Sorting Into Incentives for Prosocial Behavior*

Christian Johannes Meyer†
European University Institute

Egon Tripodi‡
European University Institute, University of Bonn

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Abstract

We study incentivized voluntary contributions to charitable activities. Motivated by the market for blood donations in Germany, we consider a setting where different incentives coexist and agents can choose to donate without receiving monetary compensation. We use a model that interacts image concerns of agents with intrinsic and extrinsic incentives to donate. Laboratory results show that a collection system where compensation can be turned down can improve the efficiency of collection. Image effects and incentive effects do not crowd each other out. A significant share of donors turn down compensation. Heterogeneity in treatment effects suggests gender-specific preferences over signaling.

Keywords: charitable giving, altruism, incentives, social image, laboratory experiment.

JEL Classification: H42, D64, C91, I18.

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†Corresponding author. European University Institute, Department of Economics, Villa La Fonte, Via delle Fontanelle 18,50014 San Domenico di Fiesole, Italy. ✉ christian.meyer@eui.eu.

‡University of Bonn, Institute for Applied Microeconomics, Adenauerallee 24–42, 53133 Bonn, Germany. ✉ egon.tripodi@eui.eu.

1. Introduction

Many public goods rely on voluntary private contributions. Millions of people every year spend their time working as volunteers in their communities, give money to charity, or donate their own blood, organs, and other tissue. For charities seeking volunteers or money and for health care providers seeking blood donations, it is important to understand how to encourage this prosocial behavior.

An often-used way is to provide extrinsic incentives. The economics literature has found mixed evidence on the effects of monetary and non-monetary incentives on giving (Bowles and Polania-Reyes, 2012; Frey and Oberholzer-Gee, 1997). Although a positive effect of extrinsic incentives is in line with standard economic theory, it goes against a considerable literature in psychology and economics, which argues that they can backfire by either crowding out the intrinsic motivation to give (Deci, 1971,7; Titmuss, 1971), or ruining the reputation of donors who could be regarded as greedy (Benabou and Tirole, 2006; Exley, 2017). Field experiments have found evidence for extrinsic incentives to have both negative effects on volunteer work (Frey and Goette, 1999) as well as positive effects on organ (Lacetera, Macis and Stith, 2014b) and blood donations (Lacetera, Macis and Slonim, 2012,1).[1]

While the role of incentives has been analyzed in a wide range of domains, they have been mostly studied in isolation and contrasted to the absence of incentives. In many settings, however, organizations may want to think strategically about how to incentivize donors – particularly when they compete with other organizations. In this paper, we study a real-world setting where different incentives to engage in a prosocial activity coexist. In this environment, agents can turn down an extrinsic incentive to donate. This lets them reveal and signal their individual preferences through their actions.

Our setting is motivated by the market for human whole blood donations in Germany.[2] In most high-income countries, the concern that incentives could backfire is reflected in tight regulation of how blood donations can be collected. Regulations typically do not allow for monetary payments to donors (Council of Europe, 1995; The

[1] Aside from the question of effectiveness, incentives to donate human tissue might be seen as controversial on moral grounds. Only limited incentives appear to be morally acceptable among a sample of people surveyed in the United States (Boulware, Troll, Wang and Powe, 2006). Becker and Elias (2007) provide a compelling argument in favor of allowing incentives for organ donations. Lacetera (2016) summarizes the debate. In this paper, we will abstract from the matter of the morality of incentives.

[2] The most common type of human blood donation is a "whole blood" donation, in which approximately one pint of blood is collected over a period of about ten minutes. Men can donate up to six times per year, women up to four times per year. Red blood cells from whole blood donations are typically used for transfusions to other patients and are most commonly seen as motivated by altruistic preferences (Niessen-Ruenzi, Weber and Becker, 2015). Other types of blood donations include platelet and plasma donations, which take much longer and require donors to be connected to a machine. Donors are commonly compensated in cash for these types of donations.

Lancet, 2005; World Health Organization, 2009). In many regions of Germany, however, monetary and non-monetary incentives appear to coexist in a "dual market" in which different blood collectors offer different incentives and prospective donors can choose where to donate. Donations at the Red Cross are always unpaid, while donations at hospitals or commercial blood banks are typically compensated with 20 to 30 euro. The Red Cross, hospitals, and commercial blood banks set themselves apart in branding and their use of social recognition in donor recruitment. The Red Cross in particular strongly relies on highly-visible donation drives to collect its unremunerated donations.

Very little is known about the features of such "dual markets" for the collection of charitable contributions. Does this system of collection increase the number of donations compared to a single market in which everyone is unpaid or one in which everyone is paid? At what cost per collected donation? Intuitively, we hypothesize that in a dual market some share of donors will choose to turn down their compensation. We call this "sorting", based on the idea that a dual market can bring about efficiency gains in the collection similar to those deriving from self-selection in second-degree price discrimination. Given the features of the German market, we suggest that social image concerns are an important driver of this sorting. While social image concerns likely motivate charitable contributions in many contexts, we hypothesize that they can lead to particularly large efficiency gains in dual markets if prospective donors choose to not be compensated for their donations.

To guide our analysis and formally illustrate this hypothesized sorting mechanism, we use a model of charitable giving in which prospective donors are motivated to give by intrinsic incentives, extrinsic incentives, and image concerns. The model predicts that both incentives and visibility of actions should increase participation in a prosocial activity. It also shows that the most altruistic agents would turn down incentives in a dual market even if they are not observed by others. Observability increases donations of the most image-concerned agents, who would also want to turn incentives down.

To empirically test the sorting mechanism, we turn to the controlled environment of a stylized laboratory experiment with 329 student subjects. While some aspects of the decision to donate blood certainly require a study with real donors, the laboratory is appealing in that it lets us manipulate the entire market design in ways that could not be done in the field.[3] We use a real effort task that generates a value for a charity under one of three market designs: donors receive no compensation for a donation (single market *NOT PAID*), donors always receive a compensation for a donation (single market *PAID*), and donors can choose whether they want to receive compensation for a donation (dual market *CHOOSE*). Like for the case of blood collection, any compensation paid out to donors reduces the social value of the donation. This is objectively measured in our controlled setup by the amount of money that goes to a charity chosen by each subject. We also vary the visibility of actions (*PRIVATE* vs. *PUBLIC*) to

[3] Kessler and Roth (2014) take a similar approach to study organ allocation systems. They model a laboratory experiment based on a policy (and a loophole in that policy) in Israel.

exogenously make image concerns more salient. The combination of market design treatments and visibility treatments in a full 3×2 design produces six distinct treatments, which we run between subjects.

The experimental results mostly support our behavioral hypotheses. We find that when given the option to turn down the compensation, a significant fraction of donors indeed chooses to do so. Offering a compensation and letting agents turn down the compensation lets the collection system leverage the heterogeneity in individual preferences. We also find robust evidence that social image concerns increase donations irrespective of the type of available incentives, though we are not powered to provide strong evidence that sorting operates through social image concerns.

