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Reciprocity and the Effectiveness of Optimal Agency Contracts

Xi (Jason) Kuang
Georgia Institute of Technology

Donald V. Moser
University of Pittsburgh

ABSTRACT: Optimal agency contracts pay the lowest wage necessary to induce profit-maximizing effort. Employees could view such contracts as violating reciprocity because, relative to more reciprocal contracts, they offer a lower wage in exchange for higher effort. Consequently, the profit-maximizing effectiveness of optimal contracts could be impaired if employees reject them or reduce their effort. We use experimental labor markets to examine (1) how employees respond to an optimal versus a suboptimal reciprocity-based contract when each contract is the only contract available, (2) how employees respond to these contracts when firms choose which one to offer, (3) whether the firms' contract offers depend on employees' reactions to those offers, and (4) how employees and firms react to a hybrid contract that incorporates features of both contracts. We find that the optimal contract is less effective than agency analysis predicts, the reciprocity-based contract can be equally effective, and the hybrid contract dominates a market in which all three contracts are available. Implications of these results are discussed.

Keywords: *reciprocity; gift exchange; agency theory; optimal contract.*

Data Availability: *Please contact the authors.*

I. INTRODUCTION

Agency theory is one of the most important theoretical paradigms in management accounting research (Indjejikian 1999; Lambert 2001). The main focus of agency research is on deriving optimal incentive contracts in various control environments

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(Baiman 1982). The goal of such contracts is to maximize firm profit, taking into account employees' rationality and incentive compatibility constraints. Optimal contracts achieve this goal by offering employees the lowest wage necessary to induce the effort that maximizes firm profits.

However, in addition to the financial incentives in employment contracts, prior experimental research in accounting (Hannan 2005) and economics (Fehr et al. 1993; Fehr et al. 1998; Hannan et al. 2002) has documented a reciprocity norm between firms and employees. Such reciprocity between firms and employees has been labeled ''gift exchange'' because, inconsistent with the predictions of conventional economic analysis, firms give employees a gift of a wage above the market-clearing level, and employees reciprocate with a gift of effort above the enforceable level (Akerlof 1982). This research has also shown that, on average, this type of reciprocity yields higher firm profit than if, as economic theory prescribes, firms pay only the market-clearing wage and employees provide only the enforceable effort level.

Preferences for reciprocity of the type documented in gift-exchange studies play no role in standard agency analysis. However, such preferences could reduce the profit-maximizing effectiveness of optimal agency contracts if employees expect the firm to maintain a reciprocal relationship with them and retaliate when the firm fails to do so (Robinson et al. 1994; Rousseau 1995). Because optimal agency contracts are designed to pay the lowest wage necessary to induce the effort that maximizes firm profit, they could be perceived as violating the reciprocity norm. If employees punish firms that offer theoretically optimal contracts for violating reciprocity by rejecting such contracts or by accepting them and reducing effort, then the profit-maximizing effectiveness of the contracts will be impaired.

We conduct three experiments using labor markets to address a number of related research questions: (1) how employees respond to being offered an optimal agency contract versus a theoretically suboptimal reciprocity-based gift-exchange contract when each contract is the only contract available in the market, (2) how employees respond to these two contracts in a market in which the firm chooses which one to offer, (3) whether firms' contract offers depend on how employees react to those offers, and (4) how employees and firms react to a hybrid contract that incorporates important features of both the theoretically optimal and reciprocity-based contracts.

The results of our first experiment provide evidence that the optimal agency contract for our experimental setting is somewhat effective as a profit-maximizing contract in that, consistent with the agency theory prediction, it yields significantly higher firm profit than the suboptimal reciprocity-based gift-exchange contract when each contract is the only contract available in the market. However, some employees react negatively to the optimal contract and provide less than the optimal effort level even though it is costly for them to do so. The results of our second experiment show that when both contracts are available and firms choose which one to offer, firm profit from the optimal contract decreases significantly because employees punish firms for offering it, either by rejecting the contract entirely or by accepting it and reducing effort. Consequently, in later periods of the experiment, firm profit under the reciprocity-based gift-exchange contract is statistically equivalent to that under the optimal contract. Moreover, in later periods, firms begin offering the reciprocity-based contract more often than the optimal contract. These results are consistent with our expectation that the profit-maximizing effectiveness of optimal agency

contracts can be impaired relative to the standard agency prediction if they are viewed as violating the reciprocity norm.

The results of our third experiment show that a new hybrid contract that combines the ''forcing'' feature of the optimal agency contract with the ''reciprocity'' feature of the gift-exchange contract can be more effective than either of the two contracts alone. In a labor market in which firms choose which of the three contracts to offer, the new hybrid contract yields the highest employee effort, the highest employee payoff, and the highest social welfare (total firm and employee payoff). In addition, although firms choose to offer the three contracts with similar frequency in the first period, they quickly shift to offering the hybrid contract far more often than either of the other contracts in subsequent periods, such that by the last period, 95 percent of firms offer the hybrid contract.

Overall, our results suggest that optimal contracts designed using standard agency analysis are not as effective as the underlying theory suggests, and that incorporating preferences for reciprocity into the design yields more effective contracts. These results are important for accounting researchers and corporate managers because most employment contracts make payments to employees contingent on performance as measured by the accounting system. Understanding how performance measures (e.g., output or firm profit) in combination with other factors (e.g., wage levels) interact with employees' preference for reciprocity to affect their behavior is crucial for successful contract design. We believe this is a rich area of study that can help management accounting researchers better understand and describe aspects of contracts observed in current practice and can help corporate managers design better employment contracts and control systems.

II. EXPERIMENT 1

Theory and Hypothesis

To illustrate the important features of an optimal agency contract versus a gift-exchange contract, we adopt the experimental setting used in several previous gift-exchange studies (Fehr et al. 1993; Fehr et al. 1998; Hannan et al. 2002; Hannan 2005). We use this setting in our experiment for two main reasons. First, it allows us to compare our results directly to the earlier results because we replicate parts of the earlier studies before extending our investigation to address our new research questions. Second, the setting is simple enough to yield an agency theory prediction, which we use as a benchmark for examining the profit-maximizing effectiveness of the optimal agency contract.[1]

Our experimental setting is a single-period agency setting, in which a firm hires an employee to provide effort in production. Employee effort is not observable, and therefore not contractible. Firm profit is observable to both the firm and the employee. The firm's profit (G) and employee's net utility (U) are:

$$G = (q - w)e$$

$$U = w - c(e)$$

[1] An agency theory prediction is possible because there is no state uncertainty and no individual reputation effects. As will be shown later, the lack of state uncertainty means our results cannot be explained by participants' risk preferences, and the single-period setting means that participants cannot develop individual reputation in the labor market. Later in the paper we also discuss the possibility that ''group'' versus ''individual'' reputation effects come into play in our experiments as participants gain experience.

where:

q = an exogenously given constant representing revenue to the firm;
w = the firm's wage offer;
e = the employee's effort; and
$c(e)$ = the cost of effort, which increases with the level of effort.

The firm's profit function, the employee's net utility function, and the employee's set of possible effort levels and the associated costs are common knowledge. Under standard agency theory, the optimal incentive contract for this setting solves the following problem for the firm:

$$\text{Maximize } [(q - w)e]$$

$$w, e$$

subject to:

$$w - c(e) \geq U_0$$

$$w - c(e) \geq w - c(e')$$

where:

U_0 = the employee's reservation net utility;
$e, e' \in E$ and $e \neq e'$ (E = the employee's set of possible effort levels).

The solution to this problem is well known. Since the link between employee effort and firm profit is not affected by any external uncertainty, the firm is able to perfectly infer the employee's effort by observing firm profit. Therefore, the firm should use the following ''forcing'' contract (Harris and Raviv 1978):

$$w = w_H = c(e^*) + U_0 \text{ if } G = (q - w_H)e^*; \text{ and } w = w_L, \text{ otherwise}$$

where e^* = the effort level that maximizes firm profit and $w_L < w_H$.

