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**Subsidizing Charitable Contributions:
A Field Test Comparing Matching and Rebate Subsidies***

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Subsidizing Charitable Contributions in the Field

Because voluntary contributions alone are unlikely to produce efficient levels of charitable activities, most governments around the world subsidize nonprofit or charitable organizations. Direct subsidies, consisting of government funds transferred directly to an organization, are often accompanied by policies that subsidize private gifts. In the US, federal tax policy rebates to itemizing taxpayers a portion of their charitable contributions by making such expenditures deductible from taxable income. Similar subsidies are seen in other western countries. Charitable gifts also are encouraged by subsidies from other sources. Thousands of corporations match their employees' charitable gifts. In addition, fundraisers often provide gifts such as mugs or t-shirts as incentives for larger donations; these can be thought of as partial rebates for giving,

The pervasiveness of both rebate and matching forms of subsidy could mean that they are equally successful in increasing giving, or that one or the other is better suited to particular situations. Rebating a portion of a gift appears on the surface to be equivalent to matching a gift at an appropriate rate. However, recent laboratory experimental results show very different responses by participants to equivalent match and rebate subsidies. Eckel and Grossman (2003) find that substantially more is received by charities under match subsidies than under the strategically equivalent rebate subsidies.

Two factors unrelated to the subsidy form itself might contribute to the observed results. First, the results may be due to confusion on the part of the participants resulting from various aspects of the experimental design. Confusion is addressed in Eckel and Grossman (2004a) and (2004b), Davis, Millner and Reilly (2004), and Davis, Millner (2004) and these studies are discussed in more detail below. Second, in the laboratory experiments, participants play with "house money": they are given endowments by the experimenter and then asked how they wish to divide the endowments between themselves and their chosen charities. Since the money is effectively a windfall for them, they may not accurately perceive the tradeoff between this money and other funds available to them, and the cost of their decisions in terms of foregone income may not be salient. Therefore they may be more likely to use some rule of thumb (such as a 50/50 split between themselves and the charity) or adopt behavior that mimics what they believe the experimenter desires (i.e., experimenter demand). Although precautions are taken in standard experimental methodology to minimize or preclude house money effects and

experimenter demand, nevertheless, when playing with the experimenter's "house money", the participants may make choices that are different from those they would make when allocating money that they earn themselves.

This paper reports results from a field study comparing the effects of rebates and matching subsidies for charitable contributions. The field study is designed to parallel the parameters used in the lab, and thus to provide external validation for the previously reported laboratory experimental results. Field experiments on charitable giving provide a bridge between laboratory research and studies that use data generated by choices made in nonexperimental settings such as tax data. This approach allows us to control key aspects of the choice situation, but in a more natural context than the lab, and with a broader variety of participants. Extending lab results to field contexts and to participants other than the convenience sample of university students can significantly enhance understanding of decisions such as charitable donations. For example, List and Lucking Reiley (2002) manipulate two aspects of a capital campaign for a university – seed money and a refund option – and find significant effects of both. (See Harrison and List, 2004, for a discussion of the value of field experiments.)

The field experiment was conducted in conjunction with Minnesota Public Radio's annual fund drive, as described below. It has three main treatments: a baseline with no subsidy, a rebate to donors of a portion of their contribution to the charity, and an equivalent matching contribution. Within each treatment there are two rates of subsidy: 20 and 25 percent rebates and 25 and $33^{1/3}$ percent matches. We report results that are largely consistent with the laboratory experiments. As in the lab experiment, our main results are that matching subsidies, relative to their strategically equivalent rebate subsidies, result in larger total contributions to the charity, and price elasticities about one and one half to three times as large for the match subsidy as for the rebate subsidy.

II. Rebate versus Matching Donations

It is trivial to demonstrate that rebating part of a donation and matching a donation are equivalent, as shown with the budget constraint in Figure 1. Dollars of charitable contributions are measured along the horizontal axis and units of other goods (with price = \$1) are measured

along the vertical axis. The taxpayer has after-tax income of \$Y. The after-tax budget line (with no deductions for charitable contributions) is given by AB (with slope = -1). Assuming the taxpayer is subject to a marginal tax rate of s_r and contributions are deductible gives an after-tax budget line of AD [with slope = $-(1 - s_r)$]. Let point E represent the taxpayer's utility-maximizing bundle of Y_1 other goods and C_1 charitable contributions. The taxpayer contributes $C_1 (= Y - Y_2)$ to the charity and receives $Y_1 - Y_2 (= s_r C_1)$ in rebated taxes.

If, instead, charitable contributions are not deductible and after-tax contributions are matched at the rate of $s_m = s_r/(1 - s_r)$, the taxpayer again faces the budget line AD. The taxpayer's utility-maximizing bundle is still be given by point E with Y_1 other goods and C_1 in total contributions received by the charity. In this case, however, the taxpayer contributes a gross amount of only $C_2 (= Y - Y_1)$ to the charity. The charity, however, receives an additional contribution from the government of $(s_r/(1 - s_r))C_2$, or $C_2 + (s_r/(1 - s_r))C_2 = C_1$ in total contributions. As long as contributions under the match scenario are less than B, the participant's full endowment, the only difference between the two scenarios is the size of the check the taxpayer writes to the charity: C_1 with a rebate subsidy; and $C_2 [= (1 - s_r)C_1]$ with a matching subsidy. (On occasion a lab participant will donate her full endowment to the charity of her choice; in the field this exception to equivalence is improbable.)

For example, assume a marginal tax rate of 20 percent. Giving a deductible \$1 to charity will result in the taxpayer reducing taxable income by \$1 and reducing taxes owed \$0.20. In effect, it cost the giver only \$0.80 out of pocket to give the charity \$1. The functionally equivalent match subsidy would be 25 percent [$25 = 20/(1-20)$]. With no deductibility, but instead a 25 percent match, the donor could still put \$1 into the hands of the charity at a cost of only \$0.80 out of pocket. Giving \$0.80 will trigger the 25 percent match (i.e. an additional \$0.20 = $.25 \times \$0.80$) resulting in the charity receiving \$1.00 in total.

