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Is There a 'Hidden Cost of Control' in Naturally-Occurring Markets? Evidence from a Natural Field Experiment

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## ABSTRACT

Several recent laboratory experiments have shown that the use of explicit incentives—such as conditional rewards and punishment—entail considerable "hidden" costs. The costs are hidden in the sense that they escape our attention if our reasoning is based on the assumption that people are exclusively self-interested. This study represents a first attempt to explore whether, and to what extent, such considerations affect equilibrium outcomes in the field. Using data gathered from nearly 3000 households, we find little support for the negative consequences of control in naturally-occurring labor markets. In fact, even though we find evidence that workers are reciprocal, we find that worker effort is maximized when we use conditional—not unconditional—rewards to incent workers.

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## I. Introduction

Behavioral economics has matured to the point where theorists are leveraging psychological insights to improve their models and government officials are using behavioral results to fine tune policy. One particular result that has attracted increasing attention is the interaction of psychological and economic incentives (see, e.g., Frey, 1997; Gneezy and Rustichini, 2000a, 2000b; Benabou and Tirole, 2003; Sliwka, 2007). For example, in a novel set of experiments, Gneezy and Rustichini (2000a, 2000b) show that extrinsic incentives influence effort in an unexpected manner—small monetary incentives can crowd out intrinsic motivation, resulting in a perverse relationship between incentives and effort.[1]

Complementing such insights is the line of work in the spirit of Fehr and Rockenbach (2003) and Fehr and List (2004), who find that the use of control and explicit incentives entail "hidden" costs: such control causes the principal's actions to backfire, leading to lower profits. As this literature points out, such effects are first order and should be a concern for economists interested in studying labor markets. Yet, whether, and to what extent, such hidden costs manifest themselves outside the confines of the laboratory remains an important open empirical question (Levitt and List, 2007). Difficulties arise, however, in finding natural instances where agents are randomly allocated to appropriate treatment groups to permit a clean test of the relevant hypotheses. Because of these challenges, the literature has to date been unable to provide tests of the major hypotheses of 'control' in the field.

In this study, we make a first step in this direction. We present an empirical approach that is composed of a set of field treatments that parallel the important economic features of the environments in Fehr and Rockenbach (2003), Fehr and List (2004), and the literature that has followed. To do so, we examine solicitor (worker) effort in a door-to-door capital campaign for the Center for Natural Hazards Research at East Carolina University. Importantly, we use natural incentives to exogenously change the action space of solicitors randomly assigned to one of three treatment groups.[2] In the baseline treatment, workers are provided a pre-announced, fixed hourly wage of $10. In a second treatment, workers are provided an unconditional gift – a

[1] Such results have also been reported in the psychology literature—see Deci (1971) and Lepper et al. (1973) for early studies. A more recent overview can be found in Tang and Hall (1995). The skeptical reader will enjoy Cameron and Pierce (1994) and Eisenberger and Cameron (1996), who present a dissenting view of the empirical evidence concerning intrinsic and extrinsic incentives.

[2] In this regard, our study shares similarity with Landry et al. (2011) who explore the effect of conditional and unconditional gifts on the generosity of potential donors and attendant public good provision in a series of temporally-linked field experiments.

copy of *Freakonomics* – in addition to the pre-announced hourly wage. In our final treatment, the most opportunistic actions are ruled out by making the gift conditional – solicitors must raise at least $10 per hour to obtain the copy of *Freakonomics*. If trust is a characteristic rewarded by workers, then the control evoked in the final treatment might crowd out effort compared to the second treatment – particularly amongst those who would have raised more than $10 if the gift were provided unconditionally.

Several insights emerge from our field experiment. First, unconditional gifts have the ability to enhance worker productivity. Solicitors in our unconditional gift treatment were approximately 56 percent more likely to elicit a contribution than counterparts in the baseline. Similarly, solicitors in this treatment raised approximately 10.1 to 63.4 percent more per hour than those in our baseline treatment. These results are consonant with the existing literature (see, e.g., Gneezy and List, 2006; Bellemare and Shearer, 2009; Cohn et al., 2009; Kube et al., 2010) and suggest that reciprocal motives are an important determinant of worker behavior.

Second, conditionality proves a profit enhancing strategy. Participation rates and dollars raised per hour in our conditional gift treatment are *higher* than those observed in *both* the baseline and unconditional gift treatments. For example, solicitors in our conditional gift treatment elicit contributions from nearly 26 percent of all households approached – a rate of giving that is approximately 68 percent (8 percent) greater than that observed in our baseline (unconditional gift) treatment. Similarly, solicitors in our conditional gift treatment raise approximately 83 percent more per hour than counterparts receiving an unconditional gift and more than double that observed in our baseline group.

Finally, solicitors in the conditional gift treatment are approximately two and half to three times more likely to raise at least $10 per hour – the required threshold for receiving the gift – than are counterparts in our unconditional gift and baseline treatments respectively. As this threshold corresponds with the level of productivity necessary to cover labor costs, conditionality therefore has a positive effect on net revenues.[3] Taken jointly, these data are at odds with models suggesting that agents respond adversely to control. Accordingly, our data suggest that hidden cost relationships identified in prior laboratory studies (see, e.g., Fehr and List, 2004) do not arise in our field setting.

[3] This result is consonant with Landry et al. (2011) who find that conditionality is an effective technology to screen donors and therefore provides a superior fund-raising mechanism in both the short- and long-run.

