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Bundling Public with Private Goods[*]

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Abstract

We propose a simple mechanism that might improve voluntary contributions to public goods. Using a laboratory experiment we analyze how bundling public with private goods affects individuals' valuations for both goods. In the experiment, subjects may purchase a private and a public good either separately or in the form of a bundle. The data show superadditivity for bundles of public and private goods, i.e., the willingness to pay for the bundle exceeds the willingness to pay for the two separate goods. In contrast, we find no superadditivity in control treatments with only private goods. We discuss several behavioral concepts which are in line with our results as well as implications for fundraisers and firms.

Keywords: Public Goods, Bundling, Valuation, Superadditivity

JEL-Classification: C91, D12, H41

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1 Introduction

Public goods, such as clean air, education, and culture, constitute an important ingredient of social welfare. Their provision by regional authorities is, however, often hindered by asymmetric information with respect to the valuation of the public goods. Charities evolved to fill this breach but typically have problems raising funds. Therefore, increasing the voluntary provision of public goods remains a crucial task.

This paper introduces a new mechanism that may increase private contributions to public goods. More precisely, we show in this paper that bundling a public good with a private good induces superadditivity. That means, offering a private good and a public good as a bundle, i.e., as a single product, may increase consumers' willingness to pay (WTP) for the combination of both goods relative to the case in which they are offered separately. An illustrative example for such a bundle is a carbon neutral flight, as it combines a flight, a private good, with a carbon offset, which constitutes a contribution to the public good of climate change mitigation.[1] Other examples in which a private good is bundled with a public good or, equivalently, features public good characteristics, include ecotourism, sustainably fished seafood, or green electricity.

Standard consumer theory assumes that bundling two goods does not affect consumers' valuations for the bundle's parts (e.g., Adams & Yellen 1976, Jehiel et al. 2007, Armstrong & Vickers 2010). However, several behavioral concepts suggest that a decision maker may exhibit a different valuation for two goods if they are bundled. For example, the presentation of two goods as a bundle can decrease the salience of the bundled goods and lead to lower valuations for the combination of both goods (e.g., Rottenstreich & Tversky 1997, Bernasconi et al. 2009). Bundling may also affect the way in which consumers aggregate information about the bundled goods' attributes and therefore influence their valuations (Tversky & Kahneman 1974, Anderson 1981).

The literature on the evaluation of bundles has so far focused exclusively on bundles of either only private or only public goods. The key contribution of our paper is to show, based on different behavioral concepts and experimental data, that bundles of public and

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[1]Since contributions to public goods fulfill the defining characteristics of a public good (i.e., non-excludability and non-rivalry), we use the terms "contribution to a public good" and "public good" interchangeably.

private goods are special in the way they are evaluated. More precisely, we argue that a consumer's evaluation of such a bundle, which we call *hybrid bundle*,[2] is subject to specific behavioral channels that are absent for bundles of only private or only public goods.

An example are spillovers from one good to another. It is well established that cues like the brand name can affect the perception of a good's quality (see the review of Lee et al. 2006). However, also items bundled to a good may either directly hint at the value of the good (Popkowski Leszczyc et al. 2008) or reveal information about the selling firm's trustworthiness in providing good quality and caring about customer needs (Siegel & Vitaliano 2007). Since public goods are positively connoted, in a hybrid bundle they are likely to induce positive inferences about the associated private good. For example, many people conjecture that fair trade food is organic, although the label "fair trade" only guarantees compliance with requirements on working conditions and employee remuneration. Consumers have also been shown to like the taste of a milk shake better if it is labelled as organic (Linder 2011).

Also consumers' desire for a positive self-image (e.g., Brekke et al. 2003, Bénabou & Tirole 2006) can affect their valuations. If a public good is bundled with a durable private good, the use of the latter can remind the consumer of the good deed she performed. The warm glow stemming from the good deed (Andreoni 1989, 1990) can in this way be extended to the duration of use of the private good. A sophisticated consumer anticipates the additional future utility that the hybrid bundle generates and thus exhibits a higher WTP for the bundle. More concretely, a driver of a hybrid car may experience warm glow whenever using the car. The purchase of a carbon offset, in contrast, does not feature the advantage of continuously reminding the consumer of her character.

These and other channels that we discuss in this paper predict that bundling public and private goods increases the valuation for the combination of the two goods. Nonetheless, it remains an empirical question whether hybrid bundling affects consumer valuations strongly enough to be of economic relevance. Since clean data that allow for a test of superadditivity in hybrid bundles can hardly be obtained in the field, we investigate this

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[2]Other research suggested the term "impure public good" for a combination of public and private goods. However, this term is also used for goods that exhibit either excludability or rivalry in consumption. To avoid confusion, we instead use the term "hybrid bundle" to capture that a pure public good, whose consumption is non-excludable and non-rival, is combined with a private good, whose consumption is excludable and rival.

question in the controlled environment of a laboratory experiment.

In a between-subjects design, we analyze the effect of hybrid bundling on individuals' valuations. In the spirit of the method introduced by Becker, DeGroot & Marschak (1964), subjects receive an endowment and make a series of purchase decisions in which they face different prices for the two goods. At the end of the experiment one of the choice situations is randomly drawn to be payoff relevant. From subjects' choices we obtain their willingness to pay (WTP) for the offered goods. In the SEPARATE treatment, both a private good (a cup) and a public good (a €2 donation to charity) can be purchased *separately*, while in the BUNDLE treatment the public good is only available in the form of a *bundle* with the private good. Two control treatments, in which the public good is replaced by a private good (a €2 voucher for an online store), further examine whether the effect of bundling on subjects' WTP depends on the nature (public vs. private) of the bundled goods.

We find that subjects exhibit a significantly higher valuation for the hybrid bundle than for the combination of both goods when sold separately. Individuals' WTP for the hybrid bundle, on average, exceeds that for the separately offered goods by more than 60%, revealing a strong superadditivity evoked by hybrid bundling. Moreover, we do not observe superadditivity when bundling two private goods. Thus, the nature of the bundled goods seems to play a decisive role for the effect of bundling on valuations.

The strong increase in the WTP documented in our experiment suggests sizeable economic effects of hybrid bundling. In particular, our data indicate that bundling can help to increase the provision of public goods. Some charities already use private goods to encourage donations. For example, the World Wide Fund for Nature (WWF) promotes animal adoptions with an "adoption kit" that contains a stuffed animal. Similarly, the Lance Armstrong Foundation uses the profits from the sale of Livestrong apparel in the fight against cancer.

Our results also provide a potential explanation for the recent increase in Corporate Social Responsibility (CSR)[3] measures, since companies linking social activities to the sales of their products effectively offer hybrid bundles. For example, the Danone group

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[3]The European Commission defines CSR as a "concept whereby companies integrate social and environmental concerns in their business operations [...] on a voluntary basis" (Commission of the European Communities 2001).

promised to provide 10 liters of drinking water in African countries for each liter of Volvic mineral water sold. Similarly, IKEA ties a \$1 donation to purchases of child related products in its annual Christmas campaigns. Our data suggest that firms may benefit from CSR because it induces a different perception and use of their products, allowing firms to pass on the costs of the public good and to still increase sales.[4]

The superadditivity in the evaluation of hybrid bundles, conceptualized and empirically documented in this paper, is a useful building block for the explanation of these phenomena. It is worth noting that, in principle, all market participants may gain from hybrid bundling and the resulting superadditivity. How consumers' augmented valuation is split up between consumers on the one hand and firms and the social cause on the other hand is ultimately determined by the market structure.

