0.69 (0.92)	1.53 (1.18)
	obs.	14	10			14	10
Asym-2	median	0.43	0.65	0.05	0.17	0.34	1.00
	mean	0.78 (0.88)	0.99 (1.06)	0.05 (0.05)	0.17 (0.01)	0.73 (0.88)	1.16 (1.05)
	obs.	15	13	15	12	15	14
Asym-5	median	1.27	1.33	0.14	0.47	1.16	1.54
	mean	1.50 (1.08)	1.72 (1.06)	0.16 (0.10)	0.42 (0.12)	1.35 (1.05)	1.87 (0.93)
	obs.	12	11	12	12	12	11
Asym-Abs	median	0.54	0.62	0.11	0.43	0.44	0.59
	mean	0.77 (0.71)	0.95 (0.69)	0.11 (0.10)	0.43 (0.00)	0.66 (0.65)	1.09 (0.99)
	obs.	10	9	10	7	10	9

Notes. Cells give mean values (in ECU). Standard deviations are in parentheses. The unit of observation is the buyer. The columns labeled 'All' show mean value over all periods, the columns labeled '$BD > 0$', '$PD > 0$' and '$TD > 0$' only include the subset of periods with positive donations of the category considered. 'Bundle Donations' shows the donations by sellers via the bundle. By design, no bundles are sold in Control. 'Private Donations' refers to the donations by buyers via a separate transaction. 'Total Donations' is the sum of donations via the bundle and private donations. By design, Control includes only private donations. '*obs.*' refers to the number of observations.

B Social norm formation

Figure B.1: **Histogram private donations conditional on NOT buying the bundle.**