III. Background: The Rebate/Match Laboratory Experiments

In the laboratory experiment reported in Eckel and Grossman (2003), a participant completed a series of allocation decisions, each consisting of a choice of how to divide an endowment between a charity and his self. The participant chooses a target charity from a list of ten provided by the experimenter (see Table 1). The charities were selected to reflect as broad a

range of services and client groups as possible. The sample includes geographically differentiated charities (international, national and local) and covers health, environmental, and social service charities. Charities were chosen from the Texas State Employee Charitable Campaign booklet for 1997, which is provided to state employees during the workplace charity campaign. All charities included in the booklet meet state eligibility standards. A brief description of services each charity provides was given to the participants. The descriptions are taken verbatim from the Texas State Employee Charitable Campaign booklet.

Each participant completed twelve allocation decisions on a single decision sheet (see Table 2). The decisions differed by: endowment (\$4.00, \$6.00, \$7.50, or \$10.00); the cost to the participant of contributing \$1 to the charity (\$1, \$0.80, \$0.75, and \$0.50); and whether the reduction in cost is a result of a rebate of a portion of any contribution or of a matching of any contribution. Contributions were rebated at the rates of 20, 25, and 50 percent; contributions were matched at the equivalent rates of 25, 33, and 100 percent. One decision was chosen at random for payment. The protocol for these experiments is a variation on the standard double-anonymous dictator game (Hoffman, et al., 1996).

In total, 168 participants made complete decisions. Table 3 reports mean contributions to the charities by endowment, price of giving, and type of subsidy. In every comparable case, the dollar value of the donation is significantly greater under the matching subsidy than under the rebate subsidy: all p -values are less than 0.003 when comparing columns 3 and 4 in Table 3. For example, with an endowment of \$7.50 (75 tokens) and a price of giving of \$0.75, charities received approximately 21 percent more, on average, under the matching subsidy than under the rebate subsidy (\$4.71 vs. \$3.89). It is also evident from Table 3 that, on average, the pattern of giving is otherwise consistent with standard predictions. Giving is price-sensitive, increasing as the cost of giving declines; and charitable services is a normal good, increasing with income.

Table 4 reports regression results for the estimated demand for charitable giving, using the commonly-applied log-linear specification.¹ The model is estimated using random-effects tobit to reflect the panel structure of the data set and censoring at contribution levels of zero and the participant's full endowment. The equation estimated is:

¹ See, for example, Clotfelter (1980 and 1989).

$$\ln(\text{CONTRIBUTIONS})_{ij} = a_0 + a_1 \ln(\text{ENDOWMENT})_{ij} + a_2 \ln(\text{PRICE})_{ij} + \varepsilon_{ij} \quad (1)$$

where $i = 1, \dots, 168$ (an index of participants) and $j = 1, \dots, 12$ (an index of allocation problems) and:

CONTRIBUTIONS = dollar value of contribution received by the charity + \$0.10;²
 ENDOWMENT = dollar value of tokens in the endowment (\$4, \$6, \$7.50, or \$10);
 PRICE = price (net of subsidy) of giving \$1 to the charity (\$0.50, \$0.75, \$0.80, or \$1.00).

A likelihood ratio test of the joint null hypothesis of no difference in the coefficients across subsidy treatments is rejected ($\chi^2(5) = 75.7$, $p\text{-value} < 0.01$). The marginal effects of ENDOWMENT and PRICE can be interpreted as the income and price elasticities of charitable giving, respectively. As predicted, charitable giving is increasing in the endowment and decreasing in price. Column 2 shows income elasticities between 0.77 and 1.03 (depending on the type of subsidy), and rebate and matching price elasticities of -0.34, and -1.07, respectively. The significance difference between the price elasticity estimates for the two subsidy types indicate that the form of the subsidy has an important effect on the total amount received by the charities.³ Both estimates are significantly negative, and giving under a matching subsidy is approximately three times as responsive to changes in the price of giving as under a rebate subsidy.

Eckel and Grossman (2003) considered several alternative explanations for the nonequivalence result. Among them was the possibility that participants did not fully understand the experiment. Confusion can play a role in decision making in even the simplest of experimental environments (e.g., Andreoni, 1995). Four recent experimental studies address aspects of the original design that might have resulted in confusion.

Davis, Millner, and Reilly (2004) replicate Eckel and Grossman (2003) and examine participants' "pass ratio" (the ratio of the dollar amount passed to the charity under the match condition to the dollar amount passed under the strategically equivalent rebate condition). Their

² Because the logarithm of zero is not defined, it is customary in studies of the effect of the tax system on charitable giving to add a small amount (\$10 is common) to the contribution, thereby allowing the dependent variable to be expressed as a logarithm. We have added only \$0.10 rather than \$10 to adjust for the fact that in our study the participants' endowments are quite small, rather than being their after-tax net income.

³ □ □ The null hypothesis of equality of price coefficients across treatments could be rejected at traditional levels □ ($\chi^2(1) = 15.28$, $p\text{-value} < 0.01$).

findings suggest participants use a “constant percentage” pass rule. They then attempt to eliminate confusion by presenting for each allocation decision a table which shows participants, for each possible allocation, how much they would earn and how much the charity would receive. The extra information increased the pass rates for the rebate conditions and reduced the pass rate for the match conditions (however, total contributions remained significantly greater under a match subsidy than under a rebate subsidy). They conclude that “...neither matching nor rebate contributions appear to reflect the intended contributions of individuals once they understood the consequences of the subsidies. Purposefully structuring charitable subsidies as either rebate or matching schemes appears to be a poor way to elicit givers’ intended contributions” (p. 17).

In the within-subjects design used in both Eckel and Grossman (2003) and Davis, Millner, and Reilly (2004), participants were presented with both rebate and matching scenarios. If the participants confused the two subsidy types and failed to distinguish fully between the two, this could produce the pattern of reported results. To eliminate this form of confusion as an explanatory factor, Eckel and Grossman (2004a) conducted a series of experiments with a rebate subsidy treatment and a matching subsidy treatment: participants make multiple decisions varying in price and endowment subject to only rebate or only matching subsidies (Eckel and Grossman, 2004a). The results are consistent with our original study, suggesting that confusion between the two subsidy types is not a strong explanatory factor.