Under this contract, a rational employee will always choose e^* because it is the only incentive-compatible effort choice. Thus, the firm achieves the first-best outcome by simply paying the market-clearing wage (w_H).

Previous gift-exchange studies that used the setting described above were silent regarding whether firm profit was contractible. If firm profit is contractible, then the contract used in the previous gift-exchange experiments would be theoretically suboptimal. That gift-exchange contract allows firms to offer any wage they wish within the specified range, and then the employees who accept a wage offer can choose any effort level they wish within the specified range. Under this contract, the conventional subgame perfect equilibrium prediction is that, regardless of the firm's wage offer, the employee will always choose the lowest effort possible to maximize his net payoff. Anticipating this, the firm always offers the lowest wage possible.

In contrast to the conventional agency theory prediction, the experiments that tested the gift-exchange contract described above (Fehr et al. 1993; Fehr et al. 1998; Hannan et al. 2002; Hannan 2005) found that both firms' wage offers and employees' effort levels were higher than the subgame perfect equilibrium predictions, and that effort levels were positively associated with wage offers. In addition, firm profit generated by employees' reciprocal effort was, on average, higher than if the firm had paid only the subgame perfect equilibrium wage. These results provided support for Akerlof's (1982) gift-exchange theory.[2] However, such evidence does not fully address the economic implications of reciprocity because the gift-exchange contract used in these studies is a theoretically suboptimal contract. That is, if firm profit is contractible, the theoretically optimal agency contract is the forcing contract described earlier, and by definition, this optimal contract should yield higher firm profit than the suboptimal gift-exchange contract. The hypothesis we test in Experiment 1 is based on this standard economic reasoning:

H1: The theoretically optimal contract for a specific setting will produce higher firm profit than a gift-exchange contract in that same setting.

Experimental Setting and Contracts

The market setting used in Experiment 1 and in our subsequent experiments is the one described earlier. Adopting the parameters used by Hannan et al. (2002) and Hannan (2005), the firm's profit function is:[3]

$$\textit{Firm profit} = (120 - \textit{wage}) \times \textit{employee effort} \tag{1}$$

where $\textit{wage} \in \{20, 21,...,120\}$ and $\textit{employee effort} \in \{0.1, 0.2,...,1.0\}$.

The employee's net payoff is:

$$\textit{Employee's net payoff} = \textit{wage} - \textit{cost of effort} \tag{2}$$

where the cost of effort to the employee is as follows:

Effort	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Cost	0	1	2	4	6	8	10	12	15	18

Firm profit is observable to both the firm and the employee. The employee's effort level is not directly observable by the firm, and therefore not contractible. However, because the link between employee effort and firm profit is not affected by any external uncertainty,

[2] Gift-exchange theory has also been supported by field and archival research (Raff and Summers 1987; Blinder and Choi 1990; Agell and Lundborg 1995; Campbell and Kamlani 1997; Huang et al. 1998; Bewley 1999; Bellemare and Shearer 2007). However, to control for potential confounds in the field, experiments have proven to be a very useful tool to test the predictive validity of the gift-exchange model.

[3] In all of our experiments, all amounts were expressed in ''lira,'' an experimental currency. At the end of each experiment, participants' earnings were converted to dollars at the rate of 50 lira = $1.00. The experiments took between approximately 35 minutes (Experiment 1) and an hour (Experiments 2 and 3) to complete, and participants' average earnings were as follows: Experiment 1 (firms/employees, $13.08/$14.05); Experiment 2 (firms/employees, $13.03/$13.83); Experiment 3 (firms/employees, $18.29/$16.28).

the firm can perfectly infer the employee's effort by observing firm profit. Also, because there is no external uncertainty, risk preferences do not affect firms' or employees' behavior.

For this setting, the optimal contract (hereafter, OPT contract) is determined by solving the maximization problem identified earlier using the parameters shown above. This yields the following optimal contract:[4]

$$\begin{aligned} \textit{wage } (w_H) &= 38 \text{ if firm profit is 82 (i.e., employee chooses effort level 1);} \\ \textit{wage } (w_L) &= 15 \text{ if firm profit is not 82 (i.e., employee chooses any other} \\ &\quad \text{effort level).} \end{aligned} \tag{3}$$

Note that the firm's profit function in Equation (1) above can be rewritten as:

$$\textit{Firm profit} = (120 \times \textit{employee effort}) - (\textit{wage} \times \textit{employee effort}). \tag{4}$$

In Equation (4), the first product (120 × employee effort) represents the output produced by the employee. Therefore, using Equation (4), the optimal agency contract in Equation (3) above can be rewritten as:

$$\begin{aligned} \textit{wage } (w_H) &= 38 \text{ if output is 120 (i.e., employee chooses effort level 1);} \\ \textit{wage } (w_L) &= 15 \text{ if output is not 120 (i.e., employee chooses any other} \\ &\quad \text{effort level).} \end{aligned} \tag{5}$$

We used this output-based version of the optimal contract, i.e., Equation (5) above, in all of our experiments because, as will become clear in Experiment 3, this allowed us to hold constant the description of the optimal contract in the instructions for all of our experiments. Faced with the optimal contract, rational employees will always choose effort level 1 and

[4] The maximization problem is solved using Grossman and Hart's (1983) approach, in which the firm's problem is to choose the contract that maximizes firm profit from among the contracts that implement every possible effort level with the minimum cost to the firm. The contract resulting from applying this approach offers a high wage (w_H) of 38 for firm profit of 82 and a low wage (w_L) for any firm profit other than 82. The low wage (w_L) was set at 15 to ensure that employees were always financially better off by choosing the theoretically optimal effort level of 1 and to avoid negative payoffs for employees who chose a suboptimal effort level. The first reason required that w_L be below 20 because if it were above 20 (e.g., 21), the employee could choose a low effort level (e.g., 0.1) and earn a higher net payoff (wage of 21 – cost of effort of 0 = 21) than the net payoff that they would earn by choosing the optimal effort level of 1 (wage of 38 – cost of effort of 18 = 20). If w_L were 20, then employees would be indifferent between choosing the optimal effort of 1 and the lowest effort of 0.1. The second reason requires that w_L be at least 15. If w_L were below 15 (e.g., 14), then employees who chose the suboptimal effort level of 0.9 would have earned a negative payoff of −1 (wage of 14 − cost of effort of 15 = −1). We avoided negative payoffs because research suggests that loss aversion (Tversky and Kahneman 1991) can bias experimental results when participants face losses and because negative payoffs are prohibited by the institutional body that approves research with human subjects. Given these constraints, we could have set w_L at any wage between 15 and 19. We chose 15 because this allowed firms to impose the highest penalty on employees who did not choose the optimal effort level of 1.

earn a payoff of 20 (wage of 38 − the cost of effort of 18), generating firm profit of 82 (output of 120 − wage of 38 × effort of 1).[5]

In contrast to the OPT contract, the gift-exchange contract (hereafter, GE contract) for the basic setting described above allows the firm to offer any wage between 20 and 120 and the employee to respond with any effort level between 0.1 and 1. This contract is theoretically suboptimal because agency theory predicts that rational employees will always choose the lowest effort level (0.1) and, anticipating this, the firm will always offer the lowest wage (20). Thus, firm profit will be 10 under the GE contract [(revenue of 120 − wage of 20) × effort of 0.1], which is lower than the firm profit of 82 achieved under the OPT contract. The employee's theoretical payoff under the GE contract is 20, the same as that under the OPT contract.[6]

Design and Procedures

There are two between-subject contract conditions in Experiment 1: GE contract and OPT contract. In the GE contract condition, the GE contract is the only contract available in the market. In the OPT contract condition, the OPT contract is the only contract available in the market.

Participants in Experiment 1 were 80 M.B.A. students, with an average of 5.5 years of full-time work experience. Four experimental sessions were conducted for each of the two contract conditions. In each experimental session, ten participants were randomly assigned the role of firm or employee (five in each role), and they retained this role throughout the session.[7] The data from the four sessions for each contract condition were pooled since there were no significant differences across sessions. Therefore, the final data set contains 20 firms and 20 employees in each of the two contract conditions.