The rest of this paper is organized as follows: In Section 2, we describe the design of our experiment. The main behavioral predictions are derived in Section 3. Section 4 reports the results of our experiment. Further channels that may affect consumers' valuation for a hybrid bundle in the field are discussed in Section 5. The paper concludes with a discussion of our findings and suggestions for future research in Section 6.

2 Design

Central to our experiment is the comparison of subjects' willingness to pay for a public and a private good when both goods are sold either as a bundle or separately. We elicit subjects' WTPs by offering the goods at varying prices and observing subjects' purchase decisions. To control for effects of bundling that are independent of the type of the bundled goods, we perform the same analysis also with two private goods.

In this section, we first present the goods used in the experiment and sketch the basic structure of the conducted treatments. Subsequently we discuss the treatments and the elicitation of subjects' WTPs in more detail. We conclude this section with a description of the experimental procedures.

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[4]Other explanations of firms' engagement in public good provision rely on complementarity between private and non-marketed public goods (Heal 2003) as well as on firms' altruism and their desire to avoid pressure from interest groups (Baron 2001).

2.1 Goods

In the main condition (PUBLIC), subjects are offered a private and a public good. We use a cup as the private good because the benefits of possessing the cup mainly accrue to the cup holder. As the public good, we use a donation of €2 to a nationally renowned charity providing help for children in need. The services provided by the charity, such as improved health care and education, generate non-excludable and non-rival benefits to the society and thus fulfill the characteristics of a public good.[5] Upon purchase of the donation, the experimenters donate €2 to the charity, while subjects pay the respective purchase price. Thus, the objective value of the public good is fixed, while its price can be altered.

In the control condition (PRIVATE), we consider bundling of two private goods. As the first private good we use the same cup as in the PUBLIC condition. The second private good is a voucher for an online store denominated at €2. This choice of goods keeps the level and the salience of the goods' objective values constant across conditions.

2.2 Treatments

The experiment consists of two conditions, PUBLIC and PRIVATE, that differ in the available goods. In each condition, two treatments capture the effect of bundling in a between-subjects design. While the two goods are available separately in the SEPARATE treatments, the donation or voucher is bundled with the cup in the BUNDLE treatments. For an increased comparability between treatments, the cup is available as a distinct product in the BUNDLE treatment as well. The resulting 2x2 design is depicted in Table 1.

Table 1: Treatments

Treatment	1st good on offer	2nd good on offer	Observations[6]
PUBLIC-SEPARATE	cup	donation	44
PUBLIC-BUNDLE	cup	cup with donation	32
PRIVATE-SEPARATE	cup	voucher	37
PRIVATE-BUNDLE	cup	cup with voucher	42

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[5]The notion that services provided by charities constitute public goods is also applied in, e.g., Andreoni (1990), Glazer & Konrad (1996), and Elfenbein et al. (2012).

[6]The sample is unbalanced because of no-shows and subjects that failed to answer the post-experimental control questions correctly (see Section 2.4 and Appendix A.2).

2.3 Elicitation of WTPs

For each condition, our aim is to compare participants' willingness to pay for the combination of two goods between the SEPARATE and the BUNDLE treatment. The standard approach for an incentive compatible elicitation of a WTP goes back to Becker, DeGroot & Marschak (1964). We adapt this method so that it can determine individual valuations for two goods at a time.[7] Participants receive an endowment of €10 and make purchase decisions in various choice situations, all featuring different prices for the two goods on offer. At the end of the experiment, one of these situations is randomly drawn to determine a subject's payment. The respective purchase decision is then implemented, i.e., the subject receives the purchased goods if she intended to buy any, and the corresponding prices are deducted from her endowment.

In the following we describe the purchase options in the SEPARATE and the BUNDLE treatment in more detail. For simplicity, we focus on the PUBLIC condition, but all explanations hold analogously for the PRIVATE condition. As the choice situation in Table 2 illustrates, the SEPARATE treatment replicates the standard environment that consumers generally face: a private and a public good are available separately, and the consumer can decide for each good whether she wants to buy it or not. Hence, in every choice situation a subject has four options: a) buying nothing, b) buying the private and the public good, c) buying only the private good, or d) buying only the public good.

Table 2: PUBLIC-SEPARATE treatment

situation	cup	donation
nr. 19	price: €0.50 O buy O don't buy	price: €1 O buy O don't buy

In the BUNDLE treatment the public good is offered in a bundle with the private good. In addition, to increase the comparability with the SEPARATE treatment, the private good can also be purchased on its own. Thus, as the choice situation in Table 3 illustrates, subjects in the BUNDLE treatment choose between a) buying nothing, b) buying the

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[7]For a detailed explanation of the restrictions of the standard BDM method in our setting see the end of this section.

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bundle of the private and the public good, and c) buying only the private good. Also this setting is familiar to subjects since they often choose between similar products, of which one has the additional feature of ensuring contributions to a public good.

Table 3: PUBLIC-BUNDLE treatment

situation	cup	cup with donation	nothing
nr. 19	price: €0.50 O buy	price: €1.50 O buy	O buy nothing

Our design allows to elicit valuations for the combination of both goods, for the cup, and for the donation. To elicit these valuations, all choice situations differ with respect to the prices of the offered goods. More precisely, the price of the cup varies in steps of €0.50 between €0 and €3.50, whereas the price of the donation varies in steps of €0.20 between €0 and €2.40. Every possible combination of cup and donation price constitutes one choice situation, yielding a total of 104 situations. The price intervals cover a broad range of possible valuations, but keep the number of required decisions manageable. The choice situations are ordered lexicographically, first with respect to the cup price and second with respect to the donation price. In the BUNDLE treatment, the price of the bundle equals the sum of the cup and the donation price.[8]

From subjects' decisions we derive measures for their valuation for the different goods. In both treatments we use the highest total price at which a subject acquired both goods (i.e., chose option b) as a measure of her WTP for both goods. Likewise, we obtain a measure of the WTP for the cup from the highest cup price at which a subject bought the cup *exclusively* (i.e., chose option c).[9] As a consistent measure of the valuation for the donation, we use the highest premium subjects tolerate to obtain the donation in addition to the cup. Table 4 again summarizes these different measures and their elicitation.

To test for superadditivity induced by hybrid bundling, we compare subjects' WTP

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[8]Instructions and screenshots can be found in Appendix A.2 and A.3.

[9]In some cases, subjects in the BUNDLE treatment always preferred a purchase of the bundle to a purchase of the cup alone. Then, we cannot determine the WTP for the cup and set it to zero. The measure of the WTP for the cup is thus likely to be biased downward in the BUNDLE treatment. However, this does not change our findings qualitatively.

[10]All measures are obtained analogously in the PRIVATE condition.

