How Sunday, price, and social norms influence donation behaviour.*

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Abstract

We describe a natural field experiment investigating donation behaviour. The setting was an art gallery where donations could be deposited into a transparent box in the foyer. Two aspects of the donation environment were manipulated: signs on the donation box, and the initial contents of the box. We used three sign treatments: a control with no sign, a sign that thanked donors, and a sign that indicated donations would be matched. We used two initial contents treatments: one with relatively little money ($50) and one with four times as much. The average donation per donor was significantly larger in the $200 treatments but this was offset by a decrease in the propensity to donate. In the matching treatments donations were significantly larger both at the per donor and per visitor level. A control variable turned out to have the largest influence on donation behaviour: the day of the week. The average donation per visitor was 51% higher on Sundays, when compared to every other day of the week.

Key Words: natural field experiment, donation, charity, price, social norms

JEL: C93, H41

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1 Introduction

In 2007, charitable giving in the USA was estimated to be $306 billion dollars \((\textit{Giving USA 2008})\), or roughly 2.2\% of the 14 trillion dollar Gross Domestic Product \((\textit{CIA World Factbook 2007})\). Much like the proverbial glass of water, there are two possible interpretations. For those that view the glass to be half empty, 2.2\% is a small number, charitable giving is of marginal importance and interest, and not much of a threat to the assumption of pure self interest. For those that view the glass to be half full, $306 billion dollars is a lot of money. Humans are notoriously bad at interpreting large numbers, so perhaps an example will help illuminate. If we were to create a stack of $100 bills with a total value of $306 billion, how high would the stack be?\(^1\) This paper is for those who view the glass to be half full.


The articles cited above can be broken into two groups. The first four articles investigate the price effects associated with matching and rebate schemes. For example Eckel & Grossman \((2008)\) investigate the effectiveness of matching and rebates in a Minnesota Public Radio fundraising drive. The last four articles investigate the influence of social comparison on donation behaviour.

\(^1\)The stack would be 334 kilometers (208 miles) high. A $100 bill is 0.010922 cm or 0.0043 inches thick \((\textit{National Money Laundering Strategy 2007})\).
For example, Frey & Meier (2004) demonstrate that students are more likely to donate to a social fund when they are told that a large proportion of their peers have donated in the past. Similarly, in the context of a fundraising telethon for a public radio station, Shang & Croson (2005) demonstrate that donations tend to be larger if callers are told that a previous caller donated a large amount.

In this experiment, visitors were not directly informed about the donation behaviour of others. Instead, we manipulated the initial contents of the donation box. The contents of the donation box provided information concerning the composition, frequency and typical size of the donations made by other visitors. Regardless of how social information is conveyed, little is known whether norm manipulations and price effects interact or their relative magnitudes. This is the question that this article addresses.

We begin the analysis by specifying a simple model, similar to that used by Levitt & List (2006). An individual $i$ allocates his/her exogenous wealth $w^i$ between private consumption $x^i$ and a contribution to the public good, $g^i$. The budget set is $\mathcal{B} = \{(x^i, g^i) \in \mathbb{R}_+^2 | w^i \geq x^i + pg^i \}$, where $p \in \{1/2, 1\}$ is the price of a donation: A one-for-one match effectively halves the donation price.