In each session, firms and employees interacted for six periods. To ensure anonymity, firms and employees were identified only by a firm number and an employee number, respectively. To preclude individual reputation formation, new firm (employee) numbers were assigned to each firm (employee) at the start of each of the six periods. Firm and employee participants were seated in the same room, but were divided by a screen. The screen prevented firm and employee participants from seeing each other, but allowed all participants to see the experimenter and a blackboard in the front of the room.

At the start of each session, the experimental instructions were read aloud to all participants. After an overview of the experimental setting and task was provided, the specifics

[5] There is a minor parametric difference in the employee's payoff function between this study and the previous studies by Hannan et al. (2002) and Hannan (2005). The previous studies impose a fixed cost of 20 on employees, making their reservation net utility zero. In this study, the fixed cost is eliminated, making the reservation net utility 20. This change avoids the situation where, under the optimal agency contract, employees receive a zero net payoff even if they choose the firm's desired effort level of 1 (wage of 38 − cost of effort of 18 − fixed cost of 20 = 0), providing employees with no financial motivation to choose the desired effort level. In the current study, employees receive a positive payoff (wage of 38 − cost of effort of 18 = 20) if they choose the desired effort level of 1, providing them with a monetary motivation to do so. This parametric change has no effect on the predictions of interest regarding firms' or employees' behavior in this study as compared to the previous studies.

[6] Although the nominal amount of the market-clearing wage differs between the OPT contract (38) and the GE contract (20), both contracts pay employees the same net payoff of 20. That is, the employee's payoff net of the cost of effort is identical under the OPT contract (wage of 38 − cost of effort of 18 = 20) and the GE contract (wage of 20 − cost of effort of 0 = 20).

[7] Labor markets with an equal number of firms and employees were used in our experiments for two reasons: First, prior research shows that the market's supply-and-demand condition has little impact on the gift-exchange relation (Fehr et al. 1998; Brandts and Charness 2004). Second, although some labor markets may have excess supply or excess demand, examining a balanced market provides a benchmark for possible future studies.

of the contract for that session (either OPT or GE) were explained in detail (see details provided earlier in the ''Experimental Setting and Contracts'' section). Throughout the session, participants in either of the contract conditions were unaware of the existence of the other contract. Terms such as ''gift-exchange'' and ''optimal'' were not used in the experiment to describe the contracts to avoid biasing participants' behavior. Instead, the contract used in any session was simply referred to as ''the employment contract.'' A spreadsheet showing both firm profit and the employee's net payoff for every possible wage-effort combination under the contract used for that session was provided to all participants for use throughout the session. Before the start of the first period of each session, participants completed a series of exercises to ensure that they fully understood the setting, their contract, and how to read the payoff spreadsheet.

For the GE contract sessions, each of the six periods consisted of the steps in the timeline shown in Panel A of Figure 1. In Steps 1 and 2, firms decided whether to enter the labor market for that period, and those that did, decided on a wage offer and recorded it on their personal record sheet (used to determine their payoff for the period) and a communication form (used to communicate information to employees). Firms that chose not to enter the labor market received zero profit for that period.[8] Next, communication forms were collected from firm participants and all wage offers and associated firm numbers were posted on the blackboard in the front of the room. In Step 3, the employee numbers randomly assigned for that period determined the order in which employees could accept a wage offer (i.e., employee #1 had the first opportunity; employee #2 had the second opportunity, etc.). When an employee's turn came, he could accept any one of the posted wage offers that was still available by silently raising the number of fingers representing the associated firm number, in which case the communication form from the firm offering that wage was given to him. Alternatively, he could choose not to accept any wage offer, in which case his payoff for that period was zero. Once a specific firm's wage offer was accepted, it was no longer available to any other employee.

In Step 4, each employee who accepted a wage offer in Step 3 chose an effort level and recorded it on the communication form, which was then passed back to the firm participant so that he could calculate his profit (Step 5).[9] Employees calculated their payoffs (Step 5) after recording their effort choice on their personal record sheet. The period ended when the experimenter collected the completed personal record sheets from both firms and employees. The procedures in Steps 1–5 described above were repeated for each of the six periods.

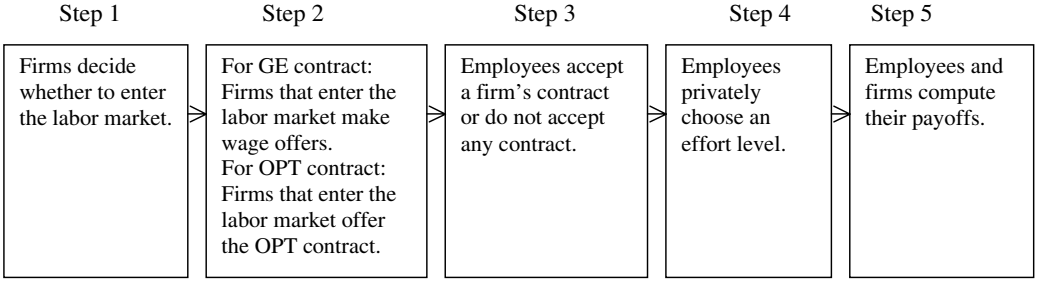
The procedures for the OPT contract sessions were the same as for the GE contract shown in Panel A of Figure 1, except that in Step 2, the OPT contract was the only contract that the firm could offer. Because wage offers were fixed and dichotomous under the OPT contract (i.e., the wage is 38 if the output is 120, otherwise the wage is 15), firms did not need to decide on a wage offer in Step 2. The experimenter simply posted on the blackboard the identification numbers of the firms that chose to enter the labor market (all offering the same OPT contract and wages), and, in Step 3, employees chose either to accept a specific firm's contract or to remain unemployed and earn zero for that period.

[8] Firms almost always chose to enter the labor market (97 percent of the time). Multiple-comparison tests using logistic regression show that the choice to enter the market does not differ significantly across experiments (ps $\geq$ 0.20, two-tailed). The rare choice of a firm to not enter the market appears to be a reaction to an employee's choice of effort level 0.1 (the lowest effort) or contract rejection in the preceding period.

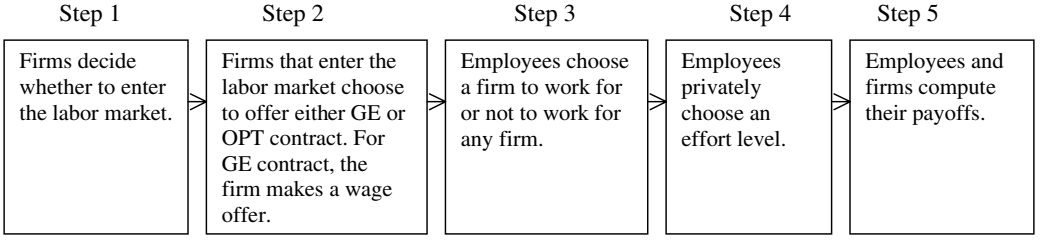
[9] We allowed firm participants to learn the employee's effort choice simply for purposes of calculating the profit they earned in the experiment. We retained the common assumption of non-contractibility of effort from standard agency theory by not allowing firm participants to condition their wage offers on effort in our experiments.

FIGURE 1
Experimental Timelines

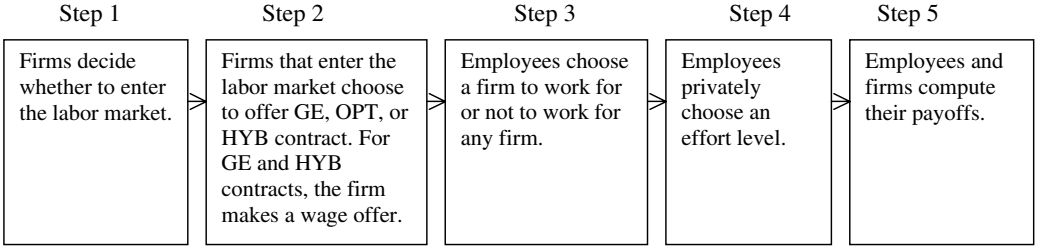
Panel A: Timeline of Experiment 1



Panel B: Timeline of Experiment 2



Panel C: Timeline of Experiment 3



Steps 4 and 5 for the OPT contract were identical to those described above for the GE contract sessions. Steps 1–5 for the OPT contract were repeated for each of the six periods.