Eckel and Grossman (2004b) further simplified their protocol to account for the possibility that making multiple decisions confused participants. In this experiment, participants were given a choice of subsidy type with a single rate of subsidy. They could receive either a 50 percent rebate or a 100 percent match on any contribution made. In addition, participants made only one decision, from a single endowment of \$20. While participants chose rebates and matches in equal numbers, contributions were again significantly greater from those selecting the match subsidy than from those selecting the rebate subsidy.

Davis and Millner (2004) attempted to reduce potential confusion by placing the problem in a more familiar context. In their experiment participants made a series of purchases of a private good (i.e. chocolate bars) subject to rebate and matching offers. Rebates were framed as refunds of a portion of the purchase price; matches were framed as, for example, “buy two get

one free”. Consistent with the other studies, they find participants purchase more chocolate bars under the match offers than under the strategically equivalent rebate offers.

As discussed in the introduction above, another possible explanation for the results was the participants’ use of “house money” for donation decisions. To reiterate the argument here, since participants were using the experimenter’s money instead of their own for making the allocation decisions, the perceived salience of the opportunity cost of giving may have been lessened, causing them to be more likely to use a rule of thumb, or more likely to succumb to perceptions of experimenter demand in making their allocation decisions. Field experiments allow us to test for this possibility. In the MPR experiment reported here, participants use their own income to make decisions about donations to public radio.

The field protocol also allows us to test more generally for external validity of the lab study. Many factors other than house money differ between the lab and the field. Subjects make decisions in a natural context, free of experimenter demand or observer effects. The participant pool is considerably more heterogeneous than the convenience sample of lab participants. These factors are likely to affect overall results, and comparisons can give insights into the appropriate translation of lab results into field predictions.

III. Field Study Procedures

The field study was conducted with the cooperation of Minnesota Public Radio (MPR) as part of regular MPR mailed fund-raising drives. The experiment included treatment and control groups. Included with the usual mail solicitation for the treatment groups was a flyer announcing the rebate or match offer; flyers were not inserted in the control mailings (see Appendix for examples of the flyers). The flyers were about 2/3 of a normal page in size. On one side in large, bold letters, the reader was made aware of the potential to either receive a rebate on any contribution made or of the potential to increase the size of the contribution going to MPR. The opposite side provided details of the rebate (match) offer and a procedure for completing a survey on line, or requesting a hard copy. The survey was designed to collect socio-economic information, information regarding a participant’s pattern of charitable giving, and information designed to measure the participant’s perceived benefits from the charity. (Despite the fact that

we offered an additional \$1 donation to MPR for every completed survey, response to the survey was disappointingly low and we were unable to make use of the responses.)

Budget limitations required the overall maximum paid out in rebates, matches, and survey incentives to be capped. We announced subsidy-specific caps on the respective flyers as follows: 20% rebate: \$5,000; 25% match: \$10,000; 25% rebate: \$8,000; and 33^{1/3}% match: \$15,000.⁴ In the end, we did not impose the caps, but rather shifted our budgeted amounts between categories as needed to complete the subsidies for all treatment-group contributors (see Table 5). We underestimated by approximately 60 percent for the 20 percent rebate costs and overestimated by approximately 20 percent for the 33^{1/3} percent match subsidy costs. The estimates for the 25 percent rebate and 25 percent match were reasonably accurate. Overall, our estimate of subsidy costs was quite accurate: we budgeted \$38,000 and paid out \$38,117.⁵

IV. Results

The number of mailings, response rate and mean revenue per solicitation for each of the five price/subsidy-type categories for each of the three donor type categories are reported in Table 6. In total 372,495 solicitations were mailed: 19,690 to Continuing members of MPR (persons who make regular contributions and maintain membership); 75,000 to Lapsed members (persons who have in the recent past been members but have let their memberships lapse); and 277,805 to Prospects (persons who have never been members and have no history of contributing to MPR). Responses were received from 8,402 persons, an overall response rate of 2.26 percent. The response rates by donor type were: Continuing (32.3 percent); Lapsed (0.9 percent); and Prospects (0.5 percent). These response rates are only marginally different from MPR's expectations based on prior mailed solicitations.⁶ For Lapsed and Prospects donors, there is little variation in response rates across the different subsidy types. For Continuing donors, response rates vary from a high of 36.2 percent for those receiving no subsidy to a low of 19.2 percent for those receiving the 25 percent match. The differences in response rates are not

⁴ The caps reflected the authors' best guesses based on information provided by MPR on average contributions and response rates and results from the laboratory experiment in Eckel and Grossman (2003a).

⁵ Our budget included funds to cover additional printing and mailing expenses incurred by MPR. Funds remained in both, and the excess subsidy costs were paid from that surplus.

⁶ MPR projects approximately a 30 percent response rate for Continuing members, 0.8 – 1.0 percent for Lapsed members, and 0.4 – 0.5 percent for Prospects (from conversations with Al Anderson, Director, Membership Marketing, MPR, May 5, 2000).

significant at the 95 percent confidence level.⁷ Of the 8,402 responses, 7,196 were useable (accurate zipcodes were provided). The proportion of useable responses did not differ across donor types or subsidy types.⁸ Revenue per solicitation average \$1.82 for the complete sample. Not unexpectedly, mean revenue per solicitation (MRS) increased with the extent of commitment, as indicated by donor type. The MRS for Prospects was \$0.25; for Lapsed members it was \$0.65, and for Continuing donors it was \$28.43.

