ON THE RELATIVE EFFICIENCY OF PERFORMANCE PAY AND NONCONTINGENT INCENTIVES

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Abstract
We report evidence from a large field experiment that compares the effectiveness of contingent and noncontingent incentives in eliciting costly effort for a large range of payment levels. The company with which we worked sent 7,250 letters asking customers to complete a survey. Some letters promised to pay amounts ranging from $1 to $30 upon compliance (contingent incentives), whereas others already contained the money in the request envelopes (noncontingent incentives). Compared to no payment, very small contingent payments lower the response rate while small noncontingent payments raise the response rate. As expected, response rates rise with the size of the incentive offered. The response rate in the noncontingent incentives rises more rapidly for low amounts of incentive, but then flattens out and reaches lower levels than under contingent payments. We discuss how the optimal policy regarding the use of each size and type of incentives crucially depends on firms' objectives. (JEL: D21, D93)

1. Introduction

How important are social incentives in economic behavior? A common simplifying assumption in economics is that people are selfish and that only direct extrinsic incentives are important. A growing body of literature in experimental economics questions the validity of this assumption, showing that individuals may sometimes perform costly activities just to help someone else or out of reciprocity (see, e.g., Akerlof 1982; Fehr, Kirchsteiger, and Riedl 1993; Bewley 1999; Fehr and Gächter 2000; Charness and Haruvy 2002; Charness 2004; Sobel 2005; DellaVigna 2009).

Demonstrating social incentives outside of the laboratory, Falk (2007) found that reciprocity could be effective in increasing charitable donations. He approached previous donors to a charitable organization by mail with a contribution request. Some of the requests included no gift; others included either one or four postcards drawn by

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children as a noncontingent gift. The main result was that enclosing noncontingent gifts was effective in increasing donations, and donations increased with the size of the gift.[1] This result is a good example for situations in which social incentives (noncontingent payment) play a role in economic interactions. This clearly does not suggest that selfish-maximizing behavior is not important in markets. Thus, it is important to study under which circumstances the use of social incentives results in increased efficiency with respect to performance payment.

In this paper, we contrast contingent and noncontingent incentives in an effort to find the conditions under which each type of incentive is more effective in eliciting costly effort. We base our data on a large study (29 treatments with 7,250 participants) that a chain-store company conducted with its club members. The company sent letters asking club members to complete a 15-minute survey. It varied the amount of money ($1, $2, $3, $4, $5, $6, $7, $8, $9, $10, $15, $20, $25, and $30) it offered and whether incentives were contingent on completing the survey. The company has shared these data with us, and in this paper we compare the response rate in the different treatments.

We find that a small noncontingent payment of $1 almost doubles the response rate relative to the no-incentive treatment (from 8% to 15%). In contrast, a $1 conditional payment significantly reduces the response rate to 4%. Increases in nonconditional payments beyond $1 raise response rates, but the increase flattens out at around 30% rate for payments of $8 and above. In contrast, increases in conditional payments lead to a steeper monotonic increase in response rates from 4% up to 45% for conditional payments of $30.

The vast majority of survey studies are carried out with either no incentives or very small noncontingent monetary incentives. The richness of our design allows us to compare both types of incentives for a larger set of reward sizes than previously studied in the marketing literature (see Yammamiro, Skinner, and Childers 1991; Church 1993; Dillman 2000; Singer 2002; Jobber, Saunders, and Mitchell 2004). With respect to the economics literature, our first result corresponds to the findings in Falk (2007) that small unconditional gifts are effective in triggering reciprocity. Similarly, our second result is consistent with that of Gneezy and Rustichini (2000), which shows that small contingent incentives may backfire. A novelty in our results is the ability to compare a large range of incentives.

Our third result can be interpreted as showing that while larger gifts may trigger higher reciprocity, the ceiling for this reciprocity effect is reached for relatively small gifts. It seems to be that gifts larger than $8 do not engage nonreciprocal participants who do not respond to gifts. Our finding that response rates increase monotonically with conditional payment is compatible with standard incentive theory. The crossing of conditional and nonconditional response rates for large enough incentive sizes allows us to conclude that depending on the objective of the firm, one type of incentive may be preferable to the other.