Results of Experiment 1

Panel A of Table 1 provides descriptive statistics for the results of Experiment 1. For each contract, the table reports average firm profit, firms' average wage offer, employees' average effort level, the percentage of effort level 1 responses (highest effort level), the percentage of effort level 0.1 responses (lowest effort level), the percentage of contract rejections, average employee payoff, and average total wealth (firm profit + employee payoff). The highest effort level (1) represents the optimal effort level under the OPT

TABLE 1
Descriptive Statistics for Experiments 1, 2, and 3

Panel A: Descriptive Statistics for Experiment 1 (separate markets for the GE and OPT contracts)

	Periods 1–6		Agency Theory Prediction	
Contract	**GE (n = 114)**	**OPT (n = 119)**	**GE**	**OPT**
Average Firm Profit	23	63	10	82
Average Wage Offer	58	38	20	38
Average Effort	0.41	0.74	0.1	1
Percentage of Effort 1	5%	66%	0%	100%
Percentage of Effort 0.1	26%	21%	100%	0%
Percentage of Rejection	3%	0%	0%	0%
Average Employee Payoff	53	17	20	20
Average Total Wealth	76	81	30	102

Panel B: Descriptive Statistics for Experiment 2 (GE and OPT contracts available in the market)

	Periods 1–6		Periods 7–12		All 12 Periods	
Contract	**GE (n = 57)**	**OPT (n = 59)**	**GE (n = 67)**	**OPT (n = 47)**	**GE (n = 124)**	**OPT (n = 106)**
Average Firm Profit	15	33	17	24	16	29
Average Wage Offer	46	38	35	38	40	38
Average Effort	0.21	0.39	0.22	0.28	0.21	0.34
Percentage of Effort 1	4%	36%	3%	26%	3%	31%
Percentage of Effort 0.1	70%	32%	57%	23%	63%	28%
Percentage of Rejection	0%	32%	6%	49%	3%	40%
Average Employee Payoff	43	12	32	8	37	10
Average Total Wealth	57	44	49	31	53	38

(*continued on next page*)

TABLE 1 (continued)

Panel C: Descriptive Statistics for Experiment 3 (GE, OPT, and HYB contracts available in the market)

	Periods 1–6			Periods 7–12			All 12 Periods		
Contract	**GE (n = 18)**	**OPT (n = 34)**	**HYB (n = 68)**	**GE (n = 4)**	**OPT (n = 10)**	**HYB (n = 102)**	**GE (n = 22)**	**OPT (n = 44)**	**HYB (n = 170)**
Average Firm Profit	14	43	44	11	46	50	14	43	48
Average Wage Offer	61	38	58	45	38	58	58	38	58
Average Effort	0.27	0.51	0.77	0.15	0.55	0.83	0.25	0.52	0.81
Percentage of Effort 1	0%	47%	75%	0%	50%	81%	0%	48%	79%
Percentage of Effort 0.1	67%	38%	19%	50%	50%	14%	64%	41%	16%
Percentage of Rejection	0%	15%	4%	25%	0%	4%	5%	11%	4%
Average Employee Payoff	58	15	38	31	18	37	52	16	38
Average Total Wealth	72	58	82	40	64	87	65	59	85

In Panel B, the agency theory predictions for all reported variables for GE and OPT contracts are identical to those in Panel A. In Panel C, the agency theory predictions for all reported variables for GE and OPT contracts are identical to those in Panel A, and the agency theory predictions for all reported variables for the HYB contract are identical to those for the OPT contract.

Variable Definitions:

Average Firm Profit = mean profit for firms who offered the indicated contract;
Average Wage Offer = mean wage that firms offered in the indicated contract. For OPT and HYB contracts, we only report the high wage that the employee would receive if effort level 1 was chosen. If effort was lower than 1, the wage would be fixed at 15;
Average Effort = mean effort level elicited by the indicated contract;
Percentage of Effort 1 = (the number of the indicated contract that elicited effort level 1)/(the total number of the indicated contract);
Percentage of Effort 0.1 = (the number of the indicated contract that elicited effort level 0.1)/(the total number of the indicated contract);
Percentage of Rejection = (the number of the indicated contract that was rejected)/(the total number of the indicated contract);
Average Employee Payoff = mean net payoff of employees who were offered the indicated contract; and
Average Total Wealth = mean of combined firm profit and employee net payoff under each contract offer for the indicated contract.

contract. The lowest effort level (0.1) represents the theoretically predicted effort level for the GE contract. The lowest effort level also represents the amount of effort an employee would be most likely to choose if he wanted to punish a firm for offering the OPT contract, because this choice imposes the largest penalty on the firm at the lowest cost to the employee. Panel A of Table 1 also reports the agency theory predictions for each of the variables described above for both the GE and OPT contracts.

Hypothesis 1 predicts that the OPT contract will yield higher firm profit than the GE contract. Consistent with H1, a regression of firm profit on contract type (i.e., GE or OPT) shows that firm profit is significantly higher ($t = 10.51$; $p < 0.001$, one-tailed) for the OPT contract (63) than for the GE contract (23).[10] Moreover, Panel A of Figure 2 shows that firm profit for the OPT contract exceeds that of the GE contract for all six periods, with little change in firm profit across the six periods for either contract.

Both firms' and employees' behavior under the GE contract is consistent with the results from prior gift-exchange studies in that, as shown in Panel A of Table 1, both firms' average wage offer (58) and employees' average effort level (0.41) are considerably higher than the conventional subgame perfect equilibrium predictions for the GE contract (wage = 20 and effort = 0.1). In addition, a Tobit regression of effort on wage yields a significant positive association ($z = 3.26$; $p = 0.001$, two-tailed), suggesting that firms and employees exchanged gifts.[11] The effect of the observed gift exchange on firm profit is depicted in Panel A of Figure 2, where we see that firm profit is higher than the theoretical prediction of 10 for the GE contract in all periods. Although these findings replicate prior evidence of reciprocity between firms and employees under the GE contract, the OPT contract still produces higher average firm profit (63) than the GE contract (23) because, under the OPT contract, a substantial percentage of employee effort choices (66 percent) are effort level 1, as predicted by standard agency analysis. However, it is important to note that while these high-effort choices yield higher profit under the OPT, the remaining 34 percent of employee effort choices under the OPT are inconsistent with the standard agency prediction. In particular, as shown in Panel A of Table 1, 21 percent of employee effort choices are the lowest possible level (0.1). This result is consistent with employees reacting negatively to the OPT and responding by imposing the maximum punishment on the firm at the lowest cost to themselves.[12] The combined effect of all suboptimal effort choices on firm profit under the OPT contract is depicted in Panel A of Figure 2, where we see that firm profit does not reach the theoretical prediction of 82 in any period.

In summary, the results of Experiment 1 demonstrate that, consistent with the standard agency theory prediction, the OPT contract yields higher firm profit than the GE contract. However, despite this predicted and observed difference in firm profit, the OPT contract yields less firm profit and the GE contract yields more firm profit than standard agency theory predicts. Hence, employees react negatively to the nonreciprocal aspects of the OPT contract and positively to the reciprocal aspects of the GE contract, but these effects do not dominate the economic forces that underlie the standard agency theory prediction that the OPT contract will yield more firm profit than the GE contract.

