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Matching donations without crowding out? Some theoretical considerations and a field experiment

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Matching donations without crowding out?
Some theoretical considerations and a field experiment^{*}

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Abstract

Is there a way of matching donations that avoids crowding out? And, more generally, what is the best way to utilize a bigger lead gift for raising smaller contributions in a fundraising campaign? To answer these questions, we present a novel matching method, some simple theoretical considerations, and evidence from a large-scale natural field experiment on charitable giving. We compare a standard linear matching scheme with a novel matching scheme in which *the matched amount is allocated towards a different project*. Treatments with unconditional lead gifts serve as controls. Similar to findings from the previous literature, conventional matching for the same project results in partial crowding-out (increasing, however, the participation rate and the overall return per mail-out). The novel matching scheme that we propose also increases the response rate and, in addition, does avoid crowding out.

JEL classifications: C93, D64, D12

Keywords: Charitable giving, Matched fundraising, Natural field experiment

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1 Introduction

Matched fundraising, in which a large donor tops up individual donations according to some scheme, is popular among charitable organizations. Recent studies based on field experiments (see, for example, Karlan and List 2007 or Huck and Rasul 2011) demonstrate, however, that matched fundraising has a downside: it generates substantial crowding out and appears inferior to solicitation schemes that simply announce a lead gift (Huck, Rasul, and Shephard 2015). One reason why fundraisers might be forced to use matched fundraising nevertheless is competition. Holding everything else constant, donors will always prefer to give money to fundraising drives that offer more matching rather than less. Simply, notice that with matching a donor's budget set rotates outward. Hence, the question arises, whether it is possible to design an alternative matching scheme that is attractive to donors and avoids crowding out (or perhaps even generates some crowding in). In this paper, we present some simple theoretical considerations that suggest that a matching scheme in which the matched money is allocated to a different project should outperform a standard matching scheme in which the match contributes to the same project. If the other project is not a near substitute, such matching might even generate crowding in. We then test this prediction in the field.

For standard linear matching we confirm that the average donation given is lower than in a pure lead donor treatment that serve as a control. (We refer to a "lead donor" environment whenever the money offered by a big donor before a fundraising drive starts is given unconditionally and simply announced, that is, when it is not used for matching.) However, in contrast to earlier field experiments, the crowding out is overcompensated by an increase in the response rate, rendering simple matching superior to environments with unconditional lead gifts. Looking across different experiments, there appear to be heterogeneous subject pool effects.

Regarding our main hypothesis, we do indeed find evidence for reduced crowding out when the matched amount is allocated to an alternative project. While more work will be required to understand the precise magnitude of the effect, our results suggest that charitable organizations might substantially improve their fundraising success through such alternative forms of matching.

2 Literature

There has been a multitude of studies employing field experiments to study fundraising and charitable giving. For example, Karlan and List (2007) conclude from a direct mail solicitation to prior donors that the introduction of a simple traditional matching scheme (1:1) significantly increases the probability of giving but reduces the average donation given. The overall return is significantly higher with matching than without. Further increases in the matching rate (2:1 or 3:1) have little, if any, effect. Controlling for the informational role a lead donor (or a large donor who offers matching) provides, Huck and Rasul (2011) show that crowding out is already quite severe with low matching rates (0.5:1). In Eckel and Grossman (2008), the matching schemes (0.25:1 and 0.33:1) generate similar average donations to those in the case without matching but surprisingly reduce response rates for repeat donors. Meier (2007) finds that matching increases participation in the short term but shows that in the long term, when no matching is offered in the future, contribution rates decline and the overall effect of matching is negative.

It has also been shown that larger lead gifts increase the success of fundraising campaigns (e.g. List and Lucking-Reiley 2002). However, only few studies hold the large donor's initial gift constant and compare several fundraising schemes in order to understand how the initial contribution can be best used to stipulate subsequent "small money" donations. Huck and Rasul (2011) compare standard matching to a pure lead gift environment which allows them to come up with precise estimates of the crowding out effect. Huck, Rasul, and Shephard (2015) estimate a structural model based on experimental data and show that, in the environment they study, linear matching will never outperform a simple lead donor treatment in which the lead donor offers his money unconditionally and recipients of the fundraising drive are informed about this lead donation. In Gneezy *et al.* (2014) a lead donor treatment outperforms standard linear matching in every dimension (response rate and average positive donation). Also, they find that a lead donor treatment in which the lead gift is said to cover overhead costs results in even higher total contributions. Rondeau and List (2008) compare, among others, a lead donor (challenge gift) campaign and a matching (1:1) campaign, but they use a different context—a threshold public good setup with a refund in case the threshold is not met. They conclude that announcing a lead donor increases average donations and the probability of giving compared to a simple solicitation campaign without lead gifts. In their

experiment, matching does not increase the success of the fundraising drive and they conclude that it is inferior to a challenge gift.

3 Some theoretical considerations

Consider a model with three goods: a composite good that captures private consumption y and two charitable goods (where we assume that the donors care about their individual contributions, that is, we assume that the project is scalable such that marginal donations matter).¹ We assume that donors have a quasi-linear utility function and that monotonicity implies that donors will allocate their full income among the three goods such that we can write their utility as

$$U(x, a, b) = I - x + u(a, b)$$

where I is income, $I - x = y$ is private consumption, and a and b denote the amounts of money allocated to the two projects with $x = a + b$. We assume $u'_a, u'_b > 0$ and $u''_{aa}, u''_{bb} < 0$ and notice that the cross derivative u''_{ab} is negative for substitutes and positive for complements. (For perfect substitutes we would have $u''_{aa} = u''_{bb} = u''_{ab}$.)