Our paper contributes to a growing empirical literature that studies how image concerns affect individual behavior across a variety of contexts (see Bursztyn and Jensen (2017) for a recent review).[4] We provide additional evidence that people tend to behave in more socially desirable ways when they are observed by others (Andreoni and Bernheim, 2009) and illustrate the importance of understanding the strategic effects of social signaling in relation to the institutional environments. We also contribute to an ongoing debate on the effectiveness of extrinsic incentives to encourage behavior in the presence of intrinsic motivation (Gneezy, Meier and Rey-Biel, 2011), especially in the domain of prosocial behavior (Chao, 2017). Unlike other studies (Gneezy and Rustichini, 2000), we find no evidence that extrinsic incentives lead to a net crowding out of prosocial behavior. This is consistent with recent evidence by DellaVigna and Pope (2016); Lacetera et al. (2012,1), who also find a positive effect of incentives on prosocial behavior.

Interestingly, and in contrast to similar studies that analyze the effectiveness of conditional and unconditional incentives to act prosocially (Ariely, Bracha and Meier, 2009; Carpenter and Myers, 2010), we also do not find that the crowding out effect of incentives occurs when behavior is observable, i.e. that social image effects attenuate incentive effects. We differ from Ariely et al. (2009) in that subjects decide to donate in the presence of an outside option. Our results suggest that when incentives are small and only partly offset the costs of donating, social image effects and incentive effects need not crowd each other out.

Most closely related to ours is the experimental work of Mellstrom and Johannesson (2008), who encourage lab subjects to participate in a medical check-up before donating blood. In their experiment, one treatment group receives a show-up fee for completing a survey before being asked to see a doctor. Another group receives an additional compensation from the experimenters to see a doctor. A third treatment group is offered a compensation with the option to turn it down (akin to the dual market setting that we present). They find that incentives crowd out prosocial behavior

[4] Various recent findings highlight how image concerns can be leveraged to encourage participation in activities with positive spillovers on others, such as child immunization (Karing, 2018), investment decisions (Riedl and Smeets, 2017), take-up of social transfers (Friedrichsen, König and Schmacker, 2018), and voting (DellaVigna, List, Malmendier and Rao, 2017).

in women (but not in men) only when there is no option to turn down the incentive. The authors interpret this effect to be consistent with a gender difference in image concerns such that women are more concerned about appearing prosocial than men. Our experiment proposes the comparison of three slightly different market designs: Like in many real-world applications, monetary incentives to donate reduce the value generated by prosocial actions. In this setting, we also find heterogeneous effects of social image on contributions that can be attributed to gender-specific preferences over signaling. In our case, men appear more concerned about image than women.

Overall, our findings suggest novel ways to improve mechanisms for the collection of charitable donations by leveraging heterogeneity in individual preferences. Applied to the collection of blood donations, our results may inform the design and regulation of systems that use monetary incentives.

The remainder of the paper is organized as follows: Section 2 fixes ideas in a simple theoretical framework and presents testable behavioral hypotheses. Section 3 details experimental design and procedures. Section 4 presents the results. Section 5 concludes with a discussion of the implications of our findings for the market for blood that initially motivated our research.

2. Theoretical Framework

To illustrate potential mechanisms underlying the hypothesized sorting in the German market for blood and to guide our empirical analysis, we use a model of charitable giving in which prospective donors are motivated to give by intrinsic incentives, extrinsic incentives, and image concerns.

We build on the model by Benabou and Tirole (2006) (henceforth: BT). In their model, being compensated to donate can crowd out donations by spoiling the image of donors. Moreover, any compensation is paid from resources that are exogenous to the economy and is given to donors without affecting the social value of their donation. BT show that whether donors can turn down compensation should not matter, because neither image-indifferent nor image-concerned agents would want to do so. For image-indifferent agents, it would be a dominated strategy to turn down compensation that does not affect the social value of their donation. Image-concerned agents would be worried that their motivation is questioned: turning down incentives could reveal that they are not acting out of altruism, but just to appear as altruistic while in fact (on average) they are not.

For a dual market like in Germany, where prospective donors can choose from a menu of options, the model would thus predict that no one should turn down compensation. Yet we observe that a considerable share of donors chooses to remain unpaid when they have the choice between donating with a 20 to 30 euro compensation or donating without any compensation. Informational frictions and transportation costs may explain part of this outcome, though these do not appear to be empirically

significant. We will return to this point when we discuss policy implications in the conclusion.

We suggest that a different payoff structure than the one by BT better fits the case of blood donations and many other charitable activities and could explain why prospective donors would choose to turn down incentives. In our version of the model, any potential compensation for the donation is paid out of the value that is generated by the donation. The collector of donations is a charitable organization that transforms collected donations into social value. To increase donations, the collector may find it optimal to pay donors a dividend from their donation as compensation. Increasing private returns from the donation comes at the expense of the value that the donation generates for the rest of the society. This feature of our setup introduces an additional channel through which incentives could potentially crowd out donations: a crowding out of intrinsic motivation. This channel is consistent with an earlier literature stemming from Deci (1971,7).

To formulate testable predictions we will simplify the original model by BT. One key simplification is that we assume agents to be homogeneous in their taste for extrinsic incentives. When this is the case, there is no scope for signaling greediness (or a lack thereof). Despite being a common assumption in economics, a potential drawback of making this simplification is that we rule out that extrinsic incentives can spoil the image of donors. Our framework can thus not produce a situation where extrinsic incentives reduce the donations of agents who seek to avoid signaling greediness through their actions. The advantage of our theoretically-informed experimental design is that we will be able to assess the plausibility of this assumption for our setting by investigating the interaction between visibility and incentive effects (Ariely et al., 2009). The experimental results indicate that our assumption holds.

2.1. Simple Model

The model economy is characterized by a unit mass of agents indexed by $i = \{1, ..., \infty\}$ and one collector of donations. This economy is analyzed under two different institutional settings. We refer to a *single* market when the collector is bound to pay an exogenously-set compensation $y = \tilde{y} \in \mathcal{R}_+$. We refer to a *dual* market when agents are allowed to choose remuneration $y = \{0, \tilde{y}\}$.

The ***collector*** takes donation d from each agent that decides to contribute and transforms it into social value $B \in \mathcal{R}_+$. For each contribution, the collector pays remuneration $y < B$.

Agents differ along two dimensions: the degree of altruism $a_i \sim F(\cdot)$ with positive bounded support, and the concern for image x_i, which we treat as binary with x_i taking value 1 with probability q (and 0 with probability $1 - q$). Both a_i and x_i are independently distributed random variables. Agents make a decision to contribute $d = \{0, 1\}$ in exchange for remuneration y while facing a private cost c. Image concern

matters for agents when actions are taken in public ($v = 1$) and is irrelevant when actions are taken in private ($v = 0$).

The utility of agent i can be written as follows:

$$U_i(d, y) = (1 - vx_i)[a_i(B - y) + y - c]d + vx_i E(a|d, y) \tag{2.1}$$

where $E(a|d, y)$ is the image that other agents have of agent i given her actions.

From this theoretical setting we derive two predictions that underpin our analysis:

Prediction 1 (Price discrimination)**.** *A dual market for donations increases contributions compared to a single market where no compensation is available. Compared to a single market where compensation cannot be turned down, allowing agents to turn down compensation reduces the cost of collection without affecting the number of donations.*

Proof in Appendix A.

