AN EXPERIMENTAL MARKET INVESTIGATION OF THE EFFECTIVENESS OF AN OPTIMAL AGENCY CONTRACT

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Abstract

In this dissertation, I conduct experimental labor markets to investigate the effectiveness of an optimal agency contract in inducing employee effort and maximizing firm profit. I compare firm profit under the optimal agency contract to that under a theoretically sub-optimal contract that relies on the norm of reciprocity to motivate employee effort, and explore how factors outside standard agency models affect the relative profitability of the two contracts. Experimental results show that firm profit is higher under the optimal agency contract in markets where only one of the two contracts is available, but is statistically indistinguishable between the two contracts in markets where both contracts are available. These results are inconsistent with the assumptions of agency theory, but are consistent with my proposition that employees' perceptions about the intentions underlying firms' contract offers, which play no role in standard agency theory, influence employees' reactions to the offers, and that this, in turn, affects the relative profitability of the two contracts. The implications of these results for research on incentives, contracting, and social norms, and for the design of management control systems in practice, are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

In this study, experimental labor markets are conducted to investigate the effectiveness of an optimal agency contract in eliciting employee effort and maximizing firm profit. The optimal agency contract is used as a benchmark against which to compare firm profit under a theoretically sub-optimal contract that relies on a non-economic social norm, i.e., reciprocity between firms and employees, to motivate employee effort. Moreover, this study explores how firm profit under these two contracts is influenced by factors outside standard agency theory, such as employees' perceptions regarding the intentions underlying firms' contract offers.

This dissertation proceeds as follows: Chapter 2 discusses the links between my study and prior research, and specifies how my study provides insights into issues that have not been fully addressed previously. Many prior studies that investigate the effect of financial incentives on effort do not use the optimal agency contract. Thus, it is not possible to determine whether, as agency theory predicts, the optimal agency contract is able to induce the effort level desired by the firm and thereby maximize firm profit. Similarly, many prior studies that examine the effect of non-economic social norms on employee behavior do not use the optimal agency contract as a benchmark. Therefore, from an economic perspective, the implications of such studies are open to question because we do not know whether implementing the optimal agency contract would lead to even higher firm profit than relying on the social norms examined in such studies. To address these issues, I focus on a particular type of reciprocity norm between firms and employees typically referred to as "gift exchange" (Akerlof 1982). Gift exchange is inconsistent with conventional economic theory because 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. Prior research has found that, on average, gift exchange yields higher firm

profit than if firms paid only the market-clearing wage and employees provided only the enforceable effort level. However, since the employment contract used in these prior studies was theoretically sub-optimal for the firm, it is not clear whether the optimal agency contract would produce even higher firm profit than documented in the gift-exchange studies (in which case gift exchange would not be necessary). My study compares firm profit under the optimal agency contract versus a sub-optimal contract that allows firms and employees to exchange gifts (hereafter, referred to as the "gift-exchange contract"), and explores how the relative profitability of these two contracts changes in different market settings.

Chapter 3 presents relevant theories and develops hypotheses. First, I review different economic models that have been developed to explain why firms pay non-market-clearing wages. Since this dissertation focuses on the gift-exchange model, I then review previous studies that documented gift exchange between firms and employees by describing the basic experimental setting used in those studies and summarizing the main findings. Next, I show why the gift-exchange contract used in prior research is sub-optimal, and analytically derive the optimal agency contract for the firm in the experimental setting used in prior gift-exchange studies. Agency theory predicts that the optimal agency contract will always produce higher firm profit than the gift-exchange contract, but I propose that the profitability of these two contracts will be influenced by employees' perceptions about firms' intentions underlying their contract offers. Specifically, I expect that employees will react positively (negatively) to intentions that appear to be positive (negative) to them. A series of hypotheses are developed to predict how I expect firm profit and firms' contract offers to change because of employees' different reactions to the two contracts.

Chapter 4 describes the experimental design and procedures. I conducted three types of experimental labor markets to test my hypotheses. The first type of market contained two treatments, with each treatment covering half of the periods. Specifically, all firms were required to offer the gift-exchange contract in the first several periods, but then were allowed to offer either the optimal agency contract or the gift-exchange contract in the remaining periods. The second type of market was the same as the first type, except that firms were required to offer the optimal agency contract, rather than the gift-exchange contract, in the first several periods. The third type of market allowed firms to offer either the optimal agency contract or the gift-exchange contract in all periods.

Chapter 5 reports the experimental results. There are two main findings. The first is that the optimal agency contract yielded higher firm profit than the gift-exchange contract in markets where only the optimal agency contract or only the gift-exchange contract was available. This result reflects the fact that, under the optimal agency contract, employees mostly chose the effort level predicted by agency theory. Firm profit was higher under the optimal agency contract than under the gift-exchange contract despite the fact that, consistent with the results of prior experiments, firms and employees did exchange gifts under the gift-exchange contract.

The second main finding is that, when both the optimal agency contract and the gift-exchange contract were available and firms chose which contract to offer, employees punished firms that offered the optimal agency contract either by accepting the contract, but then choosing low effort, or by rejecting the contract and voluntarily remaining unemployed (even though these actions lowered their own payoffs). Therefore, firm profit under the optimal agency contract was lower when both contracts were available than when the optimal agency contract was the only contract available. More importantly, firm profit under the optimal agency contract declined

further over time because employees reacted more negatively to it, while firm profit under the gift-exchange contract did not change over time. As a result, firm profit was no longer significantly different between the two contracts in later periods. As firms experienced employees' negative reaction to the optimal agency contract, they were more likely to offer the gift-exchange contract rather than the optimal agency contract.

Finally, Chapter 6 summarizes my research results, discusses the contributions and limitations of this dissertation, and proposes possible avenues for future research.

2. BACKGROUND AND MOTIVATION

2.1. Overview of Chapter

This chapter discusses the relation between this dissertation and two streams of experimental research in the accounting literature: 1) research on the incentive-effort relation, and 2) research on the effect of non-economic social norms on employee behavior. In particular, this chapter highlights several issues that are important but have not been fully addressed in prior research, and explains how the current dissertation may increase our understanding about those issues.

2.2. Experimental Research on the Incentive-Effort Relation

Firms use management control systems to motivate employees to work in line with the goals of the firm (Anthony, Dearden, and Bedford 1989; Zimmerman 2000). Incentive schemes are an integral and crucial part of the management control system because they help align the interests of the firm and employees, and thereby mitigate incentive problems caused by goal incongruence (Jensen and Meckling 1976; Holmstrom and Tirole 1989; Milgrom and Roberts 1992). Agency theory is one of the most important theoretical paradigms in incentive research in management accounting (Lambert 2001). This is because management accounting practices typically involve bilateral or multi-lateral interactions that can be modeled as the principal-agent relationship. Thus, agency theory provides a useful means to develop control strategies that induce, in an incentive compatible way, employees (i.e., agents) to act in the interest of the firm (i.e., principal), and to predict the effectiveness of those strategies in solving incentive problems involving some combination of hidden information and hidden action. This dissertation mainly focuses on the use of incentive control mechanisms in alleviating the adverse effect of hidden action problems.

Agency theory assumes that employees are effort-averse wealth maximizers. Therefore, intuitively, the provision of monetary incentives should be able to motivate effort so long as the employee's marginal income from exerting the effort exceeds its marginal cost. This reasoning is supported by some previous experimental studies, which show that incentive contracts that link pay to performance generally induce higher employee effort than contracts that pay a fixed wage (e.g., Chow 1983; Awasthi and Pratt 1990; Libby and Lipe 1992; Bailey, Brown, and Cocco 1998; Tuttle and Burton 1999; Sprinkle 2000). On the other hand, there also is evidence that, in some circumstances, financial incentives appear to be unable to motivate effort (for reviews, see, e.g., Young and Lewis 1995; Camerer and Hogarth 1999; Bonner et al. 2000).

The reasons why financial incentives cannot always motivate effort are complicated. In some cases, financial incentives have no effect on effort because the use of extrinsic financial rewards either decreases individuals' intrinsic motivation to perform a certain task (Deci 1975; Deci and Ryan 1985; Frey and Oberholzer-Gee 1997) or changes individuals' perceptions about the nature of the task (Gneezy and Rustichini 2000). For example, when high school students were organized to collect donations, the student collectors who were paid 1 percent (10 percent) of the amount they collected actually collected less than (the same amount as) those who were not paid at all (Gneezy and Rustichini 2000).

In some other cases, the effect of financial incentives on effort is moderated by various types of *contextual* variables (e.g., skills, task complexity, and assigned goals; see Bonner and Sprinkle 2000). For example, greater task complexity may result in higher costs associated with accomplishing the task and/or lower self-efficacy, which, in turn, may reduce individuals' willingness to exert effort on this task (Bonner and Sprinkle 2000). The effect of financial

incentives on effort could also be moderated by non-economic *behavioral* variables (e.g., equity concerns, reciprocation, the desire for social approval, and aversion to distrust; see Fehr and Falk 2002; Fehr and Gachter 2002; Fehr and List 2002; Falk and Kosfeld 2004). For example, when financial incentives take the form of a penalty on shirking, employee effort is lower than when such incentives are absent because the imposition of penalty may be perceived by employees as inequitable and hostile (Fehr and Gachter 2002).

However, most experimental studies that investigate how the effect of financial incentives on effort is moderated by external variables do not use the optimal agency contract for the firm. Failure to examine the optimal agency contract is inconsistent with the fundamental purpose of agency research in management accounting, which is to help the firm design optimal incentive contracts that, taking into account employees' self-interest, induce employees to take the action that maximizes firm profit (Baiman 1982).[1] From the perspective of agency theory, if an optimal agency contract is available, firms can rely on this contract to maximize profit. Therefore, other theoretically sub-optimal contracts should not be used because, by assumption and design, their effort-inducing power and profitability are always inferior to those of the optimal agency contract.

For example, Rankin and Sayre (2000) experimentally investigate the effect of performance separability and contract type on agent effort in a two-agent production setting, where each agent's performance is a function of his/her own effort, the other agent's effort, and a random shock. The following three types of contracts are examined in their study: a tournament contract in which the agent who has a higher output earns higher pay, an individual piece-rate contract in which each agent's pay is linked to his/her output, and a joint piece-rate contract in

[1] The agency-theory-based approach is a powerful tool for developing optimal incentive contracts because it allows researchers to analytically formulate the firm's profit maximization problem in a specific decision context, and solve for the optimal contract for the firm in that context (Baiman 1982; Prendergast 1999; Lambert 2001).

which each agent's pay is linked to the sum of both agents' output. The authors find that, under the tournament contract and the individual piece-rate contract, agent effort increases with the degree of performance separability, and use such findings to emphasize the importance for firms to develop separate performance measures in the control of team production. However, the authors make no attempt to explore what is the optimal agency contract in their experimental setting, and there appears to be no evidence that any of the three contracts being studied is optimal for the firm. For instance, the tournament contract, as one type of relative performance evaluation scheme, will be valuable if the exogenous uncertainty faced by different agents is correlated (Holmstrom 1982). In Rankin and Sayre (2000), however, the random shocks in the two agents' performance functions are independent, and therefore it is difficult to understand why the tournament contract would be used because, in this case, relative performance is not informative about the agent's effort. Due to the absence of the optimal agency contract in their experiments, the implications of Rankin and Sayre's (2000) results for incentive control literature and practice remain unclear because, presumably, firms could induce the desired effort level by simply adopting the optimal agency contract.

Another consequence of ignoring the optimal agency contract in incentive contracting experiments is that it is not possible to assess the practical effectiveness of a theoretically optimal contract. An optimal agency contract is able to maximize firm profit only if it is as effective in eliciting effort as agency theory predicts. However, whether the optimal agency contract is as effective as the theory predicts is an open empirical question because, when analytically formulating and solving the firm's profit-maximization problem, agency theorists make specific assumptions about the characteristics of the decision context and decision makers therein (i.e., principal and agents). For example, standard agency theory assumes that employees

derive utility only from wealth and leisure, and, when making decisions, will only take actions that maximize their utility (e.g., Demski 1972; Demski and Feltham 1978; Holmstrom 1979, 1982; Baiman and Demski 1980; Christensen 1982). However, inconsistent with this assumption, prior research shows that employees derive utility from non-monetary social preferences or other-regarding concerns (for reviews, see, e.g., Noreen 1988; Luft 1997; Camerer 2003). Thus, after optimal incentive contracts are analytically developed, it is necessary to use empirical data to test their actual effectiveness in inducing effort and maximizing profit.[2]

2.3. Experimental Research on Social Norms

Prior experimental research has found that, inconsistent with conventional economic theory, non-economic social norms, such as fairness and trust, significantly influence employee behavior (for reviews, see, e.g., Luft 1997; Shields 1997; Sprinkle 2003; Evans and Moser 2005). One goal of studying social norms is to provide insights for enhancing existing economic theory and increasing the predictive power of that theory. Toward this goal, it would be desirable to have unambiguous economic predictions regarding what type of behavior is expected to occur, and then use such predictions as benchmarks to examine whether actual behavior differs in a systematic manner that can be explained by alternative theories.

Since management accounting research focuses mainly on the principal-agent relationship between firms and employees, it is important to establish baseline agency theory predictions as to: (1) the nature of the optimal agency contract for the firm in the context being investigated, and (2) the optimal action for the employee if the firm implements the optimal

[2] Several experimental studies of this type have been conducted. DeJong et al. (1985) examine two types of control mechanism suggested by the analytical literature (i.e., variance investigation and negligence liability rule), and find that they are effective in curbing employees' shirking. Berg (1990) and Berg et al. (1992) explore firms' contract design and employees' effort provision in a standard principal-agent relationship under which the employee's action is not observable or contractible. Their results show that most firms implement the incentive contract recommended by agency theory, and that this contract successfully induces the level of employee effort desired by the firm.

agency contract. If such predictions are not available, it will not be possible to assess whether the observed behavior is consistent with agency theory, and, therefore, the implications of the results for improving agency theory will be limited (for an in-depth discussion, see Evans and Moser 2005).

For example, Fisher et al. (2002) show that providing employees with information about peers' budget-proposing behavior (via the firm's internal reporting system) significantly reduces budgetary slack. However, from the perspective of agency theory, the budget-based pay scheme used in that study is sub-optimal because it gives employees an incentive to misreport their productive capacity. The analytical literature has developed truth-inducing incentive contracts for firms that use budget-based schemes to compensate employees (e.g., Groves 1973; Weitzman 1976; Groves and Loeb 1979). So, in theory, the firm should be able to eliminate or minimize budgetary slack by adopting the truth-inducing scheme, and information concerning peers' budgeting behavior would not be necessary.

As a related point, simply showing that a non-economic social norm drives employee behavior to differ from the economic prediction may be less interesting to agency theorists than showing that this norm influences firm profit. For example, Lindquist (1995) and Magner, Welker, and Campbell (1995) find that a fair budgeting process can mitigate the negative effect of an unfair budget on employees' job satisfaction, trust in supervisor, and commitment to the organization. However, the authors do not explore whether and how the fairness of budgeting processes affects firm profit. Thus, it is difficult to tell whether the firm should seek to increase the perceived fairness of their budgeting processes, especially if doing so is costly for the firm. Therefore, in research exploring the economically anomalous effects of social norms, we may

want to view employee behavior as a mediating variable, while using firm profit (or other proxies for efficiency) as the primary dependent variable.