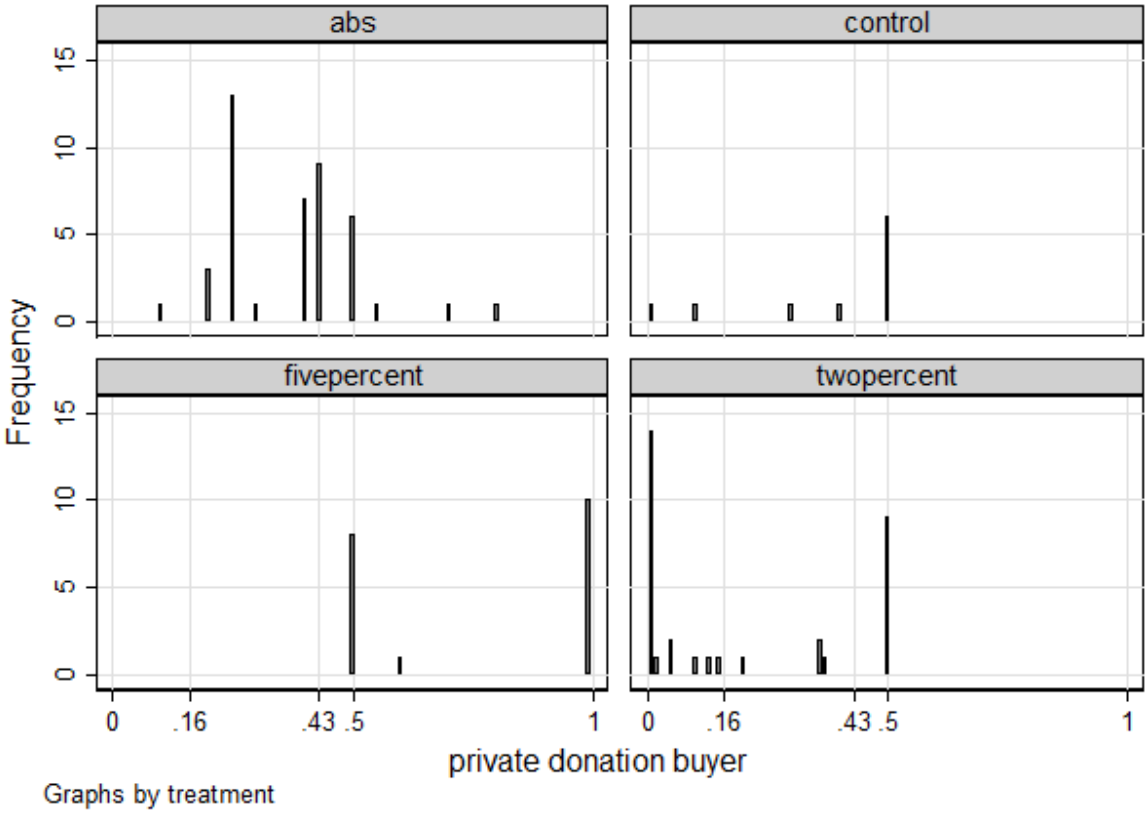
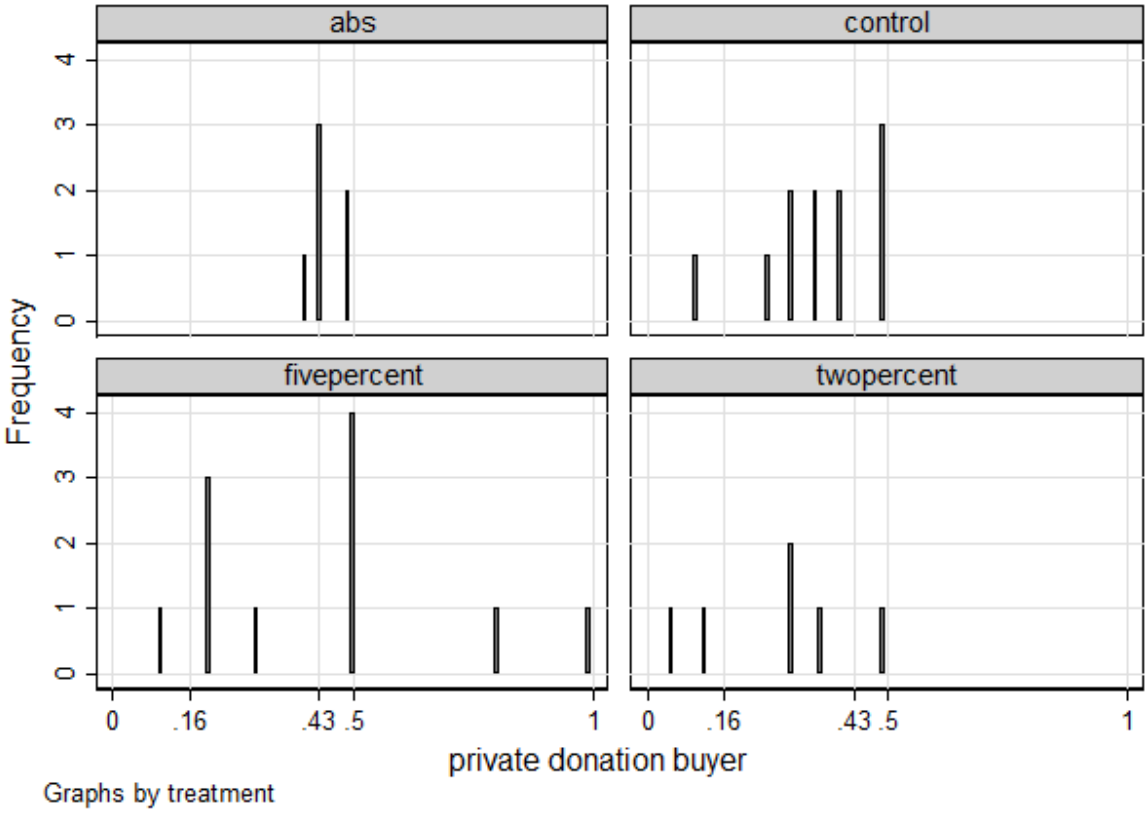