This predictions characterizes the effect of various compensation schemes on donations. It applies when actions are taken in private and in public. Introducing extrinsic incentives to donate increases donations, irrespective of whether these incentives can be turned down. Allowing people to turn down incentives, introduces another margin for people to either express or signal their altruism. Highly altruistic agents donate and choose to turn down the compensation.

As a result, when incentives can be turned down, average cost of collection decreases without compromising supply of donations. These two results illustrate how a dual market, where agents are allowed to choose a remuneration, can bring about efficiency gains in the collection similar to those deriving from self-selection in second-degree price discrimination.

The following prediction is directly linked to the previous and highlights the interaction of image effects with price discrimination.

Prediction 2 (Social Image Effects)**.** *The visibility of actions (a) increases participation in the single as well as in the dual market, and (b) lowers the average cost of collection in the dual market.*

The proof of (b) follows directly from the observation that the objective of image-concerned agents who are sufficiently altruistic to donate in private, but not altruistic enough to turn down compensation $y = \tilde{y}$, changes when acting in public. In order to improve their social image, these agents want to pool with the most altruistic agents, who turn down incentives.[5] Part (a) is due to the fact that image-concerned agents only care about their image when acting in public. As a result, even the least-altruistic

[5]This signaling game may not have an equilibrium in pure strategy if the share of image-indifferent agents who are altruistic enough to turn down the incentives is positive but small compared to the share of image-concerned agents.

of these decide to contribute in public in order to avoid the stigma of looking like the selfish segment of the population.

In addition to illustrating effects of incentive and visibility effects on donations, these two predictions illustrate how a dual market, where agents are allowed to choose a remuneration, can bring about efficiency gains in the collection similar to those deriving from self-selection in second-degree price discrimination and how image concerns can amplify these gains. Our experimental setting is designed to test these predictions on binary donation decisions over multiple rounds.

3. Experimental Design and Procedures

3.1. General Setup

To empirically investigate the mechanisms outlined above, we turn to the controlled environment of a stylized laboratory experiment.

In our experiment, subjects generate value for a charity by participating in a real-effort task. For the experimental task, we build on the "click for charity" design by Ariely et al. (2009). Different from Ariely et al. (2009), subjects in our framework can choose between participating in the donation task or skipping the task and taking a fixed payoff as outside option.[6] This outside option introduces an homogeneous private cost of donating on top of the individual cost of exerting effort. If subjects choose to participate, they can generate a donation by sequentially entering 400 key sequences on a computer keyboard. One sequence constitutes of four key presses (*"w"*, *"e"*, *"e"*, *"return"*). On their screen, subjects see a bar indicating progress towards the required number of sequences. We chose this task because it is not inherently meaningful or intrinsically rewarding, and allows us to focus on motivation to exert effort for a charity. Other tasks, particularly ones that are more gamified, may be differentially appealing to subjects and thus increase noise and confounds (Charness, Gneezy and Henderson, 2018). Donations generated with this real-effort task are paid out to a charity chosen by each subject.

We employ a full 3×2 between-subject design where we systematically vary the type of incentives offered to engage in the donation task (*PAID*, *NOT PAID*, *CHOOSE*) and the visibility of actions (*PUBLIC* and *PRIVATE*). Visibility is randomly varied across experimental sessions while the incentives offered are randomly varied across all subjects. Table 1 summarizes the design.[7]

[6] Without the outside option, the marginal cost of participating in the task could be low enough for lab subjects to be indifferent between exerting effort and waiting while others exert effort. The outside option increases the costs of participating in the donation task, so that subjects that are not altruistic and not concerned about social image should not participate in the task – as predicted by the model.

[7] We conducted a pilot study of our experimental design online on Amazon Mechanical Turk ($N = 408$) to inform the choice between a within-subject and a between-subject design. To address concerns

Table 1: Overview of Treatments

	Not paid $y = 0$	Paid $y = \tilde{y}$	Choose $y \in \{0, \tilde{y}\}$
Private Action $v = 0$	n = 46	n = 48	n = 60
Public Action $v = 1$	n = 47	n = 62	n = 66

Notes: Rows list visibility treatments, columns list incentive treatments. n refers to number of subjects in each treatment cell (total of 329 subjects). y refers to the incentive provided, v to the visibility of actions.

After being assigned to one of six treatments, subjects independently engage in the donation task for three rounds. Irrespective of the treatment, in each of the three rounds subjects can choose between participating in the donation task or skipping. Throughout the experiment, we use tokens as experimental currency. One token is worth 0.04 euro.

3.2. Treatments

Along the first dimension of the 3×2 between-subject design we vary the market design, i.e. the availability of incentives to participate in the donation task. In the first two treatments, we either provide monetary incentives to participate in the donation task (single market *PAID* treatment) or no monetary incentives (single market *NOT PAID* treatment). In the third treatment (dual market *CHOOSE* treatment), subjects are presented with both the options of a not paid and a paid donation.

The payoffs are set such that donating generates more value for the charity (100 tokens) than the outside option for the subject (75 tokens). When subjects donate and receive monetary incentives for their donation (50 tokens), those reduce the value to charity (from 100 to 50 tokens). Note that the monetary incentives are always smaller than the outside option. Table 2 summarizes the choice set in each of the three treatments and the associated monetary payoffs in tokens.

that a crowding-out effect of incentives may arise either only in an environment where incentives are introduced as a policy change (within-subject) or only in a market design where people are unaware of alternative institutional environments, we also considered an experimental design that allowed us to study the transition from a single market *NOT PAID* or single market *PAID* market design to a dual market *CHOOSE* market design. In this alternative design, we introduced the dual market to subjects after a first round in the single market design. We did not find evidence that the single market design has any persistent effects. Between- and within-subject designs led to qualitatively similar results. We conclude that the initial treatment has no impact on the effectiveness of the *CHOOSE* treatment. For the current project, we opt for a between-subject design to minimize potential confounders and demand effects (Charness, Gneezy and Kuhn, 2012). Online Appendix F summarizes the pilot.

Table 2: Payoffs to Subject and Benefits to Charity, by Treatment and Subject Choice
(Experimental Currency: "tokens", 1 token = 0.04 euro)

Treatment	Action space	Payoff to subject	Benefit to charity
NOT PAID	Donate not paid	0	100
	Skip	75	0
PAID	Donate paid	50	50
	Skip	75	0
CHOOSE	Donate not paid	0	100
	Donate paid	50	50
	Skip	75	0

Along the second dimension of the 3×2 between-subject design we vary the visibility of subject actions to make public image salient. In the *PRIVATE* treatment, subjects are informed that their actions will remain anonymous. Subjects are seated at desktop computers separated by divider walls and curtains. To maximize anonymity and to rule out that subjects hear each other type while working on the real-effort task, we install soft mats underneath computer keyboards and play a white noise sound using loudspeakers in the laboratory. We verified that these measures indeed make it impossible to hear typing from other workstations. We did not receive any complaints from subjects about this measures. In the *PUBLIC* treatment, before beginning the donation task, we inform subjects that they will be asked to reveal their actions in this task in front of all other subjects in this session. Social image effects thus reflect the full decision environment, including the incentive choice in the dual market *CHOOSE* treatment, that each subject is in. After completing all three rounds we ask subjects to publicly report the number of donations they made.[8] Subjects do so by standing up next to their computer in front of the divider walls. There is no explicit requirement to truthfully report this information.[9] Note, however, that reporting takes place after all decisions have been made.