Now consider a fundraising drive where donors are only asked to make a single decision about the amount, x , that they want to contribute and where matching schemes are in place, $a(x)$ and $b(x)$ that map the donation into effective contributions to the two charitable goods. Then we can write the donor's utility function as

$$U(x) = I - x + u(a(x), b(x)).$$

For linear matching schemes, which we employ in the experiment, we have $a(x) = \lambda x$ and $b(x) = \theta x$. The donor's optimal choice is given by the first-order condition

$$-1 + \lambda u'_a + \theta u'_b = 0.$$

¹ See Huck, Rasul and Shephard 2015 for a similar approach.

We are interested in crowding effects, that is, in how the match rates, λ and θ , affect the donation x . We can easily derive these crowding effects through the implicit function theorem which yields

$$\frac{dx}{d\lambda} = -\frac{u'_a + au''_{aa} + bu''_{ab}}{\lambda^2 u''_{aa} + 2\theta\lambda u''_{ab} + \theta^2 u''_{bb}}$$

and

$$\frac{dx}{d\theta} = -\frac{u'_b + bu''_{bb} + au''_{ab}}{\lambda^2 u''_{aa} + 2\theta\lambda u''_{ab} + \theta^2 u''_{bb}}.$$

Inspecting the numerator of these derivatives, it becomes clear that the degree of relative risk aversion will be relevant for crowding, while inspecting the denominator underlines the role of substitutability between the two charitable goods. In our experiment, we implement four treatments:

T1: $\lambda = 1$, $\theta = 0$ (donations are allocated to the first project)

T2: $\lambda = 0$, $\theta = 1$ (donations are allocated to the second project)

T3: $\lambda = 2$, $\theta = 0$ (donations are allocated to the first project and are doubled)

T4: $\lambda = 1$, $\theta = 1$ (donations are allocated to the first project and the matched money is allocated to the second project)

which generate the following first-order conditions:

$$\text{T1: } u'_a(x, 0) = 1$$

$$\text{T2: } u'_b(0, x) = 1$$

$$\text{T3: } u'_a(2x, 0) = 1/2$$

$$\text{T4: } u'_a(x, x) + u'_b(x, x) = 1$$

Let's say that the donor is asked to contribute to good a . Then for matching in the same good (and no matching in the other, that is, for $\theta = 0$) we get

$$\frac{dx}{d\lambda} = -\frac{u'_a + au''_{aa}}{\lambda^2 u''_{aa}}$$

and we will have crowding out, $\frac{dx}{d\lambda} < 0$, (as has been documented by the previous literature)

iff $-\frac{au''_{aa}}{u'_a} > 1$. This reveals the link between relative risk aversion and crowding. For example, if u (for $b = 0$) exhibits CRRA with a coefficient greater than 1 there will always be crowding out.

For matching in the other good, b , we have to consider $\frac{dx}{d\theta}$. Assuming that the two goods are either (weak) substitutes or, in case of complementarity, that u''_{ab} is not too large we get a simple condition for the absence of crowding out or some crowding in:

$$\frac{dx}{d\theta} \geq 0 \Leftrightarrow -\frac{bu''_{bb}}{u'_b} - \frac{au''_{ab}}{u'_b} \leq 1. \quad (1)$$

Inspecting (1) reveals the key insight that we take away from this model sketch: as the condition is easier to fulfill *the weaker the substitutability* between the two charitable goods is, matching should be more efficient if the match is allocated to a second project that is not a perfect substitute for the first.

Hypotheses

Given the considerations presented in this section and based on empirical evidence presented in the literature Section we state the following testable

Hypothesis 1: *Standard linear matching generates crowding out* and Hypothesis 2: *The mere presence of a lead donor is better than standard linear matching*. However, the most important hypothesis of this study is

Hypothesis 3: *An alternative matching scheme where the match is allocated to a different project results in less crowding out (and perhaps in crowding in)* and Hypothesis 4: *The alternative matching scheme outperforms traditional matching*.

4 Experimental design

In order to avoid spillovers from previous campaigns, we decided to conduct our experiment with an institution that had previously not engaged in any (“small money”) fundraising activities. This led to the choice of the municipal opera house of Frankfurt/Main. In April 2014, the opera house sent out 25,000 solicitation letters to opera visitors, asking them to support one or two social youth projects organized by the opera house. Both projects are part of the “JETZT! OPER FÜR DICH” [“NOW! OPERA FOR YOU”] program, which enhances cultural education and social integration. The first project (“Aramsamsam”) benefits small children aged 2–4 and gives children their first contact with classical music regardless of their social status. The second project (“Opera Bus”) runs an opera bus that visits schools, pediatric wards in hospitals, and social enterprises for the disabled. Those two projects are likely to be perceived as substitutes given that they benefit different recipients in a similar way. But they are clearly not perfect substitutes. Thus, condition (1) has a chance to hold.