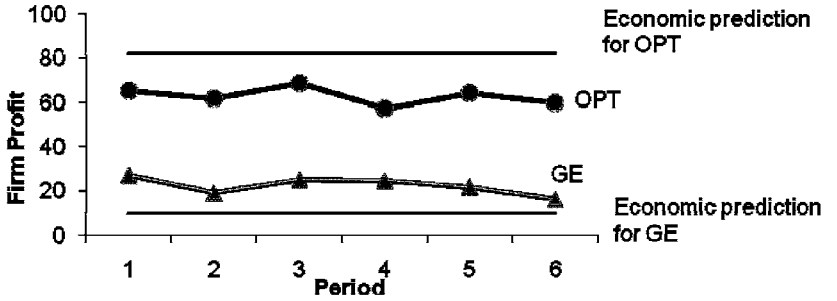
[10] In this study, all regression analyses that involve within-subject observations include the subject as a cluster variable to control for repeated measures. That is, our regression models treat each subject's responses as a cluster, and estimates robust standard errors after adjusting for intra-cluster correlations (Williams 2000; Wooldridge 2002).

[11] The Tobit model controls for the fact that the dependent measure, effort, is a censored value.

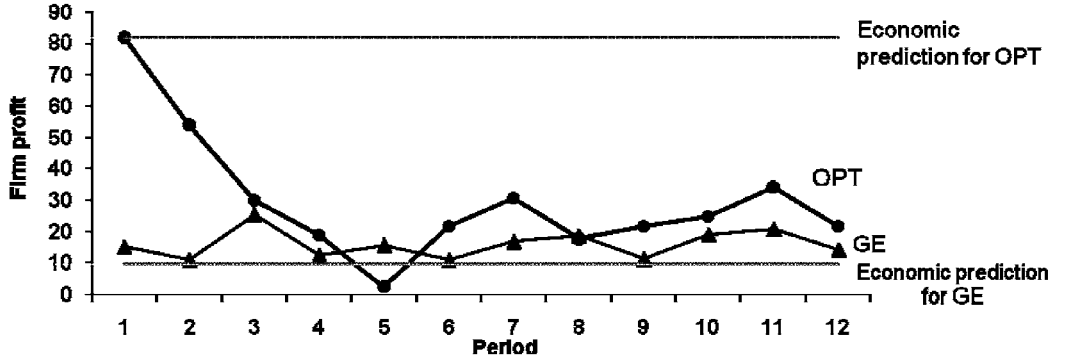
[12] There is no obvious explanation for the small portion (13 percent) of effort choices that fall between 0.1 and 1.

FIGURE 2
Average Firm Profit by Contract and Period

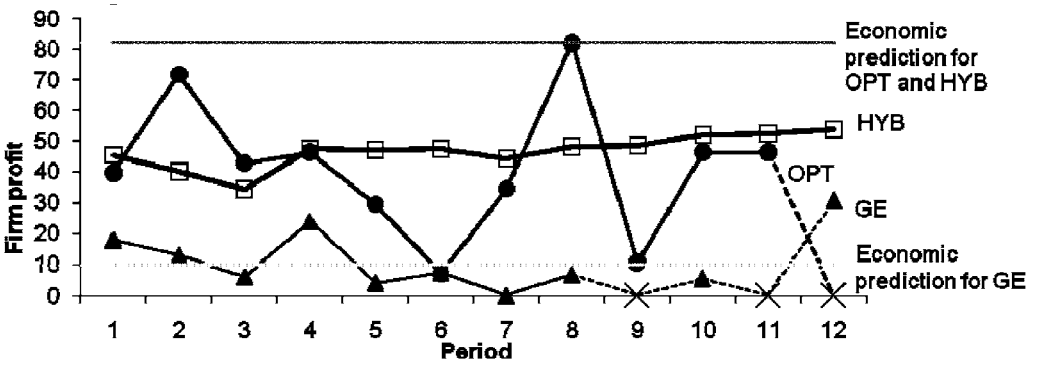
Panel A: Experiment 1



Panel B: Experiment 2



Panel C: Experiment 3



In Panel C, the dotted lines and the "x"s on the horizontal axis for Periods 9, 11, and 12 indicate that the contract was not offered in that period.

III. EXPERIMENT 2

Theory and Hypotheses

As indicated earlier, the optimal agency contract is designed to pay the lowest wage necessary to ''force'' employees via incentives to select the effort level that maximizes firm profit. Although this is a critical feature of the optimal agency contract, the contract's nonreciprocal nature may be less salient to employees when, as in Experiment 1, no alternative contract is available for comparison. On the other hand, in a market in which both a reciprocity-based gift-exchange contract and the optimal agency contract are available, employees are more likely to view the optimal contract as nonreciprocal. Research suggests that employees generally expect the firm to maintain a reciprocal relationship, and react negatively (e.g., shirk, resign) if the firm is perceived to have violated this relationship (Rousseau 1989; Robinson et al. 1994; Robinson and Rousseau 1994). In our setting, if a firm chooses to offer the OPT contract when the GE contract is available, we hypothesize that employees are more likely to punish the firm by rejecting the OPT contract entirely or by accepting it and providing lower effort, even when this is costly to employees. Such actions by employees would reduce firm profit. This leads to the first hypothesis we test in Experiment 2:

H2: When firms offer the OPT contract in markets in which the GE contract is also available, firm profit will be lower than when firms offer the OPT contract in markets in which only the OPT contract is available.

In markets in which both the OPT and GE contracts are available, employees are likely to gain a better understanding of the payoff implications of each contract as they experience these payoffs. This reasoning suggests that experience with the contracts will enable employees to see more clearly the nonreciprocal nature of the OPT contract versus the reciprocal nature of the GE contract, making them more likely to punish firms that offer the OPT contract. Thus, firm profit would decrease under the OPT contract as employees gain experience, which, in turn, would cause the difference in firm profit between the two contracts to decrease with experience. In the extreme case, the difference in firm profit could even reverse, such that the GE contract would produce higher firm profit than the OPT contract. Because there is no clear basis on which to predict which of the two contracts will yield higher firm profit as employees gain experience with the contracts, we do not offer a directional hypothesis, but rather pose the issue as a two-tailed research question.

Research Question: Will the OPT or GE contract yield higher firm profit as employees gain experience with both contracts in a market in which firms choose which contract to offer?

When deciding which contract to offer, firms will likely consider employees' reaction to earlier contract offers. While our study uses anonymity and random re-matching of participants each period to prevent individual reputation formation, it is still possible that firm participants either hold prior beliefs about how employees will react to their offers or will form beliefs about how employees will react as they observe how employees as a group react to different offers in earlier periods (i.e., a type of ''group'' reputation formation

as the experimental session progresses).[13] That is, some firms may anticipate that employees will react negatively to the OPT contract, and therefore begin by offering the GE contract in the first period. Other firms may start off by offering the OPT contract in hopes of maximizing profits, switching to the GE contract in later periods if this strategy proves ineffective. Such behavior would be consistent with Shields and Waller's (1988) finding that firms are adaptive in revising contracts based on previous outcomes. Similarly, Kagel et al. (1996) find that, in a repeated one-shot ultimatum game, proposers who make low offers are punished by responders (i.e., their offers are rejected), and therefore are ''forced'' to make higher offers. Likewise, in our setting, firms that initially offer the OPT contract may learn from experience that employees react negatively and therefore switch to offering the GE contract. This leads to the second hypothesis we test in Experiment 2:

H3: When given a choice between offering the OPT contract or the GE contract, firms will offer the GE contract more often as they gain experience.

Design and Procedures

Experiment 2 uses a labor market in which firms could choose to offer either the GE contract or the OPT contract from Experiment 1. Participants were 40 M.B.A. students, with an average of 5.2 years of full-time work experience. Four experimental sessions were conducted. As in Experiment 1, in each session, ten participants were randomly assigned the role of firm or employee (five in each role), retaining this role throughout the session. The data from the four sessions were pooled since there were no significant differences across sessions. Therefore, the final data set contains 20 firms and 20 employees. Because we expected employees and firms to change their behavior as they gained experience with the contracts, participants interacted for 12 periods in each session rather than for six periods as in Experiment 1.