3.3. Procedures

Our theoretical framework asserts that more altruistic individuals are, ceteris paribus, more likely to donate to charity. To check that individual levels of altruism are balanced across treatments, we let all subjects play a simple dictator game before begin-

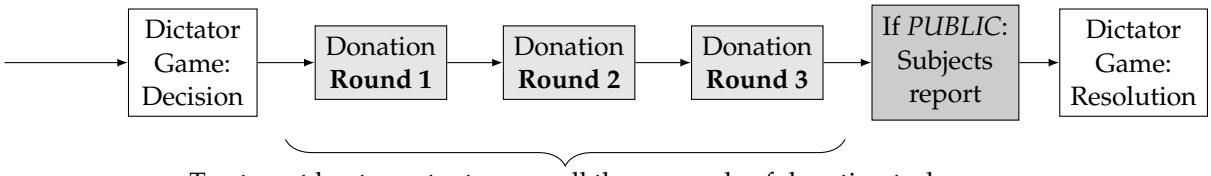
[8]The intention behind not having subjects reveal the incentives under which they donated was to avoid confusion from learning about other treatments.

[9]As an alternative design, we could have publicly announced actual subject choices at the end of the experiment. We decided against this design to stay closer to the theoretical framework of Benabou and Tirole (2006), where the desire to signal altruism has both instrumental and hedonic origins. We allow for both motivations by letting subjects state their own actions. To maintain the ecological validity of revealing a prosocial action, we do not force subjects to say the truth.

ning the main experimental task that lets subjects donate to charity.[10] In this dictator game, each subject is randomly and anonymously paired with another subject and asked to split 20 tokens between herself and the anonymous partner. After testing for subject comprehensions, we let both subjects of the pair play the game as the dictator. At the end of the experiment, the experimental software randomly determines which of the two subjects determines payoffs and the game is resolved.

We then introduce a menu of four charities. Three of those charities are chosen because they are likely well-known among our subjects: Doctors Without Borders, the International Committee of the Red Cross, and the World Wildlife Fund. We additionally included the Against Malaria Foundation, which is rated as one of the most effective charities by the independent charity evaluator GiveWell. Subjects are given a short description of each charity. We then let each subject choose the charity that they prefer to donate to throughout the experiment. We do this to reduce potential noise from heterogeneous taste for donations to a specific charity. In order to verify balance across treatments, we ask subjects to rate how they perceive each of the charities and how likely they would be to donate money to each of them. Finally, we let subjects practice the donation task before engaging in it for three rounds. In the *PUBLIC* treatment, subjects publicly report their actions after the third round of the donation task. Figure 1 summarizes the sequence of tasks in the experiment.

Figure 1: Sequence of the Experiment



At the end of the experiment, we collect demographic data. After each session, we confidentially pay out the show-up fee and any earnings that subjects have generated for themselves in the dictator game and the donation task. We also inform subjects about the amount of money donated to charity on their behalf and provide information on how to obtain a confirmation of the donation on their behalf.

We implement the computerized experiment in oTree with our own modifications written in Python and JavaScript (Chen, Schonger and Wickens, 2016). A total of 18 experimental sessions were conducted in German at the BonnEconLab in Bonn, Germany, in April 2017 ($n = 329$). Sessions included 20 to 24 subjects and lasted approximately 40 minutes. All subjects are students from various majors at the University of Bonn. They are on average 22 years old, 61 percent are female. Table 3 summarizes

[10] While giving in the dictator game is a well-established measure of generosity vis-à-vis others, it is likely confounded by perceived social norms. As a result, we only rely on our measure of altruism as a balance check, but not to establish key empirical results or to analyze heterogeneous treatment effects.

the sample. On average, participants earned 10.70 euro for themselves and generated 4 euro for charity.[11]

We can verify that the sample is balanced on observable characteristics, including our measure of altruism measured by the dictator game and preference for the chosen charity. Using a nonparametric one-way ANOVA on ranks (Kruskal-Wallis) test, we fail to reject the null hypothesis that the subject pool exhibits the same characteristics across all treatment groups at the 95 percent level (Table 3, column 8).

Table 3: Summary Statistics of Observable Characteristics,
Full Sample and by Treatment (Means and Standard Errors in Parentheses)

	Full Sample	Private			Public			p-value
		Not paid	Paid	Choose	Not paid	Paid	Choose	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				a) Measured before treatment				
DG: Tokens kept	15.365	14.891	15.271	15.250	15.021	15.677	15.818	0.848
	(0.214)	(0.621)	(0.558)	(0.507)	(0.618)	(0.501)	(0.411)	
Charity rating	4.602	4.783	4.604	4.583	4.660	4.532	4.515	0.131
	(0.043)	(0.087)	(0.129)	(0.072)	(0.102)	(0.123)	(0.100)	
				b) Socioeconomic characteristics, measured after treatment				
Age	21.544	21.630	21.708	21.717	21.511	21.210	21.545	0.499
	(0.091)	(0.263)	(0.223)	(0.213)	(0.263)	(0.184)	(0.207)	
Female	0.611	0.630	0.521	0.717	0.574	0.613	0.591	0.429
	(0.027)	(0.072)	(0.073)	(0.059)	(0.073)	(0.062)	(0.061)	
College major	4.398	4.239	4.417	4.400	4.383	4.661	4.258	0.814
	(0.100)	(0.277)	(0.258)	(0.224)	(0.273)	(0.236)	(0.221)	
Observations	329	46	48	60	47	62	66	

Notes: p-value in column (8) is for a one-way ANOVA on ranks (Kruskal-Wallis) test comparing the six treatment groups in columns (2) to (7). DG refers to the dictator game, in which we gave 20 experimental tokens to participants and asked them how many they would like to keep. Charity rating refers to the rating that subjects gave to the charity that they chose to donate to. We asked subjects to agree to the statement "I like the idea of donating money to [chosen charity]" on a 5-point Likert scale where 1 is "strongly disagree" and 5 is "strongly agree". College major is a categorical variable that summarizes the departmental affiliation of our student subjects.

4. Results

Recall that in each of the three rounds of the donation task, subjects can decide to participate in or skip the task. In our discussion of the results, we consider each participation in the task as one "donation" (all subjects who choose to participate in the

[11]Subjects from the pool of the BonnEconLab were invited using hroot (Bock, Baetge and Nicklisch, 2014). Invitations were restricted to students of the University of Bonn, aged 18–25, with no more than one no-show in prior experiments. Online Appendix B provides further details.

donation task complete it). We test our two predictions by comparing the total number of individual donations as well as the choice of incentives over the three rounds.