## II. A Model of Gifts and the "Hidden Costs" of Control

To fix ideas we present a simple, illustrative model of worker behavior under both conditional and unconditional gifts. In our model, the worker's effort decision is governed by three key parameters: a cost of effort, a kindness parameter measuring the worker's response to gifts from the firm, and a conditionality factor that is designed to capture the "hidden costs" relationship. Our approach to modeling worker utility as a function of kindness between the firm and the worker is in the spirit of Rabin (1993) and Bellemare and Shearer (2009).

We follow Bellemare and Shearer (2009) and assume workers have utility that is additively separable over earnings, effort, and gifts:

$$U(E, \mu G) = W(E) - C(E) + \beta Y \mu G$$

where W(E) represents monetary earnings, C(E) is the worker's cost of effort function, and $\beta Y \mu G$ represents a kindness function that captures how workers respond to gifts from the firm. Intuitively, the kindness function specifies that the worker receives utility from reciprocating gifts and returning value to the firm (in terms of output Y). Importantly, we assume that C(·) is twice differentiable and strictly increasing in E and that both W(·) and Y(·) are non-decreasing in effort.

To capture the "hidden costs" relationship noted in the prior literature, we assume that feelings of reciprocity depend both on the consumption value of the gift, G, and its perceived generosity – represented by a parameter $\mu \in [a, b]$. Throughout, we assume that $\mu = 1$ for a gift provided unconditionally and that $\mu$ is reduced if receipt of the gift is conditioned on specific requirements.

As a benchmark, consider the optimal effort choice of an agent with neoclassical preferences – i.e., those for whom $\mu = 0$. For such an agent, the optimal effort choice is given by the solution to the following first-order condition:

$$W_E - C_E = 0$$

Denote the solution to this problem as $E^{NC}$.

Consider now the optimal solution for an agent with reciprocal preferences receiving an unconditional gift of value G. For such an agent, the optimal effort choice is given by the solution to the following first-order condition:

$$W_E - C_E + \beta Y_E G = 0$$

Denote the solution to this problem as $E^{UG}$. Assuming that output is strictly increasing in effort, we thus have that $E^{UG} > E^{NC}$ – i.e., providing a worker with reciprocal preferences an unconditional gift leads to higher effort. Intuitively, the inclusion of the kindness function introduces an added benefit of effort. Evaluated at $E^{NC}$, we thus have that the marginal benefit of effort exceeds the marginal cost and the agent will elect to increase effort.

Consider now the case where the situation where receipt of the gift is conditioned on a specific requirement. For an agent with reciprocal preferences, the optimal effort choice is given by the solution to the following:

$$W_E - C_E + \beta Y_E \mu G = 0$$

Denote the solution to this problem as $E^{CG}$. Given our assumption that $\mu^{CG} < \mu^{UG} = 1$, we thus have that $E^{CG} < E^{UG}$ – i.e., the use of conditional gifts serves to crowd out effort. Moreover, if one allows μ to take on negative values the optimal effort level would be less than that predicted by the neoclassical model which assumes away reciprocal preferences. Such crowding captures the "hidden costs" relationship that has been documented in prior laboratory studies.

**III. Experimental Design**

Our natural field experiment attempted to follow the spirit of the laboratory experiments while staying true to the naturalness of the environment. In this way, we conducted our experiment as part of a door-to-door fundraising drive to support the Center for Natural Hazards Research at East Carolina University (ECU). The Center for Natural Hazards Research was authorized to begin operations in the fall of 2004. The Hazard Center was founded in respond to the widespread devastation in eastern North Carolina caused by hurricanes Dennis and Floyd and is designed to provide support and coordination for research on natural hazard risks.

In each treatment, households in predetermined neighborhood blocks in Pitt County, North Carolina were approached by a paid solicitor and asked if they would like to make a contribution to support the Hazard Center using a simple ask strategy (or voluntary contribution mechanism). Households that answered the door were provided an informational brochure detailing the activities of the Hazard Center and read a fixed script that outlined the reason for the solicitor's visit. The script included a brief introduction that informed the resident of the purpose of their visit and a short summary of the nonprofit organization.[4] Potential donors were informed that all proceeds raised in the fundraising campaign would be used to fund research that benefits Pitt County and the surrounding area.

As Table 1 reveals, we employed a within-solicitor design using a total of fifty-five unique solicitors randomized into three treatment cells. Our baseline, No Gift, treatment provided solicitors a flat wage of $10 per hour for working a two to three hour shift. Of the fifty-five solicitors employed, twelve were initially assigned to this treatment. Solicitors in our Unconditional Gift treatment received a copy of the book *Freakonomics* as a gift from the Hazard Center in addition to the promised $10 per hour flat wage. Nineteen solicitors were initially assigned this treatment. Of these, seven elected to work a second (or third) shift for a flat wage of $10 per hour.

Solicitors in our Conditional Gift treatment were informed that they would receive, in addition to the promised $10 per hour flat wage, a copy of *Freakonomics* as a gift from the Hazard Center should they raise at least $10 per hour. Twenty-four solicitors were initially assigned to the Conditional Gift treatment. Of these, five worked a second (or third) shift for the flat $10 per hour wage. Before proceeding, it is important to note that in both gift treatments, solicitors did not learn that they would receive a copy of *Freakonomics* until arriving for work.