2.4. The Motivation of This Dissertation

This dissertation provides direct experimental evidence regarding the effectiveness of an analytically optimal agency contract in mitigating the hidden action problem. I conduct experiments to address this issue because field or archival research in this area often requires proprietary data that are not publicly available, and there are many confounding factors in the field that potentially contaminate test results. Controlled laboratory experiments, on the other hand, allow me to eliminate the confounds that would be difficult to control for in the field, and to generate data under specific manipulated treatments to test the effect of the variables of interest.

I focus on a production setting where the link between employee effort and productive output is not influenced by any external uncertainty, and thus the firm can perfectly infer the employee's effort level even though the employee's effort choice is not directly observable. In this kind of setting, agency theory predicts that the firm can implement an optimal agency contract to completely solve the hidden action problem and achieve the first-best outcome. Therefore, in this dissertation, I label such setting as a "first-best world." The "first-best world" is not typical in practice, but I use it in this study for two reasons. First, both the analytical development and the experimental operationalization of the optimal agency contract are more manageable in the "first-best world" than in a more complex "second-best world", where the firm cannot perfectly infer the employee's input and the first-best outcome is no longer attainable. That is, the "first-best world" is a good starting point from which to gain insights about the effectiveness of optimal agency contracts before adding multiple layers of complexity.

My results show that, when the optimal agency contract is the only employment contract available in a labor market, it produces higher firm profit than a theoretically sub-optimal gift-exchange contract. This is consistent with the agency theory prediction. However, my results also show that factors that play no role in standard agency theory (such as the perceived intentions underlying firms' contract offers) can influence employee effort in ways that call into question the practical usefulness of the optimal agency contract. This suggests that it may be necessary to take into account employees' social preferences when developing analytical models and/or designing management control systems to be applied in practice.

The second reason why I use a "first-best world" in this study is that it was used in previous studies to investigate the gift-exchange relation between firms and employees, and an important goal of my study is to assess the economic implications of those studies. Fehr, Kirchsteiger, and Reidl (1993), Fehr et al. (1998), Hannan, Kagel, and Moser (2002), and Hannan (2005) have shown that, in simulated labor markets, firms pay wages higher than the market-clearing level, and employees reciprocate by exerting more effort than the economically enforceable level. These reciprocal actions yield higher firm profit than if firms paid only the market-clearing wage and employees provided only the enforceable effort level. However, the economic implications of these prior studies are unclear because the contract used in their experiments is not the optimal agency contract. That is, in all the previous gift-exchange studies, the employment contract used to induce gift exchange (i.e., the gift-exchange contract under which the firm pays a fixed wage before the employee chooses an effort level) is viewed as sub-optimal for the firm by agency theorists because the employee has no economic incentive to provide any effort higher than the minimum level. From the perspective of agency theory, firms would be able to maximize profit by adopting an optimal agency contract, and therefore would

not need to rely on gift exchange. Thus, the actual economic benefit to the firm of gift exchange is open to question until it is compared to the economic benefit of the alternative optimal agency contract.

This study addresses the issue described above by comparing firm profit under the optimal agency contract with that under the gift-exchange contract in the same "first-best" experimental setting used in prior gift-exchange studies. In addition, this study explores how factors outside standard agency models interact with the contract type to influence firm profit. The results of this study show that, although the optimal agency contract is more profitable when the two contracts are offered separately, its profitability is impaired in a more realistic market setting where both contracts are available. Thus, firm profit under the optimal agency contract may not exceed that under the gift-exchange contract in such settings. These results offer a possible explanation for why analytically sub-optimal contracts appear to be used in practice.

This study also contributes to research on the moderators of the incentive-effort relation. The findings of this study are consistent with previous research results that the effect of financial incentives on effort is moderated by factors outside standard economic theory. Specifically, my results show that the same set of financial incentives are able to induce significantly more effort (and therefore generate higher firm profit) when the intentions of firms that offer the incentives appear to be neutral or irrelevant than when the intentions appear to be selfish.

Finally, this study responds to recent calls for cross-methodological and cross-disciplinary research in management accounting (see, e.g., Berg, Coursey, and Dickhaut 1990; Kachelmeier 1996; Atkinson et al. 1997; Moser 1998; Merchant, Van der Stede, and Zheng 2003). It draws on a combination of theories, findings, and methods from different research

disciplines (including management control, agency theory, and experimental economics), and therefore is able to address important issues that would be difficult to examine through a narrow, discipline-bound approach. For example, employment contracting between firms and employees is a "market phenomenon" (Waller and Chow 1985), and thus it cannot be thoroughly researched without a market setting (Waller 2002). The experimental labor markets used in this study provide a means to examine how firms' contract choices and employees' decisions are interdependent and mutually influential. This kind of synergy from different methods and fields is consistent with a recent trend in managerial accounting research (Atkinson et al. 1997)

3. THEORY AND HYPOTHESES

3.1. Overview of Chapter

Section 3.2 of this chapter describes the non-market-clearing wages documented in prior labor market studies and reviews various economic models developed to explain this market anomaly. Focusing on the gift-exchange model, Section 3.3 reviews previous experiments that investigate the gift-exchange relation between firms and employees. Then, from the perspective of agency theory, Section 3.4 explains the sub-optimality of the gift-exchange contract used in prior experimental studies, and develops the optimal agency contract for the experimental setting used in those studies. Section 3.5 draws on behavioral theory to explore the effect of employees' perceptions of firms' intentions on employees' effort choices and, in turn, on firm profit under the optimal agency contract and the gift-exchange contract. This section also develops hypotheses about how the profitability of the optimal agency contract and the gift-exchange contract, as well as firms' decisions concerning which contract to offer to employees, may be affected by employees' different reactions to these two contracts.

3.2. Non-marketing-clearing Wages

In neoclassical economic theory, labor is one factor of production, and like the prices of all factors, the price of labor will be determined by its supply and demand (see, e.g., Friedman 1976; Milgrom and Roberts 1992). Therefore, when the labor market clears at a competitive equilibrium, all employers in the market should pay the same wage, i.e., the wage at which the supply and demand for labor are equal (Borjas 1996; Bosworth, Dawkins, and Stromback 1996). However, this "single wage" prediction appears to be inconsistent with what is observed in the field. For example, Kaufman (1984), Bewley (1995), and Campbell and Kamlani (1997) provide

survey evidence that firms generally are reluctant to adjust wages down to the theoretical market-clearing level, even in the presence of a high unemployment rate.

Several different economic models have been developed to explain the downward wage rigidity observed in practice: 1) Baily (1974), Gordon (1974), and Azariadis (1975) propose that, because workers are risk averse, they prefer fixed to variable wages, and therefore they reach an implicit agreement with the firm, under which the firm pays a wage that is fixed (i.e., rigid) but lower than the average of what the firm would pay if wages were flexible. 2) Stiglitz (1974), Salop (1979), and Hashimoto and Yu (1980) argue that, because firms incur non-trivial costs (e.g., recruiting and training expenses) when hiring new employees, they pay higher wages to keep old employees and thus reduce their labor turnover cost. 3) Fischer (1977) and Taylor (1979) propose that wage levels are relatively persistent because wage contracts are often written on a staggered basis, and the determination of wages is intertemporally correlated. 4) Weiss (1980, 1990) argues that, because the labor force is heterogeneous, firms are unwilling to lower their wages because doing so may cause adverse selection problem, i.e., firms that offer low wages will not be able to retain or attract high-quality workers. 5) Shapiro and Stiglitz (1984) argue that high wages increase the worker's opportunity cost of shirking (i.e., the worker might lose the high-pay job if caught shirking), and thus increase the incentive for the worker not to shirk. 6) Lindbeck and Snower (1988) postulate that hiring cheap inexperienced employees would generate two types of costs for the firm: recruiting/training expenses, and potential efficiency losses caused by incumbent experienced employees boycotting new hires. Knowing this, old employees take advantage of their position to bargain for high wages. 7) Akerlof (1982) proposes that there is a norm of gift exchange between firms and employees. Under this norm, the firm gives the employee a gift of a wage higher than the market-clearing level, and, in return,

the employee exerts effort higher than the economically enforceable level. Akerlof argues that gift exchange is sustained by reciprocity – if one side of the exchange does not behave as expected, the other side will also violate the norm.

The models described above have received various degrees of empirical support (for a review, see Bewley 1999). This dissertation is not designed to distinguish between the explanatory power of those models, but rather to investigate the incremental effect of gift exchange on wage and effort. This dissertation focuses on gift exchange for two reasons. First, the gift-exchange model appears to have more empirical support than most of the other theories (Bewley 1999). It has been supported not only by archival and field studies (see, e.g., Raff and Summers 1987; Blinder and Choi 1990; Agell and Lundborg 1995; Campbell and Kamlani 1997; Huang et al. 1998; Bewley 1999), but also by experimental research that controls for other factors that other models suggest may contribute to downward wage rigidity (Fehr, Kirchsteiger, and Reidl 1993; Fehr et al. 1998; Hannan, Kagel, and Moser 2002; Hannan 2005). Second, one of the purposes of this study is to use an optimal agency contract as a benchmark to examine the economic implications of non-economic social norms for inducing employee effort and improving firm profit. Since the gift exchange relation has been thoroughly investigated in prior experimental research, I adopt the same experimental setting used in prior research to compare employee effort and firm profit under the gift-exchange contract with those under the correponding optimal agency contract. Note that alternative models described earlier will not be valid unless specific necessary conditions are satisfied (e.g., fixed firm-employee relation over multiple periods, labor force heterogeneity, the availability of monitoring technology, etc.). This study and the prior experimental gift-exchange studies control for such necessary conditions, and

thereby eliminates the related alternative explanations and allows for the isolation of the pure effect of gift exchange.

In the next section, I review previous studies that documented gift exchange and reciprocity in accounting settings. Then I describe the simulated labor market and the employment contract used in prior gift-exchange experiments, and summarize the main findings of those experiments.

3.3. Prior Gift-exchange Studies

The norms of reciprocity have been shown to influence behavior in many social and economic activities (see, e.g., Sugden 1984; Smith 1992; Mowday and Colwell 2003). In accounting literature, Kachelmeier, Limberg, and Schadewald (1991) find that, if a change in tax regime inequitably increases the producer's profit, customers will give up potential gains from purchases to keep the price down. Moser, Evans, and Kim (1995) find that taxpayers likely misreport their income when the tax rates are horizontally inequitable (i.e., their tax rates are higher than those of other taxpayers). Lindquist (1995) reports that employees who are allowed to participate in the budgeting process are more satisfied with the resultant budget than non-participative employees even if the budget *per se* is unattainable. Libby (2001) documents that, under an unfair budget, employees' performance is higher when the budgeting process is fair than when the budgeting process is unfair. Evans et al. (2001) find that employees report less honestly when the employment contract leads to an inequitable payoff distribution between the firm and the employee.

However, the studies described above are not designed to explore how gift exchange influences employee effort because they address different research questions. Fehr, Kirchsteiger, and Reidl (1993), Fehr et al. (1998), Hannan, Kagel, and Moser (2002), and Hannan (2005)

conducted more direct experimental tests of the gift-exchange relation between firms and employees. In their experiments, a firm hired an employee to provide effort in production by choosing an effort level from a range of possible levels. There was a cost associated with each effort level, and the cost increased with the level of effort.

The firm's profit (G) was determined as:

$G = (q - w)e$;

and the employee's net utility (U) was:

$U = w - c(e)$

where:
q = an exogenously given constant representing revenue to the firm;
w = wage;
e = the employee's effort;
$c(e)$ = the cost of effort.

The employee's set of possible effort levels and the associated costs were common knowledge. Firm profit was publicly observable, and therefore was contractible. Employees' effort choices, however, were unobservable and non-contractible. In this setting, holding the wage constant, firm profit increased with the employee's effort level, but the employee's net utility decreased with his/her effort level.

The employment contract used in prior experiments was one in which the firm offered any wage they wanted within a specific range, and then the employee who accepted a wage offer chose an effort level. The firm could not take any action in response to the employee's effort choice, and therefore the effort level chosen by the employee determined firm profit and that employee's net utility.

According to conventional game theory, under this contract, the sub-game perfect equilibrium is that, regardless of how much wage the firm offers, the employee will always

choose the lowest effort possible to maximize his/her net utility, and that the firm, anticipating the employee's opportunistic behavior, will always offer the lowest wage possible. However, previous experimental results indicate that both firms' wage offers and employees' effort levels were higher than the sub-game perfect equilibrium prediction, and that effort levels were positively associated with wage offers. It is important to note that, although prior experiments were all run over multiple periods, each participant's decision was made strictly anonymously, and there was no fixed pairing between a firm and an employee across experimental periods. This type of repeated one-shot design precludes reputation effect. Therefore, the wage in excess of the sub-game perfect equilibrium prediction cannot be interpreted as firms' attempts to induce employees to provide more effort in the future.

The gift-exchange experiments also reveal that, when firms exchanged gifts with employees, the marginal income generated by employees' reciprocal effort was often greater than the marginal wage cost incurred to induce such effort. As a result, firm profit was, on average, higher than if the firm paid only the sub-game perfect equilibrium wage.

These results provide support for gift-exchange theory. In addition, such results suggest that gift exchange and reciprocity can be effective in motivating effort (Sprinkle 2003), and therefore are important factors to be considered in management planning and control (Baron and Kreps 1999). However, as will be discussed in the next section, the economic implications of inducing employees' reciprocal behavior are still unclear because optimal agency contracts may yield higher profit than sub-optimal contracts that rely on non-economic behavioral norms such as gift exchange to increase firm profit. The next section first presents an overview of the agency-based approach in management accounting research, and then uses this approach to

analytically develop the optimal agency contract in the experimental setting used in prior gift-exchange studies.

3.4. The Agency Theory Perspective

3.4.1. Overview

Incentive problems are pervasive in firms because employees' self interests are not generally aligned with the interest of the firm (Milgrom and Roberts 1992). To overcome such problems, firms tailor their contracting and performance evaluation systems to channel employees' behavior toward the firm's strategic goals (Holmstrom 1977; Anthony, Dearden, and Bedford 1989; Holmstrom and Tirole 1989), and therefore incentive control has been a very important theme in management accounting research (Indjejikian 1999). Research in this area has been conducted primarily within the framework of agency theory, because, under agency theory, incentive control issues can be methodically and tractably studied using analytical techniques (Lambert 2001). As Baiman (1982) points out, the main focus of agency research is on the design of optimal incentive contracts in different control environments.

When applied to employment contracting, agency theory addresses the relationship between the firm (i.e., the principal) and the employee (i.e., the agent). Incentive problems arise either when the employee has private information that the firm does not have (i.e., hidden information) or when the employee's behavior cannot be perfectly observed by the firm (i.e., hidden action). This study focuses on the most basic agency relationship – single agent and single period – in a hidden action setting. In this setting, both the firm and the employee are assumed to be interested solely in maximizing their own utility. The firm hires the employee to provide input to a specific production technology, which generates productive output for the

firm. The employee's input cannot be observed by the firm, but the output is publicly observable. The firm determines how to allocate the output between the firm and the employee.

