Funding Conservation Locally: Insights from Behavioral Experiments in Indonesia

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Abstract

Proximate stressors such as destructive fishing are key drivers of coral reef degradation. Conservation strategies that marshal local action and are tailored to the preferences of the target group are thus needed to sustain coral resources. We experimentally analyze the behavior of marine resource users in a coastal village in Indonesia to gain insight into whether people prefer to donate time or money to environmental or other charitable causes. Each person is subject to one of four treatments: monetary donation, monetary donation match, volunteer time donation, and volunteer time donation match. Contrasting with the existing literature, we find that participants give significantly more when donating money compared to time. We also find that matching donations increases the percent of people giving but does not increase the amount donated. This research furthers our understanding of what motivates resource users in a developing country to contribute to the provision of public goods.

Introduction

Fishing and pollution are the key proximate stressors of coral reefs ecosystems. In Indonesia, 95% of reefs are threatened, of which 50% are in the high or very high threat category (Burke et al. 2011). Conservation science often applies ecological methods to document losses and identify causes for such decline (Verissimo et al. 2011). A paradigm shift is needed that addresses the problem from the perspective of local human drivers so that context-appropriate strategies can be implemented (Smith et al. 2009). It is widely accepted that behavioral economic experiments are useful in understanding human behavior, yet conservation science has all but ignored this potential (Cowling 2014; Reddy et al. 2016).

The provision of local environmental public goods is essential for socioeconomic development, yet there is limited experimental evidence testing various measures that influence contributions to these goods in developing countries (Carlsson et al. 2014; Rode et al. 2015). And, to our knowledge, there are no field experiments that compare voluntary contributions of money and time.

Indonesian’s depend heavily on the health of coral ecosystems for the multitude of local resources provided: they sustain a complex food system, protect people from storm surges, and support economic growth. Yet, the country’s decentralized government and limited public funding for conservation makes local community initiatives all the more important. Participation in local conservation activities, such as when an individual donates money, volunteers, or otherwise expends effort for the purpose of conservation, are of particular research interest.

This article contributes to the gap in research between the charitable giving literature and contributions to public goods in developing countries by employing a behavioral economics field experiment in a coastal village in Indonesia. We focus on two types of contributions: (1) donating money and (2) donating time. In addition, we examine the effects of matching donations of money and...
time at a rate of 1:1 (i.e., the value of contributions is doubled). Participants, whose livelihood is heavily dependent on marine resources, begin by selecting a charity and then performing a task to earn income subject to one of the four treatments: monetary donation (D), monetary donation match (Dm), volunteer time donation (V), and volunteer time donation match (Vm).

Contrary to existing lab studies, which have identified higher donations of time than money (Brown et al. 2013; Lilley & Slonim, 2014), we find that members of an Indonesian fishing community give significantly more when donating money compared to time. We also find that matching increases the percent of people who give but has a crowding-out effect on the percent of earnings donated under the monetary treatment. Taken together, these results highlight the importance of factoring human behavior – and specifically, the role of incentive schemes in influencing preferences for giving – into the design of conservation strategies (Verissimo, 2013; Reddy et al., 2016).

**Time is money?**

This research addresses the conventional economic assumption that whenever the value of cash donations equals the value of time donations, people are indifferent between giving monetary contributions or the value of volunteer labor to the charity (Andreoni et al. 1996). The validity of this assumption has largely escaped empirical scrutiny, with the majority of studies focusing on monetary contributions. To our knowledge, only two behavioral studies\(^1\) compare monetary and time donations. Conducted with university students in developed countries, both studies identify stronger preferences for time donations. Using a lab experiment, Brown et al. (2013) find that students give substantially more time – voluntarily performing tasks while the earnings accrue to the charity – rather than donating the income they earned. Similarly, in the lab experiment by Lilley & Slonim (2014), subjects simultaneously choose how much time and money they want to donate to charity under different wage rates, tax rates, and endowments. Their results show that students give more time than money, suggesting greater “warm glow” benefits from donating time. We model our experimental design loosely on that of Brown et al. (2013) and test the hypothesis that the marine resource users in this fishing village are indifferent between donating time and money.

**Matching**

In principle, matching effectively lowers the “price” of a charitable donation. Following standard economic demand theory, if the price of something falls, consumers should consume more. Nevertheless, the literature on donation matching is inconclusive. Some studies show increased propensity to donate and increased donation amounts with matching (Okunade & Berl 1997; Karlan & List 2007; Meier 2007; Karlan et al. 2011), while other studies report decreased individual giving (Eckel & Grossman 2008; Huck & Rasul 2011).