Each solicitor's experience followed four steps: (1) consideration of an invitation to work as a paid volunteer for the research center, (2) an in-person interview, (3) a training session, and (4) participation as a solicitor in the door-to-door campaign. All solicitors were recruited from the student body at ECU via flyers posted around campus, announcements on a university electronic bulletin board, and direct appeals to students during undergraduate courses. Potential solicitors were informed that they would be paid $10 per hour during training and employment

[4] The design discussion follows Landry et al. (2006) since recruitment and training of the solicitors was similar. A copy of the script and informational brochure are provided in the Appendix.

and would work a single shift lasting three to four hours. Interested students were instructed to contact the Economics Department to schedule an interview.

Initial ten-minute interviews were conducted in private offices of the Economics Department faculty. Upon arrival to the interview, students completed an application form and a short survey questionnaire. Upon concluding the interview, *every* applicant was offered employment as a solicitor. Once hired, all solicitors attended a one-hour training session conducted by the same researcher. The training sessions provided solicitors with background information on the Hazard Center and an opportunity to practice the script in front of both the trainer and other personnel in the Economics Department.

Solicitors worked in three to four hour shifts starting between 9 and 10am on Saturday morning, 1 and 2pm on both Saturday and Sunday afternoon, and at 5pm on both Tuesday and Wednesday evenings.[5] To control for any temporal differences in rates of giving, we were careful to run multiple treatments in all weekend shifts.

A few important design issues should be discussed before proceeding to the results summary. First, we wanted to maximize the expected effect of the unconditional gift on worker effort and, hence, associated scope for the hidden cost relationship to arise. As noted in Gneezy and List (2006), gift-exchange has the greatest impact on solicitor effort during the first few hours of work, thus we hired workers for 3 to 4 hours of work.[6]

Second, in carrying out our door-to-door campaign we wished to solicit donors in a way that matched how fund-raisers carry out the task in the field. Solicitors were therefore instructed to distribute an information brochure after introducing themselves to potential donors. This provided legitimacy to the fundraising drive, as brochures are a common tool in the industry. Third, in order to provide a formal, standardized appearance, solicitors were given an attractive ECU t-shirt and were instructed to wear khaki pants (or shorts) during their door-to-door solicitations. Fourth, each solicitor wore an identification badge that included his or her picture, name, and city solicitation permit number. Fifth, we randomly allocated solicitors across neighborhoods.

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[5] To minimize the number of drivers (monitors) required to shuttle solicitors between ECU and the neighborhoods in which they were working, the start of weekend shifts were staggered by 30 minutes. Further, to prevent potential contagion, solicitors riding in a particular shuttle met drivers at different locations on campus and were assigned the same treatment.

[6] Solicitors in Gneezy and List (2006) participated in the Hazard Center's initial door-to-door fund-raising campaign which took place during the fall of 2004 and worked at least eight-hours. While gift-exchange has a significant impact on worker effort in the three-hour block before lunch, the impact decays rapidly over time.

Finally, to summarize, we have gathered a rich set of household level control variables. Solicitors were provided with a record sheet that included columns to record the race, gender, and approximate age of potential donors, along with their contribution level. The trainer stressed the importance of recording the contribution (or non-contribution) data immediately following the solicitation "sales pitch".

## III. Experimental Results

Table 1 presents summary statistics including information on the success of solicitors across treatments. For example, Table 1 indicates that solicitors in the baseline no-gift treatment approached a total of 1022 households and spoke with 431 of them. Of those, approximately 13.7 percent (or 59 of 431) contributed to the Hazard Center. In total, solicitors raised $1998.84 (or approximately $1.69 per solicitation) for the Hazard Center: $477.46 ($1.11 per solicitation) in the no-gift treatment, $456 (or $1.48 per solicitation) in the unconditional gift treatment, and $1065.38 (or $2.40 per solicitation) in the conditional gift treatment.

A quick summary of the empirical results highlight that there are signs of significant gift exchange in the data: solicitors in the unconditional gift treatment are 56 percent more likely to elicit contributions than counterparts from the control group. However, the hidden cost relationship identified in prior laboratory studies does not arise in our setting. Participation rates and dollars raised per hour in our conditional gift treatment are *higher* than those observed in *both* the baseline and unconditional gift treatments. Moreover, solicitors in this treatment are significantly more likely to elicit contributions in excess of $10 per hour and thereby generate positive net revenues for the Hazard Center. Hence, 'control' as defined in the literature provides a means to both stimulate worker productivity and enhance the profitability of fund-raising efforts. Evidence for these empirical findings are described more fully below.

### *Unconditional Gifts and Reciprocity*

Table 1 provides a summary of average donation rates and average contributions per hour across treatments. As noted in the table, solicitors in our unconditional gift treatment are more likely to obtain a contribution than counterparts in the no-gift treatment. For example, as shown in Figure 1, solicitors in the unconditional gift treatment elicit contributions from approximately 23.7 percent of all households that answer the door. In contrast, counterparts in our baseline, no-gift, treatment are only able to elicit contributions from 15.2 percent of those answering the door.

A non-parametric Wilcoxon test indicates that this approximate 56 percent difference in participation rates is statistically significant at the $p < 0.05$ level.[7]

We observe a similar, albeit less pronounced, pattern when examining total contribution levels. Solicitors in our unconditional gift treatment raise approximately 10 percent more per hour ($8.61 versus $7.82) than counterparts in our baseline group. If we restrict the sample and only consider outcomes from a solicitor's first shift, the difference in dollars raised per hour increases more than six-fold ($8.61 versus $5.27). Despite the magnitude of these differences, non-parametric Wilcoxon tests suggest that they are not statistically significant at conventional levels. Yet, the difference for the restricted sample is significant at the $p < 0.10$ if we use a parametric t-test as an alternative to the Wilcoxon test.