In Table 7 we report means tests for contributions by price/subsidy categories. For both prices of giving, \$0.80 and \$0.75, the mean contribution under the match subsidy exceeds the mean contribution under the rebate subsidy (\$85.88 vs. \$78.03 and \$90.76 vs. \$70.21, respectively). Means tests indicate that these differences are significant (p -values < 0.025 and 0.001 , respectively). Consistent with this, we report pair-wise Epps-Singleton tests, a more appropriate test for our data, for paired subsidy/price-of-giving categories (see Table 8).⁹ We are able to reject the null hypothesis (at p -value $< .05$ or better) that the donations for the paired categories have the same distribution with the exception of the 25 percent match/\$0.80 and 33 1/3 percent match/\$0.75 pairing.¹⁰ Somewhat troubling is the fact that the mean contributions

⁷ The overall response rates by price/subsidy categories are: \$1.00/no subsidy (3.4%); \$0.80/20% rebate (1.2%); \$0.80/25% match (1.2%); \$0.75/25% rebate (1.1%); and \$0.75/33 1/3% match (1.1%). The higher response rate for the \$1.00/no-subsidy category reflects the fact that continuing members were mistakenly over sampled in this category. This is also reflected in the number of useable responses by category. The differences in response rates and 95% confidence intervals are as follows:

	Difference						
			Lower Bound		Upper Bound		
Subsidy	No subsidy		20% Rebate		25% Rebate		25% Match
20% Rebate	0.141						
	0.090	0.192					
25% Rebate	0.155		0.014				
	0.103	0.207	-0.057	0.085			
25% Match	0.170		0.029		0.015		
	0.118	0.222	-0.042	0.100	-0.057	0.087	
33 1/3% Match	0.164		0.023		0.009		-0.006
	0.112	0.216	-0.048	0.094	-0.063	0.081	-0.078 0.066

⁸ The distribution of useable responses by donor type is: continuing (5,183, 72.0%); lapsed (670, 9.3%); and prospect (1,343, 18.7%).

⁹ The Epps-Singleton test is a nonparametric test designed to distinguish between different sample distributions. See Epps and Singleton (1986). Forsythe et al. (1994), evaluate the power of this and four other such tests (Cramer-von Mises, Anderson Darling, Kolmogorov-Smirnov, and Wilcoxon rank-sum) and find that the Anderson Darling and Epps-Singleton tests have the most statistical power with ultimatum game data. The Epps-Singleton test is also appealing because it does not require that the distributions be continuous.

¹⁰ Epps-Singleton test results for paired subsidy/price-of-giving categories by donor type are consistent with the aggregated results. Results are available upon request of the authors

vary directly with the price of giving for the rebate subsidies (\$78.03 when the price of giving is \$0.80 and \$70.21 when the price of giving is \$0.75; a significant difference, p -values < 0.02).¹¹ However, variation in the income of the donors is not controlled for. For this purpose we turn to our regression results.

Table 10 reports OLS regression results for the estimated demand for giving to MPR. The equation estimated is:

$$\ln(\text{CONT}) = a_0 + a_1 \ln(\text{PRICE}) + a_2 \ln(\text{INCOME}) + a_3 \text{PROSPECT} + a_4 \text{LAPSED} + \varepsilon \quad (2)$$

where:

CONT = total contribution received by MPR;
PRICE = price of giving \$1 to the charity (\$0.75, \$0.80, or \$1.00);
INCOME = family income (measured in thousands of dollars);
PROSPECT = donor type dummy variable (=1 if donation is from a prospect, 0 otherwise);
and
LAPSED = donor type dummy variable (1 if donation is from a lapsed member, 0 otherwise).

As a proxy for family income, we use median family income for 1999 by zip code as reported by the U.S. Bureau of the Census.¹² Rather than a precise measure of family income, INCOME is instead an indicator of the range of income in which the donor falls.

Our base group is Continuing donors, with dummy variables for the other two types of contributors. The estimated coefficients for donor types for Models 1 - 3 are consistent with expectations. Both Prospects (i.e., persons who have never been members and have no history of contributing to MPR) and Lapsed donors (i.e., persons who have in the recent past been members but have let their memberships lapse) are significantly less generous than Continuing donors (i.e., persons who make regular contributions and maintain membership). Furthermore, Prospects are significantly less generous than Lapsed donors.¹³

The estimated coefficients a_1 and a_2 represent price elasticity and income elasticity, respectively. Model 1 imposes common price and income elasticities of giving across subsidy types. The estimated price elasticity, -0.74, is significantly different from zero and falls within

¹¹ This same pattern is observed when we control for donor type. Results available from the authors upon request.

¹² U.S. Bureau of the Census, Census 2000, Summary File 3, http://factfinder.census.gov/servlet/DatasetMainPageServlet?_ds_name=DEC_2000_SF3_U&_program=DEC&_lang=en

¹³ Results from the statistical tests are available upon request.

the range of price elasticity estimates reported by other studies. For example, Andreoni et al. (1996) reported a price elasticity of -0.35; Barrett et al. (1997) estimated a long-run price elasticity of -0.47; Tiehen's (2001) estimates ranged between -0.94 and -1.1; and McClelland and Kokoski (1994), reported an elasticity of -1.72. The estimated income elasticity, 0.09, is also significantly different from zero, but is low relative to estimates reported by other researchers.¹⁴ Andreoni et al. (1996), Tiehen (2001), and Barrett et al. (1997) also find relatively small income elasticities, 0.28, between 0.24 and 0.35, and 0.50, respectively. McClelland and Kokoski (1994) reported income elasticity is 0.99. Finally, our estimated price and income elasticities are similar to, but slightly lower, than those by Kingma (1989), the one other study that examines giving to public radio. Kingma estimates price and income elasticities to be -0.43 and 0.99, respectively.

Consider next the results for Model 2, which estimates separate price elasticities for the two subsidy types.¹⁵ Comparing the price coefficients for the match and rebate subsidies, we find donors are approximately three times more responsive to changes in price under the match subsidy than under the rebate subsidy (-1.04 vs. -0.30, respectively). These price elasticity estimates are virtually the same as the elasticity estimates for the laboratory data (see Table 4, column 2). An F-test of the null hypothesis that the price elasticities do not vary with subsidy type is rejected (F-statistic = 43.52, p-value < 0.001).

In light of the Epps-Singleton results reported in Tables 6 and 7, we estimated Model 3 which permits price elasticities to vary both by subsidy type as well as donor type. Consistent with our other results, we find match price elasticities that are significantly larger than the rebate price elasticities for all three donor types. Match price elasticities for all three donor types are all significantly different from zero, while rebate price elasticities do not significantly differ from zero for Lapsed and Prospect donors. In the case of Continuing donors, the match price elasticity is twice that of the rebate elasticity.

Membership Donors

Forty-seven percent of all donors made contributions of either \$42 or \$84. These amounts represent the cost of an annual "membership" for Prospects as compared with

¹⁴ Our relatively low income elasticity estimate may be due to the relatively limited variation in the proxy measure of income used.