Panel B of Figure 1 provides a timeline of the steps in Experiment 2. The procedures are the same as for Experiment 1, except that in Step 2, the firm chooses which of the two contracts (GE or OPT) to offer. After a firm offers a contract, all other procedures for the GE and OPT contracts are the same as for Experiment 1.

Results of Experiment 2

Descriptive data for Experiment 2 are reported in Panel B of Table 1 in the same format as for Experiment 1. Because H2 predicts that, when firms offer the OPT contract when both contracts are available, firm profit will be lower than when the OPT contract is the only contract available, we test this hypothesis by using data from both Experiment 1 and Experiment 2. We compare firm profit for the OPT contract in Experiment 1 (when it is the only contract available; Panel A of Table 1) with that for the OPT contract in periods

[13] In studies with anonymous interaction such as ours, it is standard to view the single-period equilibrium prediction as the economic benchmark against which observed behavior is compared. Conventional economic reputation models typically address ''individual'' reputation formation and require repeated play between players who know the identity of their opponents. However, recently Healy (2007) offered a model that attempts to capture the notion of ''group'' reputation (see also Kandori 1992). Healy's (2007) model relies on the assumption that a nontrivial percentage of employees are reciprocal and that it is common knowledge that firms believe employee types are correlated (i.e., there is stereotyping). Because reciprocity and stereotyping fall outside standard economic assumptions, Healy (2007, 1752) refers to his model as ''a 'mixed' model in which reciprocity and repeated-game effects operate to generate cooperative outcomes.''

1–6 of Experiment 2 (when both contracts are available; Panel B of Table 1).[14] Consistent with H2, a regression of firm profit on market condition (Experiment 1 versus Experiment 2) shows that firm profit is significantly lower ($t = 4.86$; $p < 0.001$, one-tailed) for the OPT contract when both contracts are available (33 from Panel A of Table 1) than when only the OPT contract is available (63 from Panel B of Table 1). Firm profit is lower when both contracts are available because employees choose the theoretically optimal effort level (1) significantly less often (Fisher's exact test: $p < 0.001$, one-tailed) when both contracts are available (36 percent) than when only the OPT contract is available (66 percent), and reject the OPT contract significantly more often (Fisher's exact test: $p < 0.001$, one-tailed) when both contracts are available (32 percent) than when only the OPT contract is available (0 percent). These results are consistent with the reasoning underlying H2 that employees react more negatively to the OPT contract if firms choose to offer it when they could have offered the reciprocity-based GE contract.

Our research question for Experiment 2 asks whether the GE or OPT contract produces higher firm profit as employees and firms gain experience with these contracts. We begin by regressing firm profit on contract type (GE or OPT) for Periods 1–6 of Experiment 2. The result indicates that firm profit is higher ($t = 2.83$; $p = 0.01$, two-tailed) under the OPT contract (33) than under the GE contract (15). However, for periods 7–12, regressing firm profit on contract type indicates that firm profit no longer significantly differs ($t = 0.69$; $p = 0.50$, two-tailed) between the OPT contract (24) and the GE Contract (17). As shown in Panel B of Figure 2, firm profit is similar across the two contracts beginning with Period 3. Consistent with this observation, by-period regressions of firm profit on contract type show that the OPT contract produces significantly higher firm profit than the GE contract in Periods 1 and 2 only. Thus, we find that, as participants gain experience with the contracts, the firm profit produced by the OPT contract is statistically indistinguishable from firm profit produced by the reciprocity-based GE contract.

Hypothesis 3 predicts that firms will offer the GE contract more often as they gain experience. Panel A of Figure 3 reports the percentage of firms that offer the GE and OPT contracts for Periods 1–6, 7–12, and 1–12 in Experiment 2, and provides a graph of the percentages of firms that offer GE and OPT contracts by period. The increase in the percentage of GE contracts from Periods 1–6 (49 percent) to Periods 7–12 (59 percent) is marginally significant (Fisher's exact test: $p = 0.09$, one-tailed). In addition, a logistic regression of firms' contract choices on period shows that, over all 12 periods, firms are marginally more likely ($p = 0.07$, one-tailed) to offer the GE contract in later periods. These results provide modest support for H3.

Further analyses examine whether the shift toward offering the GE contract in later periods is consistent with employees reacting negatively to the OPT contract. Consistent with this explanation, we find that the more often employees respond to the OPT contract by providing a suboptimal level of effort (i.e., effort levels lower than 1), the less likely firms are to offer the OPT contract ($t = 2.27$; $p = 0.04$, two-tailed).[15] This result provides

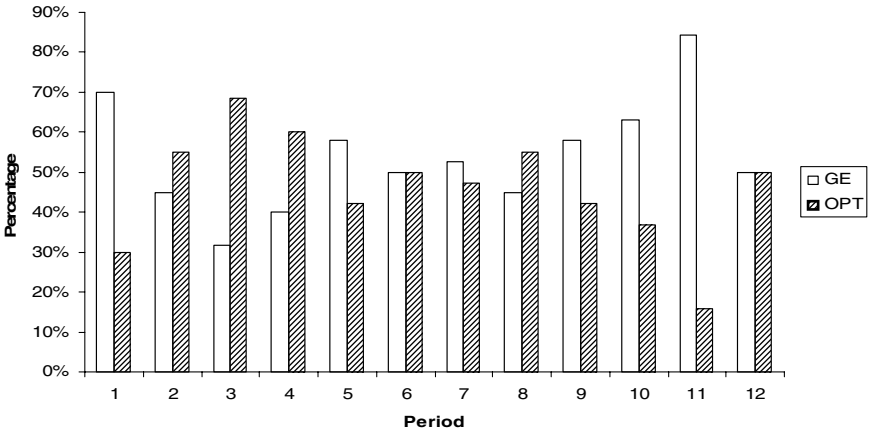
[14] Experiment 2 was conducted immediately after Experiment 1 using a separate set of participants recruited from the same population as those used in Experiment 1. This provides assurance that any differences in results across the two experiments are due to the experimental treatments rather than participant-pool or timing differences.

[15] The reported result is from a regression of the percentage of a firm's OPT contract offers over the 12 periods on: (1) the percentage of OPT contracts offered by the firm that elicited an effort level lower than 1, and (2) the average profit earned by the firm when it offered the GE contract. The latter variable is included as a control variable because the more a firm earns under the GE contract, the more willing it might be to offer the GE contract. Controlling for this possibility allows us to isolate the effect of employees' negative reaction on the firms' contract offers.

FIGURE 3
Frequency of Contract Offers

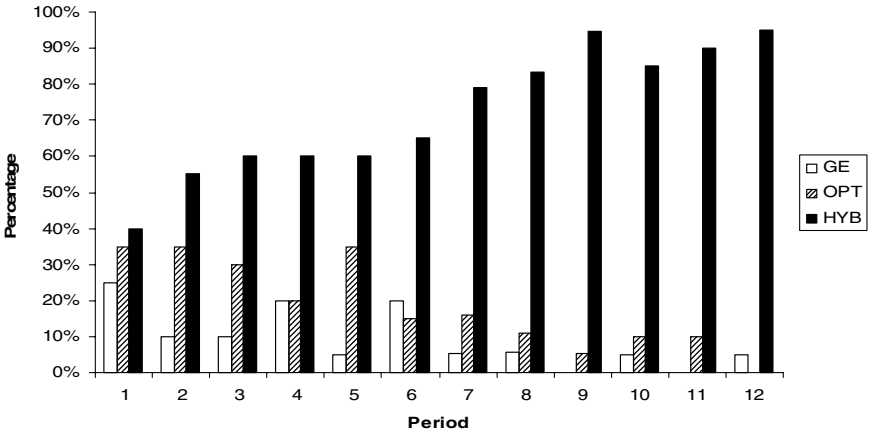
Panel A: Percentage of Contract Offers by Period for Experiment 2

Contract	Periods 1–6	Periods 7–12	Periods 1–12
GE	49%	59%	54%
OPT	51%	41%	46%



Panel B: Percentage of Contract Offers by Period for Experiment 3

Contract	Periods 1–6	Periods 7–12	Periods 1–12
GE	15%	3%	9%
OPT	28%	9%	19%
HYB	57%	88%	72%



evidence consistent with our interpretation that firms begin to shift to offering the GE contract in response to being punished for offering the OPT contract.