The recipients were randomly selected from the opera’s database of individuals who had visited at least one opera performance since 2010.² Recipients were randomly assigned to one of four treatment groups such that there were over 6,000 subjects per treatment. In the first basic treatment (T1), the letter asks for donations for the first project (Aramsamsam) and informs the reader that a sponsor has already been attracted who will support the “JETZT!” campaign (of which Aramsamsam is part) by donating €30,000. In the second basic treatment (T2), the letter asks for donations for the second project (Opera Bus) and, similarly to T1, announces a lead donor who will support the “JETZT!” campaign by donating €30,000. Those two basic treatments allow us to compare the basic desirability of the two projects. In the traditional matching treatment (T3) the letter asks for donations for the main project (Aramsamsam) and announces an anonymous sponsor who will match the donations 1:1 up to an amount of €30,000. In the new matching scheme (T4) the letter asks for donations for the main project (Aramsamsam) and announces a donor who will give the same amount to support another project (Opera Bus) up to an amount of €30,000.

The mail-out letters were identical in all treatments with the exception of two paragraphs. The exact format and wording of the mail-out is provided in the Appendix.

² In most cases, the individuals included purchased a ticket for at least one opera or concert performance or bought a subscription. There are several observations included who received free tickets.

It is important to stress a number of things. First, the projects we are considering are of an essentially linearly expandable nature such that all donations will matter on the margin. With more money, the opera house will be able to organize more sessions with small children and more visits of the Opera Bus. There are no explicit or implicit targets in the mailing. Second, recipients are told the truth. The lead gift was actually provided and each matching scheme was implemented. The value of matches across all treatments was capped at €30,000, which ensured subjects were told the truth even if the campaign was more successful than anticipated. Crucially, this holds the commitment of the lead donor and, hence, the signal of quality, constant across treatments. Note, that holding the large donation constant among treatments also reflects the situation in which a charitable organization has already identified a big donor and now has to decide how to utilize the lead gift for subsequent “small money” fundraising.

In Table 1, we analyze the random assignment of recipients into treatments. A number of recipient characteristics are available in the opera house’s database, which records information on individuals that visited an opera house performance in the recent past. Due to randomization, recipients are, in most cases, not significantly different to each other across the treatments, which is confirmed by t-tests of equality of means for the available demographic variables (female dummy, couple dummy, academic title dummy being PhD or professor, subscriber dummy³ and Frankfurt resident), and activity variables (days since last order in the database, number of orders in the database). Given the large number of variables and treatments and consequently t-tests, the number of tests with p-values at and below 0.05 is in the range of statistical error and does not contradict random assignment (2, 3, and 3 at 1%, 5%, and 10% respectively out of 54 tests). However, given that we have detected some significant differences between the treatment groups, we will control for this lack of balance when analyzing the data on donations.

³ Operagoers can choose between different types of subscription, for example for opening performances, Sunday performances, concerts etc. and they commit to attend a particular number of performances for a fixed price.

Table 1: Random Assignment of Recipients into Treatments

Mean, standard error in parentheses

P-value on test of equality of means in box brackets

Treatment	Treatment description	Comparison group	Number of recipients	Female [Yes=1]	Couple [Yes=1]	PhD or Professor [Yes=1]	Subscriber [Yes=1]	Frankfurt resident [Yes=1]	Days since last order ⁴	Number of orders	Average value of order	order value (sum)
T1	Lead donor (Aramsamsam)		6,143	.503 (.006)	.019 (.002)	.116 (.004)	.289 (.006)	.369 (.006)	301 (2.205)	6.81 (.125)	114.92 (1.43)	800.07 (20.43)
T2	Lead donor (Opera Bus)		6,143	.500 (.006)	.019 (.002)	.120 (.004)	.287 (.006)	.378 (.006)	308 (2.204)	6.43 (.119)	118.42 (1.48)	782.77 (17.54)
T3	Standard matching (Aramsamsam + Aramsamsam)		6,143	.504 (.006)	.022 (.002)	.119 (.004)	.293 (.006)	.376 (.006)	304 (2.228)	6.88 (.126)	115.92 (1.50)	814.21 (19.28)
T4	Alternative matching (Aramsamsam + Opera Bus)		6,144	.509 (.006)	.019 (.002)	.109 (.004)	.295 (.006)	.371 (.006)	302 (2.226)	6.97 (.128)	115.33 (1.51)	811.67 (17.74)
		(1)=(2)		[0.732]	[0.947]	[0.433]	[0.735]	[0.314]	[0.024]	[0.027]	[0.088]	[0.521]
		(1)=(3)		[0.857]	[0.144]	[0.575]	[0.648]	[0.467]	[0.240]	[0.691]	[0.627]	[0.615]
		(1)=(4)		[0.477]	[0.843]	[0.240]	[0.491]	[0.843]	[0.567]	[0.367]	[0.843]	[0.668]
		(2)=(3)		[0.601]	[0.163]	[0.823]	[0.426]	[0.780]	[0.282]	[0.009]	[0.235]	[0.228]
		(2)=(4)		[0.291]	[0.896]	[0.050]	[0.304]	[0.419]	[0.093]	[0.002]	[0.144]	[0.247]
		(3)=(4)		[0.595]	[0.206]	[0.083]	[0.817]	[0.596]	[0.548]	[0.610]	[0.780]	[0.923]

Notes: The tests of equality in box brackets are based on a mean comparison t-test against a two sided alternative hypothesis.

⁴ In the database of customers.