Table 4: Elicitation of valuations in the Public condition[10]

Measure	Separate	Bundle
WTP for the cup *and* the donation	highest total price at which both goods are bought (option b)	highest price at which the bundle is bought (option b)
WTP for the cup	highest price of the cup at which it is bought exclusively (option c)	
premium for the donation at a given cup price	highest price of the donation at which it is bought along with the cup (option b)	highest surcharge accepted to obtain the bundle instead of the cup alone (option b)

for the *combination of both goods* between the Separate and the Bundle treatment. This way, our results are not influenced by complementarity or substitutability between the goods. The valuation for the single goods may provide additional insights into the driving forces behind potential valuation differences.

Having outlined the design of our experiment, we would like to point out some noteworthy aspects of our novel approach of eliciting the WTP for two goods at a time. First of all, it incorporates the most important features of the Becker-DeGroot-Marschak (BDM) method (1964) for the elicitation of WTPs, as for example the random draw of the final price. For our purposes, however, the standard BDM method cannot be applied separately to measure the WTP for two goods. This would require the random draw of two prices, which leaves two options for the timing of their revelation. On the one hand, revealing the drawn prices only *after* choices for both goods have been made leaves the subject uninformed about whether she obtained the first good when deciding about the purchase of the second good. In this case, not only the uncertainty about the remaining endowment but also substitutability or complementarity between the goods could bias the obtained WTPs. On the other hand, revealing the price draw for the first good *before* eliciting the WTP for the second good may render the WTP for the second good uncomparable between subjects. The reason is that, after the price draw for the first good, subjects' remaining endowments for the acquisition of the second good are likely not identical. To overcome this problem, we adapt the standard BDM procedure by using *price combinations* for both goods from which one combination is drawn at the end of the experiment to become payoff relevant.

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2.4 Procedure of the Experiment

The experiments were conducted in 2011 in the BonnEconLab, using the experiment software BoXS (Seithe 2012). We recruited a total of 182 subjects for the experiment using ORSEE (Greiner 2004). The subject pool consisted of about 6300 subjects, most of them undergraduate students of all majors from the University of Bonn.[11] Upon arrival, subjects were randomly assigned to private cubicles. The instructions were read aloud, whereas questions were answered in private.

Before subjects received a detailed explanation of the goods they could purchase in the experiment, they had to correctly answer control questions relating to the modified BDM procedure. We also checked whether subjects understood the payoff consequences of choosing the donation or the voucher. However, performing this test before the experiment would have risked that subjects anchored their WTP at the objective value of these goods. This test was thus performed only at the end of the experiment with a second set of six control questions (see Appendix A.2). Since we are only interested in analyzing the behavior of subjects who understood the fundamentals of the experiment, participants that made more than three mistakes in answering these questions or were unable to provide the correct anwers in a maximum of three trials are excluded from the analysis.[12] Nevertheless, including them yields qualitatively similar results at the 10% significance level.

The number of observations in each treatment is reported in Table 1. Each session of the experiment lasted no more than one hour. Subjects received average earnings of €10.77[13], which include their remaining endowment after the implementation of the randomly drawn choice situation as well as the retail price of the acquired goods.

3 Behavioral Predictions

According to standard economic theory, a consumer's willingness to pay for a combination of two goods should stay unaffected by whether she can buy the goods separately or as a

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[11]Participants in the experiment were on average 24.0 years old, 41.2% of them were females. Subjects' sociodemographic variables are summarized in Table 6 in Appendix A.1.

[12]Based on this criterion, a total of 27 subjects had to be excluded from the analysis, corresponding to 14.8% of all participants.

[13]At the time of the experiment, 1 Euro was worth approximately 1.36 US Dollar.

bundle. After all, bundling does not alter the goods' inherent characteristics. This holds irrespectively of whether the goods are complements or substitutes.[14] Although complementarity or substitutability between goods can alter the valuation for the combination of the goods, this valuation should not be influenced by bundling.

However, there is reason to expect that hybrid bundling induces valuations that are not additive but *super*additive. The channels we propose in this paper suggest that hybrid bundling results in a higher WTP for the combination of the private and the public good than if both goods were offered separately. Our design focuses on two channels, which we discuss below. Additional behavioral channels that may be present in the field are discussed in Section 5.

First, consumers with image concerns may use hybrid bundles to *signal social preferences*. Depending on the observability of the purchase and the consumption of the hybrid bundle, this signaling can be directed both to others (e.g., Bénabou & Tirole 2006, Ariely et al. 2009) and to oneself (e.g., Brekke et al. 2003, Bénabou & Tirole 2006). Evidently, driving a hybrid car allows for more signaling than driving a conventional car and purchasing the corresponding carbon offset. The same is true for yoghurt bundled with a donation. Its purchase in the supermarket signals social preferences both to oneself and to other customers, while arranging the same donation in private only allows for self-signaling.

The signaling of favorable personality traits ought to have a particularly strong influence on the evaluation of a hybrid bundle if the private good component is durable. In this case, the use of the hybrid bundle can *extend the warm glow* that is generated by the public good component (see Andreoni 1989, 1990 for the concept of warm glow). We expect a prolongation of warm glow based on consumers' limited attention and imperfect recall. Whenever the consumer uses the private good, an association with the good deed is triggered. This yields a lasting improvement of both the consumers' public image and her self-image. To illustrate this point, think of a consumer donating to a charity. If this donation is bundled with a wristband, wearing the wristband allows to easily recall and signal favorable personality traits. In the same vein, we expect subjects to experience an

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[14]For an account of affect-based complementarity between public and private goods, see Strahilevitz & Myers (1998).

extended warm glow from self-signaling when they use the hybrid bundle from our experiment. A decision maker who anticipates this additional utility will therefore display a higher WTP for the bundle.

Second, bundling a public good with a private good may induce *spillovers on the perception of the private good.* For bundles of private goods, Popkowski Leszczyc et al. (2008) have already documented such spillovers between goods. They show that a consumer who is uncertain about the value of a bundle tends to infer its value from a component she is certain about. However, such spillovers need not be restricted to value inferences, but may extend to other attributes of different salience. Early work on the assessment of subordinates has shown, for example, that the rating of salient physical qualities affects the rating of intellectual qualities (Thorndike 1920). Recent work on the rating of goods has identified similar interdependencies. For example, an organic label can affect the liking of the taste of a milk shake (Linder 2011). Hybrid bundling may induce similar effects. In particular, public goods could trigger positive connotations in the consumer that affect the rating of the attached private good.

It has also been suggested that consumers draw inferences about firms when their trustworthiness in providing quality is unobservable. For example, Siegel & Vitaliano (2007) hypothesize that consumers use CSR activity to infer attributes of a firm's products as well as its honesty and reliability. In support of this hypothesis, they find for U.S. data that companies are more likely to engage in CSR the harder it is for consumers to evaluate their products before purchase. Likewise, Elfenbein et al. (2012) show that directing a certain percentage of auction proceeds to charity serves as a substitute for reputation in online auctions. With respect to our experiment, we conjecture that the public good conveys positive connotations to the cup if both are sold as a hybrid bundle.