One additional interesting aspect of Experiment 2 is that the reason that firm profit becomes statistically indistinguishable between the OPT and GE contract within only a few periods is that employees react more negatively to the OPT contract with experience rather than because employees react more positively to the GE contract with experience. This pattern is clearly depicted in Panel B of Figure 2, which shows that firm profit for the OPT begins at the economic prediction of 82, but drops rapidly to nearly the same level as that for the GE contract, whereas firm profit for the GE contract begins slightly above the economic prediction of 10 and does not change much with experience.

IV. EXPERIMENT 3

Theory and Research Question

The results of Experiment 2 show that employees react more negatively to the OPT contract when firms choose to offer it when they could have offered the more reciprocal GE contract. Nevertheless, the OPT contract still yields firm profit that is statistically indistinguishable from firm profit for the GE contract. The reason for this result is that the OPT contract is able to ''force'' some, but not all, employees to provide high effort, which, in turn, produces higher firm profit. Even so, the OPT contract performs less effectively than standard agency theory predicts. On the other hand, the GE contract yields slightly more firm profit than standard agency analysis predicts because employees provide unenforceable reciprocal effort in exchange for theoretically unpredicted high wage offers from firms. This raises the question of whether a contract that combines the most powerful features of both contracts might be more effective than either contract alone.

A powerful feature of the OPT contract is its ''forcing'' feature. Employees are forced to provide the effort level that maximizes the firm's profit because this is the only way they can maximize their own payoffs. A powerful feature of the GE contract is its ''reciprocity'' feature. Employees apparently prefer to work under a contract that allows firms to elicit reciprocal effort by offering a higher wage. More importantly, employees reciprocate with higher effort when firms offer a higher wage. Thus, both the ''forcing'' feature of the optimal contract and the ''reciprocity'' feature of the gift-exchange contract can help firms increase profit.

The question we address in Experiment 3 is whether an alternative hybrid contract that combines both the ''forcing'' feature of the OPT contract and the ''reciprocity'' feature of the GE contract can be more effective than either the OPT contract or the GE contract alone. If this were the case, then we would expect that firms would offer this new hybrid contract more often than either of the other contracts, especially as firms and employees gain experience.

Design and Procedures

The design of Experiment 3 is the same as for Experiment 2, except that in Experiment 3, firms are allowed to offer one of three contracts: (1) the OPT contract, (2) the GE contract, or (3) a new hybrid contract (hereafter, HYB contract) that combines the ''forcing'' feature of the OPT contract with the ''reciprocity'' feature of the GE contract. Incorporating the forcing feature in the HYB contract means that, as with the OPT contract, employees can only receive the high wage (now set by the firm) if they produce output of 120 (i.e., the output generated by providing the optimal effort level of 1). Otherwise, they receive the

low wage (15).[16] Incorporating the reciprocity feature in the HYB contract means that firms can now set the high wage that employees earn if the employees produce output of 120 (generated by the optimal effort level of 1). That is, under the HYB contract, firms can choose to set the high wage above the fixed optimal level of 38 for the OPT contract (possible wage offers range from 20 to 120), and thereby try to induce reciprocal effort from employees. Despite the ability of the firm participants to set the wage above 38, the agency theory predictions for the HYB contract are identical to those for the OPT contract. That is, the firm should always set the wage at the optimal wage of 38 because any amount above that is suboptimal, as it is unnecessary to induce the optimal level of effort.

Participants were 40 M.B.A. students, with an average of 4.2 years of full-time work experience. Four experimental sessions were conducted. As in Experiments 1 and 2, in each session, ten participants were randomly assigned the role of firm or employee (five in each role), retaining this role throughout the session. The data from the four sessions were pooled since there were no significant differences across sessions. Therefore, the final data set contains 20 firms and 20 employees.

A timeline of the steps for Experiment 3 is shown in Panel C of Figure 1. All steps are the same as in Experiment 2 (see Panel B of Figure 1), except that in Step 2, firms can choose one of three contracts as explained above. Procedures for the GE and OPT contract are the same as in Experiments 1 and 2. Procedures for the HYB contract are the same as for the OPT contract, except that, as is the case for the GE contract, firms make a wage offer in Step 2.

Results of Experiment 3

Panel C of Table 1 reports descriptive statistics for Experiment 3. Panel C of Figure 2 and Panel B of Figure 3 depict the average firm profit and frequency of contract offers, respectively. Our main research question for Experiment 3 is whether the new HYB contract can generate as much or more firm profit than the OPT or GE contracts. We begin our analysis by comparing average firm profit for the three contracts across all 12 periods. Regressions of firm profit on contract type show that firm profit for the HYB contract (48) is statistically indistinguishable ($t = 0.45$; $p = 0.66$, two-tailed) from that of the OPT contract (43); whereas firm profit for the GE contract (14) is significantly below (ps ≤ 0.001, two-tailed) that of either of the other two contracts. Because firm profit for the GE contract is well below that of the OPT and HYB contracts, the rest of our analysis focuses only on the latter two contracts.

Despite the similarity in average firm profit between the HYB and OPT contracts, there are significant differences on other important measures. As shown in Panel C of Figure 2, firm profit is considerably more variable for the OPT contract than for the HYB contract (Levene's robust variance test: $p < 0.001$, two-tailed). Also, wage offers are significantly higher ($t = 9.57$; $p < 0.001$, two-tailed) for the HYB contract (58) than for the OPT contract (fixed at 38), and this difference in wage offers is associated with significantly higher

[16] In Experiment 3, under both the HYB and OPT contracts, employees were informed that the high wage would be paid only if the output was 120, just as they were for the OPT contract in the first two experiments (see Equation (5) and related discussion in Section II). Such consistency in wording across the OPT and HYB contracts would have been impossible if the high wage had been conditioned on firm profit rather than output. That is, under the HYB contract the firm profit depends on both the output and the wage the firm chooses to offer, so the contract could not be based on a fixed firm profit of 82 as it could be under the OPT contract. As explained in Section II, conditioning the high wage on output is economically equivalent to conditioning it on firm profit.

employee effort ($t = 3.82$; $p < 0.001$, two-tailed) for the HYB contract (0.81) than for the OPT contract (0.52).[17] Consistent with the higher effort under the HYB contract than under the OPT contract, the percentage of lowest effort level (0.1) choices (16 percent) and contract rejection (4 percent) for the HYB contract (20 percent combined) are significantly less (Fisher's exact test: $p < 0.001$, two-tailed) than for the OPT contract (41 percent + 11 percent = 52 percent combined). As explained more fully below, these differences are consistent with employees punishing firms for offering the OPT contract and rewarding firms for offering the more reciprocal HYB contract.[18]

The most striking difference between the HYB and OPT contracts is the percentage of times that firms choose to offer each of them. As shown in Panel B of Figure 3, across all 12 periods, firms choose to offer the HYB contract 72 percent of the time, while offering the OPT contract only 19 percent of the time. Moreover, in the first period, the HYB and OPT contracts are offered with similar frequency (40 percent and 35 percent of contract offers, respectively), but the spread between the frequency of these two contract offers increases rapidly, such that by the last period, 95 percent of the firms offer the HYB contract.

To understand why virtually all firms offer the HYB rather than the OPT contract as they gain experience, we need to return to the results for employee effort and firm profit. In order for the OPT contract to produce the theoretically predicted firm profit of 82, employees must provide the theoretically optimal effort level (1) every time they face the OPT contract. In contrast to this prediction, employees facing the OPT contract only provide the optimal effort level 48 percent of the time. In the other 52 percent of the cases, employees either provide the lowest effort level 0.1 or reject the contract, resulting in average firm profit of only 43. Compare these results to those for the HYB contract, in which employees choose the highest effort level (1) 79 percent of the time, which, when combined with the smaller number of times that employees provide a lower effort level or reject the contract (21 percent combined), results in average firm profit of 48.