Table 4: Summary Statistics of Behavior in Donation Task
(Fractions and Means, Standard Errors in Parentheses)

	Incentive Treatment			Incentive Choice		p-value
	Not paid (1)	Paid (2)	Choose (3)	Not paid (4)	Paid (5)	H_0: Paid=Choose (6)
I. Fraction of subjects that participated in the task						
			a) PRIVATE treatment			
Round 1	0.609	0.604	0.667	0.083	0.583	0.504
	(0.072)	(0.071)	(0.061)	(0.036)	(0.064)	
Round 2	0.174	0.396	0.467	0.083	0.383	0.463
	(0.056)	(0.071)	(0.065)	(0.036)	(0.063)	
Round 3	0.348	0.313	0.383	0.067	0.317	0.446
	(0.070)	(0.067)	(0.063)	(0.032)	(0.061)	
Observations	46	48	60	60	60	
			b) PUBLIC treatment			
Round 1	0.766	0.806	0.818	0.136	0.682	0.866
	(0.062)	(0.050)	(0.048)	(0.043)	(0.058)	
Round 2	0.383	0.565	0.591	0.136	0.455	0.763
	(0.071)	(0.063)	(0.061)	(0.043)	(0.062)	
Round 3	0.362	0.484	0.530	0.136	0.394	0.601
	(0.070)	(0.064)	(0.062)	(0.043)	(0.061)	
Observations	47	62	66	66	66	
II. Average total number of rounds participated in the task						
			a) PRIVATE treatment			
Sum of all 3 rounds	1.130	1.313	1.517	0.233	1.283	0.290
	(0.129)	(0.142)	(0.135)	(0.072)	(0.132)	
Observations	46	48	60	60	60	
			b) PUBLIC treatment			
Sum of all 3 rounds	1.511	1.855	1.939	0.409	1.530	0.545
	(0.124)	(0.121)	(0.127)	(0.105)	(0.136)	
Observations	47	62	66	66	66	
			c) Aggregating over both visibility treatments			
Sum of all 3 rounds	1.323	1.618	1.738	0.325	1.413	0.348
	(0.092)	(0.095)	(0.094)	(0.066)	(0.096)	
Observations	93	110	126	126	126	

Notes: Total sample size is 329 subjects. Subjects can always choose between participating in the donation task or skipping. P-value in column (6) is for two-sample Wilcoxon rank-sum (Mann-Whitney) test comparing the outcomes for *PAID* treatment in column (2) and the *CHOOSE* treatment in column (3).

Table 4 summarizes those measures and gives an overview of donation behavior across treatments. Panel I presents the fraction of subjects who decide to participate in each round while panel II sums the number of rounds that subjects decide to participate in the donation task. For subjects in the dual market *CHOOSE* treatment, columns (4) and (5) report whether subjects choose to be paid.

Considering subject behavior over the three rounds of the donation task, we can identify three patterns. First, making donations (and incentives) visible increases the number of individual donations across all treatments. The magnitude of this effect does not appear to be systematically different between the single market *PAID*, the single market *NOT PAID*, and the dual market *CHOOSE* treatment. Second, making a compensation to donate available increases the number of donations, irrespective of whether or not this compensation can be turned down. Third, in the dual market *CHOOSE* treatment, making actions visible increases unpaid donations. The share of unpaid donations increases from 15.4 percent in *PRIVATE* to 21.1 percent in *PUBLIC* – leading to a decrease in the per-unit cost of donations completed. This suggests that image concerns indeed appear to play a role in the hypothesized sorting mechanism of the dual market.

In the rest of this section, we employ regression-based and non-parametric analysis to assess the statistical significance of these patterns and explicitly test our behavioral predictions. In addition, we discuss the potential interaction between incentive and visibility effects and analyze heterogeneous treatment effects between male and female subjects.

4.1. Price Discrimination and Social Image Effects

We begin with a discussion of our experimental results in light of the behavioral predictions formulated in section 2. Given the count nature of the outcome variable we use maximum likelihood to estimate the following Poisson regression:

$$\begin{aligned} Donations_i = \alpha + \beta_1 PAID_i + \beta_2 CHOOSE_i + \beta_3 PUBLIC_i + \\ + \beta_4 PAID_i \times PUBLIC_i + \beta_4 CHOOSE_i \times PUBLIC_i + \boldsymbol{X}_i \boldsymbol{\gamma} + \psi_i \end{aligned} \tag{4.1}$$

where *Donations* is the total number of donations by subject i over all three rounds of the donation task, *PAID&CHOOSE* is a dummy for the pooled single market *PAID* treatment and the dual market *CHOOSE* treatment, *PUBLIC* is a dummy for the treatment in which subjects have to reveal their actions to other participants, $\boldsymbol{X}$ is a vector of controls, and ψ is a Poisson-distributed error term. Table 5 presents the full set of estimated semi-elasticities and average marginal effect estimates.

Our results indicate strong positive effects of monetary incentives on donations. We find that compared to the single market *NOT PAID* treatment, making monetary incentives available does not induce lower participation in the donation task. This is true irrespective of the visibility of actions. The estimated average marginal effect in our specification without any other controls indicates that making monetary incentives available leads to an increase over all three rounds of 0.268 donations in *PAID* and 0.409 donations in *CHOOSE* (relative to a mean of 1.32 donations in the single market *UNPAID* treatment). The effect is robust to various sets of controls. Introducing the number of tokens kept in the dictator game as an additional control (Table 5, columns

5 to 6) reveals that this measure of altruism is a strong predictor of participation in the donation task.

Table 5: Poisson Regression for Total Individual Donations
(Coefficient Estimates and Standard Errors in Parentheses)

Dependent variable:	# of donations over the three rounds					
	Semi-elasticities			Average marginal effects		
	(1)	(2)	(3)	(4)	(5)	(6)
	a) Treatments					
Paid	0.149	0.183	0.205	0.268**	0.322***	0.333***
	(0.157)	(0.142)	(0.140)	(0.129)	(0.121)	(0.118)
Choose	0.294**	0.318**	0.363***	0.409***	0.476***	0.512***
	(0.145)	(0.131)	(0.131)	(0.128)	(0.117)	(0.118)
Public	0.290**	0.301**	0.320**	0.451***	0.496***	0.492***
	(0.141)	(0.131)	(0.129)	(0.107)	(0.098)	(0.097)
Paid × Public	0.056	0.065	0.043			
	(0.189)	(0.175)	(0.172)			
Choose × Public	-0.044	-0.008	-0.043			
	(0.179)	(0.165)	(0.163)			
	b) Controls					
Female		0.040	0.010		0.064	0.016
		(0.069)	(0.070)		(0.109)	(0.111)
DG: Tokens kept		-0.062***	-0.057***		-0.097***	-0.091***
		(0.009)	(0.009)		(0.013)	(0.013)
Other controls	No	No	Yes	No	No	Yes
Observations	329	329	329	329	329	329

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Notes: Standard errors are clustered at individual level. *NOT PAID* is the base market design treatment. *PRIVATE* is the base visibility treatment. DG refers to the dictator game, in which we gave 20 experimental tokens to subjects and asked them how many they would like to keep. Other controls include age, chosen charity, and individual rating of chosen charity.

We also find support for strong positive effects of social image concerns on donations. Using the same Poisson regression in Equation (4.1), we find that irrespective of the market design, making actions visible significantly increases the number of donations that are made over the three rounds. The effect is of similar magnitude to the incentive effect described above and is similarly robust to various sets of controls. The strong social image effect in both the single and the dual markets can be taken as support for Prediction (2a).