The firm wants to induce the employee to provide the input level that will yield the highest utility possible for the firm. To do so, the firm needs to design an appropriate incentive contract. The incentive contract, while recognizing the employee's utility maximizing behavior, makes the input level desired by the firm also yield the highest utility possible for the employee. Such a contract is the optimal agency contract for the firm because, under this contract, a rational employee will choose the input level desired by the firm and maximize the firm's utility. Analytically, the firm's goal is formulated as a constrained utility-maximization problem, with the decision variables being the pay scheme prescribed in the employment contract. The optimal agency contract is attained by solving this maximization problem (see, e.g. Ross 1973; Holstrom 1979; Shavell 1979; Baiman 1982).

Analytical researchers in accounting and economics have made significant progress in developing optimal incentive contracts in various organizational contexts (for a review, see Prendergast 1999 and Lambert 2001). However, archival or field studies that are designed to test the validity of such theoretical models appear to be less successful. Some theoretical advances have never been tested, and for those that have been tested, the results sometimes have been inconsistent with the theory with no satisfactory explanation as to why (Prendergast 1999; Chiappori and Salanie 2003). As Prendergast (1999) notes, such problems are mainly due to the lack of relevant data. For example, the actual structure of contracts used in practice is often unknown to researchers. In addition, the design of contracts in practice may be influenced by many unobserved factors, and failure to capture those factors may give rise to omitted variables in analyses, making it difficult to identify the real cause of behavior observed in the field.

Because the experimental approach gives researchers better control over the settings of interest, it offers a useful alternative to field research for testing incentive models in management accounting settings (Demski and Kreps 1982, 141).

3.4.2. The Optimal Agency Contract in Prior Experimental Settings

The employment contract used in prior gift-exchange experiments (i.e., the firm offers a fixed wage, and then, if the offer is accepted, the employee chooses an effort level) allows the firm and the employee to exchange gifts. That is, the firm can offer a wage above the market-clearing level to elicit the employee's reciprocal effort. However, from the viewpoint of standard agency theory (see, e.g., Baiman 1982; Grossman and Hart 1983), this contract is sub-optimal for the firm, and therefore should not be used. This is because, under the rationality assumption, the employee will always shirk to the full extent by providing the lowest effort level possible, so long as there is no monitoring and his/her effort choice will never be penalized. Thus, the gift-exchange contract will result in an efficiency loss for the firm.

Given the firm's profit function (i.e., $G = (q - w)e$) and the employee's utility function (i.e., $U = w - c(e)$), the optimal agency contract in prior experimental settings is one that solves the following problem for the firm:

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 the above problem is well-known in the agency theory literature. Note that the link between effort and firm profit is not subject to any external uncertainty, and the

employee's set of possible effort levels, as well as cost function, are common knowledge. Even though the employee's effort choice is unobservable, by observing its profit, the firm will be able to perfectly infer the employee's effort level. Therefore, to induce the employee to choose the effort level that maximizes firm profit, the firm should use the following contract (Harris and Raviv 1978):

$w = w_H = c(e^*) + U_0$ if $G = (q - w_H)e^*$;
and $w = w_L$, otherwise.
where: e^* = the effort level that maximizes firm profit;
$w_L < w_H$.

Under this optimal agency contract, if firm profit reaches the maximum level (which implies that the employee chose the desired effort level, e^*), the firm will pay the employee the market-clearing wage (w_H). On the other hand, if firm profit does not reach the maximum level (which implies that the employee did not choose e^*), the firm will pay the employee a wage lower than the market-clearing level (w_L). This type of contract is often called a "forcing" contract in agency theory literature because a rational employee will be "forced" to choose e^* as it is the only incentive compatible choice. Using this contract, the firm is able to achieve the first-best outcome by simply paying the market-clearing wage. In contrast, under agency theory assumptions, the gift-exchange contract used in prior experiments would result in lower firm profit than the optimal agency contract because it gives employees an incentive to shirk.

In summary, standard agency theory predicts that the "forcing" contract will generate a higher firm profit than the theoretically sub-optimal gift-exchange contract. This leads to my first hypothesis:

H1: *Ceteris paribus*, the optimal agency contract will produce a higher firm profit than the gift-exchange contract.

H1 serves two functions in this study: First, it provides a direct test of the agency theory prediction. Second, the result of the test of H1 can be used as a benchmark to examine whether the relative profitability of the optimal agency contract and the gift-exchange contract changes in different market settings. Possible reasons for such changes in the relative profitability of these two contracts are discussed in the next section.

3.5. The Behavioral Theory Perspective

3.5.1. Overview

If, as predicted in H1, the optimal agency contract generates higher firm profit than the gift-exchange contract used in prior studies, one would expect that, in real-world situations similar to the experimental setting used in prior studies, all firms would implement the optimal agency contract because it yields superior profit. However, anecdotal evidence suggests that, in such situations, firms do not necessarily use the optimal agency contract even when one is readily available. For example, Akerlof (1982) noted that the contracting behavior of a utility company located in the New England area appeared to be inconsistent with conventional economic theory. This company hired a group of cash posters, whose duty was to record the payments received from customers on the company's ledger cards. The performance of the cash poster was measured by the number of ledger cards processed per hour, and there appeared to be no "state of nature" that might interact with a cash poster's work effort to influence his/her performance. The company kept records of each cash poster's working speed, and the average number of cash postings per hour was 353. In this context, standard agency theory suggests that the company should base wages on the cash poster's actual output and impose penalty if the output falls below a desired level. However, this company paid a fixed wage to all cash posters and set a performance standard of 300 cards per hour. Even people who worked below the

already lenient standard received only a "mild rebuke from the supervisor." As Akerlof (1982) pointed out, this company's contract decision is a "puzzlement" from the perspective of conventional economic theory. Also puzzling is the cash posters' behavior. The cash posters' turnover rate was high and they were rarely promoted. In this type of setting, standard agency theory predicts that the cash posters would shirk to maximize their net utility; but in fact they worked approximately 18 percent above the standard.

One possible reason why firms do not adopt the optimal agency contract in situations where agency theory suggests they should is that their decisions regarding the type of contract to offer are influenced by factors outside the standard agency model. In this dissertation, I use experimental labor markets to explore this issue. I use a labor market setting because, in practice, employment contracting takes place in a labor market, and the contract between a firm and an employee will reflect the effects of multiple forces inherent in the market (Waller and Chow 1985). Therefore, to capture such effects and also increase the generalizeability of results, it is useful to conduct experimental research on employment contracting in an interactive market setting (Waller 2002).

In a labor market, different firms may offer different types of employment contracts. Employees observe these different contract offers, and then, after deciding which offer to accept, decide how much effort to exert. This study uses the same type of labor market setting as was used in the prior gift-exchange studies described earlier, but allows the firm to offer one of two alternative contracts: the optimal agency contract (i.e., the "forcing" contract) or the gift-exchange contract used in earlier studies. According to conventional agency theory, in this market, no firm will offer the gift-exchange contract because it produces lower profit. Even if some firms offered the gift-exchange contract before they fully understood the economic

properties of the two contracts, agency theory predicts that the gift-exchange contract would be "crowded out" of the market by the optimal agency contract due to its inferior profitability.

However, research in psychology and behavioral economics has shown that, in social interactions, individuals are concerned about the intentions underlying others' actions. Rabin (1993) and Falk and Fischbacher (2000) assume that individuals derive utility (or disutility) from their perception about others' intention (i.e., kind or unkind), and analytically incorporate such assumptions into individuals' decision models. Prior experimental research provides support for the notion that intention matters. For example, Blount (1995) finds that, in ultimatum games, responders care more about equity in payoff allocation between the proposer and the responder when the allocation is proposed by another player in the game than when it is proposed by an outsider. Kagel, Kim, and Moser (1996) find that the rejection rate in ultimatum games is higher when the proposer intentionally makes inequitable offers than when he/she does so unknowingly. Falk, Fehr, and Fischbacher (2000) and Charness and Rabin (2002) report that, in sequential response games, if the proposer makes a selfish move, deliberately lowering the responder's payoff to maximize his/her own payoff, then the responder penalizes the proposer by choosing the option that minimizes the proposer's payoff. On the other hand, if the proposer's intention is neutral, the responder is willing to sacrifice some payoff to help the proposer. Relatedly, Brandts and Sola (2001) find that, in a game similar to the ultimatum game, whether or not a proposal is rejected depends on what other possible options the proposer has when making the proposal – responders are more likely to reject a proposal if it appears to be a selfish choice relative to other options. Charness (2004) finds that the gift-exchange relation between firms and employees is weaker when wages are randomly determined than when wages are intentionally chosen by firms. In summary, prior experiments show that, when individuals observe others' behavior,

they tend to make causal inferences regarding the intention underlying such behavior, and respond cooperatively (negatively) to generous or neutral (selfish) intentions.

In the context of this study, when the firm chooses to offer one contract rather than the other, employees' perceptions about the intention underlying the firm's contract offer may influence their reaction to that offer, and, in turn, affect firm profit under that contract. Note that this study focuses on how the perceived intentions underlying firms' contract offers affect employees' effort decisions. This distinguishes the current study from previous studies that focused on the effect of the distribution of outcomes (i.e., payoffs) on behavior (see, e.g., Fehr and Schmidt 1999, 2000; Bolton and Ockenfels 2000; Evans et al. 2001). Concern for distributive equity influences behavior in many resource allocation settings (Brandts and Sola 2001; Evans et al. 2001; Camerer 2003). This study, however, is interested in the incremental effect of perceived intention on behavior, holding outcome distribution constant.

The next three sub-sections (i.e., Section 3.5.2 through 3.5.4) discuss how employees might perceive the intentions of firms that choose to offer one contract versus the other in a labor market where both the optimal agency contract and the gift-exchange contract are available, as well as how such perceived intentions could affect firm profit. Section 3.5.5 discusses how employees' reaction to different types of intentions may influence firms' decisions regarding which contract to offer. Finally, Section 3.5.6 describes the potential effects of employees' previous experience with the optimal agency contract and the gift-exchange contract on firm profit. All hypotheses proposed from this point forward (i.e., H2-A through H3-C) are based on the behavioral theories discussed earlier in this chapter, and are inconsistent with the standard agency theory prediction as stated in H1.

3.5.2. Employees' Perceptions of Firms' Intentions

The optimal agency contract is designed to pay the lowest wage necessary to "force" (in an incentive compatible way) employees to select the effort level that maximizes firm profit. If a firm offers the optimal agency contract when the gift-exchange contract is also available and possibly offered by other firms, employees may realize that the firm is attempting to reap maximum profit at the expense of the employees. This could be viewed as very self-serving on the part of the firm. In addition, under the optimal agency contract, the employee receives a penalty (i.e., a lower wage) if his/her actual output is lower than a pre-specified level. This may be perceived by employees as the firm's imposition of control over them. Frey (1997) and Falk and Kosfeld (2004) find that employees are generally averse to being controlled or restricted by the firm because controls or restrictions signal distrust.

Therefore, employees who are offered the optimal agency contract may retaliate against the firm even if such actions are costly to them. In the context of this study, there are two ways in which the employee can retaliate against the firm: one is to accept the contract but then exert low effort; the other is to reject the contract entirely and remain unemployed. In either case, firm profit will be lower than if the employee accepts the contract and provides the effort level desired by the firm. This leads to my second hypothesis:

H2-A: When firms offer the optimal agency contract in markets where the gift-exchange contract is also available, firm profit will be lower than when firms offer the optimal agency contract in markets where the gift-exchange contract is not available.

Notice that the distribution of payoffs is held constant across the two conditions that are compared in H2-A because, in both cases, employees face the same contract (i.e., the optimal agency contract). Therefore, any difference in firm profit between these two conditions must be due to employees' perceptions of the firm's intention rather than to differences in the distribution of outcomes.

If a firm chooses to offer the gift-exchange contract as opposed to the optimal agency contract when both are available, it may appear to employees that the firm has foregone a profit-maximizing opportunity to benefit them. Consequently, employees may reward the firm by providing high effort to increase firm profit, even if doing so decreases their own payoff. This leads to my third hypothesis:

H2-B: When firms offer the gift-exchange contract in markets where the optimal agency contract is also available, firm profit will be higher than when firms offer the gift-exchange contract in markets where the optimal agency contract is not available.

As was the case in H2-A, the distribution of payoffs between the firm and the employee is held constant across the two conditions compared in H2-B. Thus, the predicted profit difference in H2-B can again be attributed to employees' perceived intentions regarding firms' contract choices rather than to differences in the distribution of outcomes.

3.5.3. Employee Experience

In actual labor markets, employees are likely to work with different employers over time, and thus may experience different types of employment contracts. Such experience could influence employees' subsequent behavior under those contracts because they will understand more clearly how a particular contract influences their payoffs. In addition, working under different contracts will allow employees to compare the relative effects of those different contracts on their welfare.

In the context of this study, this suggests that, over time, employees will learn that the optimal agency contract pays the lowest amount necessary to induce them to take the action that maximizes firm profit; whereas the gift-exchange contract provides a potential opportunity for them to earn a higher payoff. Therefore, experienced employees may be more likely to punish firms that offer the optimal agency contract by withholding effort or rejecting the contract, and

reward firms that offer the gift-exchange contract (and pay higher than the market-clearing wage) by providing more effort. That is, firm profit under the optimal agency contract may decrease, while firm profit under the gift-exchange contract may increase, as employees' experience with the two contracts increases. This leads to my next two hypotheses:

H3-A: When firms offer the optimal agency contract in markets where the gift-exchange contract is also available, firm profit will be negatively associated with employees' experience with these two contracts.

H3-B: When firms offer the gift-exchange contract in markets where the optimal agency contract is also available, firm profit will be positively associated with employees' experience with these two contracts.

3.5.4. Relative Profitability

The above hypotheses (H2-A through H3-B) make predictions regarding "*within-contract*" changes in firm profit under the optimal agency contract and the gift-exchange contract. However, the main interest of this study is in the relative profitability of the two contracts, especially after firms and employees have gained experience with these contracts. This is because, even if firm profit under the optimal agency contract dropped due to employees' negative reaction, it could still be higher than that under the gift-exchange contract. If this were the case, the "within-contract" changes, although interesting, would not be as important because the optimal agency contract would still dominate the gift-exchange contract.

Since there is no basis to make an *ex ante* prediction regarding which contract will produce higher firm profit as employees gain experience with the two contracts, this issue is addressed as a research question rather than a directional hypothesis.

RQ: Does the optimal agency contract or the gift-exchange contract produce higher firm profit in a market where firms choose which contract to offer and employees have experience with both contracts?