Since both the signaling and the spillover channel can only be active in the PUBLIC condition but not in the PRIVATE condition, we obtain the following hypothesis.

Hypothesis. *The willingness to pay for the combination of both goods is higher in the* PUBLIC-BUNDLE *treatment than in the* PUBLIC-SEPARATE *treatment. There is no increase in the valuation for both goods from the* PRIVATE-SEPARATE *to the* PRIVATE-BUNDLE *treatment.*

While both outlined channels should increase the WTP for the combination of the goods in the PUBLIC condition, each channel affects the valuations of the individual goods differently. More precisely, in the presence of spillovers, the perception of the cup is altered and its WTP should increase. In contrast, the channel of signaling should leave the WTP for the cup unchanged but increase the premium for the public good.

4   Results

We start this section by analyzing subjects' purchase decisions for a private and a public good which are either offered in the form of a bundle or separately. To ascertain that the described behavior is specific to the type of the bundled goods, we subsequently contrast the results for hybrid bundles to those for bundles of two private goods. The main focus of our analysis lies on the willingness to pay for *both* goods, which is the highest sum of prices at which both goods are bought, i.e., option b) is chosen.

In line with our initial hypothesis, offering the public and the private good as a hybrid bundle indeed increases subjects' WTP for the combination of both goods. Not only the effect itself but also its size is striking: the average WTP for both goods increases from €1.54 in the SEPARATE treatment to €2.48 in the BUNDLE treatment (Wilcoxon rank-sum test, $p = 0.008$)[15]. This corresponds to an increase of more than 60%. The boxplot in Figure 1 depicts the distribution of the willingness to pay for both goods. It reveals that the observed superadditivity is not only driven by a minority of subjects but rather constitutes a general behavioral pattern. In particular, the median WTP in the BUNDLE treatment exceeds the upper quartile of the WTP in the SEPARATE treatment.[16] Merely being offered a private and a public good in a bundle instead of separately hence

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[15]Unless specified otherwise, all tests reported in this paper are two-sided.

[16]The median of a distribution is depicted by the vertical line in the box, whereas the limits of the box indicate the upper and the lower quartile.

considerably alters individuals' valuations. The size of the effect suggests that bundling public and private goods entails significant consequences for market demand.

Figure 1: Willingness to pay for both goods, PUBLIC condition
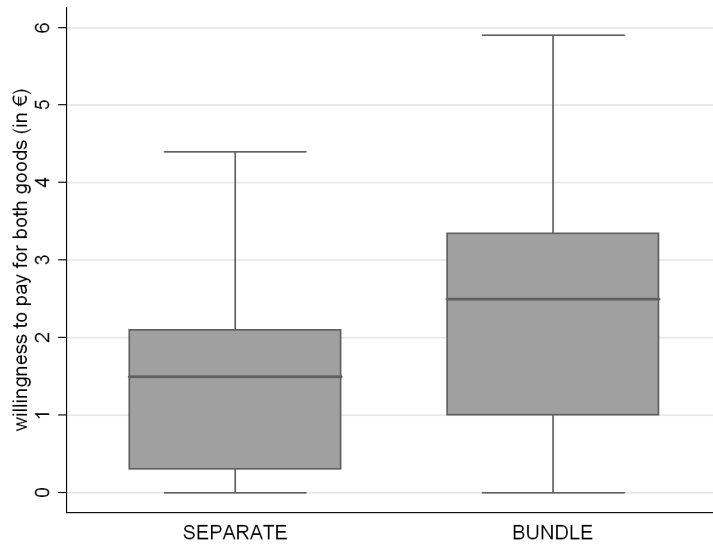

Having established that hybrid bundling induces superadditivity, it is further instructive to analyze the WTP for the private good when it is bought exclusively. The average WTP increases from €0.67 in the SEPARATE treatment to €1.39 in the BUNDLE treatment (Wilcoxon rank-sum test, $p = 0.010$), which corresponds to an important share of the increase in the WTP for the combination of both goods. Thus, the presence of the hybrid bundle not only changes the price that subjects are willing to pay for both goods, but also seems to alter the perception of the cup itself. This suggests that spillovers constitute a relevant channel for the observed superadditivity.

When inspecting subjects' valuation for the public good, we have to keep in mind that, in the BUNDLE treatment, the donation can only be ensured if the cup is bought, i.e., by choosing option b). For a comparable assessment of subjects' valuations across treatments, we may hence only focus on situations in which subjects buy the cup. For these situations, we compare the *premia* that participants are willing to pay for the donation at a specific cup price. A premium corresponds to the maximum additional price that is paid on top of the cup price to ensure the donation. At this donation price a subject still buys both goods (option b), whereas she no longer does so at higher donation prices (option a, c, or d). We restrict the analysis to cup prices of up to €2. Only two subjects in the PUBLIC-SEPARATE treatment exhibit a higher valuation for the cup, rendering choices for cup

prices above €2 uncomparable across treatments. Note that this focus imposes no major restrictions since the retail price of the cup of €1.65 is contained in the analyzed price range. We are left with a total of 65 choice situations and a minimum of six observations for every cup price in each treatment.

Figure 2: Mean premia paid for the donation or the voucher, given cup purchase

The x-axis clusters choice situations by cup prices (in €).
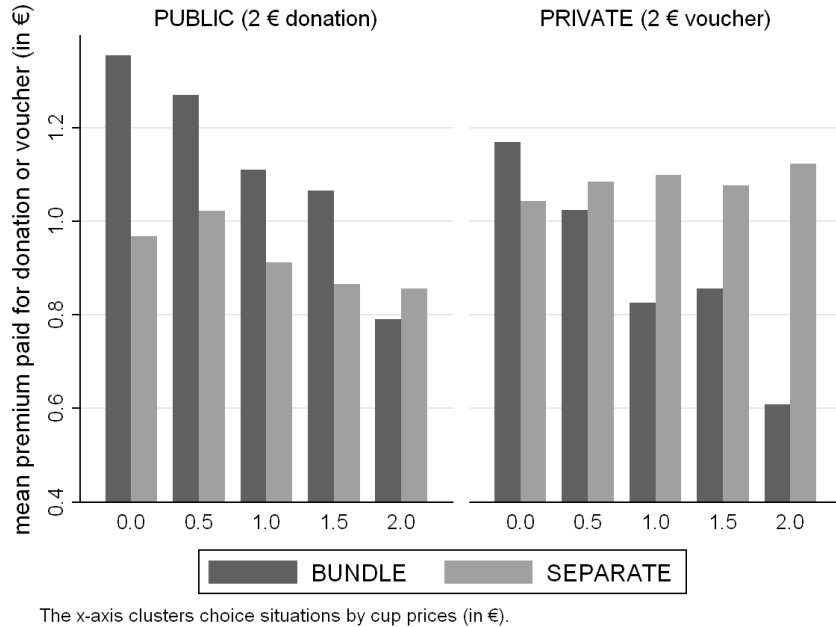
The left-hand part of Figure 2 depicts the premia that subjects pay for the donation in the SEPARATE and the BUNDLE treatment.[17] For a cup price of €0, subjects on average pay more to obtain the donation in addition to the cup if both goods are offered in a bundle (Wilcoxon rank-sum test, $p = 0.078$). Furthermore, the mean premium for the public good gradually decreases with higher cup prices in the BUNDLE treatment (Spearman's rank correlation test, $p = 0.032$), while it is more invariant in the SEPARATE treatment (Spearman's rank correlation test, $p = 0.663$). This suggests that subjects evaluate the cup and the donation independently if and only if both goods are offered separately. Given this pattern, the mean premium for the donation is no longer significantly different between treatments for strictly positive cup prices (Wilcoxon rank-sum test for each cup price, $p > 0.370$). The described pattern also stands out in a random-effects interval regression (reported in Appendix A.1), a random-effects tobit regression, and a simple OLS regression.