Figure B.2: **Histogram private donations conditional on buying the bundle.**



List of research reports

12001-HRM&OB: Veltrop, D.B., C.L.M. Hermes, T.J.B.M. Postma and J. de Haan, A Tale of Two Factions: Exploring the Relationship between Factional Faultlines and Conflict Management in Pension Fund Boards

12002-EEF: Angelini, V. and J.O. Mierau, Social and Economic Aspects of Childhood Health: Evidence from Western-Europe

12003-Other: Valkenhoef, G.H.M. van, T. Tervonen, E.O. de Brock and H. Hillege, Clinical trials information in drug development and regulation: existing systems and standards

12004-EEF: Toolsema, L.A. and M.A. Allers, Welfare financing: Grant allocation and efficiency

12005-EEF: Boonman, T.M., J.P.A.M. Jacobs and G.H. Kuper, The Global Financial Crisis and currency crises in Latin America

12006-EEF: Kuper, G.H. and E. Sterken, Participation and Performance at the London 2012 Olympics

12007-Other: Zhao, J., G.H.M. van Valkenhoef, E.O. de Brock and H. Hillege, ADDIS: an automated way to do network meta-analysis

12008-GEM: Hoorn, A.A.J. van, Individualism and the cultural roots of management practices

12009-EEF: Dungey, M., J.P.A.M. Jacobs, J. Tian and S. van Norden, On trend-cycle decomposition and data revision

12010-EEF: Jong-A-Pin, R., J-E. Sturm and J. de Haan, Using real-time data to test for political budget cycles

12011-EEF: Samarina, A., Monetary targeting and financial system characteristics: An empirical analysis

12012-EEF: Alessie, R., V. Angelini and P. van Santen, Pension wealth and household savings in Europe: Evidence from SHARELIFE

13001-EEF: Kuper, G.H. and M. Mulder, Cross-border infrastructure constraints, regulatory measures and economic integration of the Dutch – German gas market

13002-EEF: Klein Goldewijk, G.M. and J.P.A.M. Jacobs, The relation between stature and long bone length in the Roman Empire

13003-EEF: Mulder, M. and L. Schoonbeek, Decomposing changes in competition in the Dutch electricity market through the Residual Supply Index

13004-EEF: Kuper, G.H. and M. Mulder, Cross-border constraints, institutional changes and integration of the Dutch – German gas market

13005-EEF: Wiese, R., Do political or economic factors drive healthcare financing privatisations? Empirical evidence from OECD countries

13006-EEF: Elhorst, J.P., P. Heijnen, A. Samarina and J.P.A.M. Jacobs, State transfers at different moments in time: A spatial probit approach

13007-EEF: Mierau, J.O., The activity and lethality of militant groups: Ideology, capacity, and environment

13008-EEF: Dijkstra, P.T., M.A. Haan and M. Mulder, The effect of industry structure and yardstick design on strategic behavior with yardstick competition: an experimental study

13009-GEM: Hoorn, A.A.J. van, Values of financial services professionals and the global financial crisis as a crisis of ethics

13010-EEF: Boonman, T.M., Sovereign defaults, business cycles and economic growth in Latin America, 1870-2012

13011-EEF: He, X., J.P.A.M Jacobs, G.H. Kuper and J.E. Ligthart, On the impact of the global financial crisis on the euro area

13012-GEM: Hoorn, A.A.J. van, Generational shifts in managerial values and the coming of a global business culture

13013-EEF: Samarina, A. and J.E. Sturm, Factors leading to inflation targeting – The impact of adoption

13014-EEF: Allers, M.A. and E. Merkus, Soft budget constraint but no moral hazard? The Dutch local government bailout puzzle

13015-GEM: Hoorn, A.A.J. van, Trust and management: Explaining cross-national differences in work autonomy

13016-EEF: Boonman, T.M., J.P.A.M. Jacobs and G.H. Kuper, Sovereign debt crises in Latin America: A market pressure approach

13017-GEM: Oosterhaven, J., M.C. Bouwmeester and M. Nozaki, The impact of production and infrastructure shocks: A non-linear input-output programming approach, tested on an hypothetical economy