5 Results

The fundraising campaign generated a total of €46,159 in donations from 447 individuals⁵, thus yielding the overall response rate of 1.8%. Most donations arrived within the first and second month after the mail-out (344 and 79 respectively), but some donations trickled in during the subsequent months. Table 2 provides descriptive statistics on donations by treatment. The average response rate varies between 1.5% and 2.1% and the average positive donation ranges between €88 and €121 depending on the treatment. The return per mailing varies between €1.68 and €2.30. The distribution of donations is skewed with a median at €50 and donations as high as €1000 present in every treatment. In T3 there were two very high donations: In one case, a donor gave €2014⁶ and in another case, one donor donated €1000 twice, which we count as one €2000 donation.⁷

Table 2: Descriptives

Mean, standard error in parentheses

Treatment	Treatment description	Number of recipients	Number of donations	Response rate	Average positive donation	Median	Minimum	Maximum	Return
Column				I	II				III
T1	Lead donor (Aramsamsam)	6,143	93	0.0151 (.0016)	121.29 (18.09)	50	5	1000	1.836 (.3316)
T2	Lead donor (Opera Bus)	6,143	106	0.0173 (.0017)	97.36 (11.50)	50	10	1000	1.680 (.2554)
T3	Standard matching (Aramsamsam + Aramsamsam)	6,143	129	0.0210 (.0018)	109.37 (22.56)	50	5	2014	2.297 (.5126)
T4	Alternative matching (Aramsamsam + Opera Bus)	6,144	119	0.0194 (.0018)	87.81 (10.79)	50	10	1000	1.701 (.2591)

Notes: Response rate is not significantly different between treatments with the exception for the difference between T1 and T3 (Fisher's exact test: $p=0.02$) and between T1 and T4 (Fisher's exact test: $p=0.08$). Average positive donation is not significantly different between treatments with the exception for the difference between T2 and T3 (MWU-Test: $p=0.07$). Return is not significantly different between treatments with the exception for the difference between T1 and T3 (MWU-Test: $p=0.02$) and between T1 and T4 (MWU-Test: $p=0.07$).

⁵ Three donors donated twice.

⁶ The donor explained this particular amount with the year of donation—2014.

⁷ There were two other donors who donated twice; one donated €250 and €500 in T3 (counted as €750) and one donated €150 twice in T4 (counted as €300).

Table 3: Regression results

Specification	Response	Value of donations (nonzero)		Return	
Dependent variable	Donation dummy	$\log(\text{donation}) $ donation > 0	$\log(\text{donation}) $ donation > 0	$\log(\text{donation}+1)$	$\log(\text{donation}+1)$
Method	probit (m.e.)	OLS	QRE (m.e. at median)	OLS	tobit (m.e. y*)
Column	I	II	III	IV	V
T2: Lead donor (Opera Bus)	0.003 (0.002)	-0.002 (0.126)	-0.021 (0.131)	0.011 (0.010)	0.012 (0.010)
T3: Standard matching (Aramsamsam + Aramsamsam)	0.006** (0.002)	-0.237** (0.120)	-0.282** (0.125)	0.020** (0.010)	0.024** (0.010)
T4: Alternative matching (Aramsamsam + Opera Bus)	0.004* (0.002)	-0.104 (0.122)	-0.086 (0.127)	0.014 (0.010)	0.018* (0.010)
Controls	yes	yes	yes	yes	yes
Observations	24573	447	447	24573	24573

Notes: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Controls include: number of orders, average value of order, time since last activity, and dummies for subscription holder, female, couple, PhD or professor, Frankfurt resident.

Given that we have detected some imbalances between our treatment groups, it is important to condition on individual characteristics when analyzing the results. In Table 3, we present a number of regression results that control for donor characteristics. We also take care of the skewness of the distribution by taking logs when applicable⁸ and of outliers by presenting the results from quantile regression. The base treatment is T1. In the first column, we analyze the responses by running a probit specification and present marginal effects. In the second and third, we look only at positive donations. The second column presents results from a simple OLS regression and the third column shows marginal effects from a quantile regression at the median being more robust to outliers than OLS. The dependent variable is the logarithm of (positive) donations in both specifications. The last two columns look at the return from the mail-out and show regression results from a simple OLS (Column IV) and marginal effects from a tobit regression (Column V) which is better suited for the underlying distribution with

⁸ The results from QRE with levels of positive donations instead of logs lead to the same conclusions.

many zeros. The dependent variable is, in both cases, given by the logged amount of donations plus one.