Even with inconclusive evidence, the ubiquitous prevalence of matching incentives among philanthropic organizations begs the question of whether this technique works in a developing country context to increase either money or time donations. We consequently test the null hypothesis that matching has no impact on the individual gift amounts or on the percentage of people who donate.

**Background**

A total of 302 individuals were recruited\(^2\) from Bajo Mola village, a settlement of stilted houses constructed upon mined coral in the reef flat zone (Sather 1997) and located on Wangi-Wangi Island in South East Sulawesi, Indonesia (Figure 1). Being a fishing community that is almost exclusively dependent upon the marine environment, for income, food, fuel, and building materials, the Bajo are significant stakeholders in marine resource management.\(^3\) They are simultaneously often held responsible for reef destruction due to bomb fishing and coral harvesting (Caras & Pasternak 2009). There are various NGOs and community organizations within and outside the village that provide public goods, such as community clean-ups or environmental education.

Ninety-nine percent of participants in our sample identify as Muslim. The concept “Sadaka,” meaning voluntary charity, is important in Islam and is widely practiced. Self-reported figures indicate that 93% of the study participants voluntarily gave money to charity and 76% volunteered time in the last year.

**Methods**

Invitation letters with randomly assigned dates and times of sessions were distributed to all houses in the village. Participants were grouped together for the briefing instructions and then continued with the task individually.\(^4\) In all treatments (Table 1), respondents chose one charity from a list of six. Then, each person performed the same piece rate task for 1 hour and made a donation decision. Finally, they completed a survey questionnaire.

**Charities**

Participants received a list of six charities with descriptions of their missions in randomized order (Appendix 7). They were instructed to confidentially select one charity
to which they can contribute.\(^5\) Two of the six charities target marine conservation while the remaining four do not have an explicit environmental focus. We followed the standard protocol of other charitable giving studies, which provide several options of different charitable causes to create a clear treatment effect and increase the likelihood that participants will find a cause they feel worthy of supporting (Brown et al. 2013; Gallier et al. 2014). This design feature is a methodological necessity, with the added virtue of revealing preferences for marine protection. We hypothesize there will be no differences in the patterns of giving behavior across the charity options.

### Table 1 Description of between-subject treatments.

| Treatment | Description |
|-----------|-------------|
| (D) Donate | Participants can donate money at the end of the experiment after payment for work. |
| (D\(_m\)) Donate match | Participants can donate money at the end of the experiment after payment for work and the donation will be matched 1:1. |
| (V) Volunteer | Participants choose to switch between working for themselves or volunteering. |
| (V\(_m\)) Volunteer match | Participants choose to switch between working for themselves or volunteering. The value of beads produced for charity is matched 1:1 by monetary donations. |

### Treatments

Each participant was involved in only one treatment. In the D treatment, subjects earned money performing a task and then decided whether to donate money to charity. The V treatment allowed subjects to choose as they work whether each bead accrued money for themselves or for their chosen charity (Figure 2).

To examine the effects of matching, the experiment included two additional treatments – (D\(_m\)) and (V\(_m\)). These are identical to the previous treatments except that the value of the individual’s contribution to charity in either case is matched at a rate of 1:1, so that double the amount went to their chosen charity.

### Real effort task

Participants earned the money they donated to charity rather than receiving it as an endowment – the more common practice in experiments (Eckel & Grossman 2003; Davis & Millner 2005; Gallier et al. 2014).\(^6\) This is an important distinction because it is more similar to behavior in the real world.\(^7\) Participants were given 1 hour to roll paper beads (Appendix 8) and were paid 1,000 Indonesian Rupiah (IDR)\(^6\) for each bead completed. This type of task was chosen because it does not require prior

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knowledge; it is easy to teach a person of any education level or age; it does not require any particular skill; and the activity is commonly taught by NGO’s as an income-generating activity in developing countries (Holt & Littlewood 2015).

Participants were instructed to deposit each bead into a transparent collection receptacle (Figure 2). The D and Dm treatments have only one receptacle while the V and Vm treatments have two, such that any beads placed in the unmarked receptacle will earn private income and any beads placed in the receptacle marked “charity” will earn money directly for their chosen charity.