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[17]Note that higher cup prices make purchases of the cup less likely, resulting in a decreasing number of observations along the categorical axis.

An alternative measure of a subject's valuation for the public good is the *relative frequency* of public good purchases, i.e., the percentage of choice situations in which the subject buys the donation. In contrast to the premium, this measure has the advantage of including all observations. In particular, it also contains subjects' choices in which they do not buy the cup. A caveat of this measure, however, is that it is biased towards higher purchases of the donation in the SEPARATE treatment. The reason is that acquiring the donation in the BUNDLE treatment requires to also buy the cup and is therefore weakly more expensive than in the SEPARATE treatment. The left column of Table 5 provides data on the fraction of situations in which the donation is bought.[18] Subjects in the SEPARATE treatment buy the donation in 41.8% of the choice situations, whereas subjects in the BUNDLE treatment buy the donation in 42.6% of the situations. Hence, bundling the donation with the cup does not lead to less purchases of the donation (Wilcoxon rank-sum test, $p = 0.466$, one-sided). This is particularly striking since donation purchases in the BUNDLE treatment require the joint purchase of the cup. In total, the data suggest that offering the donation in the bundle also increases subjects' valuation for the donation. This hints at self-signaling as a further relevant channel for the emergence of superadditivity in hybrid bundles.

Table 5: Relative purchase frequencies of the donation or the voucher

Treatment	PUBLIC	PRIVATE
SEPARATE	41.8%	44.1%
BUNDLE	42.6%	30.4%

We now turn to the PRIVATE control condition in which the donation is replaced by a voucher. Conducting the same analysis as above reveals considerable differences to the PUBLIC condition. In the PUBLIC condition, we found a substantial increase in the willingness to pay for the combination of a private and a public good if both are bundled. In the PRIVATE condition, however, this effect is not present. Subjects' WTP for the combination of the cup and the voucher does not significantly differ between the SEPARATE and the BUNDLE treatment. On average, participants pay up to €2.15 when

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[18]In accordance with the analysis above, we again include choice situations with cup prices up to €2.

facing the two private goods separately and up to €2.20 for the bundle of both goods (Wilcoxon rank-sum test, $p = 0.953$).

We also find that the WTP for the basic private good, i.e., the cup, is not affected when it is bundled with another private good. Subjects' average WTP for the cup amounts to €1.20 in the SEPARATE treatment, whereas it is €1.26 in the BUNDLE treatment (Wilcoxon rank-sum test, $p = 0.972$). At the same time, the right-hand part of Figure 2 reveals that, contrary to the case of an attached public good, subjects' valuation for the voucher is not augmented if it is offered in a bundle with the cup. The premia are comparable between the BUNDLE and the SEPARATE treatment for low cup prices (Wilcoxon rank-sum test, $p > 0.418$ for cup prices $\leq$ €0.5). However, for cup prices exceeding €0.50 subjects are less willing to spend money on the voucher when it is bundled (Wilcoxon rank-sum test, $p = 0.100$, $p = 0.284$, $p = 0.030$ for cup prices of €1, €1.50 and €2, respectively). The reason is that, as in the PUBLIC condition, the tolerated premium in the BUNDLE treatment again decreases with the cup price, but this time it is not subject to a general upward shift. Again, this observation is supported by a random-effects interval regression (reported in Appendix A.1), a random-effects tobit regression, and a simple OLS regression.

Further evidence on the evaluation of the voucher comes from an examination of its purchase frequencies. As reported in the right column of Table 5, the voucher is bought in 44.1% of the choice situations in the SEPARATE treatment, while it is bought in only 30.4% of the situations in the BUNDLE treatment. Hence, bundling the voucher with the cup leads to less purchases of the voucher (Wilcoxon rank-sum test, $p = 0.007$, one-sided). This is not surprising per se, since subjects in the BUNDLE treatment have to buy the cup along with the voucher. However, this result is in stark contrast to the PUBLIC condition, in which purchases of the public good stay unaffected by bundling.

Despite random assignment of subjects to treatments, a concern could be that our results are due to sampling. In the post-experimental questionnaire, we therefore elicited variables that might affect the general spending patterns of subjects (see Table 6). All non-parametric results of this paper are supported in regressions controlling for these sociodemographic and personality variables.

Summarizing and interpreting our results, we can state the following: Bundling a public and a private good significantly increases the willingness to pay for the combination of both goods. No such effect is observed if two private goods are bundled. We conclude that it is the combination of a *public* and a *private* good that plays a decisive role for the documented superadditivity.

5   Further Channels

The results of our experiment are in line with the two behavioral channels of signaling and spillovers. However, these channels are not necessary for creating superadditivity, since the field offers a wider range of channels than our experiment. The following discussion of additional channels indicates that many hybrid bundles may induce superadditivity, though the relevance of each channel will depend on the specific bundle and context in question. We first describe channels that are predominantly active for hybrid bundles. Subsequently, we turn to channels which affect the valuation of all types of bundles and discuss why all channels proposed in this section are inactive in our experiment.

5.1   Hybrid Bundles

First, by attaching a public good to a private good, the willingness to pay for the public good might increase because the presence of the hybrid bundle in the market can raise consumers' *awareness of the public good*. Awareness of the externalities of one's actions and a strong feeling of personal responsibility, in turn, have been shown to prompt decision makers to partly internalize these externalities and act less selfishly (e.g., Mazar et al. 2008, Hamman et al. 2010).

Second, offering a bundle entails a *suggestion* to the consumer and thereby shapes consumers' purchase decisions, similar to a default. Seeing the bundle, the consumer may conjecture that the retailer expects consumers to be interested in buying it. This implicit suggestion by the retailer creates an additional purchase incentive. The suggestive power entailed by the presentation of options has been shown for investment and savings behavior as well as for organ donations (e.g., Benartzi & Thaler 2001, Madrian & Shea 2001, McKenzie et al. 2006). A sufficient condition for such effects is a decision maker's

uncertainty over her preferences (Kamenica 2008). Companies' product lines may also alter consumers' beliefs about the consumption of others. If a hybrid bundle is offered, these altered beliefs may create a social norm to contribute to the public good and thereby trigger conditionally cooperative behavior (e.g., Cialdini et al. 1990, Traxler & Winter 2012). Such an effect on demand is generally not induced by bundles of private goods.[19] Therefore, the suggestive power of hybrid bundles should be stronger than that of bundles of private goods. The induced demand is in turn reflected in a higher WTP for the hybrid bundle than for the separate goods before the bundle's introduction.