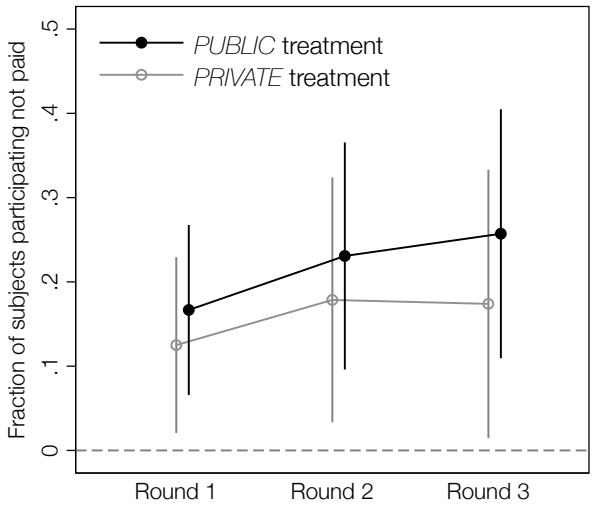
After having established the positive effect of monetary incentive and visible actions on donations, we can assess the potential interaction of both effects. Recall that our theoretical framework in section 2 rules out that extrinsic incentives can spoil the image of donors and thus does not to produce a negative interaction between extrinsic incentives and social image concerns. Our experimental results support this assumption. Table 5 (columns 1 to 3) presents semi-elasticities estimated from Equation

(4.1), including for the interaction-terms of incentive and visibility effects. We estimate zero interaction effects both in the single market *PAID* and in the dual market *CHOOSE* treatments. These results are robust across specifications. In the presence of a salient outside option, small incentives to donate do not appear to spoil the image of donors.

We now consider what actions subjects take in the dual market *CHOOSE* treatment. In particular, we are interested in the incentive choice of subjects in the *PRIVATE* and in the *PUBLIC* treatments.

In each of the three rounds and in each visibility treatment, the fraction of subjects deciding to not be paid for their donation is significantly larger than zero (Figure 2). Aggregating over the three rounds, subjects choose to make 0.23 donations without being paid in *PRIVATE* and 0.41 donations without being paid in *PUBLIC* (Table 4, panel II, column 4). We take these results as strong support for Prediction (1) of price discrimination in the dual market.

Figure 2: Fraction of Participating Subjects Turning Down Incentive in Donation Task, by Round



Notes: Bars indicate 95% confidence intervals.

To analyze the hypothesized sorting into unpaid donations in the dual market *CHOOSE* treatment across visibility treatments, we estimate the following multinomial logit random effect model for the donation decision and the chosen incentive scheme of subjects that generate at least one donation. Over the three rounds, each subject i takes decision $d_i \in \{\text{no participation, unpaid participation, paid participation}\}$:

$$d_{i,t} = \alpha + \beta PUBLIC_i + \boldsymbol{X}_i\boldsymbol{\gamma} + v_{i,t} \tag{4.2}$$

where for each subject i and round t, *PUBLIC* is a dummy for the treatment in which subjects have to reveal their actions, $\boldsymbol{X}$ is a vector of controls, and $v_{i,t} = c_i + u_{i,t}$ is the

error term of the random effect model. Treatment assignment is permanent, but exogenous. While time invariance of treatment assignment makes the fixed effect model unidentifiable, exogenous treatment assignment meets the random effect assumption and makes this model specification the natural choice.[12]

The multinomial logit random effect model provides estimates for the relative probability of observing an unpaid rather than a paid donation in the dual market *CHOOSE* treatments. In the regression specification without controls, the relative probability increases by 77.3 percent when actions are visible, and the effect size is fairly stable in specifications with controls (see Table B1). While this qualitatively confirms the pattern from Figure 2, we cannot reject that the relative risk ratio is different from unity at any conventional confidence level. We are thus not powered to find support of Prediction (2b), which says that social image concerns further lower the average cost of collection in the dual market.

4.2. Heterogeneous Social Image Effects Across Genders

We find gender-specific effects in the *PUBLIC* treatment that suggest a differential willingness to engage in costly signaling. Making actions visible increases participation in the donation task significantly among men in the *NOT PAID* and *CHOOSE* treatment. For women, we find the inverse in that the increase is only significant in the *PAID* treatment.

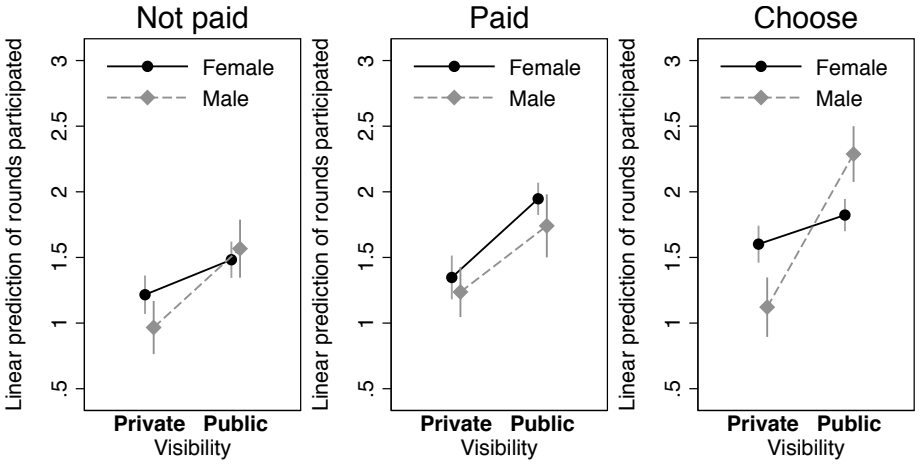
Paralleling the analysis above, we use maximum likelihood estimates of a Poisson regression. For each incentive treatment, we separately estimate a model of the form:

$$\begin{aligned} Donations_i = \alpha + \beta_1 FEMALE + \beta_2 PUBLIC \\ + \beta_3 (FEMALE \times PUBLIC) + \beta_4 DG + \psi_i \end{aligned} \tag{4.3}$$

where for each subject i, $Donations_i$ is a count variable for number of individual donations over the three rounds of the donation task, and DG is the number of tokens kept in the dictator game. Table B2 presents estimates of the semi-elasticities. We find that social image effects are significantly different across genders only in the dual market *CHOOSE* treatments. Figure 3 provides graphical illustration of the interaction effect by plotting the predicted participation in the donation task for each subsample.

[12] Any specification of the regression equation that includes individual characteristics is prone to bias and would require testing of the random effects assumption.

Figure 3: Gender-Specific Effects of Visibility Treatment, by Incentive Treatment (Linear Prediction of Rounds Participated, Based on Regressions in Table B2)



Notes: Bars indicate 95% confidence intervals. Standard errors clustered at the individual level.

We take this as suggestive evidence that men are more willing than women to engage in costly signaling. Recall that in our framework, choosing to participate in the donation task represents a signal that is differentially costly across the three donation treatments. Choosing to participate without being paid (either in the *NOT PAID* or *CHOOSE* treatments) carries the largest reputational gains, since subjects who engage in the real effort task incur the highest opportunity cost by leaving all value to the charity (i.e. they forego the outside option). In the *PAID* treatment, subjects can signal their altruism at a lower opportunity cost (i.e. they forego the outside option minus the individual compensation).