3.5.5. Firms' Contract Choices

In labor markets where both the optimal agency contract and the gift-exchange contract are available, the firm needs to decide which contract to offer to employees. When making such decisions, firms may consider employees' reaction to these two contracts. For example, some firms may anticipate that employees will react negatively to the optimal agency contract, and therefore offer the gift-exchange contract. Alternatively, some firms may start off by offering the optimal agency contract in hopes of maximizing their profits, but then switch to offering the gift-exchange contract if their initial strategy proves ineffective. Shields and Waller (1988) find that firms are fairly adaptable in the design of employment contracts – i.e., they revise their contracts based on previous outcomes. Similarly, Kagel, Kim, and Moser (1996) find that, in a one-shot, repeated-play sequential response game, proposers who intentionally attempted to implement a self-serving norm of payoff allocation were penalized by responders (even though imposing this penalty was costly to the responder), and therefore the proposers were "forced" to behave less selfishly. Thus, firms that initially offer the optimal agency contract, after learning from feedback about employees' negative reaction to it, may switch to offering the gift-exchange contract.

Regardless of whether firms initially anticipate the negative reaction or learn about it through experience, I expect more firms to offer the gift-exchange contract over time. This leads to my next hypothesis:

H3-C: When given a choice between offering the optimal agency contract and offering the gift-exchange contract, over time more firms will choose to offer the gift-exchange contract.

3.5.6. Additional Issues Regarding Employee Experience

In labor markets where both the optimal agency contract and the gift-exchange contract are available, employees may have two different types of prior experience with these contracts. Some employees may have worked with both contracts over time; while other employees may have worked under only one of the two contracts before entering the markets where both contracts are available. These two types of experience may affect the relative profitability of the two contracts in different ways. The former type of experience has been discussed in Section 3.5.3. In this section, I discuss the latter type.

Some employees may have worked under only the optimal agency contract before entering the market where both the optimal agency contract and the gift-exchange contract are available. While working *exclusively* under the optimal agency contract, these employees have no reference against which to evaluate the positiveness/negativeness of the firm's intention. Thus, these employees may perceive the firm's intention to be neutral or irrelevant, and simply provide the effort level compatible with their own incentive (i.e., the effort level desired by the firm). When they face the optimal agency contract in the market where both contracts are available, how they will react to the optimal agency contract relative to employees who have experience with both contracts is an open empirical question. On one hand, their prior experience may have a carry-over effect on their subsequent effort choices, which will cause them to choose the incentive-compatible effort level more often. On the other hand, they are more likely to perceive the intentions of firms that offer the optimal agency contract as selfish because they feel they were already "ripped off" under this contract before. This, in turn, may make them more likely to retaliate against such firms by withholding effort or rejecting the contract. Therefore, we cannot make a directional prediction concerning whether employees

with experience exclusively with the optimal agency contract will react more or less negatively to the optimal agency contract than employees who have experience with both contracts.

When employees with experience exclusively with the optimal agency contract face the gift-exchange contract, they may not fully develop the norm of reciprocity due to their lack of experience with this contract. Thus, they are likely to behave less reciprocally than employees who have experience with both contracts. This will result in lower firm profit. However, as discussed in the last paragraph, since there is no basis to predict these employees' reactions to the optimal agency contract, no formal hypothesis is offered regarding the relative profitability of the two contracts. Rather, this question is examined on an exploratory basis.

We now consider employees who have worked exclusively under the gift-exchange contract before entering the market where both the optimal agency contract and the gift-exchange contract are available. Compared to employees who have experience with both contracts, such employees are more likely to have developed a reciprocity norm while working under the gift-exchange contract, and thus may behave more reciprocally under the gift-exchange contract in the market where both contracts are available.

When employees with experience exclusively with the gift-exchange contract face the optimal agency contract in the two-contract market, their reaction is likely to be less negative because it may take some time for them to completely understand the effect of the optimal agency contract on their payoff relative to the gift-exchange contract. That is, in the two-contract market, if employees have prior experience with only the gift-exchange contract, firm profit will be higher under both contracts than if employees have prior experience with both contracts. However, as in the case where employees have exclusive experience with the optimal agency contract, we cannot make a directional prediction regarding which contract will produce

higher firm profit. Rather, the relative profitability of the two contracts is examined on an exploratory basis.

In summary, when employees have prior experience either exclusively with the optimal agency contract or exclusively with the gift-exchange contract, it is not possible to predict the relative profitability of the two contracts. However, because such previous experience could have a significant impact on employees' subsequent behavior, I examine the relative profitability of the optimal agency contract and the gift-exchange contract under different types of experience on an exploratory basis.

4. RESEARCH DESIGN

4.1. Overview of Chapter

Section 4.2 of this chapter introduces the experimental setting and describes the optimal agency contract and the gift-exchange contract used in my study. Section 4.3 presents the structures of the three different types of experimental labor markets examined. Finally, Section 4.4 describes the treatment manipulations and the experimental procedures used in each market.

4.2. Experimental Task and Contracts

The hypotheses and research questions described in Chapter 3 were tested using three types of experimental labor markets. In each market, an equal number of firms and employees interacted for twelve periods.[3] The setting of the market is the same as that used in Fehr, Kirchsteiger, and Reidl (1993), Fehr et al. (1998), Hannan, Kagel, and Moser (2002), and Hannan (2005). The firm wants to hire an employee to provide effort into a production technology, which produces profit for the firm. In the experiment, all payoffs were expressed in "lira", an experimental currency. At the end of the experiment, participants' earnings were converted to dollars at the rate of 50 lira = $1.

The firm's profit function is:

Firm Profit = (120 – wage) × Employee's effort

where: wage $\in$ [20, 120];
employee's effort $\in$ {0.1, 0.2, … …,1.0}.

The employee's net payoff is determined as:

Employee's net payoff = wage – cost of effort

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

[3] I used a labor market with an *equal* number of firms and employees for two reasons: First, although some labor markets may have excess supply or excess demand, examining a balanced market is a reasonable starting point that provides a benchmark for future studies. Second, 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).

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

There is a minor parametric difference in the employee's payoff function between this study and previous gift-exchange studies. In previous studies, the employee's reservation net utility is assumed to be zero, and there is a fixed cost of 20 to the employee. In this study, the reservation net utility is set at 20 and the fixed cost is eliminated in order to avoid the situation where, under the optimal agency contract, employees receive a zero net payoff even if they choose the effort level desired by the firm (i.e., there is no real motivation for them to choose the desired effort level). That is, in my study, employees receive a positive payoff if they choose the effort level induced by the optimal agency contract, providing them with a monetary motivation to do so. This parametric change does not cause any difference in the predictions of interest regarding firms' or employees' behavior between this study and the previous studies.

Firm profit is observable to both the firm and the employee. The employee's effort level, however, is not observable, and therefore cannot be contracted upon. To establish the optimal agency contract, I solve the maximization problem in Section 3.4.2 with the parameters given above. This maximization problem is solved using Grossman and Hart's (1983) approach, with an additional constraint, $w - c(e) \geq 0$ for all e's, to eliminate the possibility of participants getting a negative payoff, which, due to individuals' loss aversion (Tversky and Kahneman 1991), could have biased my results. Under this approach, the firm's problem is formulated 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 wage of 38 (i.e., w_H) when firm profit is 82. The wage for any firm profit other than 82 (i.e., w_L) is set so that the employee's net payoff is lower than if s/he chooses effort

level 1. Specifically, w_L is set at 15, rather than 20, to avoid the situation where employees are indifferent between choosing level 1 and 0.1 because both levels give them a net payoff of 20. Adding the constraint of $w - c(e) \geq 0$ and setting w_L at 15 do not change any of the economic predictions regarding firms' and employees' behavior.

Therefore, the optimal agency contract in my experimental setting is:

If firm profit = 82 (i.e., when the employee chooses an effort level of 1), wage = 38;
Otherwise, wage = 15.

Standard agency theory predicts that, faced with the optimal agency contract, a rational employee will choose effort level 1 and earn a payoff of 20 (i.e., a wage of 38 minus the cost of effort of 18). This, in turn, produces a firm profit of 82.

In contrast to the optimal agency contract, under the gift-exchange contract, the firm can offer any wage between 20 and 120. Then, if an employee accepts the wage offer, s/he chooses an effort level. Conventional game theory predicts that the firm will pay a wage of 20 and the employee will choose effort level 0.1.[4] Therefore, the employee's net payoff will be 20, and firm profit will be 10 (i.e., (120-20)×0.1=10). Notice that conventional game theory predicts that firm profit under the gift-exchange contract (10) is lower than under the optimal agency contract (82).

4.3. Experimental Design

My design and experimental procedures are summarized in Figure 1. The design consisted of three between-subject conditions: gift-exchange contract plus choice of contract (hereafter, "GE + Choice"), optimal agency contract plus choice of contract (hereafter, "OPT +

[4] Although the nominal amount of the market-clearing wage differs between the optimal agency contract (38) and the gift-exchange contract (20), both wages pay employees exactly their reservation utility net of the cost of effort. That is, the employee's net payoff is same under the optimal agency contract (i.e., 38–18=20) and under the gift-exchange contract (i.e., 20–0=20).

Choice"), and all choices of contract (hereafter, "All-Choice"). The "GE + Choice" condition contained two treatments: the "imposed contract" treatment, which covered Periods 1 – 6, and the "chosen contract" treatment, which covered Periods 7 – 12. Under the "imposed contract" treatment, all firms were required to offer either the gift-exchange contract (hereafter, GE contract) or no contract; and there was no mention of the optimal agency contract (hereafter, OPT contract). Under the "chosen contract" treatment, firms were allowed to offer either the GE contract or the OPT contract. The "OPT + Choice" condition was the same as the "GE + Choice" condition, except that, under the "imposed contract" treatment (Periods 1 – 6), firms were required to offer either the OPT contract or no contract. The "All-Choice" condition simply used the "chosen contract" treatment described above without the "imposed contract" treatment. That is, firms were allowed to offer either the GE contract or the OPT contract in all twelve periods.

[Figure 1]

4.4. Participants and Procedures

Participants in the experiment acted as firms or employees in the labor market. Four experimental sessions were conducted for each of the three experimental conditions, with five firms and five employees in each session. The data from the four sessions are pooled since there is no significant difference across sessions. Therefore, the final data set contains twenty firms and twenty employees in each of the three experimental conditions. One hundred and twenty MBA students at the University of Pittsburgh participated in the study. The participants have an average of 5.4 years of full-time work experience.

As shown in Figure 1, the procedures for the two "imposed contract" treatments (i.e., Periods 1 – 6 of "GE + Choice" and "OPT + Choice" conditions) were very similar, and the

procedures for the three "chosen contract" treatments (i.e., Periods 7 – 12 of "GE + Choice" and "OPT + Choice" conditions, and all twelve periods of the "All-Choice" condition) were identical. I will first describe the procedures used in the two "imposed contract" treatments, and then describe the procedures for the three "chosen contract" treatments.

4.4.1. Periods 1-6 of "GE+Choice" (Imposed GE Contract)

In each of the four sessions of the "GE + Choice" condition, ten participants were randomly assigned to the role of firm or employee, with five in each role. Firms and employees were seated in the same room, but were divided by a screen. Thus, both firms and employees could see the experimenter and a blackboard in the front of the room, but could not see each other.

The experimental instructions were read aloud to all participants. After the task and payoff functions were explained, participants were told that they would be working under the GE contract,[5] which was then explained in detail (see Section 4.2). Throughout Periods 1 – 6, participants were unaware of the existence of the OPT contract. To facilitate participants' decision making and avoid inaccurate payoff calculations, a spreadsheet showing firm profit and the employee's net payoff under every possible wage-effort combination was provided to all participants. Participants completed several exercises to ensure that they fully understood the contract, their task, and how to read the spreadsheet before proceeding with the experiment.

To ensure anonymity and preclude reputation formation, each firm (employee) was randomly assigned a new firm (employee) number before the labor market started in each of the six periods. The labor market consisted of two stages (see Panel B of Figure 1). In Stage 1, each

[5] Terms like "gift-exchange" and "optimal" were avoided in the instructions because participants' behavior might be biased by the use of such loaded terms. For example, the term "optimal agency contract" might lead some firm participants to believe that they should always offer this contract. In the "imposed contract" treatments, the GE or OPT contract was simply referred to as "the employment contract." In the "chosen contract" treatments, these two contracts were labeled "Contract A" or "Contract B."

firm decided whether to enter the labor market in that period, and firms that entered the labor market made wage offers. (Firms that did not enter the labor market received zero profit for that period.) Each firm wrote down a wage offer on both a personal record sheet and a communication form. Then, the experimenter collected the communication forms, and posted all wage offers and associated firm numbers on the blackboard.

The employee number randomly assigned to each employee determined the order in which s/he had the opportunity to accept a wage offer. (Employee No.1 had the first opportunity to accept a wage offer, and Employee No.2 had the second opportunity, etc.) When each employee's turn came, s/he could either accept a wage offer, in which case the communication form from the corresponding firm was given to him/her, or choose not to accept any offer. Employees who did not accept an offer remained unemployed and received zero payoff for that period. Firm profit and the employee's payoff were known only to the firm and employee that contracted in that period, and were not disclosed to anyone else.

In Stage 2, employees who accepted a wage offer in Stage 1 chose their effort level. Each employee wrote down his/her effort choice on both a personal record sheet and the communication form, and calculated his/her net payoff. Then, the communication form, which now contained both the wage offer and the employee's effort level, was passed back to the firm who hired the employee, and, using the information on the communication form, the firm participant calculated his/her profit on a personal record sheet. Finally, the experimenter collected the personal record sheets from both firms and employees, and the period ended. The procedures for the two stages described above were repeated for each of the six periods.

4.4.2. Periods 1–6 of "OPT+Choice" (Imposed OPT Contract)

Procedures for Periods 1 – 6 of the "OPT + Choice" condition were the same as in Periods 1 – 6 of the "GE + Choice" condition, except that the OPT contract, rather than the GE contract, was imposed (see Panel B of Figure 1). Because the wages were fixed under the OPT contract (i.e., 38 lira if firm profit = 82, and 15 lira otherwise), firms did not need to make a wage offer in Stage 1. The experimenter simply posted on the blackboard the identification numbers of the firms that entered the labor market (all offering the OPT contract), and the employee could either choose a firm to work for or choose not to work for any firm.

4.4.3. Periods 7–12 of "GE+Choice" and "OPT+Choice" (Chosen Contract)

In "GE + Choice" and "OPT + Choice" conditions, participants were informed just before the seventh period that, beginning with Period 7, firms that entered the labor market would have two options: either continue to offer employees the contract that had been offered in previous periods (labeled *Contract A*; i.e., the GE contract in the "GE + Choice" condition or the OPT contract in the "OPT + Choice" condition) or offer an alternative contract (labeled *Contract B*; i.e., the OPT contract in the "GE + Choice" condition or the GE contract in the "OPT + Choice" condition). The structure of the alternative contract was then explained in detail. In other words, in each period beginning with Period 7, firms were allowed to offer either the GE contract or the OPT contract. Except for this change, all other procedures were the same as those for Periods 1 – 6 of "GE + Choice" and "OPT + Choice" conditions.

In each period of Periods 7 – 12, the labor market consisted of the same two stages as in Periods 1 – 6, except that, in Stage 1, firms made a contract choice (see Panel C of Figure 1), and those who chose the GE contract specified their wage. Then, all contract offers were posted on the blackboard, and employees either chose a firm (and its contract) to work for or chose not to work for any firm and remained unemployed.

