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An Experimental Investigation of the Effects of Contract Frame and Discretion in Performance Evaluation on Effort

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AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF CONTRACT FRAME AND DISCRETION IN PERFORMANCE EVALUATION ON EFFORT

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Business and Economics
at the University of Kentucky

By
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ABSTRACT OF DISSERTATION

AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF CONTRACT FRAME AND DISCRETION IN PERFORMANCE EVALUATION ON EFFORT

The design of incentive compensation plans is critical to a company's success. This study develops and validates a theoretical model to examine how incentive contract framing affects effort. This study uses an experiment to observe the effect of the manipulation of incentive contract frame and the presence or absence of principal discretion in performance evaluation on effort. The results of the experiment show that when principal discretion in performance evaluation is absent, penalty contracts induce greater effort than bonus contracts. The results of the experiment also demonstrate that the interaction of principal discretion in performance evaluation and contract frame influences how agents view the perceived fairness of their incentive contract. Specifically, principal discretion in performance evaluation increases perceived fairness under a penalty contract but not under a bonus contract. This study also extends prior research by documenting that perceived fairness explains how incentive contract frame affects trust and effort.

KEYWORDS: Contract Framing, Principal Discretion, Performance Evaluation, Bonus versus Penalty, Perceived Fairness

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May 1, 2016
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AN EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF CONTRACT FRAME AND DISCRETION IN PERFORMANCE EVALUATION ON EFFORT

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1.1 Chapter Overview

The first chapter is structured as follows: Section 1.2 discusses incentive contract framing and Section 1.3 introduces principal discretion in agent performance evaluation. Section 1.4 describes this dissertation's contributions.

1.2 Incentive Contract Framing

The design of incentive compensation plans is critical to a company's success. An incentive contract can be framed as either a bonus that rewards agents for achieving certain performance goals or as a penalty that decreases compensation if agents fail to meet performance goals.[1] The effects of bonuses and penalties on managers' effort remains unclear because prior research has found mixed results.

Conventional economic theory suggests that when two contracts are economically equivalent, agents should be indifferent when choosing between them. "Economically equivalent" means the monetary payoff is the same whether the firm frames the contract as a bonus or a penalty. For example, a bonus contract that pays a salary of $10,000 and a bonus of $1,000 if the performance target is reached is equivalent to a penalty contract that pays a salary of $11,000 and a penalty of $1,000 if the performance target is not achieved. The two contracts are economically equivalent because both contracts pay

[1] Although bonus contracts are more common than penalty contracts, interest in and use of contracts that include elements of both penalties and bonuses or "bonus-malus" contracts" is becoming more common. The implementation of bonus-malus contracts is increasing as a result of "clawback provisions" that target excessive CEO compensation. For example, UBS has used a bonus-malus structure for all executive cash awards since 2009 (Christ et al. 2012).

$11,000 if the performance target is attained and $10,000 if the performance target is not achieved.

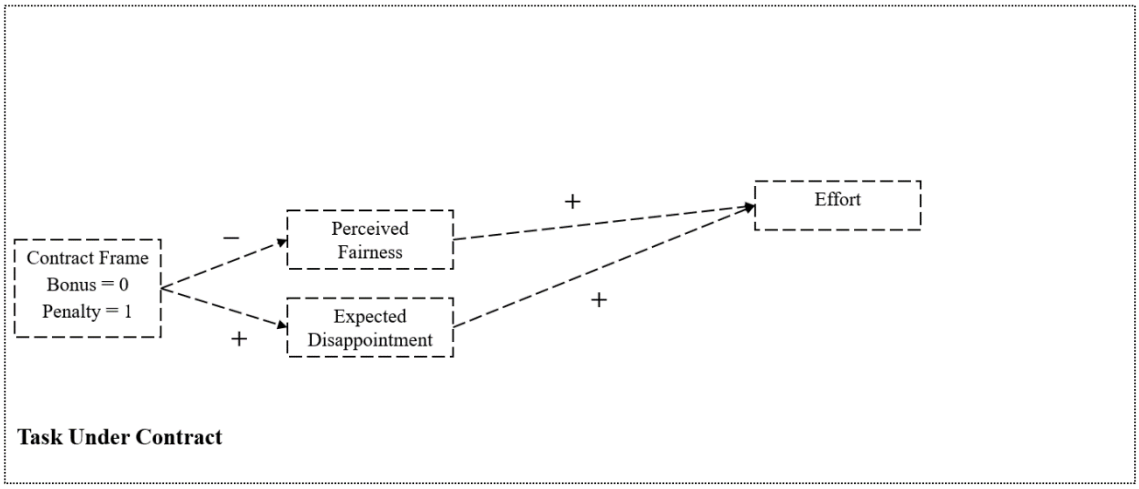
Research shows that the framing of incentive contracts can change agents' preferences. Luft (1994) studied the role of decision-framing on preferences for bonus and penalty contracts and found that agents preferred bonus contracts to economically equivalent penalty contracts. Luft (1994) suggests that agents preferred bonus contracts due to loss aversion, which refers to the idea that people tend to be more sensitive to losses than gains (Kahneman and Tversky 1979). Agent preference for bonus contracts is also consistent with what is observed in practice where bonus contracts are more prevalent than penalty contracts (Christ et al. 2012; Frederickson and Waller 2005; Hannan et al. 2005; Luft 1994).