Interestingly, these differences are driven entirely by increased fund-raising success at households who open the door rather than disparities in the number of households approached per hour. In fact, households in our unconditional gift treatment approach approximately 8.1 percent fewer households per hour than counterparts in the no-gift treatment – a difference that is significant at the $p < 0.10$ level. [8]

To complement these unconditional insights, we estimate a series of linear regression models that explicitly control for unobservable differences across solicitors. Specifically, we estimate regression models of donation rates and average dollars raised per hour for each solicitor on dummy variables for our experimental treatments and other controls:

$$Y_i = Z_i\delta + X_i\beta + \varepsilon_i$$

where $Y_i$ is the donation rate (average dollars raised per hour) for the $i^{th}$ solicitor, $Z$ is a vector of treatment group status indicators, and $X$ is a vector of other covariates – including the proportion of warm- and cold-list households approached by the $i^{th}$ solicitor. As noted in Landry et al. (2010), warm-list (cold-list) households are significantly more (less) likely to contribute than the

[7] The unit of observation for all of these Wilcoxon tests is a solicitor-specific measure. Tests for the full sample are therefore based on 28 observations in the no-gift treatment, 24 observations in the conditional gift treatment, and 19 observations in the unconditional gift treatment. Similar results are obtained if we used the household as the unit of observation.

[8] It is important to note, however, that differences in the number of households approached per hour is a poor proxy for effort. Solicitations to households that do not contribute are typically very quick compared to visits that yield contributions. Households that make contributions require more time as the solicitor has to wait for the household to write a check and must complete a receipt to give to the donors.

randomly approached individual. Although the proportion of such households approached should be orthogonal to treatment, we include controls for these factors to account slight imbalances across neighborhood blocks. To account for unobservable heterogeneity, we cluster standard errors in the full sample on individual solicitors.

Empirical estimates for the full sample are contained in Models A and C of Table 2. In terms of donation rates, Model A provides evidence consistent with our non-parametric results: solicitors in our unconditional gift treatment are approximately 60 percent more likely to elicit a contribution than counterparts in the baseline group, with this difference being significant at the $p < 0.05$ level. Yet, higher rates of giving in our unconditional gift treatment do not map into higher average earnings. As noted in Model C, the approximate $1.79 difference in the average dollars raised per hour across our unconditional gift and baseline treatments is not significant at any meaningful level.

Estimates for the restricted sample highlight similar data patterns. As noted in Model B, solicitors in the unconditional gift treatment are more than twice as likely as counterparts in the control to elicit a contribution – a difference that is significant at the $p < 0.05$ level. As noted in Model D, however, the approximate $2.59 increase in dollars raised per hour is not significant at meaningful levels. Taken jointly, these data suggest a first result:

*Result 1: Reciprocal motives are an important driver of worker behavior. Workers who receive an unconditional gift are more likely to elicit donations and raise more dollars per hour than their non-gifted counterparts.*

Importantly, Result 1 serves to reinforce conclusions from the laboratory and field experimental literature, which finds that providing solicitors an unconditional gift leads to an approximate 72 percent increase in the dollars raised over the first three hours of work (see, e.g., Fehr, Kirchsteiger, and Riedl, 1993; Fehr, Gachter, and Kirchsteiger, 1997; Fehr and Falk, 1999; Hannan et al., 2002; Charness, 2004; and the field: Gneezy and List, 2006; Bellemare and Shearer, 2009; Cohn et al., 2009; Kube et al., 2010).[9]

[9] Bellemare and Shearer (2009) double the daily wage for workers in a tree-planting firm and find an approximate 10 percent increase in the number of trees planted. Cohn et al. (2009) implement a wage increase during a newspaper promotion and find that workers approach four to five percent more passers-by than counterparts in the

*Conditional Gifts and the "Costs" of Control*

The third column of Table 1 summarizes donation rates and average dollars raised per hour for solicitors in the conditional gift treatment. As noted in the table, solicitors in this treatment are more likely to elicit a donation and raise more money per hour than worker counterparts in *either* the baseline or unconditional gift treatment. For example, as shown in Figure 1, solicitors in the conditional gift treatment are approximately 68.4 percent (8.01 percent) more likely to elicit a contribution than are workers in our baseline (unconditional gift) treatment. Using a non-parametric Wilcoxon test, the former difference is statistically significant at the $p < 0.05$ level.

Our data suggest similar differences for average dollars raised per hour: solicitors in the conditional gift treatment raise more than twice the amount (approximately 83.4 percent more than) earned by counterparts in the no-gift (unconditional gift) treatment. If we restrict the sample and consider only outcomes from a solicitor's first shift, this former difference doubles – solicitors in the conditional gift treatment raise more than three times that raised by those in the baseline group. Figure 2 illustrates these differences for both the full and restricted samples – all of which are significant at the $p < 0.05$ level a non-parametric Wilcoxon test.