A contribution to the gallery affects an individual’s utility via two additively separable channels. The first channel is consumption utility $u^i(x^i, g^i, G)$, a function of private consumption $x^i$, “warm glow” $g^i$, and the public good $G = g^i + G^{-i}$, where $G^{-i}$ is the total funding for the gallery (public, corporate, private) net of the donation of individual $i$. Individual $i$ is impurely altruistic with respect to consumption (Andreoni 1990). We denote the contribution that maximizes consumption utility over budget set $\mathcal{B}$ as the “intrinsically preferred” donation size.
Comparative statics can be used to find the condition under which the “intrinsically preferred” donation is independent of the donation behaviour of others. This independence occurs if $-pu_{xG-i} + u_{yG-i} + u_{GG-i} = 0$ over the range of conceivable private donations. As a first approximation we believe this condition is likely to be met. City Gallery Wellington receives approximately two million dollars of public funding per year, and an undisclosed amount of corporate funding. In contrast, extrapolating our results would suggest annual private donations of roughly $14,000. If we ignore corporate funding, the point elasticity of total revenue with respect to private donations is $\epsilon = \frac{\% \Delta \text{Total Revenue}}{\% \Delta \text{Private donations}} = 0.007$. In other words, the donations of other visitors to the gallery have virtually no affect on the “size” or quality of the public good, and thus should have no impact on the marginal utility that an individual derives from private consumption, “warm glow” giving, or even the public good itself. Nevertheless, it is possible that visitors to the gallery might be unaware of how inconsequential private donations are, at least when compared to the public funding. In such a scenario, impurely altruistic preferences would generate a partial crowding out effect; namely, a negative relationship between the “intrinsically preferred” donation and the donation behaviour of others.

The second channel by which a contribution affects an individual’s utility is a non-pecuniary moral cost $M^i(g^i, n^i(b))$, associated with deviation from $i$’s perception of the social norm $n^i(b)$. In this experiment, the visitor’s perception of the social norm is affected through the initial contents of the box, $b$. In contrast with Bernheim (1994), but similar to Akerlof (1982), we assume that the moral cost is based on observable actions rather than unobservable preferences. In the absence of a signalling problem, the desire for esteem will merely cause the distribution of observed contributions to become more concentrated than the underlying distribution of “intrinsi-
cally preferred” contributions. This complete information model of esteem seeking does not generate conformity in the strict sense, where we would expect agents with heterogeneous preferences to make the (exact) same choice. Instead, the perceived social norm will exert a gravitational pull on donations away from their “intrinsically preferred” size, towards the implied social norm. We assume that the moral cost of deviation from the implied social norm is increasing in the magnitude of the deviation, and that the moral cost is strictly quasiconvex.

Subject to the budget set, individual \( i \) maximizes \( u^i(x^i, g^i, G) - \theta^i M^i(g^i, n^i(b)) \) where \( \theta^i \) is the weight \( i \) places on moralistic concerns. The contents of the donation box provide information concerning the norms of giving: the frequency of donations, and the typical (positive) donation size. In a previous study (Martin & Randal 2008), the total value of the initial contents was held constant, and the composition was varied. In this study the opposite is done: we hold the composition of the initial contents constant, and vary the total value. We consider two treatments, which we will refer to as the \$50 and the \$200 treatments. The \$50 treatment consists of one \$10 bill, three \$5 bills, nine \$2 coins, five \$1 coins, two 50¢ pieces, and five 20¢ pieces. The \$200 treatment has exactly the same composition, only it is scaled up four times, i.e. four \$10 bills, twelve \$5 bills, etc. The typical appearance of the two treatments in the donation box at the start of a day are shown in Figure 1.

Holding the busyness of the gallery and the frequency at which the box is emptied constant, more money in the box suggests that: a larger proportion of visitors donate, or the typical (positive) donation size is larger, or perhaps both of the above. If visitors place a positive weight on the moral cost of deviating from the (perceived) social norm (\( \theta > 0 \)), then we would expect the average donation per visitor to be larger in the \$200 treatments when
Figure 1: The typical appearance of the contents of the donation box, the $50 treatment on the left, and the $200 treatment on the right.

compared to the $50 treatments. In contrast, if visitors place zero weight on this moral cost, then altering the initial contents of the box should have no impact on donation behaviour. This generates a testable null hypothesis.

In addition to manipulating the contents of the box, we investigate the effect of signs placed on all four sides of the base of the donation box. We used three treatments: the “control” had no signs at all; the “thank you” treatment had signs reading “City Gallery Wellington Foundation thanks you for your donation” and showing logos of two corporate members of this foundation; and finally, the “matching” treatment had signs reading “Cash donations today will be matched by City Gallery Wellington Foundation”, again accompanied by the two logos. The two sets of signs were visually very similar, differing only by the message.