¹⁵ We also estimated models where the income elasticities varied with subsidy type (not reported). An F-test of the null hypothesis that they did not vary with subsidy type could not be rejected (F-statistic = 0.96, p-value < 0.39).

Continuing and Lapsed donors.¹⁶ Membership conveys upon the donor certain benefits not available to those contributing less. In particular, members are provided early purchase opportunities for *A Prairie Home Companion* tickets, subscriptions to *Minnesota Monthly*, and discount cards good at selected restaurants and shops in Minnesota. These donors may view their donations as the purchase price of an essentially private good rather than as contribution to the creation/maintenance of a public good. As such they may be less sensitive to price adjustments due to the subsidies than other donors. We expect this to be true for all donors regardless of the type of subsidy provided. Likewise, the amount donated should be relatively unresponsive to changes in income.

If the sole goal of donating is to purchase the private good of membership, neither a rebate subsidy nor a match subsidy should influence the amount given. For those offered a rebate subsidy, the cost of membership is minimized by giving only the minimum required amount. A donation of \$42 (\$84) garners the donor the same private benefits as a larger donation, so the donor has no incentive to increase giving in response to the subsidy. For those offered a match subsidy, membership requires an out of pocket donation of \$42 (\$84). In theory, assuming the 25 percent match subsidy, the donor could contribute only \$33.4 (\$67.2) and the membership price reached when the match is added. However, due to an oversight by the researchers, this option was not made available to potential donors. Thus, membership required an out of pocket outlay of the full \$42 (\$84). And as with the rebate subsidy, if a donation of \$42 (\$84) garners the donor the same benefits as a larger donation, the donor has no incentive to increase giving in response to the subsidy.

Table 10 reports the distribution of donors and mean donations by subsidy and donor type excluding the \$42 and \$84 membership donors. The overwhelming majority of \$42 donors came from the Prospects category; the \$84 donors from the Continuing and Lapsed categories. Excluding membership donations increases mean donation for Prospects by approximately 30 percent; decreases mean donation for Lapsed donors by 14 percent; and leaves mean donations for Continuing members virtually unchanged.

We re-estimate equation 2 controlling for donors who contributed enough to purchase membership -- $\geq \$42$ for Prospects and $\geq \$84$ for Lapsed and Continuing (Table 9, Models 1a –

¹⁶ The regular annual membership fee is \$84; however, MPR offers Prospects the opportunity to purchase membership at half price.

3a). A comparison of Models 1-3 to Models 1a-3a indicates that controlling for membership donors has no significant impact on price elasticity. Considering the subsidy-specific price elasticities, we find the match price elasticities little changed. The rebate price elasticity, and more specifically the rebate elasticity for Continuing donors, decreases by about one-third. The match price elasticity is three to five times that of the rebate price elasticity. Again, an F-test of the null hypothesis that the price elasticities do not vary with subsidy type (Model 1a vs. Model 2a) is rejected (F-statistic = 138.1, p-value < 0.001). The effect on income elasticity is opposite that expected. The estimated income elasticity decreases and is now insignificant.

As mentioned previously, Davis, Millner and Reilly (2004) point out that if subjects ignore the subsidy rates in their decision making, focusing on “pass rates” instead, then that could produce a pattern of results consistent with greater contributions under match subsidies. In the data from the MPR study, we are unable to determine directly whether subjects considered the subsidy when making their decision. Although prominent notices of the available rebate and match subsidies were included in the mailings to potential donors, we are unable to determine whether or not the notices of rebates or matches were taken into account by the donors. In addition to the notice, a mailing included a solicitation letter, a donor card, and a return envelope, so it is possible that some donors “missed” the subsidy notice.

To address this issue, in Table 11 we report mean out-of-pocket (OOP) donations (i.e. donations before either any rebate or any match is paid). On the one hand, theory would predict that offers of a subsidy (regardless of type) would elicit greater overall donations relative to a no-subsidy situation. OOP donations under a rebate subsidy should be greater than no-subsidy donations. However, we find mean OOP donations less for both the rebate and match subsidy donors than for the no-subsidy donors. However, these averages are not directly comparable because of the over sampling of no-subsidy continuing members (see footnote 9). Continuing members made more generous donations than did Prospect and Lapsed donors. To correct for this, we randomly sampled 434 observations from the no subsidy, Continuing donors subset ($1,200 \times 0.362$) and used this subsample along with the Lapsed and Prospects samples. With this subsample we get a no subsidy mean OOP donation of \$60.70 which is significantly less than either the rebate or match mean OOP donation. Furthermore mean match donations are less than mean rebate donations, which is consistent with theory if subjects are paying attention to the subsidy. However, the mean match donation is not smaller by a sufficient amount to equalize the

total contribution to the charity under the two types of subsidy (as predicted by theory). On balance, this analysis provides evidence that subjects are paying attention to the subsidy. In future studies we plan to add an additional hurdle for receiving the subsidy that requires the subject to indicate, by checking a box, their intention to receive the subsidy.

V. Conclusions

We present results of a field experiment designed to test the impact of alternative ways to subsidize charitable giving. A rebate subsidy of s_r and a matching subsidy of rate $s_m = s_r / (1 - s_r)$ present a donor with the same net cost of giving to the charity and therefore should result in the same level of giving. In laboratory experiments Eckel and Grossman (2003) found that giving to the charity is sensitive to whether the subsidy takes the form of a rebate or a match. Contributions are significantly higher with matching subsidies than with rebate subsidies. The estimated match price elasticity of giving is between two and three times greater than the rebate price elasticity.

Two factors muddy the results. First, Minnesota Public Radio “sells” annual memberships which require a minimum donation level and confer extra benefits, of a private good nature, on the donor. To the extent a donor treats membership as a private good, the amount contributed will be insensitive to subsidy. Second, while notices were included in the mailings informing potential donors of the opportunity to receive a match or rebate subsidy, we are unable to ascertain whether the notices were fully taken into account by the recipients.

Three additional field tests of differential impacts of rebate and matching subsidies are underway. We have made changes in the experimental design to address the noted shortcomings. First, we have incorporated a means to determine whether or not donors are aware of the subsidy potential. Second, the additional three charities do not sell memberships. While donation levels are suggested, no extra, private, benefits are received by those donating some minimum amount. Comparison of the results for these charities with the Minnesota Public Radio data will provide an indication of the seriousness of the problem.