13018-EEF: Cavapozzi, D., W. Han and R. Miniaci, Alternative weighting structures for multidimensional poverty assessment

14001-OPERA: Germs, R. and N.D. van Foreest, Optimal control of production-inventory systems with constant and compound poisson demand

14002-EEF: Bao, T. and J. Duffy, Adaptive vs. eductive learning: Theory and evidence

14003-OPERA: Syntetos, A.A. and R.H. Teunter, On the calculation of safety stocks

14004-EEF: Bouwmeester, M.C., J. Oosterhaven and J.M. Rueda-Cantuche, Measuring the EU value added embodied in EU foreign exports by consolidating 27 national supply and use tables for 2000-2007

14005-OPERA: Prak, D.R.J., R.H. Teunter and J. Riezebos, Periodic review and continuous ordering

14006-EEF: Reijnders, L.S.M., The college gender gap reversal: Insights from a life-cycle perspective

14007-EEF: Reijnders, L.S.M., Child care subsidies with endogenous education and fertility

14008-EEF: Otter, P.W., J.P.A.M. Jacobs and A.H.J. den Reijer, A criterion for the number of factors in a data-rich environment

14009-EEF: Mierau, J.O. and E. Suari Andreu, Fiscal rules and government size in the European Union

14010-EEF: Dijkstra, P.T., M.A. Haan and M. Mulder, Industry structure and collusion with uniform yardstick competition: theory and experiments

14011-EEF: Huizingh, E. and M. Mulder, Effectiveness of regulatory interventions on firm behavior: a randomized field experiment with e-commerce firms

14012-GEM: Bressand, A., Proving the old spell wrong: New African hydrocarbon producers and the 'resource curse'

14013-EEF: Dijkstra P.T., Price leadership and unequal market sharing: Collusion in experimental markets

14014-EEF: Angelini, V., M. Bertoni, and L. Corazzini, Unpacking the determinants of life satisfaction: A survey experiment

14015-EEF: Heijdra, B.J., J.O. Mierau, and T. Trimborn, Stimulating annuity markets

14016-GEM: Bezemer, D., M. Grydaki, and L. Zhang, Is financial development bad for growth?

14017-EEF: De Cao, E. and C. Lutz, Sensitive survey questions: measuring attitudes regarding female circumcision through a list experiment

14018-EEF: De Cao, E., The height production function from birth to maturity

14019-EEF: Allers, M.A. and J.B. Geertsema, The effects of local government amalgamation on public spending and service levels. Evidence from 15 years of municipal boundary reform

14020-EEF: Kuper, G.H. and J.H. Veurink, Central bank independence and political pressure in the Greenspan era

14021-GEM: Samarina, A. and D. Bezemer, Do Capital Flows Change Domestic Credit Allocation?

14022-EEF: Soetevent, A.R. and L. Zhou, Loss Modification Incentives for Insurers Under ExpectedUtility and Loss Aversion

14023-EEF: Allers, M.A. and W. Vermeulen, Fiscal Equalization, Capitalization and the Flypaper Effect.

14024-GEM: Hoorn, A.A.J. van, Trust, Workplace Organization, and Comparative Economic Development.

14025-GEM: Bezemer, D., and L. Zhang, From Boom to Bust in de Credit Cycle: The Role of Mortgage Credit.

14026-GEM: Zhang, L., and D. Bezemer, How the Credit Cycle Affects Growth: The Role of Bank Balance Sheets.

14027-EEF: Bružikas, T., and A.R. Soetevent, Detailed Data and Changes in Market Structure: The Move to Unmanned Gasoline Service Stations.

14028-EEF: Bouwmeester, M.C., and B. Scholtens, Cross-border Spillovers from European Gas Infrastructure Investments.

14029-EEF: Lestano, and G.H. Kuper, Correlation Dynamics in East Asian Financial Markets.

14030-GEM: Bezemer, D.J., and M. Grydaki, Nonfinancial Sectors Debt and the U.S. Great Moderation.