The results reported above are consistent with firms experiencing employees' negative reaction to the OPT contract and relatively positive reaction to the HYB contract, and responding by shifting to offering the HYB contract. The negative reaction is evidenced by the lower effort and related decrease in firm profit for the OPT contract. The positive reaction is evidenced by the fact that, under the HYB contract, employees reciprocate by offering the highest effort level (1) more often when firms offer a wage higher than the optimal wage. The average wage offered by firms under the HYB contract (58) is significantly higher ($t = 16.13$, $p < 0.001$) than the optimal wage (38), and wage offers are positively related to effort levels ($z = 4.42$, $p < 0.001$, two-tailed).[19] It is important to note that firms do not make themselves worse off by shifting to the HYB contract, because, as

[17] The reported results are, respectively, from a regression of wage on contract type (OPT or HYB) and a regression of effort on contract type (OPT or HYB).

[18] An analysis of the order in which employees accept the HYB and OPT contract offers provides further evidence that employees prefer the HYB contract to the OPT contract. There are a total of 48 stand-alone markets in Experiment 3 (four sessions with 12 periods in each session). At least one firm (often most firms) choose to offer the HYB contract in all 48 markets, and the HYB contract is the first contract accepted by an employee in 39 of these 48 markets. Compare this to the OPT contract, which is offered by at least one firm in only 23 of the 48 markets, and which is the first contract accepted by an employee in only one of those 23 markets. In fact, the OPT contract is the last contract accepted in 22 of the 23 cases. These results show that employees strongly prefer the HYB contract to the OPT contract.

[19] The reported association represents the result of an ordered logistic regression of effort level on wage, where effort level is a dummy variable coded as 1 for effort level 1, and 0 otherwise. Effort level is dichotomized because virtually all (99 percent) of effort choices for accepted HYB contracts are either the highest level (1) or lowest level (0.1).

reported earlier, firm profit under the HYB contract is, if anything, higher than, albeit statistically indistinguishable from, firm profit under the OPT contract.

A final observation that helps explain why the HYB contract dominates the market in Experiment 3 is that it yields higher social welfare. As can be seen in Panel C of Table 1, the total wealth generated by the HYB contract (85) is higher ($t = 2.55$; $p = 0.02$, two-tailed) than that generated by the OPT (59).[20] This is primarily due to the significantly higher ($t = 10.9$; $p < 0.001$, two-tailed) employee payoffs for the HYB contract (38) than for the OPT contract (16).[21]

In summary, it appears that what is happening in the labor market in Experiment 3 is that firms learn that employees' negative reaction to their OPT offers cause their profit to drop substantially. In response, they switch to the HYB contract and offer a wage that is higher than the theoretically optimal wage of 38, which results in enough reciprocal employee effort to yield firm profit at the same level as the OPT contract. Thus, the market settles into a pattern of HYB contract offers that produce welfare gains for employees, while simultaneously producing firm profit at least as high as under the OPT contract.

V. DISCUSSION AND CONCLUSION

We report the results of three labor market experiments designed to examine the effectiveness of an optimal agency contract as compared to two alternative contracts. The first alternative contract is a reciprocity-based gift-exchange contract used in a series of previous studies. For example, Hannan (2005) used this contract in her study of the effects of wages and firm profit on employee effort, and demonstrated, among other things, that reciprocity between firms and employees can yield higher firm profit than standard agency analysis predicts. Moreover, the broader accounting literature suggests that it may be possible to take advantage of this reciprocity norm to motivate employee effort (Sprinkle 2003).

However, since prior studies did not compare the results from the gift-exchange contract used in those studies with results from the agency contract that would be optimal for the setting used in those studies, the implications of these previous studies for management accounting research are uncertain. That is, from an agency theory perspective, firms should maximize profit by adopting the optimal contract and, therefore, would not need to rely on gift exchange. Our study addresses this issue by examining both contracts. In our first experiment, we find that, consistent with standard agency analysis, the optimal agency contract yields higher firm profit than the gift-exchange contract in markets in which the only contract available is either the optimal contract or the gift-exchange contract. Conversely, in our second experiment, when firms can choose which of the two contracts to offer, employees punish firms that offer the optimal contract by reducing effort or by rejecting the contract. This results in lower firm profit, especially as firms and employees gain experience with the contracts, such that in later periods of the experiment, firm profit under the optimal contract is statistically indistinguishable from that under the gift-exchange contract.

In our third experiment, we include a hybrid contract that combines the ''forcing'' feature of the optimal contract with the ''reciprocity'' feature of the gift-exchange contract. In a market in which firms can choose whether to offer the optimal contract, the gift-exchange contract, or the hybrid contract, we find that the hybrid contract dominates the market as firms and employees gain experience with the alternative contracts. Specifically, firms rarely offer the gift-exchange contract, and employees reduce their effort or reject the

[20] The reported result is from a regression of the total wealth on contract type (OPT or HYB).
[21] The reported result is from a regression of employee net payoff on contract type (OPT or HYB).

contract entirely when they are offered the optimal contract. Consequently, firms quickly switch to the hybrid contract rather than the optimal contract, such that in later periods of the experiment, virtually all firms offer the hybrid contract. The hybrid contract yields the highest employee effort, the highest employee payoff, at least as much firm profit as the optimal contract, and the highest total social welfare (combined firm and employee payoff).

Overall, our results suggest that optimal contracts designed using standard agency analysis are likely to be less effective than the theory suggests, and that incorporating preferences for reciprocity can improve contract design. In the spirit of attempting to explain existing employment practices, we believe that many incentive systems currently used in practice already broadly reflect both of the effort-inducing (and profit-maximizing) features we incorporated into our hybrid contract. This strikes us as very reasonable, as firms would be unlikely to offer a pure gift-exchange contract because the power of such contracts to generate effort and firm profit relies entirely on trusting employees to reciprocate if the firm pays a wage above the market-clearing level. Likewise, it is also unlikely that firms would rely exclusively on financial incentives to force employees to provide effort as is the case in optimal agency contracts, because they most likely understand that employees may react negatively to such contracts. Hence, rather than rely exclusively on either financial incentives or reciprocity alone to induce effort, firms' compensation policies most likely try to incorporate both features. For example, Hansen (2007) explains that in determining employees' compensation, Microsoft Corporation uses a stringent, forced-distribution rating system to evaluate employee performance (a type of ''forcing'' feature), but then pays employees rated as top performers significantly more than other employees (a ''reciprocity'' feature).

Notwithstanding this example, there may not be a large number of contracts that *explicitly* include both the ''forcing'' and ''reciprocity'' features of the hybrid contract examined in our third experiment. Nevertheless, we believe that the general characteristics of these features are typically part of the broader *implicit* compensation policies applied in practice (Rousseau 1989, 1995). For instance, while many firms may not explicitly indicate the level of performance that triggers an employee's termination, there is still almost surely some implicit threat of being fired for poor performance. Similarly, while there may not be an explicit statement regarding the amount of effort that a firm expects from employees who have been awarded larger than expected pay raises, there is almost surely some implied or informally understood expectation that, in exchange for a large pay raise, employees will increase their effort, or at least maintain effort at an already high level. Thus, we believe that both the ''forcing'' and ''reciprocity'' features included in our hybrid contract reflect important aspects of implicit compensation policies observed in practice.

Several limitations of this study could be addressed in future research. For example, our experiments used a one-shot setting to preclude individual reputation formation. However, in practice firms and employees often have an ongoing relationship over multiple periods. Now that baseline results have been established for the case without individual reputation, future research could examine the incremental effects of individual reputation arising from repeated play with fixed firm-employee pairings. Also, future research could investigate the behavior of firms and employees in settings in which employees' effort choices cannot be inferred with certainty by the firm. Since we now have baseline results for the case without external uncertainty, it could be informative to examine the extent to which reciprocity affects behavior in settings with state uncertainty.

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