Assuming our results are confirmed, the findings have important implications for government policies towards subsidization of nonprofit and charitable organizations. They

suggest that replacing the current system of tax rebates with an equivalently costly matching subsidy system could increase contributions to charitable organizations.

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Figure 1

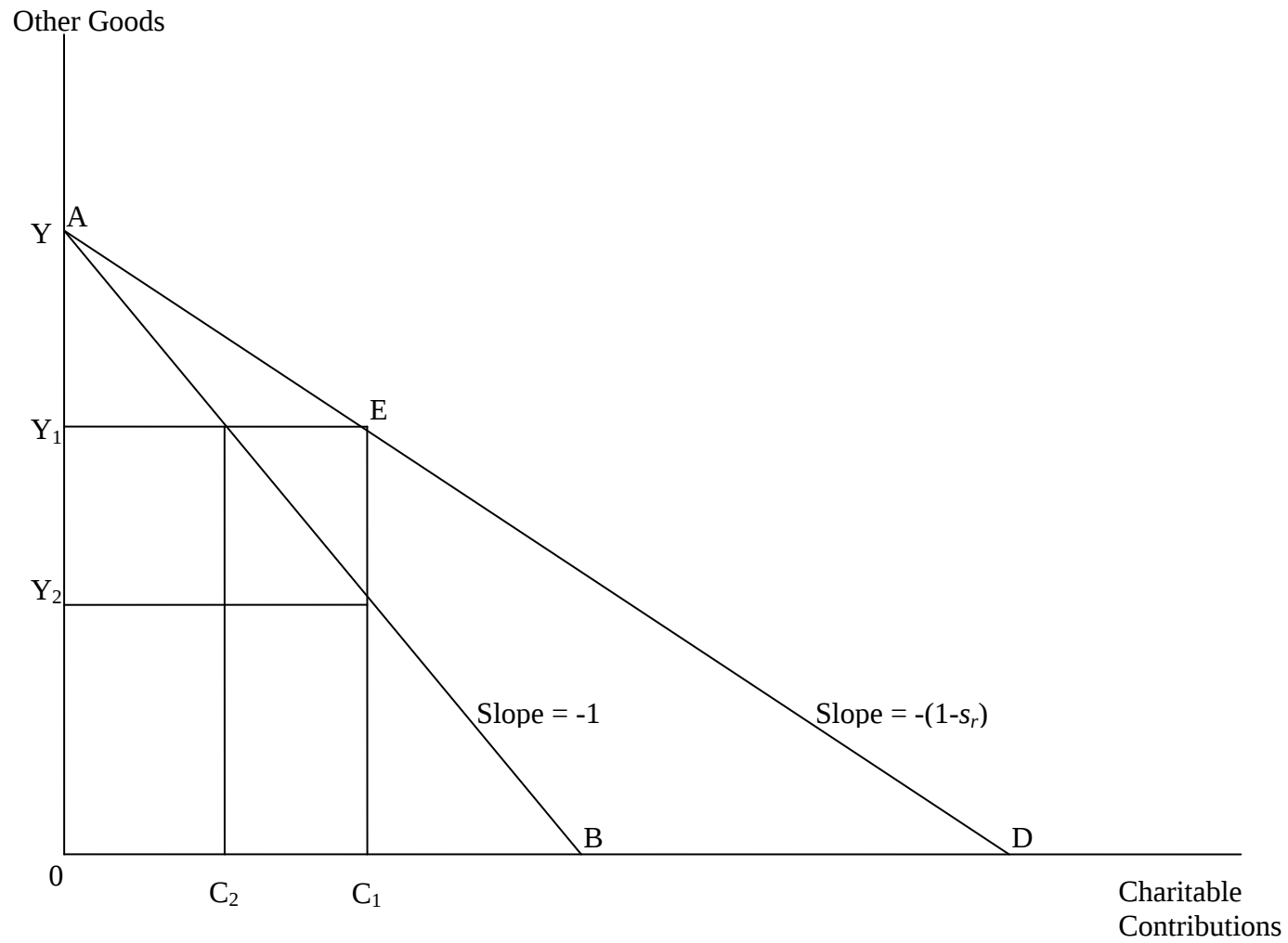


Table 1: Charities

Earth Share of Texas

Protect our natural resources and public health and teach people how they can help through your gift to local, statewide, national, and international organizations.

Doctors Without Borders USA

Doctors and nurses volunteer to provide urgent medical care in some 70 countries to civilian victims of war and disasters regardless of race, religion, politics.

African Christian Relief

International Christian Relief Agency distributing lifesaving medicine, supplies, equipment, food, clothing, agroseeds: develops self-reliance, humanitarian, educational programs in 97 communities in Africa/America.

Feed The Children

One of America's most effective charities providing food, clothing, medical care, education, and emergency relief to children in the United States and overseas since 1979.

AIDS Outreach Center

Serves men, women, and children with HIV/AIDS and their families, educates the public about the HIV epidemic and advocates for sound HIV public policy.

American Red Cross, Tarrant County Chapter

Humanitarian organization, led by volunteers, providing disaster relief, special medical transportation (WHEELS), health services, and military social services.

Cancer Care Services

Provides financial, emotional, and social assistance to cancer patients and their families in Tarrant, Parker Counties.

Women's Haven of Tarrant County

Provides emergency shelter and supportive counseling to women and children who are victims of family violence. Children's programs; case management; traditional housing.

YMCA of Arlington

In 1996, served over 10,000 participants from Arlington and Mansfield in youth sports, child care, aquatics, summer camp, and parent/child programs.

I Have A Dream Foundation

A national educational program designed to encourage local at-risk youths to stay in school, providing \$2,000 scholarships to a college/trade school upon graduation.

Table 2: Selected Rebate and Match Allocation Decisions

Problem	Endowment		Hold	Pass
1	100	For every token you pass to the charity, the charity will receive one token.		
2	40	For every token you pass to the charity, the experimenter will match it with one-fourth additional token.		
3	75	For every token you pass to the charity, the experimenter will match it with one additional token.		
4	60	For every token you pass to the charity, the experimenter will match it with one-third additional token.		