After 1 hour, the beads were counted and the respondent was paid privately in cash in bills of various denominations. In D and Dm, participants were handed an envelope with their name, which contained their personal earnings, and an empty charity envelope. There was a separate private area where they made their donation decision. They were asked to seal both envelopes before leaving the area so that their decision was confidential. In V and Vm, the value of the beads from the unmarked receptacle was paid in cash and placed into the envelope labeled with the participant’s name. The value of the beads from the charity receptacle was paid in cash into the envelope labeled with the name of the charity the participant selected. In the case of the match treatments, the donated amount is doubled and placed into an envelope in front of the participant.
Results

Summary statistics of the donations by treatment are presented in Table 2. The table is split into averages across all participants as well as the averages conditional on giving. We report on both absolute amounts donated and percentage of earnings donated. Due to the wide range in earnings, we focus our discussion on the percentage of earnings donated.

Result 1. There are no significant differences in the pattern of donations between marine conservation charities versus those dedicated to other objectives.

As seen in Figure 3(a), 36% of the sample chooses a marine conservation charity. Figure 3(b) shows no significant difference between charity types in the percent of participants that make a donation based on a chi-square test ($P = 0.21$). A one-way analysis of variance (ANOVA) test with Bonferroni correction shows that there are also no significant differences in the percent of earnings donated ($P = 0.61$), nor in the amount donated ($P = 0.28$) when comparing the marine conservation charities to the other charity options (Figures 3c and d).

Result 2. The average percent of earnings donated is significantly higher in the monetary donation treatment, $D$, than in the volunteer time treatment, $V$.

The ANOVA test with Bonferroni correction shows a highly significant difference ($P = 0.00$) between $D$ and $V$ in the average percentage of earnings donated. Participants in $D$ give an average of 15.03% of their income to charity while those in $V$ give an average of 7.54%. This holds true whether we include those that donated nothing in the average donation or whether we analyze the results conditional on giving ($P = 0.00$; Figure 4a). This result remains robust when analyzing the absolute amount donated (Table 2). We also explored the results when we correct the standard errors for clustering at the session level, which has only a negligible bearing on the precision of the estimates (Appendix 1). We can therefore reject the hypothesis suggested by Andreoni et al. (1996) that there should be no differences in the average amounts of money or time donated when they are of equal value. On the other hand, our results are the opposite of the findings of Brown et al. (2013) and Lilley & Slonim (2014), who showed that participants prefer to donate time rather than money.

Result 3. The percent of participants who donate increases significantly with the presence of the match.

As seen in Figure 4(b) the percentage of participants that give to charity increases significantly in both of the matching treatments. There is a seven percentage point increase in the percent of people giving, from 85% in $D$ to 92% in $D_m$ ($P = 0.05$; Table 2). The difference is even greater in $V_m$, with nearly an 11 percentage point increase in the frequency of giving (from 82.7% to 93.4%; $P = 0.001$) with the offer of the match.

Result 4. Matching does not increase the percent donated in either the money or time treatments.

Table 2 shows the average percent of earnings donated is 15% for $D$ and 10.6% for $D_m$ ($P = 0.461$). Conditional on giving some amount, this decrease in percent of earnings donated becomes significant with $D$ at 17.6% and $D_m$ at 11.6% ($P = 0.008$). There is no significant differen-
ence in the average percent of earnings donated between $V$ and $V_m$. All results hold true when absolute donation amounts are analyzed (Table 2).

Thus, offering a match can be a counterproductive fundraising mechanism. However, in a dynamic strategy of identifying and developing a new donor subpopulation, the significant increase in the percentage of participants giving something in both match treatments (from Result 3) may be of strategic importance to charity organizations (Figure 5).

**Discussion**

Voluntary contributions to conservation are highly important yet receive little research attention in the conservation sciences (Scarlett et al. 2013). Here, we present the first experimental methodology designed to evaluate resource users’ preferences for contributing time or money and their response to matching incentives. This method allows for evidence-based design of conservation campaigns based on the preferences of the target audience.

Participants from this fishing community display similar preferences for selecting and donating to marine conservation charities as compared to other charitable causes. Marine conservation charities represent one-third of the charity choices and slightly more than one-third of participants select this type of charity. Additionally, participants that choose marine conservation charities donate an equivalent percent of their earnings as those participants that chose other charities. We find clear treatment effects regardless of the type of charity selected. These are important findings for conservation organizations trying to involve communities in engagement and investment in sustaining their natural resources.

Contrary to previous experimental studies, all of which were done in the lab, we find that participants donate a higher percentage of earnings as monetary contributions than time to charities. This result shows the risk in extending insights from university lab experiments in developed countries to behavior in a field setting in a developing country when designing conservation campaigns. Several plausible explanations exist to explain why monetary donations would be larger.
One possibility is that participants may gain more gratification from giving away the relatively scarcer resource (Macdonnell & White 2015) – cash in the case of a low-income fishing community in Indonesia. Tentative evidence is seen by a regression interacting the treatments with income, which indicates that the positive effect of the donation treatment decreases in magnitude with increases in the income of the participant (Appendix 3).