5.2 Bundles in General

It has been shown that consumers make mistakes in *information aggregation* when evaluating bundles of private goods. According to experiments by Gaeth et al. (1991) and Yadav (1994), information aggregation is performed by averaging over the separate categorial evaluations of a bundle's components. In this process, the individual evaluations obtain *weights that do not reflect the components' values*. This can both be a consequence of simple averaging (Anderson 1981) or an anchoring and adjustment heuristic (Tversky & Kahneman 1974). Due to this biased information aggregation, attaching a high-quality but low-value good (such as a rather small donation to charity) to another good may disproportionally increase the quality rating of the two goods and hence the overall WTP.

Furthermore, based on prospect theory (Kahneman & Tversky 1979), Thaler (1985) argues that consumers have a *preference to integrate losses*. Thus, the presentation of a single price for multiple items, i.e., bundling, can increase the demand for these items. This argument is supported in experiments on bundles of private goods (e.g., Drumwright 1992, Johnson et al. 1999).

Moreover, the purchase of two goods in the form of a bundle also reduces the *pain of paying* and the *transaction costs* that go along with every purchase. The former implies that consumers prefer to reduce the number of monetary transactions (Prelec & Loewenstein 1998, Rick et al. 2008). The latter, transaction costs, are well accepted to be part of every purchase. Bundling does not only change the number of transactions for

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[19]An exception may be bundles of private goods with network effects, since they may induce similar interdependencies in decision makers' utility.

the purchase of multiple products but can also reduce the search costs related to their acquisition. For example, consumers often have to find suitable complementary products for goods they wish to purchase (e.g., a zoom lens for a camera). Similar search costs are present for public goods. For example, donations can be directed to multiple organizations which differ in their scope and efficacy. By suggesting particular organizations or projects, a firm selling a bundle reduces these costs.

All channels explained above drive an increase in the valuation for bundles. Nonetheless, there also exists a behavioral channel which supports subadditivity. More precisely, unpacking a good into its parts can increase the parts' salience and thereby raise the valuation for the sum of its components. This has been termed the "unpacking effect". For instance, Rottenstreich & Tversky (1997) find that subjective probabilities of uncertain events increase when the events are decomposed into disjoint components. Subadditivity in valuations has also been documented for events described in different detail (Johnson et al. 1993, Van Boven & Epley 2003) and for the demand of either unpacked private goods (Bateman et al. 1997) or unpacked public goods (Bernasconi et al. 2009). Thus, if bundling decreases the *salience of product characteristics*, bundles may also be valued less than the sum of their parts.

5.3 Discussion

None of the channels presented in this section drives the results of our experiment. We explain in the following how these channels are precluded by the experimental design.

Both the SEPARATE and the BUNDLE treatment provide the opportunity to make a contribution to the public good, effectively inducing the same level of awareness of the public good. Moreover, in contrast to firms' product lines, the goods offered in the experiment are evidently not a response to market demand. Hence, subjects in both treatments learn the same about the desirability of the public good and the purchase behavior of others. The hybrid bundle thus neither entails suggestive power nor does it increase the awareness of the public good in the experiment.

Also channels affecting bundles in general are either inactive or controlled for by the PRIVATE treatments. Since the offered goods have comparable objective values (1.65 €

for the cup vs. 2 € for the donation and the voucher), subjects are unlikely to make substantial mistakes if they assign equal weights to the goods in their information aggregation. Furthermore, the experiment keeps both the degree of detail in the description of the goods and the individual goods' salience constant across treatments to exclude valuation differences due to unpacking. Finally, also the channels of loss integration, pain of paying, and transaction costs would affect the WTP for bundles in the PUBLIC and the PRIVATE condition similarly and are thus controlled for.

6 Conclusion

In this paper, we analyze the effect of hybrid bundling on individuals' willingness to pay. Using a controlled laboratory experiment, we elicit subjects' WTP for a private and a public good, varying across subjects whether the public good is sold separately or in a bundle with the private good. We find that the WTP for both goods is about 60% higher when they are sold as a bundle. In contrast, we observe no such effect when two private goods are bundled.

We lay out two behavioral channels that support our results. The first one, self-signaling, stems from an extension of warm glow to the whole usage period of the underlying private good. The second one, spillovers, originates from positive connotations of public goods (e.g., Bjørner et al. 2004, Elfenbein et al. 2012) that carry over to the attached private good. The field offers additional channels that we discuss in Section 5. Hence, the superadditivity documented by our experiment should be present for a wide range of hybrid bundles in natural environments.

The higher valuation that subjects attribute to both the public and the private good when bundled indicates that markets may play a stronger role in the provision of public goods than is commonly acknowledged. Both charitable organizations and the private sector may gain from offering hybrid bundles. Such cooperations increasingly evolve and raise significant contributions to public goods. The UNICEF-Volvic program for providing drinking water in rural Africa elicited $2.5 million in the U.S. and Canada from 2008 to 2009. This corresponds to more than 1.6% of all private-sector donations to UNICEF in these countries. Fostering these cooperations can circumvent political concerns related to

tax-based funding as well as the problem of assessing peoples' valuation for specific public goods.

Our results also suggest that hybrid bundling bears the potential to improve a company's sales. The findings thus serve as an explanation for the widening application of Corporate Social Responsibility (CSR) measures by firms, as companies that link social activities to the sales of their products effectively bundle private with public goods. However, since firms' CSR campaigns often go along with altered levels of advertisement and a reshaped image of the company (Baron 2001), the net effect of hybrid bundling on consumers' WTP so far remained unexplored. Our lab experiment abstracts from this image channel and provides clean evidence on how hybrid bundling affects consumers' valuations for the bundled products. The degree to which the WTP increase serves the firm, the good cause, and the consumer is ultimately determined by the market structure.

This paper constitutes a first step towards understanding the valuation for public goods in markets and documents that the evaluations of public and private goods are interdependent. We therefore see our paper also as a starting point for future research. For example, it seems important to further evaluate the relevance of the discussed channels in mediating superadditivity. Particular interest should lie on the extent to which self-signaling is responsible for the increase in valuations. If a favorable identity or a desired level of warm glow is maintained more easily through the use of hybrid bundles, prosocial activity in other environments might be crowded out. Thus, if this effect turns out to be dominating in the field, total voluntary contributions can decrease when hybrid bundles are available. A similar point is made by Engelmann et al. (2012) who show experimentally that a hybrid bundle with only token contributions to a public good may crowd out total charitable giving by creating moral wiggle room.

Furthermore, to determine the share of the WTP increase that is due to spillovers, it will be important to distinguish a truly increased appreciation of the private good when observing a hybrid bundle from a preference for consistency (Falk & Zimmermann 2011). Such a preference may induce a discrepancy between stated and true valuations. In our case, this could result in high stated valuations for the private good if the hybrid bundle is valued highly.

Our paper also opens the discussion of public good evaluation in a broader context. According to our results, hybrid bundling increases the private gains from the provision of the bundled public good. Thus, hybrid bundling could divert voluntary contributions away from public goods with higher social return. An extension of this paper in which a second, more efficient public good is introduced could deliver insights into this problem. Subsequent studies may also wish to adopt a dynamic perspective and focus on repeated decisions. Given the current state of knowledge about the interdependencies of public and private good evaluations, this field promises to be interesting for future research.