Table 3: Contributions to Charities

(1) Endowment	(2) Price of Giving \$1 to Charity	(3) Rebate Subsidy	(4) Matching Subsidy	(5) No-Subsidy	(6) Matching vs. Rebate Means Test <i>p</i> -value*
\$4.00	\$0.50	\$2.22 (1.15)	\$4.10 (2.55)	--	0.001
	\$0.80	\$2.02 (1.31)	\$2.64 (1.65)	--	0.001
\$6.00	\$0.75	\$3.05 (1.82)	\$3.76 (2.51)	--	0.001
	\$1.00	--	--	\$2.84 (1.96)	--
\$7.50	\$0.50	\$3.92 (2.28)	\$7.71 (4.73)	--	0.001
	\$0.75	\$3.89 (2.32)	\$4.71 (3.10)	--	0.003
\$10.00	\$1.00	--	--	\$4.87 (3.22)	--

Sample size = 168.

* - one-tailed test.

Table 4: Regression Results: Random Effects Tobit Maximum Likelihood

Dependent Variable = ln(dollars contributed to the charity + \$0.10)		
	(1)	(2)
Variable	Coefficient (<i>t-stat.</i>) Elasticity	Coefficient (<i>t-stat.</i>) Elasticity
Constant	-1.095* (7.83)	
Constant (no-subsidy)		-1.557* (3.40)
Constant (rebate subsidy)		-1.101* (4.74)
Constant (match subsidy)		-0.987* (3.62)
Endowment	0.883* (12.78) 0.821	
Endowment (no-subsidy)		1.100* (4.94) 1.030
Endowment (rebate subsidy)		0.895* (7.00) 0.838
Endowment (match subsidy)		0.820* (5.96) 0.767
Price	-0.777* (10.09) -0.723	
Rebate Price		-0.364* (1.95) -0.340
Match Price		-1.140* (6.17) -1.067
L.L.F.	-2436	-2399
<i>N</i>	7196	7196

* - significant at the 5% level, one-tailed test.

Table 5: Subsidy Expenditure Caps and Subsidy Payouts by Subsidy Type

Subsidy	Total Subsidy Payout	Subsidy Payout Cap
No subsidy	\$0	\$0
20% Rebate	\$8,114	\$5,000
25% Rebate	\$8,960	\$8,000
25% Match	\$9,335	\$10,000
33 1/3% Match	\$11,768	\$15,000
Total	\$38,117	\$38,000

**Table 6: Summary Statistics by Donor and Subsidy Type
(Mean Revenue amounts including match subsidies)**

Continuing				
Subsidy	Mailed	Responses (Rate)	Mean Revenue per Solicitation	Useable Responses*
No subsidy	14,890	5,384 (36.2%)	\$30.97	4,207
20% Rebate	1,200	266 (22.1%)	\$21.62	266
25% Match	1,200	230 (19.2%)	\$20.62	227
25% Rebate	1,200	248 (20.7%)	\$17.73	248
33 1/3% Match	1,200	237 (19.8%)	\$22.13	235
Total	19,690	6,364 (32.3%)	\$28.43	5,183
Lapsed				
Subsidy	Mailed	Responses (Rate)	Mean Revenue per Solicitation	Useable Responses*
No subsidy	15,000	130 (0.9%)	\$0.55	127
20% Rebate	15,000	116 (0.8%)	\$0.54	115
25% Match	15,000	140 (0.9%)	\$0.73	139
25% Rebate	15,000	144 (1.0%)	\$0.60	141
33 1/3% Match	15,000	150 (1.0%)	\$0.83	148
Total	75,000	680 (0.9%)	\$0.65	670
Prospect				
Subsidy	Mailed	Responses (Rate)	Mean Revenue per Solicitation	Useable Responses*
No subsidy	157,805	778 (0.5%)	\$0.23	769
20% Rebate	30,000	154 (0.5%)	\$0.25	152
25% Match	30,000	174 (0.6%)	\$0.36	171
25% Rebate	30,000	119 (0.4%)	\$0.19	119
33 1/3% Match	30,000	133 (0.4%)	\$0.26	132
Total	277,805	1,358 (0.5%)	\$0.25	1,343

* Accurate zipcodes were provided.

Table 7: Mean Contribution (including subsidy) by Subsidy Type and Rate

Price of Giving \$1 to MPR	Subsidy Type (N)	Mean Contribution (Std. Dev.)	Means Test t-statistic (p-value)
\$0.80	Rebate (N = 533)	\$78.03 (57.13)	2.25 (< 0.025)
	Match (N = 537)	\$85.88 (57.13)	
\$0.75	Rebate (N = 508)	\$70.21 (42.06)	5.24 (< 0.001)
	Match (N = 515)	\$90.76 (78.25)	
\$1.00	No-Subsidy (N = 5103)	\$78.91 (66.27)	

Table 8: Epps-Singleton Test by Subsidy/Price-of-Giving Categories

	Subsidy/Price-of-Giving Category			
	$\chi^2(4)$ (p-value <)			
Subsidy/Price-of-Giving Category	No Subsidy/\$1	20% Rebate/\$0.80	25% Match/\$0.80	25% Rebate/\$0.75
20% Rebate/\$0.80	19.64 (0.0006)			
25% Match/\$0.80	47.80 (0.0001)	18.91 (0.0008)		
25% Rebate/\$0.75	11.35 (0.02)	10.57 (0.03)	29.94 (0.0001)	
33 1/3% Match/\$0.75	89.52 (0.0001)	28.75 (0.0001)	4.23 (0.38)	49.12 (0.0001)

Table 9: OLS Regression Results – Field Study
(t-statistics in parentheses)