Consistent with the interpretation that men may be more prone to engage in costly signalling of prosocial orientations, we find some evidence that men are more likely than women to turn down incentives when their actions are observed by others. To see this, we restrict our analaysis to subjects in the dual market *CHOOSE* treatment in *PUBLIC*. We again use a multinomial logit random effect model to estimate the relative probability of observing unpaid rather than paid donations. We find that the relative probability of engaging in unpaid rather than paid donations is larger than unity and marginally significant at the ten percent level (see Table B1).

Both gender-specific results presented in this subsection are consistent with a framework of image utility in which the most image-concerned agents donate more and turn down incentives when they are observed by others. We caution, however, that our experiment was not powered to detect heterogeneous effects within each treatment. We thus only take our results as suggestive and encourage further work to adequately assess potential gender-specific effects.

5. Discussion and Conclusion

Motivated by the market for blood donations in Germany, where different incentives for altruism coexist and donors can effectively turn down monetary incentives to donate, we set out to study a "dual market" for the collection of charitable donations. While incentives for prosocial behavior have mostly been studied in isolation and in contrast to the absence of incentives, we explicitly allow agents to turn down a compensation for their donation.

In the case of blood donations in Germany, different blood collectors offer different incentives and prospective donors can choose where to donate. Donations at the Red Cross are always unpaid, while donations at hospitals or commercial blood banks are compensated with 20 to 30 euro. Everyone who lives in one of the 50 largest communities in Germany can reach an unpaid donation point of the Red Cross within 30 minutes time driving or on public transport. This compares to about 62 percent of the population who can reach a paid donation point within 30 minutes time using the same means of transport (see in the online appendix Table E2 for details and and Figure E1 for the spatial distribution of blood collection centers). In Meyer and Tripodi (2018) we survey knowledge of various institutions to donate blood in the city of Bonn and find awareness for paid and unpaid options to be similar (see in the online appendix Table E3).[13] While donors appear to be able to choose whether or not they want to be paid, unpaid donations still represent more than 70 percent of all donations in Germany (Paul-Ehrlich-Institut, 2018). Incidentally, the German market also has the highest per capita rate of donations among all 172 countries that report to the WHO and comparatively low wholesale prices for human blood.[14]

We hypothesized that that in such a dual market, a positive fraction of donors chooses to be not paid and that this fraction is bigger when actions are taken in public. In our theoretically-motivated laboratory experiment, find that when given the option to turn down the compensation, a significant fraction of donors indeed chooses to do so. Offering a compensation and letting agents turn down the compensation lets the collection system leverage the heterogeneity in individual preferences. This

[13] Meyer and Tripodi (2018) interview about 1,000 randomly sampled customers of the municipal service center in Bonn, a mid-sized city in the west of Germany. Although the data is not representative for Germany, we take awareness of both paid and unpaid collection centers, for a rich set of demographic groups in an urban area, as confirmation that the choice between incentives for donating blood is indeed salient for a non-negligible share of the population.

[14] Germany has the highest number of donations at 57.3 per 1,000 people, compared to 49.2 in Sweden and 43.7 in the United States. The cost of one blood unit on the German wholesale market is among the lowest in the world at about $110, compared to $190 in Sweden and Switzerland (Trimborn, 2009) and about $211 in the United States (Toner, Pizzi, Leas, Ballas, Quigley and Goldfarb, 2012). We calculate per capita donations based on the total number of whole blood donations collected in the years 2011 to 2013 (World Health Organization, 2017). We use the latest year available for all countries that report to the WHO. Population data comes from the World Bank World Development Indicator database. Online appendix E provides more details on the German market for whole blood donations.

enables efficiency gains in the collection similar to those deriving from self-selection in second-degree price discrimination.

These findings stand in contrast with the influential work of Titmuss (1971), who argued that paid blood donations could crowd out the intrinsic motivation to donate and lead to a net drop in donations. Our results complement the findings of Lacetera et al. (2014a), who conduct a field experiment in which the American Red Cross offers gift cards as incentive to donate blood. They report that after donating, virtually none (2 percent) of the offered cards were turned down. In their setting, the ability to turn down incentives is not salient to prospective donors in their decision to come to the donation drive. Moreover, there is no clear signaling motive for turning down the gift card. In our setting, the two incentive schemes carry different utility in terms of private benefit and signaling value. With this choice between the two different incentives schemes, our dual market should be more effective at leveraging heterogeneity in individual preferences.

For a simple illustration of how the dual market increases the number of donations, we can use the average marginal effects from the Poisson regression of the number of individual donations over the three rounds on treatment indicators, a gender dummy, and the number of tokens kept in the dictator game (Table 5, column 5). Holding everything else constant, the predicted number of donations in a dual market is 0.473 standard deviations larger than in the single market where donations are not paid. This is equivalent to the estimated effect of moving from the 20th percentile to the 60th percentile in the distribution of "generosity" of subjects as measured by the dictator game, again holding everything else constant.

Even though we cannot provide strong evidence that sorting operates through social image concerns, we do find robust support for the remainder of our second prediction, which states that visibility of actions increases donations irrespective of whether incentives are available. We can again use the average marginal effects from Poisson regression (Table 5, column 4) to illustrate the effect size of social image. Making actions observable while holding everything else constant increases the predicted number of donations by 0.493 standard deviations. This is slightly larger than the estimated effect of moving from the 20th percentile to the 60th percentile in the distribution of "generosity" of subjects as measured by the dictator game, again holding everything else constant.

The single market *PAID* and *NOT PAID* treatments allow us to further compare our findings to the existing literature. In contrast to previous work, we do not find that social image effects attenuate incentive effects (Ariely et al., 2009; Carpenter and Myers, 2010). Individuals in our experiment have an outside option that is larger than the monetary incentives to donate, so that *homo economicus* would never choose to donate. Both our work and Ariely et al. (2009) are based on the theoretical framework of Benabou and Tirole (2006). Our findings suggest that in this framework, a salient outside option makes incentivized donations more likely to signal altruism and less likely to

signal greed. This attenuates the image-spoiling effects of incentives that can bring about a negative interaction between incentive and image effects.

Our findings also suggest a gender-specific willingness to engage in costly signaling that could be interpreted as consistent with gender-specific aversion to standing out (Jones and Linardi, 2014) as well as with costly signaling theory in evolutionary biology (Gintis, Smith and Bowles, 2001; Smith and Bird, 2000) and strategic signalling of generosity among men (Barclay, 2010; Boehm and Regner, 2013; Eagly and Crowley, 1986; Iredale, Van Vugt and Dunbar, 2008).

Our findings have implications for the design of mechanisms for the collection of charitable donations. Applied to the collection of whole blood donations, our results could inform the design and regulation of systems that use monetary incentives. Because voluntary provision of blood donations is often insufficient (Whitaker, Rajbhandary, Kleinman, Harris and Kamani, 2016), demand for blood is likely increasing in the future (Greinacher, Fendrich, Brzenska, Kiefel and Hoffmann, 2011), and modern screening technologies appear sufficiently safe to counter adverse selection (Offergeld, Faensen, Ritter and Hamouda, 2005), several countries are now re-evaluating partial reliance on incentivized or paid donations (Lacetera, Macis and Slonim, 2013). Even small efficiency gains in these collection systems can imply economically meaningful savings for public health budgets, and behavioral models that capture the potential effects of social interactions may be better equipped to extract those gains. In the Unites States alone, about 13.6 million blood units are collected every year at a total value of more than US$ 3 billion.[15] Our results suggest that having different institutions provide distinct incentive schemes can improve the efficiency of the market compared to the case of all institutions offering the same incentives. In such a market, collectors may be able to increase donations by making image concerns more salient. In the case of Germany, the institution that offers unremunerated donations and has most to gain from making donations visible – the Red Cross – in fact largely relies on highly visible mobile drives for its collection.