We anticipated that thanking the visitors for their donation might enhance the “warm glow” associated with a contribution, or alternatively call attention to the existence of corporate sponsorship, thus providing a signal concerning the quality of the public good (Vesterlund 2003). We expected that matching would induce a negative relationship between the donation
price $p$, and both the propensity to donate and the average donation per donor. In other words, we predict that the price effect of the match will dominate the potentially perverse income effect, yielding a downward sloping “donation” curve. Since average donations at City Gallery are typically between $2 and $3, and survey data indicated 47% of visitors had household incomes in excess of $40,000, we expect that the income effect of the match will be small relative to the price effect.

2 Methodology

This experiment was conducted at City Gallery Wellington, New Zealand from Monday 14 November 2005 to Monday 6 February 2006. The gallery is relatively small at ten thousand square feet (less than 2% of the size of Musée du Louvre), so we were confident that for a given exhibition, visitors would not spread their visit to the gallery across multiple days/treatments. We took a number of precautions to ensure that if differences between treatments were observed, these differences could not be attributed to other causes. In other words, we attempted to either control or measure those factors that could potentially contaminate the results.

For the duration of the experiment the art on display was unchanged, the gallery was open for the same hours (10:00am to 5:00pm) and admission was always free. These aspects of the environment were perfectly controlled. Data were collected for six individual treatments, over a period of 84 days, as can be seen in Figure 2.

Unfortunately Christmas fell in the middle of our experiment, and the closure of the gallery spoiled an otherwise perfectly balanced design. The $200 matching treatment ended up short one Sunday, and had one additional Mon-
day. While not anticipated, we found a significant “Sunday effect” where donations were larger and more frequent on Sundays. This is investigated in Section 3.3, after the core analysis has been discussed. To achieve balance, we eliminate from the sample: all Sundays, and the final Monday, i.e. the bottom row, and final (partial) column, of Figure 2. This leaves us with two complete replications of a 6×6 design, in which each sign and value treatment combination is sampled on each day of the week (Monday to Saturday).

Visitors allocated themselves randomly to treatment groups following the decision to visit the gallery. Normally subject-determined treatment allocation would severely limit the experimenters’ ability to make causal statements. Fortunately three aspects of our study ensured that the allocation of subjects to treatments was indeed random. First, every person who stepped through the entrance of the gallery necessarily became a subject in our experiment. By doing so they tripped an invisible beam and were counted as a visitor. Second, visitors had no idea that an experiment was taking place in the gallery, or more importantly what treatment was being undertaken. Third, at least in the 72 day subset, the temporal allocation of treatments ensured that treatments were uncorrelated with (possible) “day of the week” or “week of the year” effects.

Figure 2: The temporal distribution of treatments.
The number of visitors exposed to each treatment varied naturally. We deal with this issue in two ways. Our analysis focuses on ratios that, to a first approximation, should be independent of the number of visitors exposed to each treatment. Nevertheless, the differences in numbers of visitors could cause congestion effects, which may diminish the visitors’ enjoyment, alter their perception of the typical donation behaviour, or increase the social pressure to donate. We include the busyness of the gallery as an explanatory variable in our regression analysis.

As with Martin & Randal (2008), individual donation sizes were not observed, and consequently, we analyze daily totals. In addition to measuring total donations, we also recorded the composition of the donations, the number of donations, and the number of visitors\(^2\) to the gallery – all on a daily basis.

3 Results

Unless otherwise stated, the following results are based on 72 data collection days, from Monday to Saturday of the weeks between Monday 14 November 2005 and Saturday 4 February 2006.

3.1 Donation composition

One of the most significant results in Martin & Randal (2008) was the influence that the composition of the initial contents (not value) had on the composition of the donations, i.e. the composition of donations mimicked the

\(^2\)City Gallery Wellington provided us with disaggregated daily data on the number of visitors to the gallery. Groups which have liaised with the gallery for special admission are categorised in the spreadsheet. From the opening hours admissions total, we exclude primary and secondary school groups, and community and corporate groups not using the exhibition spaces. We include tertiary student groups, weekend tours, and public programmes.
composition of the seed money. In contrast, in this experiment the initial contents had exactly the same composition across treatments (only the total value changes). We anticipated that the contents manipulation would not influence the composition of the donations.