	All Data			Controlling for Membership Contributions		
Variable	Model 1	Model 2	Model 3	Model 1a	Model 2a	Model 3a
Price	-0.738* (10.17)	...		-0.707* (15.17)	...	
Match Price	...	-1.044* (12.14)		...	-1.059* (19.33)	
Match Price X Continuing	...	...	-1.052* (9.07)	...	...	-1.101* (14.88)
Match Price X Lapsed	...	...	-0.706* (2.85)	...	...	-0.687* (4.35)
Match Price X Prospect	...	...	-1.076* (6.59)	...	...	-1.059* (10.18)
Rebate Price	...	-0.302* (3.08)		...	-0.205* (3.27)	
Rebate Price X Continuing	...	...	-0.503* (3.93)	...	...	-0.338* (4.14)
Rebate Price X Lapsed	...	...	0.081 (0.28)	...	...	0.224 (1.19)
Rebate Price X Prospect	...	...	0.033 (0.17)	...	...	-0.027 (0.22)
Income	0.093* (3.59)	0.096* (3.72)	0.096* (3.71)	0.023 (1.40)	0.027 (1.62)	0.026 (1.60)
Prospect = 1	-0.530* (27.57)	-0.531* (27.67)	-0.513* (21.44)	-0.698* (20.35)	-0.693* (20.41)	-0.681* (19.33)
Lapsed = 1	-0.376* (13.71)	-0.375* (13.71)	-0.301* (5.56)	-0.182* (10.26)	-0.180* (10.27)	-0.099* (2.87)
Prospect Membership	...	...	...	0.992* (28.48)	0.989* (28.65)	0.988* (28.63)
Lapsed/ Continuing Membership	...	...	...	1.062* (97.18)	1.064* (98.33)	1.064* (98.36)
Constant	3.877* (35.96)	3.867* (35.96)	3.863* (35.93)	3.449* (49.70)	3.436* (49.99)	3.433* (49.96)
R ²	10.5	11.0	11.1	63.1	63.8	63.9
F-statistic (p-value)	210.91 (< 0.001)	178.43 (< 0.001)	100.08 (< 0.001)	2049.6 (< 0.001)	1811.54 (< 0.001)	1155.05 (< 0.001)
S.E.E.	2704.56	2688.29	2685.26	1114.82	1093.22	1091.48
N	7196	7196	7196	7196	7196	7196

* - significant at the 5% level, one-tailed test.

Table 10: Distribution of Useable Responses and Mean Donations by Subsidy and Donor Types – Excluding Membership Donors*

Subsidy	Continuing		Lapsed		Prospects	
	Responses	Mean Donation	Responses	Mean Donation	Responses	Mean Donation
No subsidy	2491	\$86.16	82	\$53.60	163	\$59.65
20% Rebate	171	\$105.76	72	\$60.05	30	\$70.28
25% Rebate	135	\$87.60	92	\$51.29	26	\$53.65
25% Match	128	\$110.24	94	\$66.53	47	\$83.31
33 1/3% Match	143	\$112.82	101	\$70.84	18	\$74.07
Total	3,068	\$89.59	441	\$61.20	284	\$65.05

* Those donors contributing \$42 or \$84.

Table 11: Mean (Out of Pocket) Giving by Subsidy Type*

Subsidy Type (N)	Mean Contribution (Std. Dev.)	Minimum	Maximum	Means Test t-statistic (p-value)		
				No-Subsidy	Adjusted No-Subsidy	Rebate
No-Subsidy (N = 5103)	\$78.91 (66.27)	\$2.00	\$2,500.00			
Adjusted No-Subsidy (N = 1330)	\$60.70 (41.16)	\$2.00	\$500.00			
Rebate (N = 1041)	\$74.21 (50.47)	\$1.00	\$500.00	2.58 (< 0.01)	7.18 (< 0.01)	
Match (N = 1052)	\$68.40 (52.44)	\$1.00	\$1,000.00	5.64 (< 0.001)	4.02 (< 0.01)	2.58 (< 0.01)

* - Donations before either any rebate or any match is paid.

Appendix

Rebate Mailing

Here is how you can get a 20% Rebate on your membership contribution to Minnesota Public Radio

Get a rebate on your membership contribution

MPR is participating in a study examining contributions to nonprofit institutions. The study is being conducted by researchers at Saint Cloud State University and Virginia Polytechnic Institute and State University in Blacksburg, Virginia (Study Group). As part of this study, you will receive a 20% rebate* of your contribution to MPR. (For every \$1 you contribute the researchers will rebate you \$0.20.)

Regardless of your donation choice, the Study Group would appreciate your completing an online, internet questionnaire developed by the researchers. To complete the survey, please go to www.MPRsurvey.vt.edu** and enter the code number above your name on the contribution

form (see circle at right). If you do not have internet access, please call 800-228-7123 to receive a copy of the survey in the mail. Your responses to the survey

will be held in the strictest confidence and your

anonymity will be protected. The researchers will not be provided any identifying information. For every completed survey, \$1 will be donated by the researchers to MPR (up to a maximum of \$1,000).

M0000000	DQ12345B
MPR Friend	
1234 Anywhere Street	
Hometown, MN 55555	

Philip Grossman
Study Group Head

* The study will refund contributions in the order in which they are received until an overall maximum of \$4,500 is reached.

** At the completion of this project a description of the study and a brief summary of the results will be posted at this Internet address.

Match Mailing

Here is how you can increase your membership contribution to Minnesota Public Radio by 25%

Have your membership contribution matched

MPR is participating in a study examining contributions to nonprofit institutions. The study is being conducted by researchers at Saint Cloud State University and Virginia Polytechnic Institute and State University in Blacksburg, Virginia (Study Group). As part of this study, your contribution to MPR will be matched at the rate of 25%*. (For every \$1 you contribute the researchers will contribute an additional \$0.25.)

Regardless of your donation choice, the Study Group would appreciate your completing an online, internet questionnaire developed by the researchers. To complete the survey, please go to www.MPRsurvey.vt.edu** and enter the code number above your name on the contribution

form (see circle at right) If you do not have internet access, please call 800-228-7123 to receive a copy of the survey in the mail. Your responses to the survey will be held in the strictest confidence and your anonymity will be protected. The researchers will not be provided any identifying information. For every completed survey, \$1 will be donated by the researchers to MPR (up to a maximum of \$1,000).

M0000000	DQ12345B
MPR Friend	
1234 Anywhere Street	
Hometown, MN 55555	

Philip Grossman
Study Group Head

* The study will match individual contributions in the order in which they are received until an overall maximum of \$7,500 is reached.
** At the completion of this project a description of the study and a brief summary of the results will be posted at this Internet address.