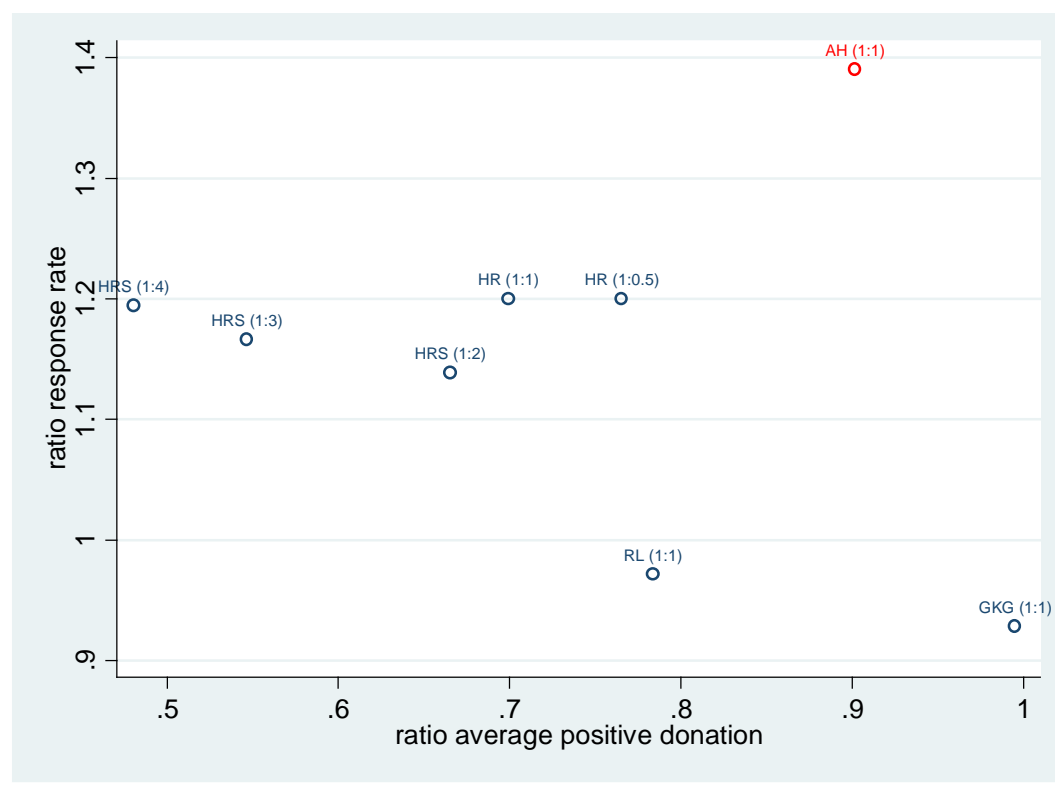
Standard matching (T3): crowding out and performance

In order to assess the performance of the standard matching (T3) treatment and analyze the crowding out, we compare T3 to the lead donor treatment (T1). The response rates are 2.1% in the standard matching treatment T3 and 1.5% in the respective lead donor treatment T1 (Table 2, Column I). In a probit regression (Table 3, Column I), where we control for individual characteristics, we confirm that standard matching significantly increases the response rate, the marginal effect being 0.6 percentage points (pp).

The average positive donation is €121 in the lead donor treatment and €109 in the matching treatment. An OLS regression confirms a significant negative effect of matching on the value of donations (Table 3, Column II). Also, when we perform a quantile regression, (Table 3, Column III), which better accounts for outliers and the skewed distribution, crowding out in T3 (Hypothesis 1) is confirmed.

The return rate is €1.84 in the lead donor treatment and €2.30 in the matching treatment. The difference is meaningful—the return per mail-out is 25% higher in the matching treatment. In fact, when running the regressions, we find a significant positive but rather small effect of the matching treatment on the return of around 2–2.4%. Overall, we conclude that, in our environment, matching works better than the pure lead donor treatment. Thus we reject our Hypothesis 2. In other words, our results differ from the findings of the earlier literature which we demonstrate in Figure 1. The figure shows ratios of response rates (on the y-axis) and of average positive donation amounts (on the x-axis) for matching treatments over lead donor treatments in a number of comparable earlier studies. The past studies (HR – Huck and Rasul 2011, HRS – Huck, Rasul and Shephard 2015 (hypothetical effects), RL – Rondeau and List 2008, GKG – Gneezy, Keenan, Gneezy 2014) suggest a tradeoff between the response rate and average positive donation. Our results (AH) are rather different. Our matching treatment performs much better relative to the pure lead donor treatment, both, in terms of the response rate as well as in terms of the average positive donation.

Figure 1: The ratios of the matching treatment to lead donor treatment in different studies for the response rate (y-axis) and for the average positive donation (x-axis).



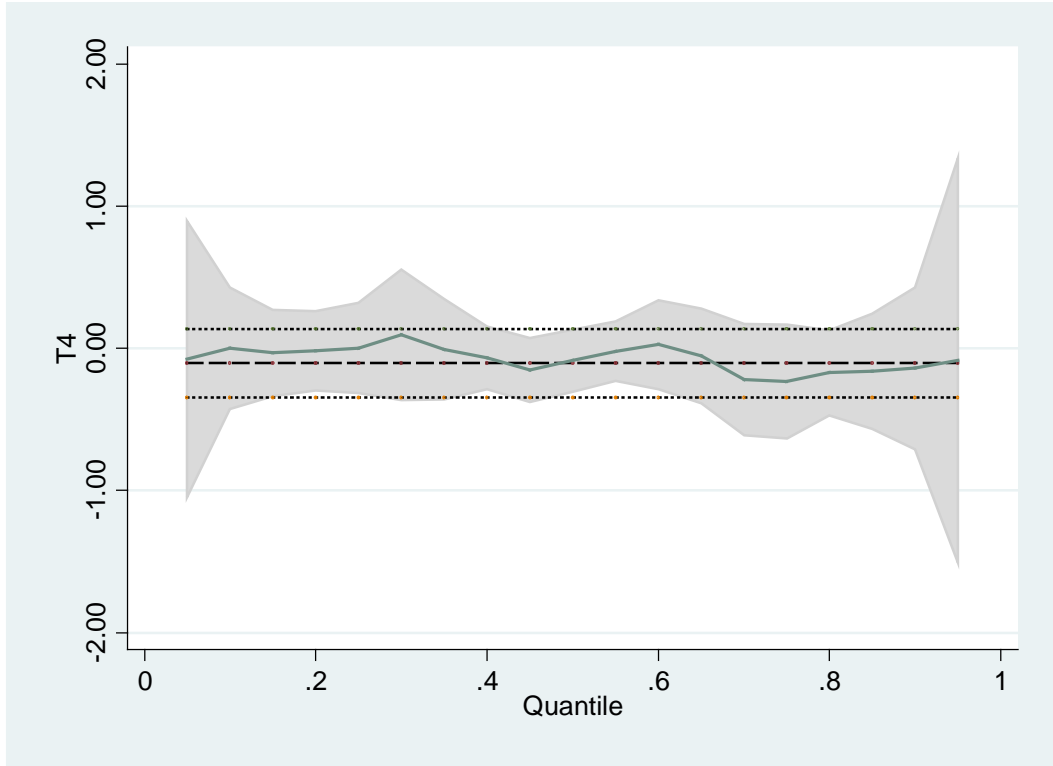
Note: HR – Huck and Rasul 2011, HRS – Huck, Rasul and Shephard 2015 (hypothetical), RL – Rondeau and List 2008 (threshold and return), GKG – Gneezy, Keenan, Gneezy 2014, and AH – this study.