1. This result is in line with a large body of literature that studies the effectiveness of noncontingent rewards in generating replies to surveys (e.g., Church 1993; Dillman 2000; Singer 2002).

Our study involves a large and diverse group of participants who made choices in their natural environment, unaware of their participation in an experiment, with relatively high stakes (up to $30 for 15 minutes) and choices that involved real effort. Note that our setting closely resembles a labor market, in which returned questionnaires can be interpreted as workers and response rates correspond to costly effort. Thus, our comparison of contingent and noncontingent incentives can be interpreted as comparing piece-rate pay with gift exchange incentives (Akerlof 1982). On a conceptual level, researchers have observed gift exchange in the laboratory, starting with Fehr et al. (1993), and in the field (e.g., Falk 2007). Yet, other studies (Gneezy and List 2006; List 2006; Benz and Meier 2008; see also the survey in DellaVigna 2009) question whether the laboratory findings are readily transferred outside the laboratory. The paper by DellaVigna, List, and Malmendier (2012) gives an example of a field experiment studying whether altruism or peer pressure may be behind charitable giving. Our results contribute to this discussion by showing that incentives that are based on social preferences work in the field, but their relative effectiveness, with respect to traditional incentives based on performance, crucially depends on their size.

2. Experimental Design

The data we report in this paper are based on a study designed and conducted by a large chain store company that operates all over the United States. The study was conducted in the fall of 2006, and we obtained the data after the study was concluded. The company's objective was to understand how varying amounts of incentives and methods of payment affect the response rate. This company conducts regular survey studies among members of its shopping club. Membership in this club allows customers to enjoy discounts on their shopping in the store. In addition, members receive monthly mailings that include coupons for further discounts and information about the store. In any case, no participant in our experiment was included in more than one treatment, and no participant had received similar requests for survey completion by the company prior to the present study.

Our main outcome variable is the response.[2] The survey followed the guidelines of the Total Design Method (Dillman 1978).[3] It included a cover letter that explained the purpose of the survey (marketing). The letter ensured participants' confidentiality and asked them to complete a 15-minute survey regarding their shopping habits. Participants were then asked to return the survey in an enclosed postage-paid envelope. The survey was two double-sided pages and contained 40 questions.

2. We do not have access to demographics, and hence cannot study, for example, whether the income level, the ethnic origin, or purchasing habits affect response patterns.

3. The Total Design Method is defined as follows: "... identifying each aspect of a survey process affecting either the quality or quantity of response and modify it to obtain the best possible responses and then organize survey efforts so design intentions are carried out in complete detail."

The company frequently uses monetary incentives to achieve a high response rate.[4] Roughly half of the participants (3,500) received cash in the envelope itself. The cover letter explained the money was given in appreciation of the customer's efforts and was not conditioned on his or her response. A second group of 3,500 participants did not receive any cash in the envelope; instead, their cover letter promised they would be paid by mail once the company received the completed survey. The letter to the remaining 250 subjects did not include or mention any rewards either before or after completion of the survey. Apart from the sentence explaining the presence or not of incentives, all other aspects of the cover letter were identical. Since the firm is a large and established company operating all over the United States, we can be relatively sure that individuals offered contingent incentives trusted the company.

Participants in the experiment were randomly assigned to different treatments using only their club membership numbers. These numbers are assigned to new members randomly across the US. A total of 7,250 subjects were assigned equally to each of the 29 treatments (250 participants per treatment).

Each of the incentivized treatments included either contingent or noncontingent incentives. The size of the incentives in each of these groups was \$1, \$2, \$3, \$4, \$5, \$6, \$7, \$8, \$9, \$10, \$15, \$20, \$25, and \$30, resulting in a total compensation of \$46,988. Because a few million people belong to this club and the survey sampled members from all over the United States, the probability of participants being aware of the incentive structure offered to other participants is low.