To complement these unconditional non-parameteric results, we consider the regression estimates contained in Table 2. In terms of donation rates, Model A provides evidence consistent with the raw data – solicitors in the conditional gift treatment are approximately 67 percent (3.84 percent) more likely to elicit contributions than counterparts in our baseline (unconditional gift) treatment. While this former difference is significant at the $p < 0.05$ level, the latter is not significant at any meaningful level. Estimates for the restricted data sample in Model B highlight similar data patterns. Solicitors in the conditional gift treatment are approximately 140 percent more likely to elicit a donation than counterparts in the baseline group – a difference that is also significant at the $p < 0.05$ level.

Our data highlight similar differences for average dollars raised per hour. As noted in Model C of Table 2, solicitors in the conditional gift treatment raise nearly $9.00 more per hour than counterparts in the baseline and approximately 77.3 percent more than those receiving an unconditional gift – differences that are significant at the $p < 0.05$ level. If, as in Model D, we

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control group. Kube et al. (2010) find student workers receiving an unconditional gift – a plastic thermos bottle – catalog 30 percent more library books than counterparts in the control group.

restrict the sample, the difference in average earnings per hour between the baseline and conditional gift treatments increases.

Taken jointly, these data suggest a second result:

*Result 2: The hidden costs of control do not arise in our setting. Donation rates and dollars raised per hour are greatest in the conditional gift treatment.*

Result 2 is at odds with the existing evidence from the laboratory and opens up the possibility that the hidden cost relationships may not generalize to field settings. For employers, this finding is noteworthy as it calls into question whether agents respond adversely to control – a premise from this line of work. Although data from our unconditional gift treatment suggest reciprocal motives influence worker behavior, providing workers a conditional gift netted both more donors and total contributions per dollar spent on labor.

For fund-raising professionals, Result 2 is noteworthy as it suggests a fundamental difference in the effect of incentivizing workers as opposed to potential donors. The gains to donor-side incentives such as charitable lotteries, donor gifts, matching grants, and rebates accrue largely along the extensive margin via increased participation rates (see, e.g., Landry et al., 2006; Falk 2007; Karlan and List, 2007; Meier, 2007; Aplizar et al., 2008; Eckel and Grossman, 2008; Landry et al., 2010). In contrast, our data suggest that linking worker compensation to dollars raised generates gains along *both* the intensive and extensive margins.

*The Likelihood of Exceeding the Target Threshold*

Falk and Kosfeld (2006) highlight an important channel through which control serves to influence payoffs to the principal – agents pool at the minimum effort level. For example, in their low-control treatment, over 50 percent of all agents provide the minimum effort level when the principal elected to enact control. In contrast, median effort is approximately four times this level when the principal elected not to enact control. As only 20 percent of the agents would select effort levels below the minimum level in the absence of control, the net effect is a reduction in earnings for the principal.

Given this underlying data pattern, one might therefore intuit that crowding is most pronounced for *small* incentives and associated levels of control. As such, one might question whether the benefits from conditionality in our study only arise as our threshold is sufficiently

large. Yet, if this were the case, we would expect a non-trivial subset of agents in the conditional gift treatment to pool at the $10 threshold.

Importantly, however, we observe no such pooling in our data. Agents in our conditional gift treatment are more likely to raise almost any amount above $10 per hour than counterparts in either the baseline or unconditional gift treatment. As illustrated in Figure 3, the cumulative distribution of dollars raised per hour for the conditional gift treatment lies everywhere to the right of the corresponding distribution for the unconditional gift treatment. We observe similar differences when comparing the distribution of dollars raised per hour across the conditional gift and baseline treatments. The former lies to the right of the latter over all but the extreme right tail of the support – i.e., contribution rates that exceed $30 per hour.

Similarly, agents in the conditional gift treatment are significantly *more* likely to raise the $10 per hour required to obtain the gift than counterparts in either the baseline or unconditional gift treatment. For example, as illustrated in Figure 4, approximately 83.3 percent (20 of 24) of all solicitors in our conditional gift treatment raise at least $10 per hour and thus receive a copy of *Freakonomics*. This proportion is more than twice (three-times) that observed amongst solicitors in our unconditional gift (baseline) treatment – differences that are significant at the $p < 0.05$ level using a two sample test of proportions.

To complement this summary of the raw data, we estimate a probit model that explicitly controls for unobservable differences across solicitors. Specifically, we estimate whether a solicitor raised enough per hour to receive the copy of *Freakonomics* on dummy variables for our experimental treatments and other controls:

$$Prob(T_i > \$10) = \Omega(Z_i\delta + X_i\beta + \varepsilon_i > \$10)$$

where $T_i$ is the average contributions per hour for the $i^{th}$ solicitor, $\Omega$ is the standard normal cumulative distribution, $Z$ is a vector of treatment group status indicators, and $X$ is a vector of other covariates – including the proportion of warm- and cold-list households approached by the $i^{th}$ solicitor. To account for unobservable heterogeneity, we cluster standard errors in the full sample on individual solicitors.

Empirical estimates are provided in Table 3 and provide evidence consistent with the raw data summary. Using estimates from Model A, the predicted probability a solicitor in the

baseline (unconditional gift) treatment elicits contributions in excess of $10 per hour is approximately 17.1 (36.8) percent.[10] For solicitors in the conditional gift treatment, the estimated 83.9 percent probability of eliciting contributions in excess of this amount is approximately four-times (128 percent) greater than that observed in our baseline (unconditional gift) treatment. Both of these differences are significant at the $p < 0.05$ level.