Alternative matching (T4): reduced-crowding-out hypothesis and performance

In order to test the reduced-crowding-out hypothesis, we look at the regression results with the average positive donation being the dependent variable (Table 3, Column II and III). We see that T4 does not significantly reduce the average donation suggesting no crowding out. Figure 4 shows that, in the quartile regression, the coefficient on T4 is virtually zero at every percentile (i.e. not only at the median). Moreover, the coefficient on T4 is small compared to that of T3. While the simple matching (T3) significantly reduces the average donation given by 23–28%, a test of equality of those coefficients after the quantile regression rejects the equality at 10%, confirming that there is less crowding out in T4 than in T3. In total, we see that the alternative matching scheme significantly raises the response rate (Table 3, Column I) and, at the same time, *does not generate any significant crowding out*. Given that the second project on its own is not considered better than the first, this suggests that matching with

another good can indeed improve the effectiveness of matching which speaks in favor of our Hypothesis 3.

Figure 2: T4 coefficient: Quantile regression estimates



Note: solid line – coefficient on T4 from quantile regression for all percentiles of logged positive donations, grey area – 95% confidence interval, dashed line – OLS coefficient on T4, dotted line – 95% confidence interval.

The unconditional average return in our alternative matching treatment is only €1.70 (see Table 2) compared to €2.30 in our standard linear matching. However, in regressions that condition on observables, both treatments significantly raise the return and there is no significant difference between the two (Table 3, Column IV and V). Therefore, we cannot confirm the Hypothesis 4.

Individual characteristics

Similarly to previous studies concerned with the question of “who gives”? (see e.g. Andreoni and Payne 2013), we note that some of the individual characteristics are strongly correlated with more giving. This suggests that the effectiveness of a particular fundraising design might differ in different environments (for the full estimation results, see the appendix B). In the context of our opera house, being a subscriber, having visited more performances, and having a last visit that was not too distant in time increased, both, the response rate and the average amount given. From the available demographic characteristics we find being female to have a negative effect on the average donation given and having an academic title to have a negative effect on the response rate and return per mail-out. Given the strong effects of individual characteristics and some detected imbalance between treatment groups make us rather rely on the regression results when interpreting the results from our field experiment.

6 Conclusions

We hypothesized that matching donations for one project with contributions to another project might be a promising alternative to traditional matching schemes. Earlier studies of matched fundraising have indicated that standard matching might be problematic as it causes partial crowding out and hinted at the superiority of fundraising campaigns where large lead gifts are simply announced as unconditional. However, competition might force charitable organizations to employ matching nevertheless. *Ceteris paribus*, donors will prefer to give to fundraising calls that offer more rather than less matching.

In a simple theoretical sketch we showed that, for rather general assumptions on donors’ preferences, matching schemes that introduce a second charitable good towards which the matched amount is allocated should outperform standard matching. Taking our inspiration from these considerations, we conducted a field experiment to shed some light on this idea.

We investigated four different fundraising schemes: two environments with lead donors for the two different charitable goods, standard linear matching (1:1) in the same good, and an alternative matching scheme in which the matching (1:1) amount is allocated to a second project. First of all, contrary to data patterns observed in earlier studies, the standard matching treatment performed in our experiment better than the simple announcement of a lead donor. Nevertheless we do confirm that standard linear matching generates substantial crowding out.

Crowding out is attenuated when the matched amount is allocated to a second project which is a likely to be a (non-perfect) substitute to the first. Indeed our point estimates suggest that there is no crowding out under the novel matching scheme. As the two projects are not too dissimilar and the second project generated lower average donations than the first when on its own we believe that alternative designs with a second project that is as popular as the first but an even weaker substitute should improve outcomes even further.

We view our study as a proof of concept. It demonstrates that charitable organizations might be able to improve the success of their fundraising schemes substantially by trying out more imaginative forms of matching. This would retain the advantages of matching in competitive environments while avoiding crowding out, its major downside.

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Appendix A) Mail-out letter (original)

Spendenaufruf für das JETZT! OPER FÜR DICH

es ist ein großes Anliegen der Oper Frankfurt, Kinder und Jugendliche aus dem Rhein-Main-Gebiet mit altersgerechten Angeboten an die faszinierende Welt von Oper und Musik heranzuführen. JETZT! OPER FÜR DICH fördert kulturelle Bildung und soziale Integration.