3. Results

Our results focus on response rates and on cost effectiveness for a given response rate.

3.1 Response Rate

Figure 1 presents the response rates and confidence intervals for all treatments Table A.1 in the Appendix shows the detailed data.

The response rate in the control treatment with no incentives is 7.6%. Offering \$1 noncontingent rewards doubled the response rate to 15.6%, while offering \$1 contingent on responding decreased the response rate to 3.3%. When paying, response rates increase with the size of the incentive for both contingent and noncontingent incentives. For rewards below \$15, noncontingent incentives resulted in higher response rates than contingent incentives.

We now turn to regression analysis to confirm the results. Table 1 reports an ordinary least-squares (OLS) regression of the response rate using a constant, and dummy variables representing each of the treatments as regressors. Note that for incentive sizes from \$2 to \$5 and from \$6 to \$10, we group data in single dummy

4. In any case, the value of incentives used prior to this experiment never exceeded \$10.

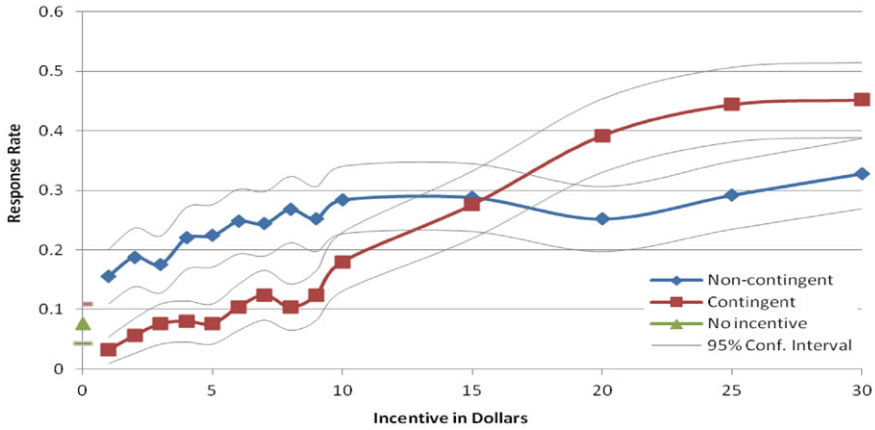

FIGURE 1. Response rates and standard errors in the different treatments.

variables. Estimated coefficients thus represent the increase in the response rate for each incentive type and size with respect to the no-incentive treatment. In line with the crowding-out hypothesis, offering a $1 contingent incentive significantly (at the 5% level) decreases the probability of responding.[5] Offering $2 to $5 contingent incentives does not significantly change the response rate with respect to not offering any incentive at all. All other comparisons of treatments to the no-incentive result show a significant (at the 1% level) increase in response rate.[6]

Columns (1) and (2) in Table 2 report differences in the estimated coefficients of Table 1, comparing the response rate of each incentive type and size with respect to the immediately lower incentive size of the same type. As seen in Figure 1 and reported in Column (3) of Table A.1 in the Appendix, the response rate doubled in the $1 treatment relative to the control for the noncontingent incentives treatments (15.6% vs. 7.6%). We also observe significant increases in the response rate when comparing $1 noncontingent incentives to $2−$5 and when comparing $6−$10 to $2−$5 (at the 10% and 1% levels, respectively). A test of the differences at $5 intervals for higher noncontingent incentives shows no significant differences in response rate between each incentive size and the previous one (at the 1% level). Interestingly, the response rate at the $30 noncontingent level (32.8%) is double that of the $1 (15.6%) treatment. This difference is statistically significant at the 1% level. These findings allow us to conclude that although the response rate increases with the size of social incentives, the slope is relatively flat and has a limit at around a 30% response rate. This result is consistent with Armstrong (1975), Moser and Kalton (1976), and Jobber and Saunders (1988), who, using much less variability and smaller incentives, argue that the mere act of giving an incentive has a major impact and a relatively low sensitivity to size.