We observe similar results if the sample is restricted to outcomes from a solicitor's first shift only. In this instance, however, the estimated six-fold difference in the probability of eliciting more than $10 per hour across our baseline and unconditional gift treatments (4.6 versus 30.8 percent) obtains statistical significance at the $p < 0.10$ level. Moreover, the differences between conditional and unconditional treatments and conditional and baseline treatments for the restricted sample are large and statistically significant for $p < 0.05$.

As workers in all three treatments were paid a fixed wage of $10 per hour, the Hazard Center only earned positive net revenue on solicitors who raised at least this amount. Taken jointly with the data summarized above, this suggests a third result:

*Result 3: Controlling solicitors by providing a conditional gift, has a positive effect on net revenue and is thus a profit enhancing strategy for the Hazard Center.*

Net labor costs, the average solicitor in our conditional gift treatment raises approximately $5.79 per hour for the Hazard Center. In contrast, the Hazard Center loses an average of approximately $2.18 per hour ($1.39 per hour) on solicitors in the baseline (unconditional gift) treatment. Thus, in our setting, control provides a means to both *stimulate* worker productivity and *enhance* the profitability of fund-raising efforts.

## IV. Conclusions

There is a growing body of laboratory evidence showing that the use of control and explicit incentives entail "hidden" costs (see, e.g., Fehr and Rockenbach, 2003; Fehr and List, 2004; Falk and Kosfeld, 2006). Despite its profound implications, there is a dearth of compelling evidence from naturally-occurring markets to support or refute this view. Finding natural instances where agents are properly randomized into relevant treatment groups is

[10] The predicted probabilities are evaluated at the sample mean for the proportion of warm- and cold-list households approached.

challenging, however. As such, determining the extent to which these laboratory results generalize to real world setting remains unclear.

We begin to resolve this uncertainty by exploring individual behavior in the labor market for solicitors in a door-to-door fund-raising campaign. Our empirical approach is composed of a set of field treatments that parallel the economic features of the environments in previous studies examining the "hidden" costs of control: we use natural incentives to exogenously change the solicitors' action space. If trust is a characteristic rewarded by workers, then the control evoked by restricting the solicitors' action space should crowd out effort.

Data from our natural field experiment suggest two main insights. First, unconditional gifts enhance worker productivity. This result is consonant with a bulk of the existing literature and suggests that reciprocal motives are an important determinant of worker behavior in this setting. Second, conditionality is a profit enhancing wage structure for the Hazard Center. Participation rates and dollars raised per hour in our conditional gift treatment are *higher* than those observed in *both* the baseline and unconditional gift treatments. Accordingly, our data are inconsistent with the notion that agents respond adversely to control, and suggest that the hidden cost relationship does not arise in our setting.

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**Table 1: Summary Statistics**

| | No Gift | Unconditional Gift | Conditional Gift |
|---|---|---|---|
| ***Full Sample – Panel Data*** | | | |
| # of Worker Shifts | 28 | 19 | 24 |
| # of HHs Approached | 1022 | 722 | 1029 |
| # of Doors Answered | 431 | 308 | 443 |
| # of HHs Contributing | 59 | 66 | 109 |
| Total Dollars Raised | $477.46 | $456 | $1065.38 |
| Total Hours Worked | 67.5 | 50.5 | 67.75 |
| ***Solicitor Specific Averages*** | | | |
| HH's Approached/Hour | 15.18<br>(6.43) | 13.95<br>(4.68) | 15.29<br>(3.25) |
| Donation Rate | 15.2%<br>(14.6) | 23.7%<br>(15.8) | 25.6%<br>(10.9) |
| $'s Raised per HH | $1.33<br>(1.49) | $1.46<br>(1.00) | $2.49<br>(1.28) |
| $'s Raised/Hour | $7.82<br>(9.14) | $8.61<br>(7.02) | $15.79<br>(7.87) |
| # Workers Exceeding $10/hour Threshold (%) | 7<br>(25%) | 7<br>(36.8%) | 20<br>(83.3%) |
| ***Restricted Sample**** | | | |
| # of Unique Workers | 12 | 19 | 24 |
| # of HHs Approached | 495 | 722 | 1029 |
| # of Doors Answered | 207 | 308 | 443 |
| # of HHs Contributing | 23 | 66 | 109 |
| Total Dollars Raised | $177 | $456 | $1065.38 |
| Total Hours Worked | 32 | 50.5 | 67.75 |
| ***Solicitor Specific Averages*** | | | |
| HH's Approached/Hour | 16.68<br>(8.63) | 13.95<br>(4.68) | 15.29<br>(3.25) |
| Donation Rate | 10.7%<br>(8.7) | 23.7%<br>(15.8) | 25.6%<br>(10.9) |
| $'s Raise per HH | $0.99<br>(1.17) | $1.46<br>(1.00) | $2.49<br>(1.28) |
| $'s Raised/Hour | $5.27<br>(4.70) | $8.61<br>(7.02) | $15.79<br>(7.87) |
| # Workers Exceeding $10/hour Threshold (%) | 1<br>(8.3%) | 7<br>(36.8%) | 20<br>(83.3%) |

*The restricted sample only includes data from the initial three hour solicitation shift worked.