Auch in der Spielzeit 14/15 steht die Oper Frankfurt vor der Herausforderung,

(T1, T3) *Aramsamsam*, einen wichtigen Pfeiler des JETZT! Programms für Kinder im Alter von 2-4 Jahren, durchzuführen. Die Realisierung des künstlerisch und pädagogisch anspruchsvollen Projekts

(T2) *Oper für Kinder unterwegs*, einen wichtigen Pfeiler des JETZT! Programms für Grundschüler, durchzuführen. Die Realisierung des künstlerisch und pädagogisch anspruchsvollen Projekts

(T4) *Aramsamsam* und *Oper für Kinder unterwegs*, wichtige Pfeiler des JETZT! Programms für Kinder von 2-4 Jahren bzw. für Grundschüler, durchzuführen. Die Realisierung der künstlerisch und pädagogisch anspruchsvollen Projekte

bedeutet für das Haus einen großen finanziellen Aufwand, für den leider kaum Mittel im Haushaltsetat vorgesehen sind.

Ein Förderer, der anonym bleiben möchte, konnte bereits gewonnen werden.

(T1, T2) Er unterstützt JETZT! OPER FÜR DICH mit insgesamt 30.000 €

(T3) Er wird *Aramsamsam* unterstützen: Für jede Spende, die für *Aramsamsam* eingeht, spendet er den gleichen Betrag noch einmal für *Aramsamsam* - bis zu einem Maximum von 30.000 € insgesamt, das uns der Spender im Rahmen unserer Kampagne für JETZT! OPER FÜR DICH zur Verfügung stellt.

(T4) Er wird *Oper für Kinder unterwegs* unterstützen: Für jede Spende, die für *Aramsamsam* eingeht, spendet er den gleichen Betrag noch einmal für *Oper für Kinder unterwegs* - bis zu einem Maximum von 30.000 € insgesamt, das uns der Förderer im Rahmen unserer Kampagne für JETZT! OPER FÜR DICH zur Verfügung stellt.

(T1, T3) Helfen auch Sie! Mit Ihrem Engagement tragen Sie dazu bei, dass *Aramsamsam* weiterhin angeboten und ausgebaut werden kann.

(T2) Helfen auch Sie! Mit Ihrem Engagement tragen Sie dazu bei, dass *Oper für Kinder unterwegs* weiterhin angeboten und ausgebaut werden kann.

(T4) Helfen auch Sie! Mit Ihrem Engagement tragen Sie dazu bei, dass *Aramsamsam* und *Oper für Kinder unterwegs* weiterhin angeboten und ausgebaut werden können.

Weitere Informationen finden Sie in der beiliegenden Projektbeschreibung. Bei Fragen ist das Development-Team (Tel. XXXXXX) gerne für Sie da.

Als Dankeschön verlosen wir unter den Spendern einen Opernbesuch für 2 Personen sowie 20 Bücher „Ein Haus für das Theater“.

Herzlichen Dank für Ihre Unterstützung!

Mit freundlichen Grüßen

Appendix B) Mail-out letter (translation)

Call for donations for the JETZT! OPER FÜR DICH

It is a major concern of the Opera Frankfurt to introduce children and adolescents of the Rhine-Main Region to the fascinating world of opera and music by offering age-appropriate attractions. JETZT! OPER FÜR DICH [NOW! OPERA FOR YOU] enhances cultural education and social integration.

Also in the 14/15 season, the Opera Frankfurt faces the challenge of offering

(T1, T3) *Aramsamsam*, an important pillar of the JETZT! [NOW!] program for children aged 2–4. The realization of this artistically and pedagogically ambitious project

(T2) *Oper für Kinder unterwegs* [Opera on the go for children], an important pillar of the JETZT! [NOW!] program for elementary school students. The realization of this artistically and pedagogically ambitious project

(T4) *Aramsamsam* and *Oper für Kinder unterwegs* [Opera on the go for children], important pillars of the JETZT! [NOW!] program for children aged 2–4 and elementary school students. The realization of these artistically and pedagogically ambitious projects

implies a large financial outlay for the opera, which exceeds unfortunately the opera's budget.

We have already succeeded in attracting a sponsor for our program, who wishes to remain anonymous.

(T1, T2) He is supporting JETZT! OPER FÜR DICH with an amount of €30,000.

(T3) He is supporting *Aramsamsam*: For each donation for *Aramsamsam*, the sponsor will donate the same amount to *Aramsamsam*, up to a maximum of €30,000—the total amount he will provide for our campaign JETZT! OPER FÜR DICH.

(T4) He is supporting *Oper für Kinder unterwegs*: For each donation for *Aramsamsam*, the sponsor will donate the same amount to *Oper für Kinder unterwegs*, up to a maximum of €30,000—the total amount he will provide for our campaign JETZT! OPER FÜR DICH.

(T1, T3) Please help us too! Your commitment will contribute to ensuring that *Aramsamsam* continues to be offered and improved.

(T2) Please help us too! Your commitment will contribute to ensuring that *Oper für Kinder unterwegs* continues to be offered and improved.

(T4) Please help us too! Your commitment will contribute to ensuring that *Aramamsam* and *Oper für Kinder unterwegs* continues to be offered and improved.

Further information can be found in the enclosed material. If you have any questions, our development team would be delighted to help you [No. XXXXX].

As a thank you, we will raffle a pair of opera tickets and twenty books “Ein Haus für das Theater” [“A house for the theatre”] among all our donors.

With many thanks for your support and best wishes,

(T1, T3, T4) ARAMSAMSAM – die Mitmachkonzerte der Oper Frankfurt für die Kleinsten!