In a contract setting where the contract specifies the payout for each possible outcome, penalty contracts induce more effort than bonus contracts (Hannan et al. 2005). Hannan et al. (2005) found that even though agents preferred bonus contracts to penalty contracts, agent effort was higher under a penalty contract than an economically equivalent bonus contract. Using the same explanation as Luft (1994), Hannan et al. (2005) concludes that loss aversion caused agents to expend more effort under the penalty contract than under the bonus contract. Agents were more averse to paying a penalty than not receiving a bonus so they chose a higher effort level under the penalty contract to avoid paying the penalty (Hannan et al. 2005).

Hannan et al. (2005) call for additional research to understand the full range of costs and benefits associated with each type of contract. Because agent effort was higher

under penalty contracts, offering a bonus contract gives up the benefit of this increased effort. Therefore, it is no longer clear that offering a bonus contract maximizes firm profit (Hannan et al. 2005). A more comprehensive explanation is also needed to better understand the conditions under which firms should use bonus contracts versus penalty contracts. The figure below illustrates the Hannan et al. (2005) model:

Figure 1: Hannan et al. (2005) Model

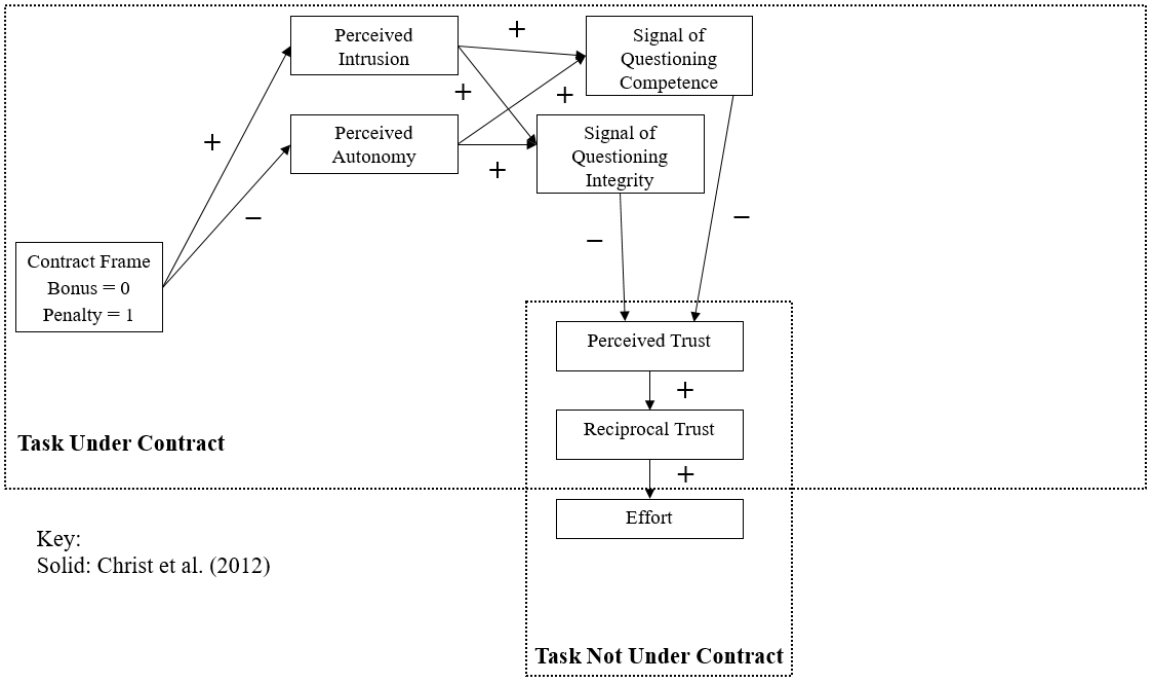


Key:
Dashed: Hannan et al. (2005)

Christ et al. (2012) examined the effect of contract framing on effort in a contract setting with principal discretion. A contract setting with principal discretion allows principals to use their discretion to determine agent pay (Christ et al. 2012). Christ et al. (2012) found that when contracts included principal discretion, agent effort on a subsequent task that was not under a contract was greater under bonus contracts relative to penalty contracts because bonus contracts induced a more trusting environment.