**Table 2: Estimating Performance Measures**

| | Model A Percent Give | Model B Percent Give | Model C $'s Raised per Hour | Model D $'s Raised per Hour |
|---|---|---|---|---|
| Baseline - No Gift Treatment | 0.16** (0.05) | 0.15** (0.05) | 7.48** (2.17) | 6.93** (2.98) |
| Unconditional Gift Treatment | 0.10** (0.03) | 0.11** (0.05) | 1.79 (2.45) | 2.59 (2.82) |
| Conditional Gift Treatment | 0.11** (0.05) | 0.12** (0.05) | 8.96** (2.23) | 9.42** (2.82) |
| Proportion of Warm- List HHs Approached | 0.11 (0.12) | -0.06 (0.24) | 7.03 (5.86) | -12.63 (13.40) |
| Proportion of Cold-List HHs Approached | -0.18* (0.10) | -0.11 (0.13) | -6.75 (4.81) | -0.41 (7.44) |
| | | | | |
| Data Sample: | Full | Restricted | Full | Restricted |
| # of Observations | 71 | 55 | 71 | 55 |
| Clustered Standard Errors | Yes | No | Yes | No |
| R-Squared | 0.19 | 0.15 | 0.22 | 0.26 |

** Denotes statistical significance at the $p < 0.05$ level

* Denotes statistical significance at the $p < 0.10$ level

**Note:** Cell entries are parameter estimates from a series of linear regression models examining two different performance metrics for each solicitor – the percentage of HH's that contributed to the Hazard Center and total $'s raised per hour worked. Standard errors are in parentheses. We cluster standard errors on individual solicitors. The restricted data includes only contributions collected during the initial three hour solicitation shift worked.

**Table 3: Probability of Raising $10+ per Hour**

| | Model A | Model B |
|---|---|---|
| Baseline – No Gift | -1.02** | -1.59** |
| | (0.45) | (0.77) |
| Unconditional Gift Treatment | 0.62 | 1.18* |
| | (0.48) | (0.67) |
| Conditional Gift Treatment | 1.94** | 2.49** |
| | (0.49) | (0.72) |
| Proportion of Warm List HH's Approached | 1.23* | -3.00 |
| | (0.75) | (2.79) |
| Proportion of Cold List HH's Approached | -0.07 | 1.64 |
| | (0.98) | (1.68) |
| | | |
| Data Sample: | Full | Restricted |
| # of Observations | 71 | 55 |
| Clustered Standard Errors | Yes | No |
| Log Likelihood | -37.75 | -26.00 |

** Denotes statistical significance at $p < 0.05$ level

* Denotes statistical significance at $p < 0.10$ level

**Note:** Cell entries are parameter estimates for a probit model examining the likelihood a solicitor raises at least $10 per hour – the target threshold for receiving the conditional gift. Standard errors are in parentheses. Model A clusters standard errors on individual solicitors. The restricted data in Model B includes only contributions collected during the initial three hour solicitation shift worked