4.4.4. Periods 1-12 of "All-Choice" (Chosen Contract)

Throughout all twelve periods of the "All-Choice" condition, firms were allowed to offer either the GE contract or the OPT contract. That is, the procedures were identical to those described above for Periods 7 – 12 of "GE + Choice" and "OPT + Choice" conditions (see Panel C of Figure 1).

5. EXPERIMENTAL RESULTS

5.1. Overview of Chapter

This chapter reports the results of the tests of my hypotheses and research questions. Table 1 provides descriptive statistics for all three experimental conditions, divided into Periods 1 – 6 and Periods 7 – 12. For the GE contract, whether imposed or chosen, Table 1 reports average firm profit ("firm profit"), firms' average wage offer ("wage"), employees' average effort level ("effort"), the percentage of effort level 0.1 responses to wage offers higher than 20 lira ("effort 0.1 for wage > 20"), and the percentage of contract rejections ("rejection"). Wage and effort under the GE contract are averaged based on the GE contracts that were accepted by employees because no effort was chosen for a rejected GE contract. Firm profit under the GE contract is averaged based on all GE contracts that firms offered (i.e., both accepted and rejected) to completely reflect the actual profitability of the GE contract. (Recall that a rejected GE contract resulted in zero profit for the firm.) The percentage of effort 0.1 responses to wage offers higher than 20 is the portion of economically rational responses (i.e., responses consistent with the conventional sub-game perfect equilibrium prediction).

[Table 1]

For the OPT contract, whether imposed or chosen, Table 1 reports average firm profit ("firm profit"), the percentage of effort level 1 responses ("effort 1"), the percentage of effort level 0.1 responses ("effort 0.1"), and the percentage of contract rejections ("rejection"). As in the case of GE contract, firm profit under the OPT contract is averaged based on all OPT contracts that firms offered (i.e., both accepted and rejected).

5.2. Tests of H1

H1 predicts that, *ceteris paribus*, the OPT contract will yield higher firm profit than the GE contract. H1 is tested by comparing firm profit for the imposed GE contract (i.e., Periods 1 – 6 of the "GE + Choice" condition) with that for the imposed OPT contract (i.e., Periods 1 – 6 of the "OPT + Choice" condition). In this study, all regressions with within-subject observations are conducted in combination with the Huber-White estimator to control for heteroscedasticity caused by repeated measures. Regressions in which the dependent variable is effort level or wage are conducted using the Tobit model to control for the effect of censored values.

A regression of firm profit on a dummy variable for the type of imposed contract (i.e., OPT vs. GE) shows that firm profit was significantly higher (one-tailed $p < 0.001$, see model (1) in Panel A of Table 2) for the imposed OPT contract (63 lira) than for the imposed GE contract (23 lira). Panel A of Figure 2 shows that this relation held in all periods. That is, firm profit was higher for the imposed OPT contract than for the imposed GE contract in each of the six periods.[6] These results support H1.

[Table 2]

[Figure 2]

Firms' and employees' behavior under the imposed GE contract was consistent with that reported in prior research. That is, as shown in Table 1, firms offered an average wage of 59 lira, and employees chose an average effort level of 0.42, both of which were higher than the conventional sub-game perfect equilibrium prediction (i.e., wage = 20 and effort = 0.1). Moreover, a Tobit regression of effort on wage shows that effort levels were positively associated with wage offers (two-tailed $p = 0.001$), suggesting that there was significant gift exchange between firms and employees. However, despite the fact that firms and employees did

[6] By-period regressions show that this relation was statistically significant in each of the six periods.

exchange gifts under the imposed GE contract, the imposed OPT contract yielded higher firm profit because the majority of the effort level choices (66 percent, see Table 1) under the imposed OPT contract were consistent with the agency theory prediction (i.e., effort level 1).

Note that, as shown in Table 1, under the imposed OPT contract, 21 percent of the effort choices were level 0.1. This is consistent with inequity aversion theory (Fehr and Schmidt 1999), which proposes that some individuals derive disutility from inequitable outcomes, and thus are willing to sacrifice part of their own payoff to make outcomes more equitable. Since effort level 0.1 yields the most "equitable" (i.e., closest to an equal division) outcome available in the experiment (i.e., 15 for the employee and 10.5 for the firm) at the lowest cost to the employee (i.e., 5), inequity-averse employees would be expected to choose effort level 0.1 to reduce payoff disparity.[7]

5.3. Tests of H2-A

H2-A predicts that, when firms offer the OPT contract, firm profit will be lower if the GE contract is also available than if the GE contract is not available. This hypothesis is tested by comparing firm profit for the imposed OPT contract (i.e., Periods 1 – 6 of the "OPT + Choice" condition) with that for the chosen OPT contract (i.e., Periods 1 – 6 of the "All-Choice" condition). As shown in Table 1, firm profit was significantly lower (one-tailed $p < 0.001$, see model (2) in Panel A of Table 2) for the chosen OPT contract (33 lira) than for the imposed OPT contract (63 lira). Panel A of Figure 2 shows that this was true for most periods.[8] Thus, H2-A is supported.

[7] There is no obvious explanation for the small portion (13 percent) of effort choices that fell between 0.1 and 1.
[8] By-period regressions reveal that the chosen OPT contract yielded statistically significantly lower firm profit in Periods 3, 4, 5, and 6. In Periods 1 and 2, firm profit did not significantly differ between the chosen OPT contract and the imposed OPT contract.

Firm profit was lower under the chosen OPT contract than under the imposed OPT contract because there were fewer "economic" (i.e., level 1) effort choices and more "non-economic" (i.e., level 0.1 or rejection) effort choices under the chosen OPT contract (see Table 1). Specifically, the percentage of level 1 choices was lower (Fisher's exact test, one-tailed $p < 0.001$) under the chosen OPT contract (36 percent) than under the imposed OPT contract (66 percent), and the percentage of level 0.1 choices was marginally significantly higher (Fisher's exact test, one-tailed $p = 0.075$) under the chosen OPT contract (32 percent) than under the imposed OPT contract (21 percent). Moreover, employees rejected fewer (Fisher's exact test, one-tailed $p < 0.001$) imposed OPT contract offers (0 percent) than chosen OPT contract offers (32 percent). Overall, the chosen OPT contract was significantly more likely (one-tailed $p < 0.001$) to elicit a "non-economic" effort response than the imposed OPT contract.[9] These results are consistent with the logic underlying H2-A that employees evaluate the intentions underlying firms' contract choices, and react negatively if they perceive the intentions to be selfish.

5.4. Tests of H2-B

H2-B predicts that, when firms offer the GE contract, firm profit will be higher if the OPT contract is also available than if the OPT contract is not available. This hypothesis is tested by comparing firm profit for the imposed GE contract (i.e., Periods 1 – 6 of the "GE + Choice" condition) with that for the chosen GE contract (i.e., Periods 1 – 6 of the "All-Choice" condition). As shown in Table 1, inconsistent with H2-B, firm profit was higher (two-tailed $p = 0.005$, see model (3) in Panel A of Table 2) under the imposed GE contract (23 lira) than under the chosen GE contract (15 lira). This can also be seen in Panel A of Figure 2, which shows that

[9] Tested with a logistic regression of effort response ("non-economic", "economic", and "other effort levels") on the source of the OPT contract (imposed vs. chosen).

firm profit was directionally higher for the imposed GE contract than for the chosen GE contract.[10] Therefore, H2-B is not supported.

It is not entirely surprising that firm profit decreased rather sharply under the OPT contract (H2-A) but did not increase under the GE contract (H2-B) because prior research (Offerman 2002; Hannan 2005) has shown that individuals are more likely to punish unkind behavior than reward kind behavior. The real surprise is that firm profit actually declined under the GE contract. The main reason for this decline is that, controlling for wage, employees chose significantly lower effort (two-tailed $p = 0.001$, see Panel B of Table 2) under the chosen GE contract than under the imposed GE contract. The question is why employees did not reward firms that chose to offer the GE contract.

Table 3 provides the distribution of firms' contract offers in all three experimental conditions. Focusing on the "All-Choice" condition, we see that, in Period 1, 70 percent of the firms offered the GE contract. However, this percentage dropped to 45 percent in Period 2, and 30 percent in Period 3, showing that firms switched to offering the OPT contract very quickly. There appears to be two possible reasons for this switch. The first is that firms realized that the OPT contract is, by design, more favorable to them. This can be seen by examining firms' contract choices in Periods 7 – 12 of the "GE + Choice" condition (see Table 3). Recall that in Periods 1 – 6 of this condition, there was a significant gift-exchange relation between firms and employees. In spite of such a mutually cooperative history, however, once firms were allowed to choose which contract to offer, 80% of the firms offered the OPT contract in Period 7; and 60% in Period 8.

[Table 3]

[10] By-period regressions show that the imposed GE contract yielded statistically significantly higher firm profit in Periods 1 and 4. In each of the other four periods, firm profit was not significantly different between the imposed GE contract and the chosen GE contract.

The second possible reason why firms switched to offering the OPT contract quickly is that firms who offered the GE contract in Period 1 were not rewarded. That is, controlling for wage, employee effort was significantly lower (two-tailed $p = 0.026$), but the percentage of effort 0.1 responses to wage offers higher than 20 was significantly higher (Fisher's exact test, two-tailed $p = 0.03$), in Period 1 under the chosen GE contract than in Period 1 under the imposed GE contract.

Seeing that many firms offered the "self-serving" OPT contract, employees reacted negatively to the OPT contract (as shown in the tests of H2-A). More importantly, it appears that, once employees perceived firms' intentions to be selfish, they punished the firms, and thus the mutual trust between firms and employees necessary to support reciprocity was undermined. Consistent with this interpretation, a Tobit regression of effort on wage shows that, in Periods 1 – 6 of the "All-Choice" condition, there was no significant gift-exchange relation between firms and employees (two-tailed $p = 0.786$). Also consistent with the interpretation that trust was undermined, the percentage of effort 0.1 responses to wage offers higher than 20 (i.e., economically rational responses) was significantly higher (Fisher's exact test, two-tailed $p < 0.001$) in Periods 1 – 6 of the "All-Choice" condition (65 percent) than in Periods 1 – 6 of the "GE + Choice" condition (23 percent).

To summarize the results of H2-A and H2-B, when both GE and OPT contracts were available, employees punished firms that offered the OPT contract, and therefore firm profit under the OPT contract was lower than when it was the only contract available (H2-A). However, employees did not reciprocate under the GE contract, and therefore firm profit under the GE contract was also lower than when it was the only contract available (H2-B). As shown in Panel B of Figure 2, despite the drop in firm profit from the imposed OPT contract (63 lira) to

the chosen OPT contract (33 lira), firm profit was still higher (two-tailed $p = 0.01$, see model (4) in Panel A of Table 2) under the chosen OPT contract (33 lira) than under the chosen GE contract (15 lira).[11] Next, I examine how firm profit under the two contracts changed over time.

5.5. Tests of H3-A

H3-A predicts that firm profit under the OPT contract will decrease as employees gain experience with GE and OPT contracts. This hypothesis is tested by comparing firm profit under the OPT contract for Periods 1 – 6 (i.e., when employees had less experience) with that for Periods 7 – 12 (i.e., when employees had more experience) of the "All-Choice" condition, and by examining changes in firm profit over all twelve periods of the "All-Choice" condition. Panel A of Figure 3 plots firm profit under OPT and GE contracts in all twelve periods of the "All-Choice" condition.

[Figure 3]

In the "All-Choice" condition, firm profit under the OPT contract was not statistically significantly different (one-tailed $p = 0.123$, see model (1) in Panel A of Table 4) between Periods 1 – 6 (33 lira) and Periods 7 – 12 (24 lira). However, as shown in Panel A of Figure 3, firm profit did decline significantly over the entire twelve periods (one-tailed $p = 0.012$, see model (2) of Panel A of Table 4). This decline occurred because the OPT contract was significantly less likely to receive an "economic" effort response (one-tailed $p = 0.036$) across the twelve periods, suggesting that employees reacted more negatively to the OPT contract over time.[12] These results support H3-A.

[Table 4]

[11] Regression of contract type (OPT vs. GE) and the source of contract (imposed vs. chosen) on firm profit reveals a statistically significant interaction effect (two-tailed $p = 0.004$).
[12] Tested with a logistic regression of effort response ("non-economic", "economic", and "other effort levels") on a period variable (12 levels, i.e., Periods 1 – 12).

5.6. Tests of H3-B

H3-B predicts that firm profit under the GE contract will increase as employees gain experience with GE and OPT contracts. This hypothesis is tested by comparing firm profit under the GE contract for Periods 1 – 6 (i.e., when employees had less experience) with that for Periods 7 – 12 (i.e., when employees had more experience) of the "All-Choice" condition, and by examining changes in firm profit over the twelve periods of the "All-Choice" condition.

As shown in Panel A of Figure 3, in the "All-Choice" condition, firm profit under the GE contract did not significantly differ (one-tailed $p = 0.122$, see model (1) in Panel B of Table 4) between Periods 1 – 6 (15 lira) and Periods 7 – 12 (17 lira). Over the entire twelve periods, firm profit under the GE contract did not significantly change (one-tailed $p = 0.139$, see model (2) in Panel B of Table 4) across periods. Therefore, H3-B is not supported.

To investigate why H3-B is not supported, employee behavior under the GE contract in the "All-Choice" condition is examined. Recall that there was no significant gift-exchange relation between firms and employees in Periods 1 – 6. A Tobit regression of effort on wage shows that, in Periods 7 – 12, effort levels were significantly positively related to wage offers (two-tailed $p = 0.075$), indicating that employees did reciprocate under the GE contract in Periods 7 – 12. Furthermore, controlling for wage, employees' effort levels were marginally significantly higher (one-tailed $p = 0.091$) in Periods 7 – 12 than in Periods 1 – 6, and the percentage of effort 0.1 responses to wages higher than 20 dropped from Periods 1 – 6 (65 percent) to Periods 7 – 12 (49 percent). These results suggest that, consistent with the reasoning underlying H3-B, employees appeared to become more reciprocal under the GE contract in Periods 7 – 12 than in Periods 1 – 6.

Despite the slight increase in reciprocity, firm profit did not increase in Periods 7 – 12 because there was an offsetting increase in contract rejections. (Recall that firms earned zero

profit if their contract was rejected.) As explained earlier, the tests of the effort-wage relation reported above are conducted using accepted GE contracts only, but the test of firm profit is conducted using all GE contracts, regardless of whether the contract was accepted or rejected. Although, as shown in Table 1, the rejection percentage for GE contracts was generally very low in all conditions, in the "All-Choice" condition no GE contracts were rejected in Periods 1 – 6, but 6 percent of the GE contracts were rejected in Periods 7 – 12. When the rejected GE contracts are excluded from the analysis, firm profit is higher (one-tailed $p = 0.049$) in Periods 7 – 12 than in Periods 1 – 6, and increases across the twelve periods (one-tailed $p = 0.069$).[13]

5.7. Tests of Research Question (RQ)

RQ investigates whether the OPT contract continues to yield higher firm profit than the GE contract as employees and firms gain experience with these contracts. The tests of H3-A and H3-B showed that, as employees gained experience with GE and OPT contracts, firm profit under the OPT contract declined, and firm profit under the GE contract did not change. I now examine how this pattern affects the relative firm profit across the two contracts.