Second, religious background may also play a role. With 99.7% of the sample self-identifying as Muslim, it is possible that the effects are based on the deeply ingrained obligation of monetary charitable giving in Islam, known as “Zakat” (Lambarraa & Riener 2015). Indeed, the sample’s self-reported frequency of voluntarily donating money to charity (93%) compared to volunteering (76%) confirms the pattern seen in the data.

A third possible explanation for higher monetary donations may owe to risk aversion, given that those in treatment D are aware of the total amount they earned before they have to make the donation decision, thus making it easier to calculate how much private income they will take home after giving. While warranting consideration, we do not believe that this factor drives our results. Participants were able to monitor the accumulation of beads in the transparent containers, a highly repetitive process that varies little from bead to bead, making it straightforward to anticipate the total amount.
that would be produced. Moreover, anecdotal evidence from postexperimental surveys indicates that participants in the volunteer treatments applied different strategies to account for earnings and donations, such as counting beads and giving one in every 2 or 10 beads, or deciding on a value to donate at the outset.

Some practical insights have emerged that can inform efforts to raise funds and encourage community engagement in conservation. If the goal is to increase monetary donations, matching does not appear to be effective, but if the goal is to increase the donor base, matching significantly increases the percentage of people donating, which can have great value over the long term. If the goal is to get people actively involved through participation and volunteering, announcing that their time will be matched can allow organizations to better recruit new volunteers, and will lead to more individual volunteer hours received by the charity. An overwhelming majority of conservation organizations are nonprofit and depend on grants, donations, and volunteer time. Reframing secured funds as matches does not incur additional cost to the charity and it significantly increases the number of money and time donors. This evidence paves the way for additional studies that focus on whether people are more likely to participate in activities if the value of their individual volunteered time is known and matched with monetary funds.

The experiment further demonstrates that giving behaviors are not universal and are highly context-dependent (Henrich et al. 2004; Lambarraa & Riener 2015). To improve on this method, alternative designs which introduce the treatments after the effort task should be tested to isolate the effect of the treatment on the donation amount and rule out any doubt that this is a secondary result from a change in effort level driven by the treatment. We also recommend that similar methods be applied across different cultural settings to provide more understanding as to whether our results are idiosyncratic or whether there is widespread cultural variation in giving behavior.

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1. Rai et al. (2015) use choice experiments and Eom & Larson (2006) use contingent valuation methods to identify differences in local demand for environmental services. Their results show a stronger preference for offering time for local environmental services rather than making a monetary payment.
2. One-third of all houses participated.
3. For in-depth ethnographies of the Bajo Sea nomads, see Chou (2003), Sather (1997), and Clifton & Majors (2012).
4. See Appendix for a detailed description of the experimental setup and location, the invitation letters, and experimental instructions.
5. Each participant was informed that all donations would be sent to the charities within 90 days and that signs would be posted publicly in the village showing the total amounts donated to all of the charities.
6. Reinstein & Riener (2012) find that those subjects who earned their compensation choose to donate less than those who received an endowment.
7. It is important to note here that a necessity of this design was to introduce the treatments prior to beginning the task to differentiate between giving time compared to giving money, but this also represents a potential weakness in the design. Similar to results from Balakrishnan et al. (2011), we find that treatment affects effort level. Effort and treatment then both affect donations. Therefore, it is difficult to disentangle the mechanism driving the change in donations given that the introduction of the treatment affects not only how much one gives but also how hard he works, and consequently, the amount earned.
8. European Central Bank exchange rate October 7, 2015 is €1 = IDR15,492. Therefore, 1,000 IDR is equivalent to 0.07 €.
9. Analysis of mean age, income, education, and gender distribution across treatment groups does not show any significant differences. See appendix for results of analysis of demographics across treatments.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher’s web site:

Appendix 1. Experimental design.
Appendix 2. Demographic distribution of district and regional population data compared to sample data.
Appendix 3. Regression table showing treatment and income interactions.
Appendix 4. Comparison of demographics across treatment groups.
Appendix 5. Invitation letter.
Appendix 6a. Experimental instructions – donation.
Appendix 6b. Experimental instructions – donation match.
Appendix 6c. Experimental instructions – volunteer.
Appendix 6d. Experimental instructions – volunteer match.
Appendix 7. Charity choices.

Appendix 8. Step-by-step visual guide to rolling paper beads.

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