Collating the cash received into Bills (\$10, \$5), Gold coins (\$2, \$1), and Silver coins (50¢, 20¢, 10¢, 5¢) we obtain the data presented in Table 1. We conduct contingency table tests for independence between the treatment variable and the composition for the following subsets of the data: all six treatments; the \$50 treatments alone, and the \$200 treatments alone (testing across signs); the “no sign” treatments alone, the “thank you” treatments alone, and the “matching” treatments alone (testing across value).

Even at the 10% level of significance, no differences in the composition of donations can be detected when comparing all six treatments. As expected, the contents manipulation had no discernible impact on the composition of the donations in the matching and no-sign treatments. This result provides support for the link between the composition of past (perceived) donations and future donations. Not only is there an effect when the composition changes and the value remains constant (Martin & Randal 2008), but the effect is absent when the composition remains constant and the value of the contents change. We view these results to be strong evidence that conformity plays a large role in determining donation behaviour.

We did not anticipate that the contents manipulation would influence the composition of donations in the “thank you” treatments. Specifically, in the combined \$200–“thank you” treatment, bills were over-represented and silver coins were under-represented when compared to the \$50–“thank you” treatment (\(p = 3.6\%\)). We believe that thanking donors is most likely to affect the “warm glow” motive to donate. It is not clear why enhancing “warm glow” would trigger a differential response to the contents of the
Table 1: The composition of donations for the six treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>$10</th>
<th>$5</th>
<th>$2</th>
<th>$1</th>
<th>50¢</th>
<th>20¢</th>
<th>10¢</th>
<th>5¢</th>
<th>Bills</th>
<th>Gold</th>
<th>Silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>$200, matching</td>
<td>1</td>
<td>18</td>
<td>66</td>
<td>43</td>
<td>59</td>
<td>57</td>
<td>36</td>
<td>51</td>
<td>19</td>
<td>109</td>
<td>203</td>
</tr>
<tr>
<td>$200, no sign</td>
<td>2</td>
<td>9</td>
<td>45</td>
<td>28</td>
<td>37</td>
<td>39</td>
<td>32</td>
<td>35</td>
<td>11</td>
<td>73</td>
<td>143</td>
</tr>
<tr>
<td>$200, thank you</td>
<td>3</td>
<td>11</td>
<td>57</td>
<td>35</td>
<td>28</td>
<td>77</td>
<td>41</td>
<td>44</td>
<td>14</td>
<td>92</td>
<td>190</td>
</tr>
<tr>
<td>$50, matching</td>
<td>1</td>
<td>13</td>
<td>50</td>
<td>39</td>
<td>44</td>
<td>90</td>
<td>33</td>
<td>48</td>
<td>14</td>
<td>89</td>
<td>215</td>
</tr>
<tr>
<td>$50, no sign</td>
<td>0</td>
<td>9</td>
<td>37</td>
<td>37</td>
<td>43</td>
<td>48</td>
<td>36</td>
<td>57</td>
<td>9</td>
<td>74</td>
<td>184</td>
</tr>
<tr>
<td>$50, thank you</td>
<td>0</td>
<td>5</td>
<td>56</td>
<td>45</td>
<td>51</td>
<td>78</td>
<td>55</td>
<td>56</td>
<td>5</td>
<td>101</td>
<td>240</td>
</tr>
</tbody>
</table>

donation box. A plausible ex post rationalization is that “warm glow” is a relative rather than absolute phenomenon: people feel “warm glow” only when they believe that their donation is above average. This would imply that in the $200 treatment a larger donation is necessary to generate “warm glow”. Large donations are typically bills rather than coins.