Recall that, in Periods 1 – 6 of the "All-Choice" condition, firm profit was higher under the OPT contract than under the GE contract. However, as shown in Panel B of Figure 3, as employees gained experience with these contracts in Periods 7 – 12, firm profit was no longer significantly different between the two contracts (two-tailed $p = 0.417$, see model (1) in Panel C of Table 4) between the two contracts.[14] Moreover, as shown in Panel A of Figure 3, firm profit appeared similar across the two contracts beginning with Period 3. Consistent with this observation, by-period regressions of firm profit on contract type shows that the OPT contract

[13] Note that this result is reported only to explain why firm profit did not increase despite increased reciprocity. Both accepted and rejected contracts are included in all other firm profit analyses reported in the paper in order to fully reflect the overall profitability of a particular type of contract.

[14] In the regression of contract type (OPT vs. GE) and experience (less vs. more) on firm profit, the interaction effect is not statistically significant at conventional significance levels (two-tailed $p = 0.125$).

produced significantly higher firm profit than the GE contract only in Periods 1 and 2. That is, over time, the OPT contract was no longer more profitable than the GE contract.

In addition, note that, in Periods 7 – 12 of the "All-Choice" condition, approximately half of the OPT contract offers were rejected (see Table 1). As a result, the standard deviation of firm profit under the OPT contract (34.8) is more than twice higher than that under the GE contract (14.5). In other words, firm profit is more volatile under the OPT contract than under the GE contract.

I also compare the *total* firm profit generated by OPT and GE contracts. In Period 1 – 6 of the "All-Choice" condition, the OPT contract generated a total profit of 1922 (320 per period) for firms that offered this contract, while the GE contract only generated 834 (139 per period; the difference between 320 and 139 is significant at $p = 0.068$, two-tailed). However, in Periods 7 – 12, the total firm profit under the OPT contract dropped to 1121 (187 per period), but the total firm profit under the GE contract increased to 1149 (192 per period; the difference between 187 and 192 is not statistically significant). Consistent with the results of earlier firm profit analyses (which are based on average profit per firm), this result indicates that, over time, firms that offered the OPT contract produced no more wealth than firms that offered the GE contract.

Combining the results reported above for RQ with those for H1 gives us a clearer picture of the change in relative profitability. As shown in Figure 4, firm profit was higher under the OPT contract (63 lira) than under the GE contract (23 lira) when each contract was offered separately with no mention of the other contract (H1). However, when both contracts were available and employees had more experience, firm profit did not significantly differ between the two contracts (24 lira for the OPT contract vs. 17 lira for the GE contract). As these results suggest, the data in Figure 4 yield a significant interaction (two-tailed $p < 0.001$, see model (2) in

Panel C of Table 4) between contract type (OPT vs. GE) and the source of contract (imposed vs. chosen – more experience).

[Figure 4]

5.8. Tests of H3-C

H3-C predicts that, over time, more firms will offer the GE contract. This hypothesis is tested by examining firms' contract choices in the "All-Choice" condition because this condition is most similar to actual labor markets in the field. Figure 5 plots the percentages of GE contracts and OPT contracts in the "All-Choice" condition. As shown in Table 3 and Figure 5, the percentage of GE (OPT) contracts increased (decreased) from 48% (49%) in Periods 1 – 6 to 56% (39%) in Periods 7 – 12 (Fisher's exact test, one-tailed $p = 0.091$). Logistic regressions reveal that firms were marginally significantly more likely to offer the GE contract in Periods 7 – 12 than in Periods 1 – 6 (one-tailed $p = 0.095$, see model (1) in Panel A of Table 5). Over the entire twelve periods, firms were more likely to offer the GE contract in later periods (one-tailed $p = 0.076$, see model (2) in Panel A of Table 5). These results support H3-C.

[Figure 5]

[Table 5]

Further analyses are conducted to examine whether the negative reaction to the OPT contract in previous periods affected firms' contract offers. A regression of the percentage of OPT contracts in period *t* on the percentage of "non-economic" effort responses to OPT contracts in period *t-1* reveals a marginally significant negative relation (one-tailed $p = 0.092$, see model (1) in Panel B of Table 5). Each firm's contract offers over all twelve periods are also examined. Overall, the percentage of a firm's OPT contract offers was negatively related (one-tailed $p = 0.04$, see model (2) in Panel B of Table 5) to the percentage of "non-economic" effort responses

to the OPT contracts the firm offered, controlling for the firm's average profit under the GE contracts it offered.[15] These results suggest that, consistent with the reasoning underlying H3-C, firms were less likely to offer the OPT contract after being punished for doing so.

5.9. Tests of Additional Issues Regarding Employee Experience

To explore the relative profitability of GE and OPT contracts when employees have prior experience with only the OPT contract, I compare firm profit under the two contracts in Periods 7 – 12 of the "OPT + Choice" condition with that in Periods 7 – 12 of the "All-Choice" condition. Recall that firm profit did not significantly differ between the two contracts in Periods 7 – 12 of the "All-Choice" condition. In Periods 7 – 12 of the "OPT + Choice" condition, firm profit was significantly higher under the OPT contract (two-tailed $p < 0.001$, see model (1) in Panel C of Table 5). As shown in Table 1, the reason why firm profit did not differ between the two contracts in Periods 7 – 12 of the "All-Choice" condition but was higher under the OPT contract in Periods 7 – 12 of the "OPT + Choice" condition is that employees' reaction to the OPT contract was less negative in the latter condition. That is, in the "OPT + Choice" condition, employees' experience with only the OPT contract in Periods 1 – 6 appeared to have some carry-over effect on their behavior in Periods 7 – 12. However, despite this carry-over effect, in the "OPT + Choice" condition employees reacted more negatively to the OPT contract over time – the rejections of the OPT contract increased from 0 percent in Periods 1– 6 to 22 percent in Periods 7–12 (see Table 1). As a result, firm profit under the OPT contract significantly decreased (two-tailed $p = 0.023$) from Periods 1 – 6 (63 lira) to Periods 7 – 12 (50 lira).

[15] The firm's average profit under the GE contracts it offered is included as a control variable because it could influence the firm's contract offer decision (i.e., *ceteris paribus*, the more a firm earned under the GE contract, the more willing it might be to offer the GE contract).

When employees had experience with only the GE contract (i.e., in Periods 7 – 12 of the "GE + Choice" condition), firm profit did not significantly differ (two-tailed $p = 0.617$, see model (2) in Panel C of Table 5) between the OPT contract and the GE contract. Note that, in the "GE + Choice" condition, controlling for wage, employees provided significantly more effort (two-tailed $p = 0.048$) in Periods 7 – 12 than in Periods 1 – 6, suggesting that employees became more reciprocal over time. Hence, firm profit under the GE contract significantly increased (two-tailed $p = 0.026$) from 23 lira in Periods 1 – 6 to 29 lira in Periods 7 – 12. This relation holds (two-tailed $p = 0.054$) even if rejected GE contracts are excluded from the analysis.

To summarize the relative profitability of the two contracts across all three types of experience (i.e., in Periods 7 – 12 of the three experimental conditions), firm profit was higher under the OPT contract only when employees' previous experience was exclusively with the OPT contract, and was not significantly different between the two contracts when employees had experience either with both contracts or with only the GE contract.

6. CONCLUSION AND DISCUSSION

6.1. Overview of Chapter

Section 6.2 of this chapter summarizes the results of my experiments. Section 6.3 revisits the contributions of this dissertation to the research literature and management control practice initially discussed in Chapter 2. Section 6.4 discusses the limitations of this dissertation and proposes potential avenues for future research.

6.2. Summary of Results

This study uses experimental labor markets to compare firm profit under two compensation contracts, i.e., an optimal agency contract versus a theoretically sub-optimal contract that allows firms and employees to exchange gifts. I investigate how employees' reaction to these two contracts changes in different market settings where either only one or both of the two contracts are available, and explore how such changes affect the relative profitability of the two contracts as well as firms' decisions regarding which contract to offer to employees. Standard agency theory predicts that the optimal agency contract will always yield higher firm profit than the sub-optimal gift-exchange contract because the optimal agency contract incentive-compatibly induces employees to choose the effort level that maximizes firm profit. This prediction was supported in markets where only one of these two contracts was offered (with no mention of the other contract) and thus firms' intentions appeared to be neutral or irrelevant. In such markets, employees facing the optimal agency contract mostly chose the effort level predicted by agency theory. This produced higher firm profit under the optimal agency contract than under the gift-exchange contract, despite the fact that firms and employees did exchange gifts under the gift-exchange contract.

However, in a market where both contracts were available and firms decided which contract to offer, employees' reaction to the optimal agency contract was considerably more negative, i.e., many employees punished firms that offered the optimal agency contract either by accepting the contract, but then choosing low effort, or by simply rejecting the contract. Therefore, firm profit under the optimal agency contract was lower than when it was the only contract available. More importantly, as experience with the two contracts increased, firm profit under the optimal agency contract declined further because employees reacted even more negatively to it, while firm profit under the gift-exchange contract did not change. Consequently, over time, firm profit did not significantly differ between the optimal agency contract and the gift-exchange contract. Finally, as firms experienced employees' negative reaction to the optimal agency contract over time, they were more likely to offer the gift-exchange contract.

Results also show that, when employees had prior experience with either one or both of the two contracts, the relative profitability of these two contracts depended on the nature of employees' experience. There was no significant difference in firm profit under the optimal agency contract and the gift-exchange contract when employees had experience either with both contracts or with only the gift-exchange contract. The only case in which firm profit was higher under the optimal agency contract was when employees' experience was exclusively with the optimal agency contract.

6.3. Contributions

This dissertation provides a direct experimental test of the effectiveness of a theoretically optimal agency contract in eliciting employee effort and maximizing firm profit. Results show that the effectiveness of the optimal agency contract is affected by factors outside

standard agency theory, and suggest that such factors may need to be considered in incentive contracting research and management control practice. For example, my experimental results show that, among all the labor markets examined in this study, firm profit is the highest in the market where only the optimal agency contract is available. This suggests that, in industries where all firms offer the same type of employment contract, firms may be better off implementing a contract similar to the optimal agency contract. However, my results also show that in markets where both the optimal agency contract and the gift-exchange contract are available, employees react negatively to the optimal agency contract, and firm profit does not significantly differ between the two contracts. Therefore, in industries where different firms offer different types of employment contracts, firms may need to consider how employees might react to each type of contract and, in turn, how such reaction would affect firm profit. Focusing only on the economic aspects of employment contracts while ignoring their non-economic behavioral consequences may lead to decisions that reduce firms' profitability.

My research also contributes to the accounting literature on the effect of incentives on employee effort and performance. Prior incentive research has shown that certain environmental and behavioral variables influence the effort-eliciting power of incentive contracts. This dissertation adds to that research by showing that employees' perceptions about the intentions underlying firms' contract offers may have an important impact on employees' effort choices and, thereby, on firm profit.

Finally, this study adds to the growing body of research on the effect of social norms on employee behavior. Specifically, an optimal agency contract is used as a benchmark against which to compare the economic implications of a non-economic social norm – gift exchange. My results show that a theoretically sub-optimal contract that induces gift exchange between

firms and employees can produce about the same level of firm profit as the optimal agency contract, thereby offering a possible explanation for why what appear to be sub-optimal contracts are used by firms in practice.

6.4. Limitations and Future Research

Some limitations of this study could affect the generalizability of the findings. First, to simplify the research design, I examined only two types of contracts. Bonner et al. (2000) find that contract type influences the effect of financial incentives on effort. For example, a quota-based scheme (i.e., employees receive a flat wage until a budgeted output level is reached, and receive a bonus for the output in excess of the budget) sets up an explicit challenging goal for employees, and thus has greater motivating effect than compensation schemes that do not involve such a goal. Therefore, if more contracts were available in the market, the differences – both financial and behavioral – in contract scheme might interact with perceived intentions to affect employees' behavior. Future research could examine whether employee behavior differs in the presence of other types of contracts.

Second, this study used a repeated one-shot experimental design in order to preclude reputation effects. However, in real organizations, firms and employees often have an on-going relationship over multiple periods. As a result, firms may be more likely to offer a gift-exchange contract in order to build an unselfish reputation, and employees may be more reciprocal under the gift-exchange contract. That is, with reputation effects, firm profit could be higher under the gift-exchange contract than was observed in this study. Future research could explore this issue in a multi-period setting with fixed firm-employee pairings.

Third, when the optimal agency contract was intentionally chosen by the firm, employees' negative reaction to it is consistent with my prediction that employees will punish

the firm if they perceive the firm's intention to be selfish. However, in my experiments, there was no direct measure for employees' perceptions about firms' intentions, and this makes it difficult to completely rule out alternative explanations. For example, employees might react negatively to the optimal agency contract because they felt they were treated unfairly when comparing their payoff with the payoffs of the employees who were offered a gift-exchange contract. Further research is needed to more directly test whether employees' negative reaction to the optimal agency contract is driven primarily by their perceptions about the firm's intentions.

Fourth, one might wonder whether my experimental result that firm profit does not significantly differ between the optimal agency contract and the gift-exchange contract is driven by the specific parameters used in this study. All but one (see Section 4.2) of the parameters used in my experiments were the same as those used in previous gift-exchange studies. In selecting those parameters, prior researchers attempted to reduce or eliminate possible alternative explanation for their results. For example, the firm profit function was set as $G = (q - w)e$, rather than $G = qe - w$, to rule out the possibility of firms incurring a loss, which could have affected firms' behavior because of individuals' loss aversion. Fehr and Gachter (1998) and Fehr et al. (1998) compared the patterns of behavior under the gift-exchange contract across these two types of firm profit functions, and found that they were very similar. Because it is possible for firm profit to be negative when $G = qe - w$, but impossible when $G = (q - e)w$, technically the form of firm profit function might influence the profitability of the gift-exchange contract. However, this issue is less of a concern in my study because there is anecdotal evidence that the gift-exchange contract is offered by real firms in environments similar to the experimental setting used in my study (see Section 3.5.1), and therefore it is unlikely that my

results depend on the specific profit function used in my study. Nevertheless, further research is needed to systematically explore whether and how the results of this study might change with changes in the experimental parameters.

Several other issues arising from this study also warrant further research. For example, future research could investigate the behavior of firms and employees in a different information environment where the employee's effort choice cannot be inferred with certainty by the firm from the level of profit and therefore the forcing contract is no longer applicable. Also, it would be useful to explore whether different levels of the supply and demand of labor in the market would influence employees' effort choices and firms' contract offers.

Despite the limitations discussed above, I believe my dissertation provides useful insights into how non-economic factors that play no role in agency theory can influence the effectiveness of optimal agency contracts and how such non-economic factors could be incorporated into management control systems to enhance firm efficiency. However, my study is only the first step toward an in-depth investigation of these topics. As a next step, I am planning a set of follow-up studies that address several important issues that were not explored in this dissertation, some of which were discussed above.