**Figure 1: Proportion of Households Contributing to the Hazard Center**

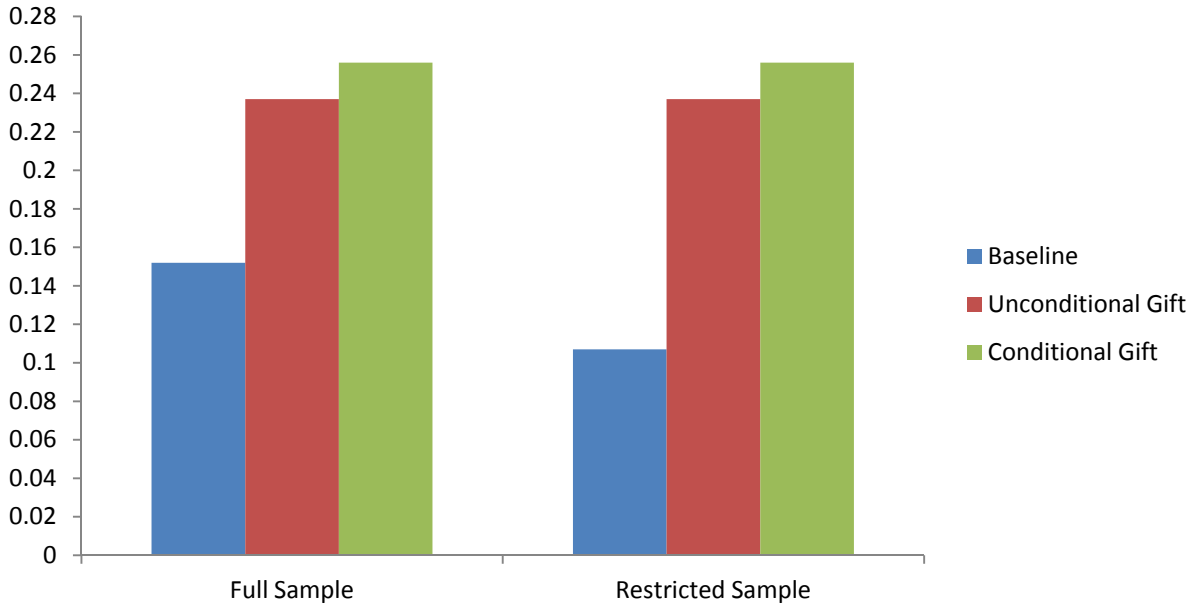


**Figure 2: Average Contributions ($'s) Raised per Hour Work**

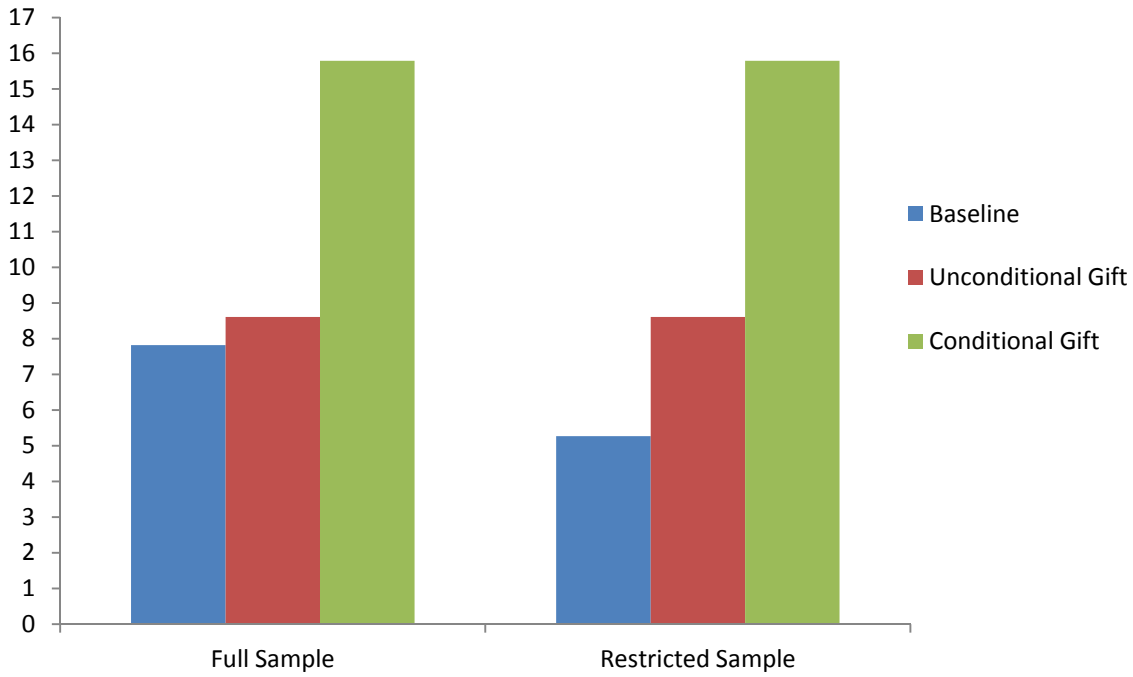

**Figure 3: Cumulative Distribution of Contributions Raised Per Hour Work**

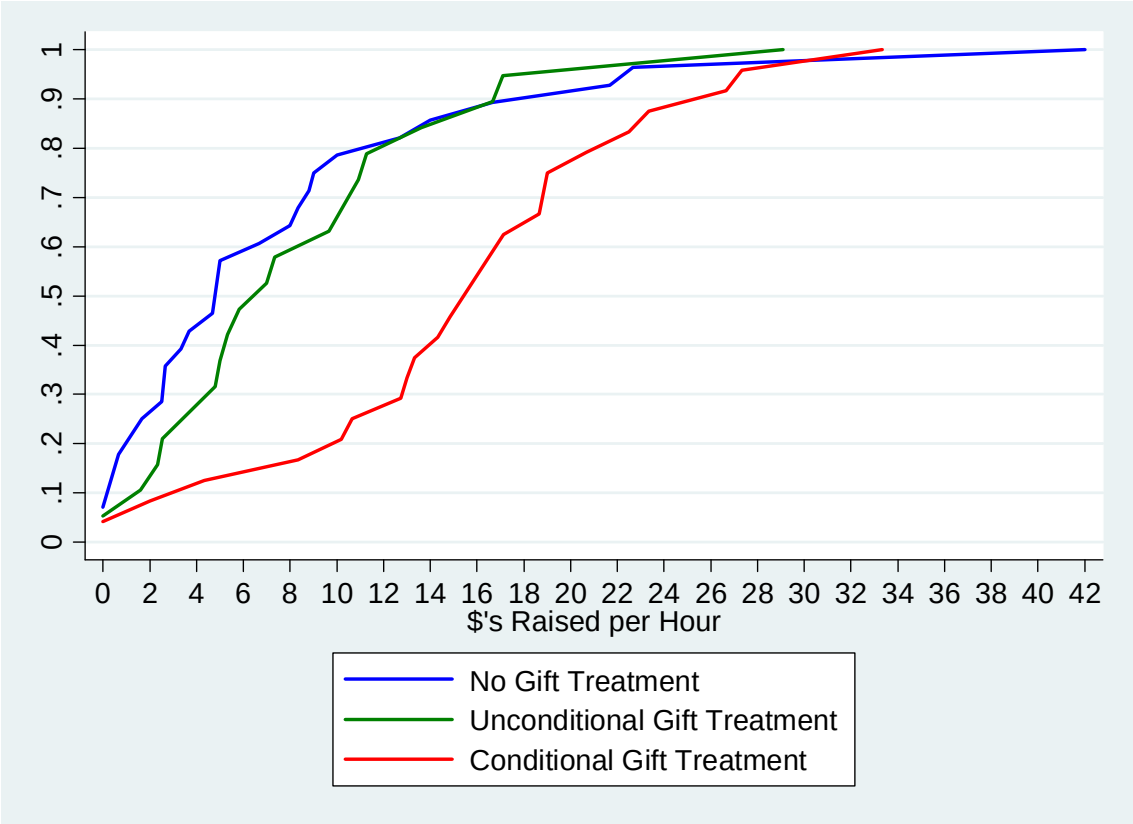


**Figure 4: Percentage of Solicitors that Raise $10+ per Hour**