5. We do not observe a negative effect in the $1 noncontingent treatment, which possibly indicates that crowding out may be stronger when offers are made than when subjects already hold their payment.

6. Identical results (not reported) are obtaining by estimating a probit model.

TABLE 1. Treatment differences in response rate.

		OLS
	Treatment	Response
	Constant	0.076***
		(0.017)
Noncontingent	\$1	0.08***
		(0.028)
	\$2−\$5	0.126***
		(0.021)
	\$6−\$10	0.183***
		(0.021)
	\$15	0.212***
		(0.033)
	\$20	0.176***
		(0.032)
	\$25	0.216***
		(0.033)
	\$30	0.252***
		(0.034)
Contingent	\$1	−0.044**
		(0.020)
	\$2−\$5	−0.004
		(0.019)
	\$6−\$10	0.512***
		(0.019)
	\$15	0.200***
		(0.033)
	\$20	0.316***
		(0.035)
	\$25	0.368***
		(0.036)
	\$30	0.376***
		(0.036)
	Observations	7,250
	R^2	0.074

Notes: The table shows an OLS regression including a constant. The outcome variable in the last column is the response rate, which is an indicator variable taking the value of 1 if the subject responded, and 0 otherwise. All regressors are dummy variables. Treatments where the incentive offered ranges from \$2 to \$5 and from \$6 to \$10 are grouped under the \$2−\$5 and \$6−\$10 dummy variables Standard errors are in parentheses. **Significant at 5%; ***significant at 1%.

Comparing response rates for each of the pairs of payoffs (i.e., the same level of incentives either under contingent or noncontingent incentives) reveals interesting patterns. Column (3) in Table 2 reports differences in the estimated coefficients of Table 1, comparing response rates of contingent and noncontingent incentives for the same size of incentive. As seen in Figure 1, we confirm that all response rates are statistically different at the 1% level (with the exception of the \$15 treatments). Lower payoffs produced higher response rates for noncontingent incentives, whereas higher payoffs (greater than \$15) produced higher response rates for contingent incentives.

TABLE 2. *T*-tests comparing size and types of incentives.

	Smaller versus larger (with respect to previous incentive size)		Noncontingent versus contingent (with respect to same incentive size)
Incentive size	Noncontingent response (1)	Contingent response (2)	Response (3)
$1	0.080***	−0.044**	0.124***
	(0.029)	(0.020)	(0.026)
$2−$5	0.046*	0.040***	0.130***
	(0.026)	(0.014)	(0.015)
$6−$10	0.057***	0.052***	0.132***
	(0.018)	(0.012)	(0.015)
$15	0.029	0.149***	0.012
	(0.031)	(0.030)	(0.040)
$20	−0.036	0.116***	−0.140***
	(0.040)	(0.042)	(0.041)
$25	0.040	0.052	−0.152***
	(0.040)	(0.044)	(0.043)
$30	0.036	0.008	−0.124***
	(0.041)	(0.044)	(−0.043)

Notes: Columns (1) and (2) report differences in the coefficients of the regression estimated in Table 1, comparing response rates for the same type of incentive of one size and the immediately smaller size. Column (3) reports differences in coefficients, comparing response rates across types of incentives for the same size of incentive. Robust standard errors appear in parentheses. **Significant at 5%; ***significant at 1%.

3.2 Effectiveness and Costs

We now turn to a simple cost−benefit analysis associated with each treatment.[7] The company launched this experiment to learn how different incentives affect response rates. It then used this knowledge to choose the relevant incentive level and method for new surveys. The cost of the survey includes the different incentives provided plus the mailing costs. The company estimated the marginal cost of each survey request at 60 cents, whereas the mailing cost of returned surveys was 55 cents. In the contingent treatments, sending the money to compliant customers added an additional mailing cost of 55 cents. Table A.2 in the Appendix shows the total cost per treatment as well as the unitary cost per completed survey in each treatment. Because the company enclosed the payment in every request in the social-incentives treatment, while sending it only to people who completed the survey in the contingent-incentives treatment, the total cost in the noncontingent-incentives treatments was almost three times higher than in the contingent treatments ($38,820.25 vs. $13,212.5). Yet, the former only produced 35.71% more completed surveys. The average cost of a returned survey in the noncontingent treatments was $45.40, compared with $20.97 in the contingent