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A Appendix

A.1 Data

Table 6: Summary statistics: Sociodemographic variables

	PUBLIC-SEPARATE	PUBLIC-BUNDLE	PRIVATE-SEPARATE	PRIVATE-BUNDLE
Demographics				
Female	0.64	0.53	0.68	0.50
	(0.49)	(0.51)	(0.47)	(0.51)
Age	23.32	24.00	23.73	24.19
	(3.25)	(3.07)	(3.60)	(6.61)
Liquidity	0.89	0.81	0.84	0.79
	(0.32)	(0.40)	(0.37)	(0.42)
Big Five				
Openness	0.52	0.60	0.55	0.42
	(1.03)	(1.03)	(0.94)	(1.08)
Conscientiousness	−0.82	−0.68	−0.76	−0.82
	(1.17)	(1.03)	(0.98)	(1.25)
Extraversion	−0.27	0.25	0.09	0.07
	(1.02)	(1.07)	(1.17)	(1.30)
Agreeableness	−0.77	−0.56	−0.48	−0.34
	(1.02)	(0.87)	(1.11)	(0.96)
Neuroticism	−0.10	−0.15	−0.06	−0.01
	(1.14)	(1.06)	(1.11)	(1.03)
Observations	44	32	37	42

Values are means over all observations in the respective treatments. Standard deviations are provided in parentheses.

Table 7: Random-effects interval regressions

premium for the donation or the voucher	(1) PUBLIC	(2) PRIVATE
cup price	−0.166***	−0.088**
	(0.064)	(0.038)
BUNDLE	0.365*	0.129
	(0.198)	(0.135)
BUNDLE · cup price	−0.186**	−0.236***
	(0.091)	(0.072)
Individual controls	Yes	Yes
Observations	240	265
Groups	76	77
Chi-squared	49.21	39.57

Marginal effects. Bootstrapped standard errors in parentheses. ***, **, * indicate significance at the 1-, 5-, and 10-percent level, respectively. BUNDLE is a dummy variable indicating the treatment. Individual controls include gender, age, financial situation, and Big Five personality traits.

A.2 Instructions

In the following, we provide the instructions for the PUBLIC-BUNDLE treatment. The instructions for the other treatments were adapted appropriately and are available from the authors upon request.

Information on the experiment

You are now participating in an economic experiment, during which you will receive money and have the opportunity to buy goods. The payoff that you receive from this experiment depends on your personal decisions.

The decisions that you take during the experiment will be analyzed in an exclusively anonymous way. This means that your decisions will never be related to your identity. During the experiment any kind of communication is absolutely forbidden. If you have any questions, put a hand out of your booth. The experimenters will then come to your booth and answer your question there so that the other participants will not be disturbed.

In the following, different situations will be presented to you. In each of these situations you have to decide which one of two available goods (good A and good B) you want to buy at the given prices (or whether you want to buy none of the goods at the given prices). For the purchase of the goods you are provided with an amount of €10 (your initial endowment) in each situation.

Each of the overall 104 choice situations is labeled with a number. One of these situations will be paid out to you afterwards. After the experiment, this situation will be determined by drawing a random number between 1 and 104. Each of the numbers is equally probable. Since, when taking your decision, you of course do not yet know which number will be drawn, you have to think about each of your decisions carefully because each can potentially become relevant for you.
You will receive your payoff directly after this experiment. At this occasion, every participant will also draw his individual random number.

Your payoff is:

if you bought	endowment (€10)
good A	- price of good A
	(+ good A)
if you bought	endowment (€10)
good B	- price of good B
	(+ good B)
if you bought	
neither good A nor good B	endowment (€10)

An example:

Consider the case in which the following situation with the number 37 is presented to you:

situation	good A	good B	nothing
. . .	. . .	. . .	. . .
nr. 37	price: €3.20 O buy	price: €3.60 O buy	O buy nothing
. . .	. . .	. . .	. . .

This means that you have the choice to either buy only good A at €3.20, only good B at €3.60 or none of both goods. If you do not want to buy any of the goods, you do not incur any costs, i.e., you keep your endowment of €10.

If you want to buy good A at €3.20 in this situation, you have to tick the corresponding box so that the screen looks like this:

situation	good A	good B	nothing
. . .	. . .	. . .	. . .
nr. 37	price: €3.20 X buy	price: €3.60 O buy	O buy nothing
. . .	. . .	. . .	. . .

If you draw the random number 37 afterwards, which corresponds to the situation above, you will accordingly receive good A as well as €6.80 (€10 - €3.20).

If you want to buy good B at €3.60 in this situation, you accordingly have to select 'buy' in the column for good B. If you draw the random number 37 afterwards, you will receive good B as well as €6.40 (€10 - €3.60).

If you do not want to buy any of both goods in this situation, you accordingly have to select 'buy nothing' in the right column. If you draw the random number 37 afterwards, you will receive none of the goods but €10 (€10 - €0) instead.

If you draw a different random number, the decision that you have taken for this other situation becomes payoff relevant.

Before the real experiment starts, we ask you to answer the control questions that will appear on your screen in a few seconds. In case, doing this, you still have additional questions, please indicate this by raising your hand.

Control Questions I

Case I:

1) Which boxes do you have to tick if - facing prices of €4.90 for good A and of €6.70 for good B in situation a) - you prefer the **purchase of good A** over the purchase of good B as well as over the non-purchase of both goods?

situation	good A	good B	nothing
	price: €4.90	price: €6.70	
nr. a)	O buy	O buy	O buy nothing

2) Which payoff would you receive in this case at the end of the experiment (including the initial endowment of €10) if situation a) were randomly drawn?

Good A: O Yes   O No

Good B: O Yes   O No

Money: _____ Euro

Case II:

1) Which boxes do you have to tick if - facing prices of €1.50 for good A and of €4.10 for good B in situation b) - you prefer to buy **none of the goods**?

situation	good A	good B	nothing
	price: €1.50	price: €4.10	
nr. b)	O buy	O buy	O buy nothing

2) Which payoff would you receive in this case at the end of the experiment (including the initial endowment of €10) if situation b) were randomly drawn?

Good A: O Yes   O No

Good B: O Yes   O No

Money: _____ Euro

Case III:

1) Which boxes do you have to tick if you face prices of €3.30 for good A and of €4.00 for good B in situation c), but are willing to pay **at most €3.10 for good A** and **at most €4.30 for good B** in this situation?

situation	good A	good B	nothing
	price: €3.30	price: €4.00	
nr. c)	O buy	O buy	O buy nothing

2) Which payoff would you receive in this case at the end of the experiment (including the initial endowment of €10) if situation c) were randomly drawn?

Good A: O Yes   O No

Good B: O Yes   O No

Money: _____ Euro

Case IV:

1) Which boxes do you have to tick if you face prices of €1.70 for good A and of €5.20 for good B in situation d), but are willing to pay **at most €3.10 for good A** and **at most €4.30 for good B** in this situation?

situation	good A	good B	nothing
	price: €1.70	price: €5.20	
nr. d)	O buy	O buy	O buy nothing

2) Which payoff would you receive in this case at the end of the experiment (including the initial endowment of €10) if situation d) were randomly drawn?