Policy makers looking to evaluate the costs and benefits of different mechanisms to encourage prosocial behavior should take into the potential role of social interactions such as signaling motives of prospective donors. For the case of blood donations, ignoring social image effects might lead a policy maker who is considering to lift a ban on monetary incentives to underestimate the benefits of such a change. More generally, many behaviorally-informed policy interventions and "nudges" likely entail both benefits and costs due to social interactions among the intended audience that merit the attention of policymakers and researchers alike (Allcott and Kessler, 2019).

Our results point to various avenues for future research. First, it would be important to further understand the mechanisms through which sorting into unpaid donations operates both in the German blood market and in general. While our theoretical framework suggests that social image effects should play a key role, our experimental

[15] Back-of-the-envelope calculation based on 2007 US data from Toner, Pizzi, Leas, Ballas, Quigley and Goldfarb (2011).

data provides weak evidence to support this hypothesis only for men. Second, our setting does not appear to suffer from the negative interaction of social image effects and incentive effects that has been found in the previous literature. Empirical studies to determine if and when incentives spoil image utility constitute a promising avenue for future research. Third, we cannot rule out that specific features of our experimental task undermine the external validity of our findings. While we used a task that is popular in the literature because it is not inherently meaningful and lends itself to a test of subject motivation, there is scope for future work in less stylized settings. Finally, we hope this work stimulates theoretical efforts on the characterization of competitive aspects of dual markets that would allow us to better understand the endogenous formation and broader social welfare implications of such institutional arrangements – important matters from which we largely abstract in this paper.

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A. Appendix: Proofs

Proof of Prediction 1. The proposition is composed of two statements.

First statement: "*A dual market for donations increases contributions compared to a single market where no incentives are available.*"

When actions are private, the utility of any agent i can be re-written as

$$U_i(d,y) = \begin{cases} [a_i(B-y)+y-c]d, & \text{Dual Market: } y \in \{0,\tilde{y}\} \\ [a_iB-c]d, & \text{Single Market - No Incentives } y=0 \end{cases}$$

Availability of incentives $\tilde{y} > 0$ does not affect donation behavior of highly altruistic agents ($a_i > 1$), who can choose to turn down the incentive, gaining utility

$$a_iB - c > a_i(B-\tilde{y}) + \tilde{y} - c.$$

At the same time, the availability of incentives get agents for whom

$$a_iB - c < 0 < a_i(B-\tilde{y}) + \tilde{y} - c$$

involved in the donation.

When actions take place in public, the same as above applies for image-indifferent agents. Image-concerned agents will now focus instead on taking the action that sends the best possible signal about their degree of altruism. Independence in the distribution of the degree of altruism and image concern implies that image-concerned agents would never refrain from donating, as doing so would send the worst possible signal about their degree of altruism.

Second statement: "*Compared to a single market where conditional incentives are automatic and cannot be turned down, allowing to turn down incentives reduces the cost of collection without affecting the number of donations.*"

When actions are private, the utility of any agent i can be re-written as

$$U_i(d,y) = \begin{cases} [a_i(B-y)+y-c]d, & \text{Dual Market: } y \in \{0,\tilde{y}\} \\ [a_i(B-\tilde{y})+\tilde{y}-c]d, & \text{Single Market - with Incentives} \end{cases}$$

Define the share of highly altruistic agents as $s(a) = Pr(a_i > 1)$. Because $B > c$, a $s(a)$ share of agents would donate irrespective of the availability of incentives, even though their intrinsic motivation to donate is partially crowded out in a single market with incentives. Allowing agents, in a dual market, to sort out of incentives un-does the described crowding out of intrinsic motivation to donate and reduces the average cost of collection.

When actions take place in public, the same as in private applies for image-indifferent agents. For image concerned agents, we need to show that participation is unaffected

by the possibility of turning down incentives. Therefore, we need to show that in neither a single incentivized market nor in a dual market image concerned agents want to abstein from donating. The proof goes by contradiction.

In a dual market, suppose there exists a pure strategy equilibrium in which all image concerned agents were to not donate. Any one of these agents could deviate from the equilibrium by donating and turning down the compensation to mimic the most altruistic image indifferent agents. Such deviation would improve the reputation of this agent, hence her utility. A contradiction.

Similarly, in the single incentivized market the profitable deviation is represented by the reputational gain of donating with incentives.

□

B. Appendix: Additional Tables

Table B1: Random Effects Regressions: Relative Risk Ratios
(Coefficient Estimates and z-scores in Parentheses)

Dependent variable:	Incentive Choice				
	(1)	(2)	(3)	(4)	(5)
	a) Treatment				
Public	1.625	1.481	1.599	20.732*	19.907
	(0.63)	(0.54)	(0.63)	(1.65)	(1.55)
Public × Female				0.031*	0.035
				(-1.71)	(-1.62)
	b) Controls				
Female		0.701	0.588	8.960	6.296
		(-0.43)	(-0.66)	(1.35)	(1.08)
DG: Tokens kept			0.926		0.906
			(-0.64)		(-0.83)
Observations	321	321	321	321	321

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$ for relative risk ratios different from unity.
Notes: z-scores reported in parenthesis are based on heteroskedasticity robust standard errors of the multinomial logit estimates. *PRIVATE* is the base visibility treatment. The incentive choice dependent variable only applies to the 126 subjects in *CHOOSE* treatment over three rounds. Incentive choice takes value "0" if subject skips, "1" if participates unpaid, and "2" if participates paid to the donation task in a given round. The table reports relative risk ratio for outcome "1" unpaid participation and base outcome "2" paid participation estimated among subjects that make at least one charitable contribution. All specifications include round fixed effects.

Table B2: Poisson Regression for Total Individual Donations: Semi-Elasticities (Coefficient Estimates and Standard Errors in Parentheses)

	Incentive Treatment Subsamples		
	Not paid	Paid	Choose
	(1)	(2)	(3)
a) Gender dummy × visibility treatment			
Public	0.483*	0.342	0.713***
	(0.253)	(0.210)	(0.268)
Female	0.230	0.086	0.357
	(0.242)	(0.196)	(0.258)
Public × Female	-0.285	0.026	-0.584*
	(0.293)	(0.251)	(0.315)
b) Controls			
DG: Tokens kept	-0.050***	-0.053***	-0.083***
	(0.015)	(0.015)	(0.019)
Observations	93	110	126

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Notes: Standard errors are clustered at individual level. *NOT PAID* is the base market design treatment. *PRIVATE* is the base visibility treatment. DG refers to the dictator game, in which we gave 20 experimental tokens to subjects and asked them how many they would like to keep.