7. Note that our cost−benefit analysis values all responses equally, ignoring the possible selection issues.

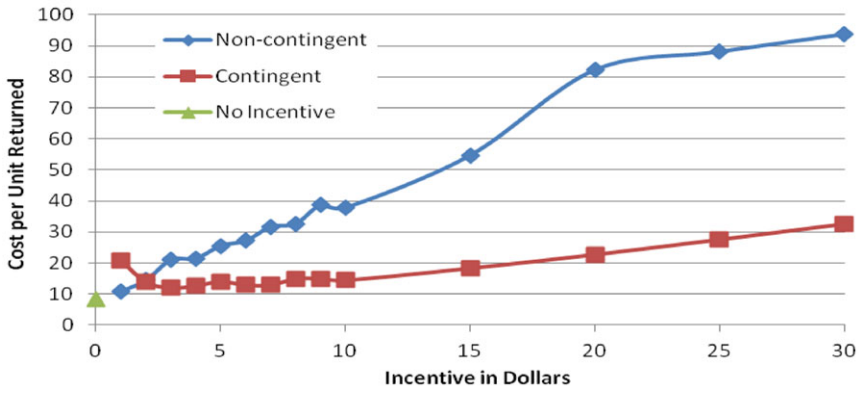

FIGURE 2. Cost per returned survey.

treatments. The average cost in the no-incentive treatment was the lowest ($8.44), because it only included request and mailing costs.[8]

Figure 2 shows the unitary cost per survey returned for each incentive condition. Unitary costs steadily increased with the size of the incentive in the noncontingent treatment. The low return rate when $1 was offered upon compliance in the contingent treatment made the initial unitary cost higher than in the noncontingent treatment. With regards to contingent incentives, given the extremely low response rate when $1 is offered, the initial unitary cost is high, and double the unitary cost of $1 noncontingent incentives ($20−$85 vs. $10.81). However, the contingent unitary cost dropped below the noncontingent-incentive treatment when incentives equaled $2 ($14.38 for noncontingent vs. $13.41 for contingent), and its increasing slope is lower than in the noncontingent treatment. Therefore, from $2 onwards, the unitary cost of each returned survey was lower with contingent incentives than under noncontingent incentives. In fact, the difference in unitary costs between the two treatments increased with the size of the incentive.

Unitary costs for noncontingent incentives are minimized by enclosing $1 while unitary costs for contingent incentives are minimized by offering $3 per returned survey.

4. Discussion

Noncontingent incentives can be an effective way of eliciting costly effort from individuals. Our rich design allows us to test for the relative effectiveness of noncontingent incentives versus performance pay, showing that effectiveness interacts with the size of the incentive offered.

One possible explanation for our results is that only a fraction of the population are driven by reciprocal concerns and react to noncontingent gifts. In order to activate this

8. A potential mechanism to minimize the cost of the noncontingent treatment would have been to use redeemable coupons instead of cash. However, responses rates may vary in unexpected ways in this alternative treatment, because subjects may not assign the same value to coupons as to cash, as they may feel forced to spend them at the provider's shop.

fraction of the population, it is enough to offer a relatively small noncontingent reward. If the rest of the population is not driven by reciprocal concerns, increasing the level of incentives above this amount would not increase the response rate. Therefore, once the reciprocal population is exhausted with high-enough noncontingent gifts, this form of compensation becomes ineffective in soliciting effort. However, pay-per-performance rewards seem to work in line with theory (i.e., the larger the contingent reward, the larger the fraction of the population who respond to the incentive). Thus, depending on the target rate of the firm, and on the individual costs of providing each type of incentive, one method may be preferable to the other. In fact, we have shown that if the firm's objective is only to maximize the number of responses, it may be optimal not to use incentives at all, because unitary costs per response are lowest, and target as large a population as required.