Given the well documented benefits associated with donation matching (Eckel & Grossman 2008, Karlan & List 2007) we expected that matching would influence donation composition: bills would be over-represented and silver coins under-represented. We found no evidence to support this hypothesis, neither overall nor broken down by the contents. In our experiment donation matching did not affect the relative composition of donations.

3.2 Donation size, and frequency

From the daily numbers of donations and visitors, we derive the daily number of visitors who do not donate. We conduct contingency table tests for differences in propensity for the following: all six treatments; the $50 treatments alone, and the $200 treatments alone (testing across signs); the “no sign” treatments alone, the “thank you” treatments alone, and the “matching” treatments alone (testing across value).
A test for differences between all six treatments indicates significance \( (p = 3.4\%) \) for the difference in the observed propensities shown in Table 2. Much like the compositional effect, the only pairwise difference that is significant is within the “thank you” subgroup. \( (p = 1.2\%) \). Specifically, if donors are thanked for their donation, the propensity to donate is 41% higher in the $50 treatment than in the $200 treatment. Looking at this propensity effect in isolation, it appears consistent with a crowding out effect. Note that the “thank you” signs featured the logos of two of the primary corporate sponsors for the gallery. One could imagine a visitor to the gallery thinking “my property taxes help support this gallery, apparently the gallery receives corporate funding from these two companies, and to top it all off, the donation box is full of money,” and then choosing not to donate. The problem with this explanation is that it is not consistent with the compositional effect described above: in the $200–“thank you” treatment, bill donations were more frequent and silver coin donations were less frequent than in the $50 treatment.

Reconsider the “warm glow” explanation, where thanking donors for their donation enhances “warm glow”. Our conjecture that “warm glow” is a relative effect is also consistent with the observed propensity effect. If “warm glow” only occurs when the donor believes their donation is larger than average, then in the $200–“thank you” treatment, a larger donation is required to trigger a “warm glow”. This could create a hurdle effect, where donors who would have donated a small amount in the $50–”thank you” treatment, choose not to donate because the cost of achieving a “warm glow” is too high.

No differences within the other subgroups were significant. Again, given the well documented benefits of donation matching, we were surprised to see that the matching treatments did not result in significantly higher propensities.
Table 2: The propensity to donate for the six treatments.

Furthermore, we expected to see that the $200 treatments would yield higher propensities. A model of social norms would predict that the propensity to donate would be higher in the $200 treatments because the initial contents makes it appear that more people donate.

Next, we focus our attention on the visitors who donate. The average donations per donor are shown in Table 3. Martin & Randal (2008) document a congestion effect whereby average donations per donor are affected by whether or not the gallery is busy. We consider a linear model

\[ \bar{X}_{ijt} = \mu + \alpha_i + \beta_j + \gamma_{ij} + \omega D_t + \epsilon_{ijt} \]  

(1)

where \( \bar{X}_{ijt} \) is the day \( t \) donation, belonging to value treatment \( i \), and sign treatment \( j \), \( \mu \) is the overall mean, \( \alpha_i \) is the value main effect, \( \beta_j \) are the sign main effects, \( \gamma_{ij} \) the interaction terms, \( \omega \) measures the congestion effect, \( D_t \) is the busyness dummy variable (defined to be one when the number of visitors exceeds the sample median over the duration of the study and zero otherwise), and the \( \epsilon_{ijt} \) are innovations, assumed to be independent across \( t \), with mean zero, and variance \( \sigma^2/n_{ijt} \), where \( n_{ijt} \) is the number of donations on day \( t \).

The model (1) is fitted using weighted least squares. The interaction terms and the busyness term are not significant, so these are omitted from the model, and it is re-estimated. The value main effect is significant, with
Table 3: The average donation per donor for the six treatments

<table>
<thead>
<tr>
<th></th>
<th>No sign</th>
<th>Thank you</th>
<th>Matching</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50</td>
<td>$1.79</td>
<td>$1.78</td>
<td>$2.15</td>
</tr>
<tr>
<td>$200</td>
<td>$2.35</td>
<td>$2.68</td>
<td>$2.95</td>
</tr>
</tbody>
</table>

donations to the $200 treatments being on average 76¢ higher than those to the $50 treatments \((p < 0.01\%)\). Relative to the “no sign” control treatments, the “thank you” sign does not have a significant effect on donation size, while the “matching” sign increases donations by 47¢ on average \((p = 1.04\%)\).