Mit Aramsamsam hat die Oper Frankfurt ein neues Projekt initiiert, das schon den Jüngsten unabhängig ihrer sozialen Herkunft den Zugang zu Kultur ermöglicht. Die Zielgruppe der Kleinkinder zwischen zwei und vier Jahren kommt zusammen mit vertrauten Personen, z.B. ihren Eltern oder ihrer Kita-Gruppe, am Vormittag in das Holzfoyer der Oper. In den Aramsamsam-Konzerten wird für und mit Kindern gesungen und musiziert. Hier findet ein erster Kontakt zu Liedern und Melodien statt; die Kinder werden spielerisch in die Welt der Musik eingeführt. Die Konzerte haben jeweils einen Themenschwerpunkt, der eine Verbindung zum täglichen Leben der Jüngsten darstellt. In dieser Spielzeit können die Kinder die Themen SONNE, MOND UND STERNE sowie LUFTSPRÜNGE musikalisch erleben und kennenlernen.

(T1, T3, T4) ARAMSAMSAM – the join-in concerts of the Opera Frankfurt for the little ones!

Aramsamsam is a new project initiated by the Opera Frankfurt, which enables even the youngest children, regardless of social background, to access culture. The target audience of toddlers aged 2–4 arrives in the morning at the opera's Holzfoyer accompanied by familiar faces, e.g. their parents or their kindergarten group. During the *Aramsamsam* concerts, the actors sing and play instruments for and with the children. This is where the children get in touch with songs and melodies for the first time; thus they become playfully introduced to the world of music. Each concert contains a key subject, which expresses a connection to the children's daily lives. During the current season the children may musically experience the subjects SONNE, MOND UND STERNE [Sun, moon and stars] and LUFTSPRÜNGE [leaping in the air].

(T2, T4) OPER FÜR KINDER UNTERWEGS – die mobile Produktion der Oper Frankfurt!

Die Oper Frankfurt versorgt mit einem mobilen Angebot zahlreiche Institutionen des gesamten Rhein-Main-Gebietes: Unser Opernbus tourt jährlich mit einer Oper für Kinder durch Schulen und andere soziale Einrichtungen, wie z.B. die Praunheimer Werkstätten und die Uniklinik Frankfurt. Das Projekt ermöglicht Schülern aller sozialer Schichten, Menschen mit Behinderung und Patienten einen spielerischen (Erst-) Kontakt zu Welt der Oper. Die Bearbeitungen großer Opernwerke sind für alle leicht verständlich. Mit im Gepäck ist natürlich auch das Opernensemble: direkt vor Ort erleben die Zuhörer die Künstler, die sich ihrerseits schon auf ein Wiedersehen mit den kleinen und großen Experten im Opernhaus freuen.

(T2, T4) OPERA ON THE GO FOR CHILDREN – the mobile production unit of the Opera Frankfurt!

The Opera Frankfurt serves a numerous institutions throughout the Rhine-Main region with a mobile service: our opera bus and its opera for children annually tours schools and other social facilities like, for example, the Praunheimer Workshop and the University Hospital Frankfurt. This project allows students of all social classes, people with disabilities, and patients their (first) contact with the world of opera. The adaptations of large-scale operatic works are easily understandable for everyone. The opera ensemble comes as part of the package: the audiences directly experience the artists, who are already looking forward to seeing the younger and older experts in the opera again.

Appendix B

Table B1: Regression results

Specification	Response	Value of donations (nonzero)		Return	
Dependent variable	Donation dummy	log(donation) donation >0	log(donation) donation >0	log(donation+1)	log(donation+1)
Method	probit (m.e.)	OLS	QRE (m.e. at median)	OLS	tobit (m.e. y*)
Column	I	II	III	IV	V
T2: Lead donor (Opera Bus)	0.003 (0.002)	-0.002 (0.126)	-0.021 (0.131)	0.011 (0.010)	0.012 (0.010)
T3: Standard matching (Aramsamsam + Aramsamsam)	0.006** (0.002)	-0.237** (0.120)	-0.282** (0.125)	0.020** (0.010)	0.024** (0.010)
T4: Alternative matching (Aramsamsam + Opera Bus)	0.004* (0.002)	-0.104 (0.122)	-0.086 (0.127)	0.014 (0.010)	0.018* (0.010)
number of orders	0.001*** (0.000)	0.009*** (0.003)	0.007** (0.003)	0.006*** (0.000)	0.002*** (0.000)
average value of order (in 100 Euros)	0.002*** (0.001)	0.217*** (0.035)	0.197*** (0.036)	0.016*** (0.003)	0.009*** (0.003)
subscription holder	0.005*** (0.002)	-0.062 (0.098)	-0.044 (0.101)	0.010 (0.010)	0.023*** (0.008)
time since last activity (in months)	-0.001*** (0.000)	-0.003 (0.010)	0.001 (0.011)	-0.002*** (0.001)	-0.005*** (0.001)
female	-0.000 (0.002)	-0.200** (0.086)	-0.108 (0.089)	-0.003 (0.007)	-0.001 (0.007)
couple	-0.001 (0.005)	0.288 (0.254)	0.443* (0.263)	0.004 (0.026)	-0.003 (0.023)
PhD or professor	-0.004 (0.003)	0.090 (0.136)	0.084 (0.141)	-0.015 (0.011)	-0.015 (0.012)
Frankfurt resident	-0.001 (0.002)	0.026 (0.087)	0.085 (0.090)	-0.002 (0.008)	-0.004 (0.007)
Observations	24573	447	447	24573	24573

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$