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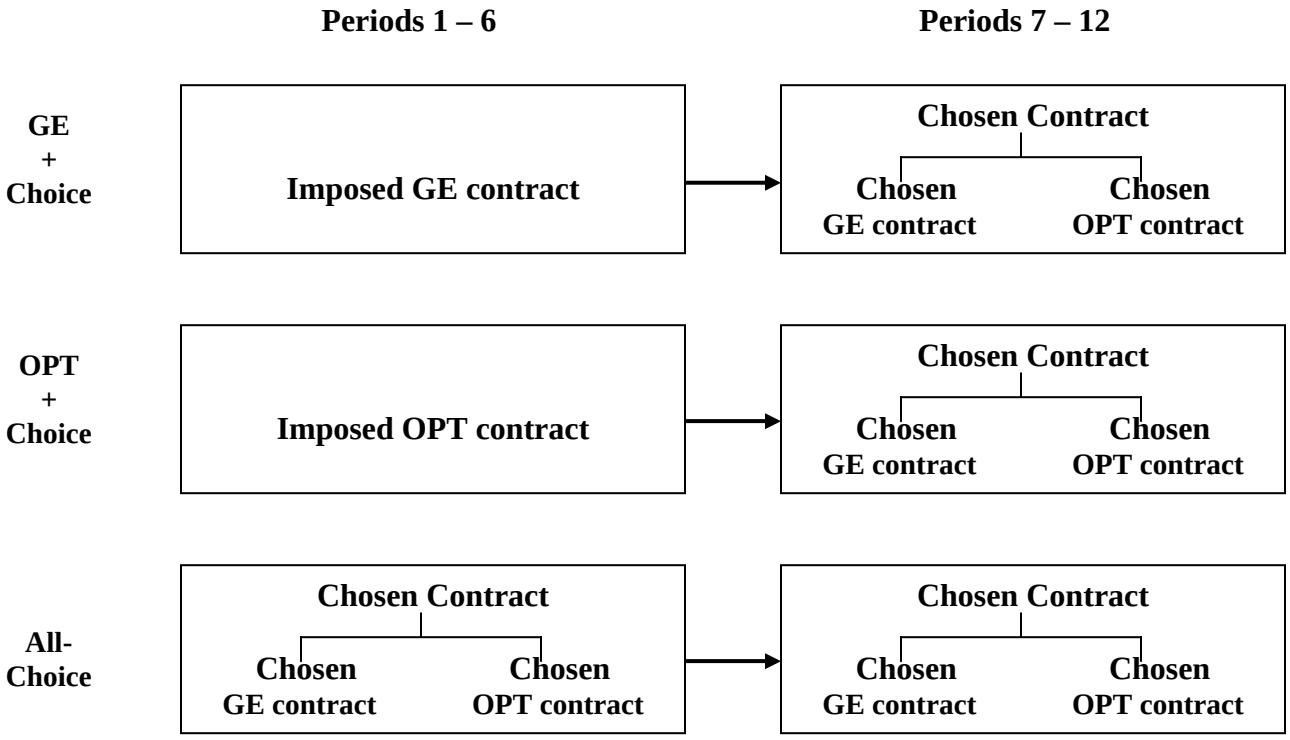
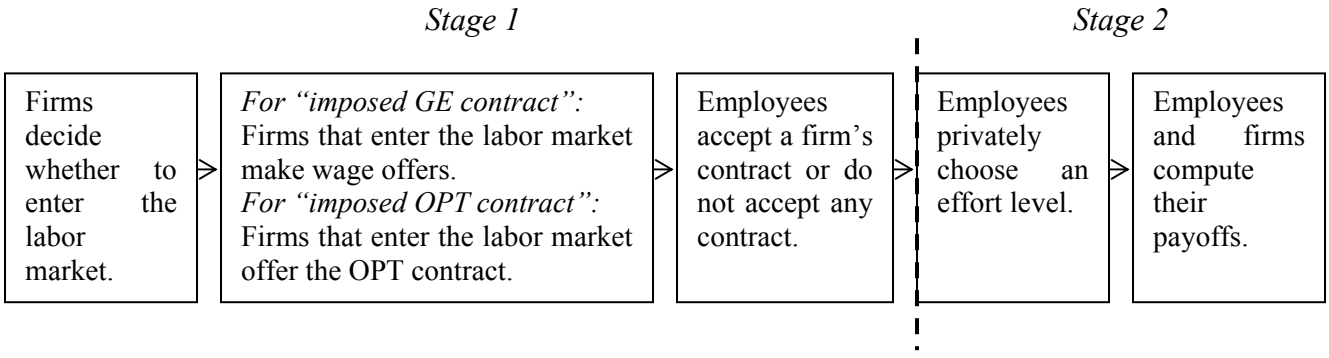
Figure 1: Experimental design and procedures

Panel A: experimental conditions



Panel B: Timeline of experimental procedures for "imposed contract" treatments:



Panel C: Timeline of experimental procedures for "chosen contract" treatments:

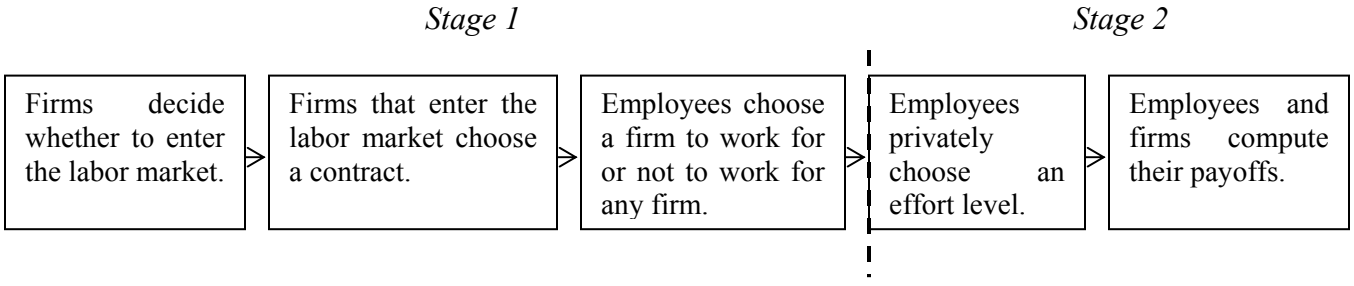
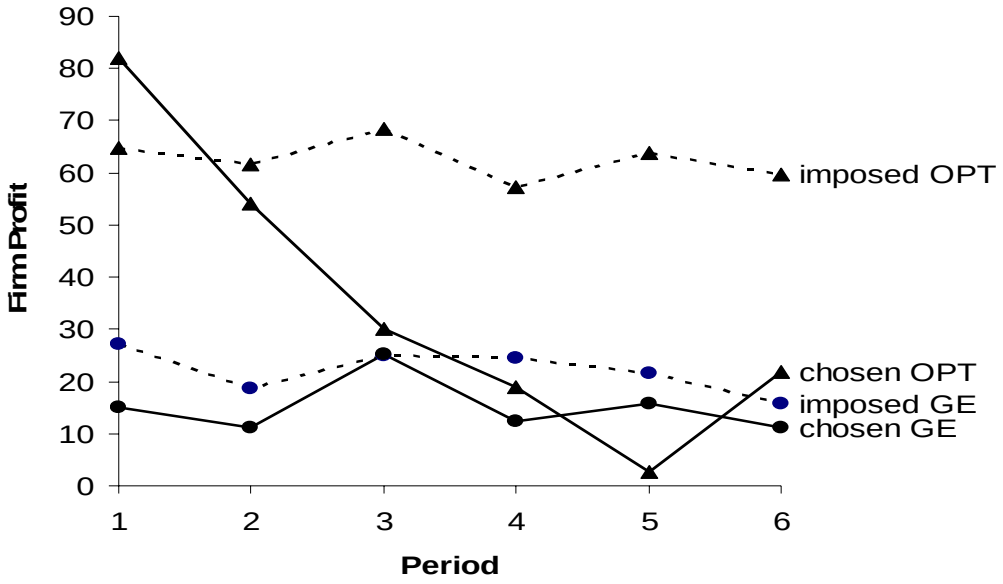
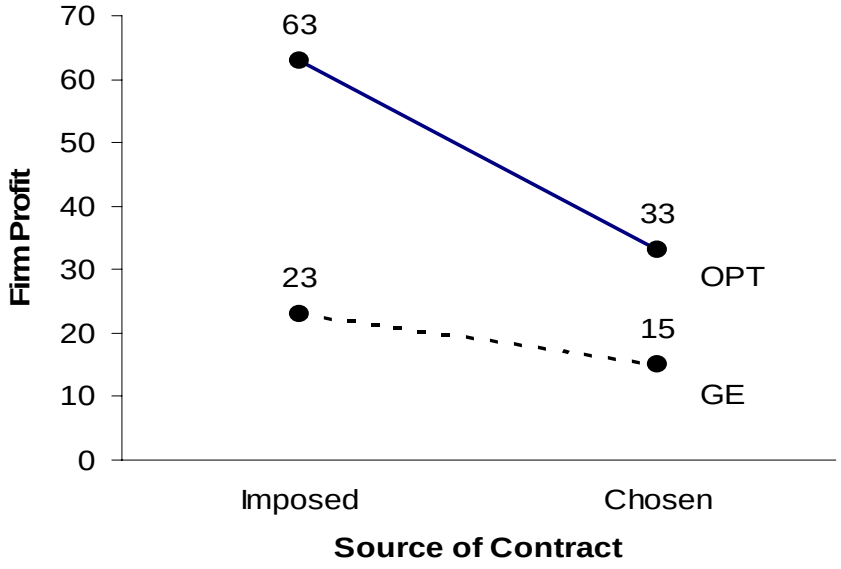


Figure 2: Firm profit comparisons for H1, H2-A, and H2-B

Panel A: Average firm profit under GE and OPT contracts in Periods 1 – 6 of the three experimental conditions



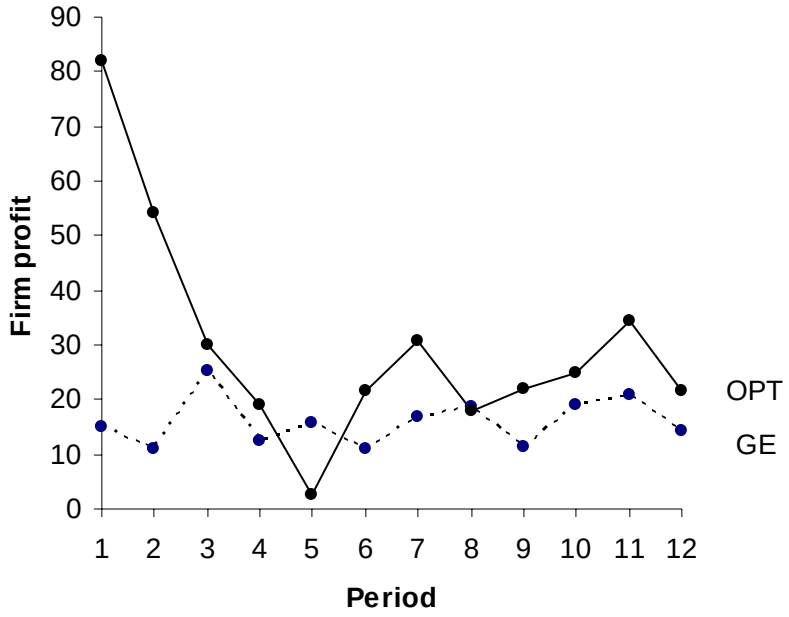
Panel B: Average firm profit in Periods 1 – 6 for imposed and chosen contracts by contract type



Notes:
Imposed GE = the GE contract in Periods 1 – 6 of the "GE + Choice" condition.
Chosen GE = the GE contract in Periods 1 – 6 of the "All-Choice" condition.
Imposed OPT = the OPT contract in Periods 1 – 6 of the "OPT + Choice" condition.
Chosen OPT = the OPT contract in Periods 1 – 6 of the "All-Choice" condition.

Figure 3: Firm profit under GE and OPT contracts in the "All-Choice" condition

Panel A: Average firm profit under GE and OPT contracts in all twelve periods



Panel B: Average firm profit in Periods 1-6 (i.e. less experience) versus Periods 7-12 (i.e., more experience) by contract type

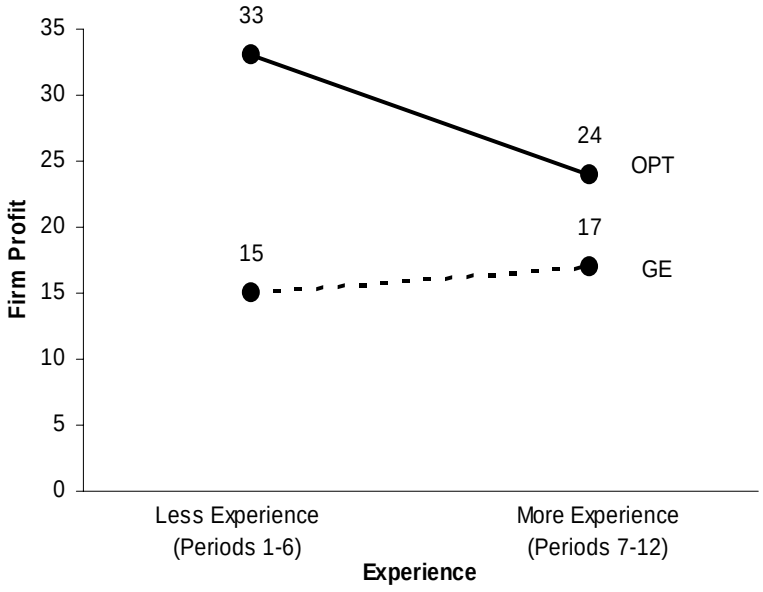
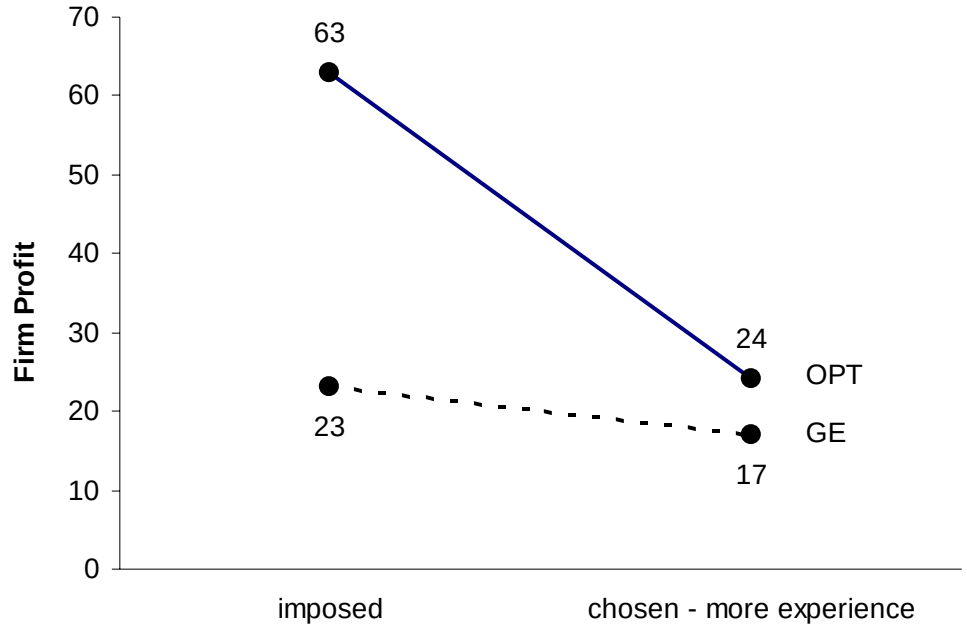