While it is interesting to decompose donation behaviour into propensity and average donation per donor, it is reasonable to assume that a charity’s objective is to maximize donation revenue. Because the number of visitors exposed to our treatments varied, we focus our attention on the average donation per visitor, shown in Table 4. We consider the linear model

\[
\tilde{X}_{ijt} = \mu^* + \alpha_i^* + \beta_j^* + \gamma_{ij}^* + \omega^* D_t + \tilde{\epsilon}_{ijt}
\]

where \(\tilde{X}_{ijt}\) is a vector consisting of \(n_{ijt}\) copies of the day’s average donation per donor \(\tilde{X}_{ijt}\) and \(N_{ijt} - n_{ijt}\) copies of 0, \(\mu^*\) is the overall mean, \(\alpha_i^*\) is the value main effect, \(\beta_j^*\) are the sign main effects, \(\gamma_{ij}^*\) the interaction terms, \(\omega^*\) measures the congestion effect, \(D_t\) is the “busyness” dummy variable, and \(\tilde{\epsilon}_{ijt}\) are the innovations, assumed to be independent across \(t\), with mean zero, and variance \(w_{ijt}\sigma^2\), with weight \(w_{ijt} = 1/n_{ijt}\) for the daily averages, and \(w_{ijt} = 1\) for the zero observations.

As in the per donor regression, the interaction and busyness terms are not significant, and these are omitted from the final fitted model\(^3\). There is

\(^3\)We have also omitted one $30 donation received in the $200 matching treatment. This single large donation has an undue influence on the results, and cannot easily be dealt with due to the fact we do not observe individual donations, i.e. transformation is not possible, and without treatment would conflict with the assumptions of weighted
Table 4: The average donation per visitor for the six treatments

<table>
<thead>
<tr>
<th></th>
<th>No sign</th>
<th>Thank you</th>
<th>Matching</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50</td>
<td>4.3¢</td>
<td>4.8¢</td>
<td>5.5¢</td>
</tr>
<tr>
<td>$200</td>
<td>4.1¢</td>
<td>4.5¢</td>
<td>6.0¢</td>
</tr>
</tbody>
</table>

da significant benefit to offering matching over no sign, with 1.4¢ per visitor expected ($p = 0.15\%$, a 36% increase over the constant term). No other main effects are significant, implying that the significant increase in the average donation per donor in the $200$ treatments is offset by the decrease in the propensity to donate.

### 3.3 The “Sunday effect”

As mentioned earlier, Christmas Day disrupted the balanced design of the experiment over treatments and days of the week. If gallery visitors’ behaviour were independent of the day of the week, replacing Christmas Day (which fell on a Sunday) by a Monday would make no difference, however, we observe significant differences between donations made on a Sunday, and those on other days. We document these differences below, and discuss the implications for the results already presented.

As before, we begin by analyzing the composition of the donations made on a Sunday. Based on the general absence of compositional effects across treatments, we amalgamate by day of the week to yield the information shown in Table 5. Testing the composition and the day of the week for independence yields a significant result ($p = 2.8\%$) indicating that the larger numbers of least squares. If the $30$ donation were included (holding the estimate of $\sigma^2$ constant), the average donations per donor and per visitor in the $200$ matching treatment would increase, in turn increasing the significance of the observed differences, i.e. the matching main effect, and also increase the significant of the value main effect in the per donor analysis.
Table 5: Composition of donations made on Sundays, compared to the other days of the week.

