Trust Games Part 2: Gift Exchange

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1 Introduction

In the 1980s there were a flurry of articles on the "efficiency wage hypothesis." These were models that explained involuntary unemployment by proposing that wages above the market clearing level would induce workers to work harder. This reduces turnover and monitoring costs. There were several mechanisms through with this worked. One way (proposed by Kruger and Summers, 1987) is that the excess pay creates a bonus that would be lost if the person is caught shirking and is fired. In equilibrium all firms pay this bonus, so unemployment is generated and this become the punishment. Another story is by Akerlof (1982) that the higher wage creates a "gift" to employees, which they repay with higher effort. Firms reciprocate with higher wages next period, and so on. The gift exchange is profitable for the firm since output goes up by more than the cost.

This idea was given weight by a paper by Kahneman, Knetsch and Thaler (Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler (1986). Fairness as a Constraint on Profit Seeking: Entitlements in the Market, *American Economic Review*, 76, 728-741). This paper asked hypothetical questions, like would you buy a snowblower if the price went up the day of a snowfall, to argue that fairness was important in exchange.

Ernst Fehr and many coauthors explored a "Gift Exchange" game in many experiments and found evidence to support Akerlof's model and predictions. Others have had less success replicating these findings (such as the Trust games literature we just discussed). This suggests a need to explore the robustness of the finding. Recent papers have deeply challenged the scope and robustness of these results.

2 Gift Exchange Games

Fehr, Ernst, et al., "Does Fairness Prevent Market Clearing? An Experimental Investigation." QJE, May 1993,437-59.

Experimental Design:

- Players are in the role of Firms or Workers.
- There is excess supply of workers.
- Firms offer a wage w and request a level of effort level.
- After seeing *w* workers chose a costly effort level *e*. If they agree to work, they also pay a fixed cost *f* of working.
- Effort costs c(e), where c' > 0 and c'' > 0.
- Every unit of effort generates v value for the firm

TABLE I m(e)-Schedule										
e	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
m(e)	0	1	2	4	6	8	10	12	15	18

- Payoffs are:
 - Workers: $u_i = w_i c(e_i) f$
 - Firms: $\pi_i = (v w_i)e_i$

– Schedule for c(e) is (Fehr uses m(e) for c(e))

• Note: This is a non-linear version of the trust game. It's a lot more complicated, however, so it will be natural to ask whether it differs from trust games and what part of the design might be responsible for that.

Things to note about the design:

- c(e) is not linear, but increasing at an increasing rate.
 - This makes it hard to know the "price" of the gift
 - It also means inframarginal gains accrue to the worker, making small amount of fairness pay a lot at low levels of effort.
- Firm's profit function isn't quite right
 - real profit should be $\pi = ve_i w$
 - Since in the study $\pi = (v w_i)e_i$, it means that in the neighborhood of equilibrium it is extremely cheap for the firm to offer a higher wage. In fact, the more the person shirks, the cheaper it becomes for the firm to bribe the person to work harder. So if shirking is high, a firm might say "why not" to paying a higher wage.
- Also, the value of the "gift" of the worker depends on the *w* named by the firm, and in fact a higher *w* creates a higher price for reciprocating. Some people who care a lot about inequality may give more in such cases, whereas others are more likely to be at corner solutions. This means the changes may be driven mostly by the "ultra-fair" people in the population.
- In addition, the endogeneity will make it hard to interpret the strategic responses and fairness evaluation of the game.

• Parameters:

-v = 126

- -f = 26
- -w's must be in multiples of 5.
- Predictions
 - Money Maximization: For any w, costly e should be $e^* = e_{\min} = 0.1$, so w is just enough to ensure entry: u = w 0 f > 0. Given multiples of 5, $w^* = 30$
 - Fairness: Some $w > w^*$ and some $e > e^*$ and profits of the firm exceed π^* and utility of the worker exceeds u^* .
 - * Specifically
 - · Hypothesis 1: effort should be increasing in wage offers
 - · Hypothesis 2: wage offers are significantly higher than market clearing wages
 - · Hypothesis 3: effort exceeds e^* and does not converge over time to e^* .

Results:

• Hypothesis 1:

Wage	Average observed effort level	Median observed effort level
30-44	0.17	0.1
45-59	0.18	0.2
60-74	0.34	0.4
75-89	0.45	0.4
90-110 ,	0.52	0.5

TABLE II THE WAGE-EFFORT RELATION



FIGURE I The Wage-Effort Relation

	RESULTS OF REGRESSION (6): $e = \sum_{i=1}^{n} \gamma_i d_i + \beta p + \mu$							
	N	n	β	<i>t</i> (β)	R^2	W-st	prob	
S1-4	276	35	0.0076	10.8	0.6	275	0.000	
S1	72	9	0.0067	5.9	0.61	56.9	0.000	
S2	72	9	0.0081	5.4	0.65	81.3	0.000	
S3	72	9	0.0072	6.3	0.51	45.1	0.000	
S4	, 60	8	0.0118	4.4	0.38	25.0	0.002	

		n	
RESULTS OF	REGRESSION (6): ϵ	$e = \sum_{i=1} \gamma_i d_i + $	$\beta p + \mu$

TABLE IV

S#: Session#.

N: Number of observations.

n: Number of workers.

 $t(\beta)$: t-value of the β -coefficient.