Good A: O Yes   O No

Good B: O Yes   O No

Money: _____ Euro

Further information on the experiment

In this experiment you can buy goods whose values are likely to be subjectively different. In this respect, there do not exist any wrong or correct purchase decisions for you as a participant. You can acquire the following goods:

Good A:

The first available good is a 'blackboard cup' (see the picture below). With the included chalk it can always be daubed or labeled anew.

Good B:

The second available good is an identical 'blackboard cup' which, however, goes along with a donation of €2 to the 'Kindernothilfe'. The experimenters donate this amount for you if you buy this second good. The donation amount of €2 is independent of the purchase price, i.e., you only have to pay the respective purchase price, while the donation of €2 is performed by the experimenters.
(The 'Kindernothilfe' supports destitute children in 28 countries of the world. The corresponding donation receipt can be inspected immediately after you have received your payoff.)

In the following, we ask you - as described above - to decide in each of the presented situations whether you want to buy

- either the 'blackboard cup'

- or the 'blackboard cup' that goes along with the €2 donation

- or none of the goods

at the given prices.

Control Questions II

Please answer the following additional questions by filling in the blanks.

Case 1:

Suppose the **cup** is offered at a **price of €1** and the **cup with donation** at a **price of €1.70**.
Furthermore suppose that you **buy the cup with donation** in this situation and that you indeed draw this situation.

How many Euros do the experimenters donate to the 'Kindernothilfe'?
Answer: _____ Euro

How many Euros do you have to pay *additionally* so that - instead of only receiving the cup - you also effect the donation?
Answer: _____ Euro

How many Euros do you have to pay altogether (i.e., for the cup with donation)?
Answer: _____ Euro

Case 2:

Suppose that the **cup** is offered at a **price of €1.50** and the **cup with donation** at a **price of €3.70**.
Furthermore suppose that you **buy the cup with donation** in this situation and that you indeed draw this situation.

How many Euros do the experimenters donate to the 'Kindernothilfe'?
Answer: _____ Euro

How many Euros do you have to pay *additionally* so that - instead of only receiving the cup - you also effect the donation?
Answer: _____ Euro

How many Euros do you have to pay altogether (i.e., for the cup with donation)?
Answer: _____ Euro

A.3 Screenshots

Figure 3: Screenshot Public-Bundle treatment

Please take your decision for each given situation. In each situation you are endowed with 10 €.

situation	cup	cup with donation	nothing
nr. 1	price: 0 € ○ buy	price: 0 € ○ buy	○ buy nothing
nr. 2	price: 0 € ○ buy	price: 0,20 € ○ buy	○ buy nothing
nr. 3	price: 0 € ○ buy	price: 0,40 € ○ buy	○ buy nothing
nr. 4	price: 0 € ○ buy	price: 0,60 € ○ buy	○ buy nothing
nr. 5	price: 0 € ○ buy	price: 0,80 € ○ buy	○ buy nothing
nr. 6	price: 0 € ○ buy	price: 1 € ○ buy	○ buy nothing
nr. 7	price: 0 € ○ buy	price: 1,20 € ○ buy	○ buy nothing
nr. 8	price: 0 € ○ buy	price: 1,40 € ○ buy	○ buy nothing
nr. 9	price: 0 € ○ buy	price: 1,60 € ○ buy	○ buy nothing
nr. 10	price: 0 € ○ buy	price: 1,80 € ○ buy	○ buy nothing

situation	cup	cup with donation	nothing
nr. 11	price: 0 € ○ buy	price: 2 € ○ buy	○ buy nothing
nr. 12	price: 0 € ○ buy	price: 2,20 € ○ buy	○ buy nothing
nr. 13	price: 0 € ○ buy	price: 2,40 € ○ buy	○ buy nothing
nr. 14	price: 0,50 € ○ buy	price: 0,50 € ○ buy	○ buy nothing
nr. 15	price: 0,50 € ○ buy	price: 0,70 € ○ buy	○ buy nothing
nr. 16	price: 0,50 € ○ buy	price: 0,90 € ○ buy	○ buy nothing
nr. 17	price: 0,50 € ○ buy	price: 1,10 € ○ buy	○ buy nothing
nr. 18	price: 0,50 € ○ buy	price: 1,30 € ○ buy	○ buy nothing
nr. 19	price: 0,50 € ○ buy	price: 1,50 € ○ buy	○ buy nothing
nr. 20	price: 0,50 € ○ buy	price: 1,70 € ○ buy	○ buy nothing

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Figure 4: Screenshot Public-Separate treatment

Please take your decision for each given situation. In each situation you are endowed with 10 €.

situation	cup		donation	
nr. 1	price: 0 € ○ buy	○ don't buy	price: 0 € ○ buy	○ don't buy
nr. 2	price: 0 € ○ buy	○ don't buy	price: 0,20 € ○ buy	○ don't buy
nr. 3	price: 0 € ○ buy	○ don't buy	price: 0,40 € ○ buy	○ don't buy
nr. 4	price: 0 € ○ buy	○ don't buy	price: 0,60 € ○ buy	○ don't buy
nr. 5	price: 0 € ○ buy	○ don't buy	price: 0,80 € ○ buy	○ don't buy
nr. 6	price: 0 € ○ buy	○ don't buy	price: 1 € ○ buy	○ don't buy
nr. 7	price: 0 € ○ buy	○ don't buy	price: 1,20 € ○ buy	○ don't buy
nr. 8	price: 0 € ○ buy	○ don't buy	price: 1,40 € ○ buy	○ don't buy
nr. 9	price: 0 € ○ buy	○ don't buy	price: 1,60 € ○ buy	○ don't buy
nr. 10	price: 0 € ○ buy	○ don't buy	price: 1,80 € ○ buy	○ don't buy

situation	cup		donation	
nr. 11	price: 0 € ○ buy	○ don't buy	price: 2 € ○ buy	○ don't buy
nr. 12	price: 0 € ○ buy	○ don't buy	price: 2,20 € ○ buy	○ don't buy
nr. 13	price: 0 € ○ buy	○ don't buy	price: 2,40 € ○ buy	○ don't buy
nr. 14	price: 0,50 € ○ buy	○ don't buy	price: 0 € ○ buy	○ don't buy
nr. 15	price: 0,50 € ○ buy	○ don't buy	price: 0,20 € ○ buy	○ don't buy
nr. 16	price: 0,50 € ○ buy	○ don't buy	price: 0,40 € ○ buy	○ don't buy
nr. 17	price: 0,50 € ○ buy	○ don't buy	price: 0,60 € ○ buy	○ don't buy
nr. 18	price: 0,50 € ○ buy	○ don't buy	price: 0,80 € ○ buy	○ don't buy
nr. 19	price: 0,50 € ○ buy	○ don't buy	price: 1 € ○ buy	○ don't buy
nr. 20	price: 0,50 € ○ buy	○ don't buy	price: 1,20 € ○ buy	○ don't buy

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