<table>
<thead>
<tr>
<th>Day</th>
<th>Bills</th>
<th>Gold</th>
<th>Silver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday - Saturday</td>
<td>72</td>
<td>538</td>
<td>1175</td>
</tr>
<tr>
<td>Average, Mon - Sat</td>
<td>12</td>
<td>89</td>
<td>196</td>
</tr>
<tr>
<td>Sunday</td>
<td>21</td>
<td>126</td>
<td>210</td>
</tr>
</tbody>
</table>

Table 6: The propensity to donate by day of the week and value treatment.

<table>
<thead>
<tr>
<th>Day</th>
<th>$50 treatments</th>
<th>$200 treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Donations</td>
<td>Visitors</td>
</tr>
<tr>
<td>Monday - Saturday</td>
<td>359</td>
<td>16304</td>
</tr>
<tr>
<td>Average, Mon - Sat</td>
<td>60</td>
<td>2717</td>
</tr>
<tr>
<td>Sunday</td>
<td>93</td>
<td>2933</td>
</tr>
</tbody>
</table>

high denomination currency (bills and gold coins) given on Sunday relative to the “average non-Sunday” are indeed statistically significant.

We now compare the donation propensities observed on Sundays to those on other days of the week. The sample distributions of daily propensities are shown in Figure 3, along with the averages per day. The boxplots indicate that the propensities may differ across days, although the sample sizes are quite small, and the standard errors on the medians high. We now use the contingency table approach as before, focusing particularly on the Sunday propensity.

Since the propensities are (statistically) constant across signs, but not values, we analyze them separately for the $50 and $200 treatments. The data are shown in Table 6 along with the average counts per day from Monday to Saturday, and with propensities. Testing whether or not someone donates and the day of the week for independence, we observe independence in the case of the $200 treatments, but a high degree of significance in the $50 treatments, indicating strong dependence ($p = 0.2\%$). People seem to be
much more willing to donate on a Sunday, when there is little money in the donation box, indicating an interaction between the day of the week, and the value main effect.

Figure 3 indicates the average donations per donor are systematically higher on Sundays. Regression analysis confirms this difference to be statistically significant. Repeating the regression (1) with the full data set of 84 days, and an added dummy variable equal to one on a Sunday and zero otherwise, a Sunday is estimated to yield donations 54¢ higher than other days on average \((p = 0.5\%)\), or approximately 21% of the intercept term. The value main effect is almost identical to the restricted sample result, while the matching sign main effect diminished to 34¢ \((p = 4.6\%)\). There is no estimated interaction between the value treatment and the day of the week, unlike with the propensities.

Finally, replicating the per visitor regression with the full sample of 84 days and including a dummy variable for Sunday, suggests the average donation
per visitor is 2.0¢ higher on a Sunday ($p = 0.01\%$), representing approximately 51% of the constant term. Again, all other parameter estimates are qualitatively the same as in the restricted sample. The matching sign increases donations by 1.5¢ per visitor on average ($p = 0.06\%$). Note that the Sunday main effect is 25% greater than the matching sign main effect, and almost 6 times larger than the (insignificant) thank you sign main effect.

The analysis on the propensities strongly motivates including an interaction between the Sunday dummy variable and the value treatment. Including this in the model and re-estimating, we obtain a significant interaction effect ($p < 0.01\%$) confirming the fact that the much higher propensity to donate on a Sunday spills over into the average donation per visitor for the $50 treatment, despite the value main effect being insignificant when Sundays are excluded.

4 Conclusions

Compared to the $50 treatments, the $200 treatments were effective at increasing the average donation per donor, but this was offset by a decrease in the propensity to donate. As a result the average donation per visitor was not significantly higher in the $200 treatments. Compared to the no sign treatments, matching significantly increased the average donation per donor, had no effect on the propensity to donate and resulted in a significantly higher average donation per visitor. That thanking donors caused the initial contents to influence donation behaviour suggests that “warm glow” might be a relative rather than absolute phenomenon. Our most striking finding is the relative importance of Sundays, yielding a clear prescriptive policy implication for charities. Finally, our results serve as a caution to scientists investigating charitable behaviour: make sure that your treatments are not
confounded with the days of the week.

References