 R^2 : Adjusted coefficient of determination.

W-st: Wald-statistic for the hypothesis that all γ_i are equal to α (the relevant α can be found in Table III).

This statistic is CHI(n-1) distributed.

prob: Significance level of W-st.

• Hypothesis 2 and 3:







FIGURE II Average Relative Overpayment and Average Effort per Period

Conclusions:

- Big success for gift exchange, and lots of evidence of positive reciprocity that is increases efficiency.
- Authors (p. 453): "On the whole, our results provide evidence for the validity of the fair wageeffort hypothesis."

Critique:

- Engelmann Dirk and Andreas Ortmann (2002). The Robustness of Laboratory Gift Exchange: A Reconsideration, working paper, Charles University.
 - Shows that small changes in parameters get hugely different results. Gift exchange is very sensitive to parameters.
- Charness Gary, Guillaume R. Frechette, and John H. Kagel (2006), How Robust is Laboratory Gift Exchange? *Experimental Economics*.
 - Shows that if subjects see a detailed table of payoff consequences for both the worker and firm, the benefits of GE are greatly reduced and it becomes unprofitable. Moreover it tends to zero as the game is repeated.
 - The implication is that some of the features are not transparent.
- Look at the payoff surfaces:

Gneezy, Uri. and John A. List "Putting Behavioral Economics to Work: Field Evidence of Gift Exchange." *Econometrica*. September 2006, 74(5): 1365-84

- They take seriously the claim that Fehr et al. have found evidence of gift exchange in labor markets.
- Do a field study with real workers doing real tasks.
- Task 1: Library work
 - Advertise on campus for work in the library at \$12/hour.
 - Half the subjects who come it are told they will actually earn \$20
 - Subject work 3 hours in the morning and 3 hours in the afternoon.
- Task 2: Door-to-door fund raising
 - As before, all recruits told they would be paid \$10/hour
 - Half were actually paid \$20/hour.

- Hypotheses:
 - H0: No difference for any reason.
 - H1: Gift Exchange
 - H2: Hot vs Cold behavior (psychological hypothesis): Upon being surprised by the gift of a higher wage, the good news will fuel their enthusiasm (the hot state), but after time they will return to normal (cold state) and behave as the others do.
 - H3: Habituation. As people get used to earning \$20, they may put in less additional effort.
 They come to see the situation as "normal" and no longer deserving of reciprocity.

- Results:
 - Effort

Figure 1: Average Books Logged Per Time Period



	Library Task		Fundraiser		
Variable		Variable	(Hourly)	(3 Hour Block)	
Gift	10.9 (6.6)	Gift	3.4 (3.3)	13.8 (5.8)	
Time2	-0.2 (1.6)	Time2	3.0 (2.8)		
Time3	0.5 (1.6)	Time3	-3.6 (2.8)		
Time4	-1.1 (1.9)	Time4	-1.2 (2.8)		
Gift*Time2	-6.6 (3.1)	Time5	2.6 (2.8)		
Gift*Time3	-10.5 (3.1)	Time6	-1.3 (2.8)	0.70 (4.4)	
Gift*Time4	-10.2 (3.3)	Gift*Time2	2.0 (3.7)		
Constant	40.7 (3.6)	Gift*Time3	1.6 (3.7)		
		Gift*Time4	-0.9 (3.7)		
		Gift*Time5	-5.8 (3.7)		
		Gift*Time6	-2.2	-12.6	
		Constant	(3.7) 6.6 (2.4)	(5.9) 19.2 (4.4)	
N	76		138	46	

Table 2 Regression Results

• - Fund-raising

Figure 2: Average Earnings – by 3 Hour Block



	Pre-Lunch	Post-Lunch	Difference
Gift Exchange	11.00	7.026	3.974**
	(1.443)	(0.786)	
Non-Gift Exchange	6.40	6.633	-0.233
_	(1.803)	(1.389)	

Table 4: Average Earnings – Within Treatment by 3 Hour Block

Note: Cell entries provide summary statistics for average earnings per hour for the 3-hour blocks before and after lunch across our two treatments (gift exchange and non-gift exchange). Standard errors for the earnings are in parentheses. Column 4 provides the difference in average hourly earnings within a treatment across these blocks. ** indicates that the reported difference is statistically significant at the $p \le 0.05$ level using a matched pairs t-test.

- Conclusions:
 - Field study suggests that in real markets the gift exchange is a short lived phenomenon that is gone after 3 hours.
 - Firms would have been better off not giving the gift, but hiring more workers.
 - Casts serious doubt on the external validity of the laboratory Gift Exchange models.

3 Conclusions

From the studies we saw today we can conclude:

- 1. Reciprocity can be a profitable and effective tool to use as a substitute for enforcement.
- 2. However, there are serious questions about the generality the findings of Fehr et al.
- 3. When the parameters are changed, often the benefits of gift exchange are weaker.
- 4. When tested for "external validity" in real world labor markets, the effect seems fleeting, suggesting that even the successful demonstrations of a profitable gift exchange may not hold up with applied to the real world.
- 5. The once "settled questions" about the power of reciprocity needs to be revisited and tested further.
- 6. The next challenges are to ask how real world markets can deal with reciprocity and if there are modifications of markets that can help use reciprocity to enhance efficiency.