14031-EEF: Hermes, N., and R. Lensink, Financial Liberalization and Capital Flight: Evidence from the African Continent.

14032-OPERA: Blok, C. de, A. Seepma, I. Roukema, D.P. van Donk, B. Keulen, and R. Otte, Digitalisering in Strafrechtketens: Ervaringen in Denemarken, Engeland, Oostenrijk en Estland vanuit een Supply Chain Perspectief.

14033-OPERA: Olde Keizer, M.C.A., and R.H. Teunter, Opportunistic condition-based maintenance and aperiodic inspections for a two-unit series system.

14034-EEF: Kuper, G.H., G. Sierksma, and F.C.R. Spieksma, Using Tennis Rankings to Predict Performance in Upcoming Tournaments

15001-EEF: Bao, T., X. Tian, X. Yu, Dictator Game with Indivisibility of Money

15002-GEM: Chen, Q., E. Dietzenbacher, and B. Los, The Effects of Ageing and Urbanization on China's Future Population and Labor Force

15003-EEF: Allers, M., B. van Ommeren, and B. Geertsema, Does intermunicipal cooperation create inefficiency? A comparison of interest rates paid by intermunicipal organizations, amalgamated municipalities and not recently amalgamated municipalities

15004-EEF: Dijkstra, P.T., M.A. Haan, and M. Mulder, Design of Yardstick Competition and Consumer Prices: Experimental Evidence

15005-EEF: Dijkstra, P.T., Price Leadership and Unequal Market Sharing: Collusion in Experimental Markets

15006-EEF: Anufriev, M., T. Bao, A. Sutin, and J. Tuinstra, Fee Structure, Return Chasing and Mutual Fund Choice: An Experiment

15007-EEF: Lamers, M., Depositor Discipline and Bank Failures in Local Markets During the Financial Crisis

15008-EEF: Oosterhaven, J., On de Doubtful Usability of the Inoperability IO Model

15009-GEM: Zhang, L. and D. Bezemer, A Global House of Debt Effect? Mortgages and Post-Crisis Recessions in Fifty Economies

15010-I&O: Hooghiemstra, R., N. Hermes, L. Oxelheim, and T. Randøy, The Impact of Board Internationalization on Earnings Management

15011-EEF: Haan, M.A., and W.H. Siekman, Winning Back the Unfaithful while Exploiting the Loyal: Retention Offers and Heterogeneous Switching Costs

15012-EEF: Haan, M.A., J.L. Moraga-González, and V. Petrikaite, Price and Match-Value Advertising with Directed Consumer Search

15013-EEF: Wiese, R., and S. Eriksen, Do Healthcare Financing Privatisations Curb Total Healthcare Expenditures? Evidence from OECD Countries

15014-EEF: Siekman, W.H., Directed Consumer Search

15015-GEM: Hoorn, A.A.J. van, Organizational Culture in the Financial Sector: Evidence from a Cross-Industry Analysis of Employee Personal Values and Career Success

15016-EEF: Te Bao, and C. Hommes, When Speculators Meet Constructors: Positive and Negative Feedback in Experimental Housing Markets

15017-EEF: Te Bao, and Xiaohua Yu, Memory and Discounting: Theory and Evidence

15018-EEF: Suari-Andreu, E., The Effect of House Price Changes on Household Saving Behaviour: A Theoretical and Empirical Study of the Dutch Case

15019-EEF: Bijlsma, M., J. Boone, and G. Zwart, Community Rating in Health Insurance: Trade-off between Coverage and Selection

15020-EEF: Mulder, M., and B. Scholtens, A Plant-level Analysis of the Spill-over Effects of the German *Energiewende*

15021-GEM: Samarina, A., L. Zhang, and D. Bezemer, Mortgages and Credit Cycle Divergence in Eurozone Economies

16001-GEM: Hoorn, A. van, How Are Migrant Employees Manages? An Integrated Analysis

16002-EEF: Soetevent, A.R., Te Bao, A.L. Schippers, A Commercial Gift for Charity

www.rug.nl/feb