However, there are other aspects involved in these considerations. For example, firms are reluctant to exhaust their databases of potential responders with massive mailings. Thus, in order to obtain large enough samples of respondents and high response rates, they are willing to use incentives.

As Titmuss (1970) hypothesized in the case of blood donation, contingent incentives may affect the selection of people who participate and even the quality of their responses. Unfortunately, our data do not allow us to study the selection issue, because the firm provided us with only a limited measure of the quality of the completed surveys. We believe that future research that can address this issue in a careful way will make an important contribution to our understanding of the interaction between the different incentives and the quality of the outcome.

Finally, a possible interpretation of our results is that different types of people may respond differently to different incentives. Thus, the choice of one type (or size) over another may produce selection problems affecting the representativeness of the sample of responders. Some evidence for this is the decrease in response rate observed when offering low contingent incentives. This segment of the population may be very different from those who typically respond to incentives. Future research could highlight the importance of this heterogeneity with respect to different incentives.

As discussed by Gneezy, Meier, and Rey-Biel (2011), incentives of different types and size may convey different messages. For example, noncontingent incentives may primarily convey the message that the employer is being nice to the employee, or that it wants to exploit the employees' reciprocity. In any case, the size of the noncontingent incentive may not change the message, and this may explain why response rates are relatively flat with respect to the size of the noncontingent incentive. However, the offer of a very low payment contingent for performing a relatively costly task may insult the recipient. This is compatible with our result that $1 contingent incentives actually lower the response rate with respect to the offer of no incentive at all (Gneezy and Rustichini 2000). As contingent incentives become larger, not only the cost of effort is covered, but also the message sent changes.

An important limitation of our study is that we had no access to demographic variables that could have enriched our conclusions. One important dimension is whether different types and sizes of incentives affect the selection of participants who respond. For example, we would like to study whether individuals of different

income levels, ethnic origin, and/or with different purchasing habits react differently to both types and sizes of incentives. We hope that future research will investigate this dimension.

Appendix

TABLE A.1. Response patterns in the contingent and noncontingent treatments.

	Number of responses		Frequency	
No incentive	19		0.076	
Incentive	Noncontingent	Contingent	Noncontingent	Contingent
$1	39	8	0.156	0.032
$2	47	14	0.188	0.056
$3	44	19	0.176	0.076
$4	55	20	0.220	0.080
$5	56	19	0.224	0.076
$6	62	26	0.248	0.104
$7	61	31	0.244	0.124
$8	67	26	0.268	0.104
$9	63	31	0.252	0.124
$10	71	45	0.284	0.180
$15	72	69	0.288	0.276
$20	63	98	0.252	0.392
$25	73	111	0.292	0.444
$30	82	113	0.328	0.452
N	**855**	**630**	**0.244**	**0.180**

TABLE A.2. Costs in the contingent and noncontingent treatments.

	Total cost		Cost per unit returned	
No incentive	160.45		8.45	
Incentive	Noncontingent	Contingent	Noncontingent	Contingent
$1	421.4	166.8	10.81	20.85
$2	675.8	193.4	14.38	13.81
$3	924.2	227.9	21.01	11.99
$4	1180.3	252.0	21.46	12.60
$5	1430.8	265.9	25.55	13.99
$6	1684.1	334.6	27.16	12.87
$7	1933.6	401.1	31.70	12.94
$8	2186.9	386.6	32.64	14.87
$9	2434.7	463.1	38.65	14.94
$10	2689.1	649.5	37.87	14.43
$15	3939.6	1260.9	54.72	18.28
$20	5184.7	2217.8	82.30	22.63
$25	6440.2	3047.1	88.22	27.45
$30	7695.1	3664.3	93.84	32.43
Average	–	–	**45.40**	**20.97**

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