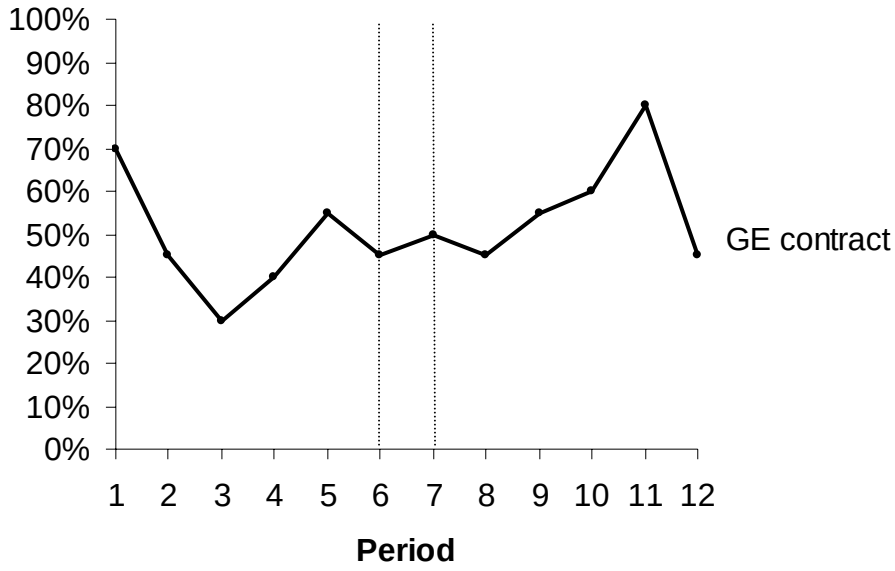
Figure 4: Firm profit comparison between imposed contracts and chosen contracts (with experienced employees)



Notes:
Imposed GE = the GE contract in Periods 1 – 6 of the "GE + Choice" condition.
Imposed OPT = the OPT contract in Periods 1 – 6 of the "OPT + Choice" condition.
Chosen – more experience = OPT and GE contracts in Periods 7 – 12 of the "All-Choice" condition.

Figure 5: The percentages of GE and OPT contract offers in the "All-Choice" condition

Panel A: The percentage of GE contract offers in all twelve periods



Panel B: The percentage of OPT contract offers in all twelve periods

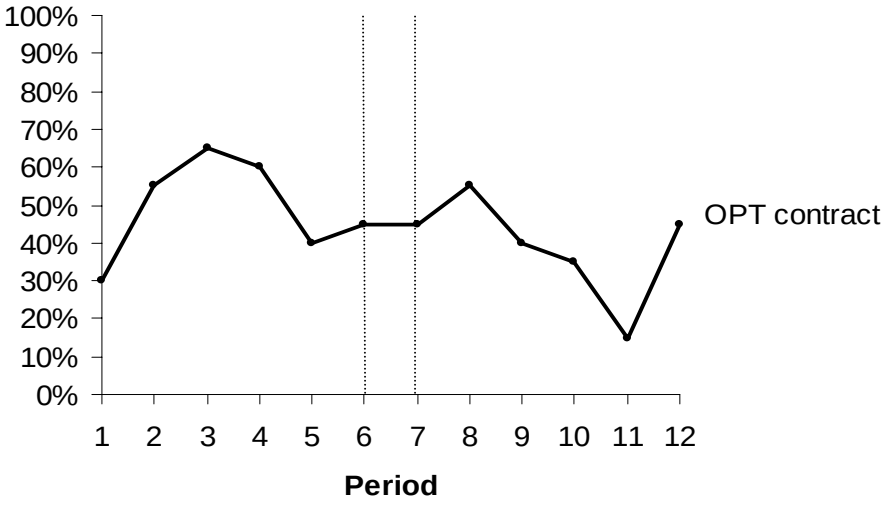


Table 1: Descriptive statistics for the three experimental conditions

Condition	**Periods 1 – 6**						**Periods 7 – 12**					
	Imposed GE contract (N=114)						Chosen GE contract (N=46)			Chosen OPT contract (N=72)		
GE	**firm profit:**	**23**					**firm profit:**	**29**		**firm profit:**	**33**	
+	wage:	59					wage:	57		effort 1:	32%	
Choice	effort:	0.42					effort:	0.48		effort 0.1:	32%	
	effort 0.1 for wage >20:	23%					effort 0.1 for wage >20:	20%		rejection:	22%	
	rejection:	3%					rejection:	0%				
	Imposed OPT contract (N=119)						Chosen GE contract (N=46)			Chosen OPT contract (N=73)		
OPT	**firm profit:**	**63**					**firm profit:**	**17**		**firm profit:**	**50**	
+	effort 1:	66%					wage:	49		effort 1:	58%	
Choice	effort 0.1:	21%					effort:	0.27		effort 0.1:	18%	
	rejection:	0%					effort 0.1 for wage >20:	54%		rejection:	22%	
							rejection:	2%				
	Chosen GE contract			Chosen OPT contract								
	(N=57)			(N=59)			Chosen GE contract (N=67)			Chosen OPT contract (N=47)		
All-	**firm profit:**	**15**		**firm profit**	**33**		**firm profit:**	**17**		**firm profit:**	**24**	
Choice	wage:	46		effort 1:	36%		wage:	36		effort 1:	26%	
	effort:	0.21		effort 0.1:	32%		effort:	0.23		effort 0.1:	23%	
	effort 0.1 for wage >20:	65%		rejection:	32%		effort 0.1 for wage >20:	49%		rejection:	49%	
	rejection:	0%					rejection:	6%				

Notes: For GE contract:
Firm profit = mean firm profit for all GE contracts;
Wage = mean wage offer for accepted GE contracts;
Effort = mean effort level for accepted GE contracts;
Effort 0.1 for wage > 20 = the percentage of effort level 0.1 responses to accepted GE contracts for which the wage offer is higher than 20 lira;
Rejection = the percentage of rejected GE contracts.

For OPT contract:
Firm profit = mean firm profit for all OPT contracts;
Effort 1 = the percentage of effort level 1 for accepted OPT contracts;
Effort 0.1 = the percentage of effort level 0.1 for accepted OPT contracts;
Rejection = the percentage of rejected OPT contracts.

Table 2: Tests of H1, H2-A, and H2-B

Panel A:

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) firm profit = α + β [imposed contract] + ε	Intercept	-16.436	5.212	0.003
	Imposed contract	39.768	3.924	0.000[a]
(2) firm profit = α + β [source of OPT] + ε	Intercept	124.167	14.855	0.000
	Source of OPT	-30.533	6.387	0.000[a]
(3) firm profit = α + β [source of GE] + ε	Intercept	27.679	3.168	0.000
	Source of GE	-4.347	1.475	0.005[b]
(4) firm profit = α + β [contract type] + ε in Periods 1–6 of the "All-Choice" condition	Intercept	14.639	2.216	0.000
	Contract type	17.929	6.259	0.01[b]

Panel B: Tobit regression: effort = $\alpha + \beta_1$ [source of GE] + β_2 wage + ε

Variables	Coeff.	S.E.	*p*-value
Intercept	0.248	0.162	0.127
Source of GE	-0.181	0.056	0.001[b]
Wage	0.005	0.002	0.006

Notes: 1. *p*-value: *a* = one-tailed; *b* = two-tailed.
2. Imposed contract = 0 for the imposed GE contract (i.e., the GE contract in Periods 1 – 6 of the "GE + Choice" condition), and 1 for the imposed OPT contract (i.e., the OPT contract in Periods 1 – 6 of the "OPT + Choice" condition").
3. Source of OPT = 0 for the imposed OPT contract (i.e., the OPT contract in Periods 1 – 6 of the "OPT + Choice" condition"), and 1 for the chosen OPT contract (i.e., the OPT contract in Periods 1 – 6 of the "All-Choice" condition").
4. Source of GE = 0 for the imposed GE contract (i.e., the GE contract in Periods 1 – 6 of the "GE + Choice" condition), and 1 for the chosen GE contract (i.e., the GE contract in Periods 1 – 6 of the "All-Choice" condition).
5. Contract type = 0 for the GE contract and 1 for the OPT contract.
6. The Huber-White estimator is used in the regressions to control for heteroscedasticity caused by within-subject repeated measures

Table 3: Firms' contract choices in the three experimental conditions

Condition	Contract	Period													
		1	2	3	4	5	6	***Phase 1***	7	8	9	10	11	12	***Phase 2***
GE + Choice	GE	95%	100%	90%	85%	100%	100%	**95%**	20%	40%	35%	55%	40%	40%	**38%**
	OPT	0%	0%	0%	0%	0%	0%	**0%**	80%	60%	65%	45%	60%	50%	**60%**
	NE	5%	0%	10%	15%	0%	0%	**5%**	0%	0%	0%	0%	0%	10%	**2%**
OPT + Choice	GE	0%	0%	0%	0%	0%	0%	**0%**	55%	35%	30%	30%	40%	40%	**38%**
	OPT	100%	100%	100%	100%	95%	100%	**99%**	45%	65%	70%	70%	60%	55%	**61%**
	NE	0%	0%	0%	0%	5%	0%	**1%**	0%	0%	0%	0%	0%	5%	**1%**
All-Choice	GE	70%	45%	30%	40%	55%	45%	**48%**	50%	45%	55%	60%	80%	45%	**56%**
	OPT	30%	55%	65%	60%	40%	45%	**49%**	45%	55%	40%	35%	15%	45%	**39%**
	NE	0%	0%	5%	0%	5%	10%	**3%**	5%	0%	5%	5%	5%	10%	**5%**

Notes: 1. Entry is the percentage of a particular contract in total contract choices.
2. Phase 1 = Periods 1 – 6; Phase 2 = Periods 7 – 12.
3. NE = the firm chose not to enter the labor market.

Table 4: Tests of H3-A, H3-B, and RQ

Panel A: the OPT contract in the "All-Choice" condition

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) firm profit = α + β phase + ε	Intercept	32.568	5.493	0.000
	Phase	-8.727	7.295	0.123[a]
(2) firm profit = α + β period + ε	Intercept	45.331	6.861	0.000
	Period	-2.742	1.118	0.012[a]

Panel B: the GE contract in the "All-Choice" condition

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) firm profit = α + β phase + ε	Intercept	14.639	2.216	0.000
	Phase	2.514	2.091	0.122[a]
(2) firm profit = α + β period + ε	Intercept	14.016	2.8	0.000
	Period	0.294	0.262	0.139[a]

Panel C:

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) firm profit = α + β [contract type] + ε in Periods 7 – 12 of the "All-Choice" condition	Intercept	17.152	2.239	0.000
	Contract type	6.688	8.066	0.417[b]
(2) firm profit = $\alpha + \beta_1$ [contract type] + β_2 [Source of contract] + β_3 ([contract type]× [Source of contract]) + ε	Intercept	23.332	1.977	0.000
	Contract type (C)	39.768	3.916	0.000
	Source of contract (S)	-6.18	2.958	0.041
	C × S	-33.08	8.841	0.000[b]

Notes: 1. *p*-value: *a* = one-tailed; *b* = two-tailed.
2. Phase = 0 for Periods 1 – 6, and 1 for Periods 7 – 12.
3. Period = 1 – 12 for Periods 1 – 12.
4. Effort response = 0 for "non-economic" effort choices (i.e. rejection or level 0.1), 1 for effort levels higher than 0.1 but lower than 1, and 2 for "economic" effort choices (i.e., level 1).
5. Contract type = 0 for the GE contract and 1 for the OPT contract.
6. Source of contract = 0 for imposed OPT (i.e., the OPT contract in Periods 1 – 6 of the "OPT + Choice" condition) and GE (i.e., the GE contract in Periods 1 – 6 of the "GE + Choice" condition) contracts, and 1 for chosen OPT and GE contracts in Periods 7 – 12 of the "All-Choice" condition.
7. The Huber-White estimator is used in the regressions to control for heteroscedasticity caused by within-subject repeated measures.

Table 5: Tests of H3-C and additional issues regarding employee experience

Panel A: firms' contract choices in the "All-Choice" condition

Logistic Model	Variables	Coeff.	S. E.	*p*-value
(1) Contract type = $\alpha + \beta$ phase + ε	Intercept	0.034	0.176	0.845
	Phase	-0.389	0.297	0.095[a]
(2) Contract type = $\alpha + \beta$ period + ε	Intercept	0.208	0.261	0.426
	Period	-0.057	0.04	0.076[a]

Panel B: firms' OPT contract offers in the "All-Choice" condition

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) $(\text{OPT-per})_t = \alpha + \beta [(\text{nonecon-per})_{t-1}] + \varepsilon$	Intercept	0.601	0.109	0.000
	Nonecon-per	-0.224	0.155	0.092[a]
(2) OPT-firm = $\alpha + \beta_1$ [nonecon-firm] + β_2 [GE-profit] + ε	Intercept	0.97	0.215	0.000
	Nonecon-firm	-0.449	0.241	0.04[a]
	GE-profit	-0.014	0.006	0.016

Panel C:

OLS Model	Variables	Coeff.	S. E.	*p*-value
(1) firm profit = $\alpha + \beta$ [contract type] + ε in Periods 7 – 12 of the "OPT + Choice" condition	Intercept	17.339	2.801	0.000
	Contract type	33.2	7.632	0.000[b]
(2) firm profit = $\alpha + \beta$ [contract type] + ε in Periods 7 – 12 of the "GE + Choice" condition	Intercept	28.598	2.859	0.000
	Contract type	4.159	8.191	0.617[b]

Notes: 1. *p*-value: *a* = one-tailed; *b* = two-tailed.
2. Contract type = 0 for the GE contract, and 1 for the OPT contract.
3. Phase = 0 for Periods 1-6 and 1 for Periods 7-12.
4. Period = 1 – 12 for Periods 1 – 12.
5. $(\text{OPT-per})_t$ = the percentage of OPT contracts offered in period *t*. ($t \in [2, 3, \ldots, 12]$)
6. $(\text{nonecon-per})_{t-1}$ = the percentage of non-economic effort responses (i.e., level 0.1 or rejection) to OPT contracts in period *t-1*.
7. OPT-firm = the percentage of OPT contracts offered by a firm in all twelve periods.
8. nonecon-firm = the percentage of non-economic effort responses (i.e., level 0.1 or rejection) to OPT contracts offered by a firm in all twelve periods.
9. GE-profit = a firm's average profit under the GE contracts offered by this firm in all twelve periods.
10. The Huber-White estimator is used in the logistic regressions to control for heteroscedasticity caused by within-subject repeated measures