The figure below illustrates the Christ et al. (2012) model:

Figure 2: Christ et al. (2012) Model



It is unclear whether and how the Hannan et al. (2005) and the Christ et al. (2012) models fit together. Christ et al. (2012) call for additional research to analyze the various mechanisms through which contract framing may influence agent behavior. Christ et al. (2012) suggest that future research examine when the effect of one mechanism might outweigh the others and when managers should implement a bonus versus a penalty contract. Understanding how the models fit together will not only improve principals' use of contract framing but will also help principals to maximize firm profit (Hannan et al. 2005).

1.3 Principal Discretion in Agent Performance Evaluation

Prior literature on contract framing assumes a contract setting without principal discretion. A contract setting without principal discretion details the duties of principals to provide compensation for each potential future outcome (Christ et al. 2012). In practice, however, most contracts allow principals to use their discretion to pay agents. Incentive contracts with principal discretion are more common than incentive contracts without principal discretion (Prendergast 1999; Bol 2008).

Principal discretion in agent performance evaluation means that principals use subjective judgment to assess agent performance. Principal discretion may be based on personal impressions, feelings and options, rather than on external facts (Bol 2008). By definition, the correctness of principal discretion cannot be determined by a third party.

Principal discretion in agent performance evaluation is commonly introduced with the use of *ex post* discretional adjustments based on factors other than the performance measures specified *ex ante* (Gibbs et al. 2004; Bol 2008). Other ways of introducing principal discretion are by using subjective performance measures and by allowing for *ex post* flexibility in the weighting of objective performance measures (Bol 2008). Principal discretion in agent performance evaluation falls onto a continuum. Principals who allow for *ex post* adjustments to objective performance measures may use less discretion than principals who combine all three types of discretion. The type and amount of principal discretion depends on the contracting problem (Hoppe and Moers 2011).

Most research on principal discretion is based on agency theory. The main purpose of principal-agent models is to describe the "optimal contract" (Bol 2008). In

most situations, agents have better information than principals because complete observation of agent actions is not possible. To address this problem, principals may link agent pay to performance. However, agents must bear risk due to imperfect performance measures. The optimal contract balances the need to motivate unobservable agent effort with the need to minimize the risk to agents (Bol 2008).

Principal discretion compensates for imperfect performance measures such as objective performance measures, which can be noisy. Objective measures do not account for all dimensions of agent effort and can be contaminated by uncontrollable events (Bol 2008). The use of discretion improves contracting (Homstron and Milgrom 1991; Budde 2007) and allows principals to use all relevant information known at the time of the agent performance evaluation instead of the limited information available from objective measures.

However, the costs of principal discretion must be considered along with its benefits. The biggest problem with principal discretion is that discretion allows principal self-interest to bias agent evaluations (Prendergast and Topel 1993; Bol 2008; Bol 2011). Because contracts with principal discretion are not legally enforceable, principals may even renege on promises to pay agents. The possibility of reneging causes agents to withhold effort out of concern that their effort will not be rewarded (Bol 2008).

Principal discretion may also lead to inaccurate assessments (Bol 2008). Inaccurate assessments can lead to lower productivity because agents will not increase their effort when they fear that their effort will not be rewarded. Inaccuracies blur the link between pay and performance which then decreases the effectiveness of the incentive

plan. Bol (2008) showed a negative relationship between rating inaccuracies and agent incentives and that centrality bias negatively impacts agent performance. Centrality bias is the tendency to compress performance ratings, which results in less variance in ratings than is justified by variance in performance (Bol 2011).

Principal discretion also introduces uncertainty about which measures will be used to assess performance. This can lead to confusion about how agents can improve performance. Agents will not be motivated to increase effort unless they understand how performance improvements can lead to increased reward. Ittner et al. (2003) examined the introduction of a compensation plan with principal discretion. They found that discretion in the new plan led agents to complain about the uncertainty in the criteria used to determine rewards.

Prior literature on principal discretion in agent performance evaluation focuses on environmental conditions when principal discretion is more common (Hoppe and Moers 2009; Murphy and Oyer 2003) and the specific ways that principal discretion is used in practice (Bol et al. 2015; Bol and Smith 2011; Hoppe and Moers 2009; Ittner et al. 2003). Few studies, however, examine the effects of principal discretion on agents (Gibbs et al. 2004; Bol 2008) with the exception of Bol (2008), which shows that principal discretion negatively impacts agent performance due to centrality bias.

1.4 This Study

This study develops and validates a theoretical model of the effects of incentive contract framing on agent effort based on the Hannan et al. (2005) and Christ et al. (2012) models. The study also uses the model to examine whether and how principal discretion

in agent performance evaluation interacts with incentive contract framing. The effect of principal discretion in agent performance evaluation is unclear because the effect of principal discretion depends on the degree to which agents interpret its use as a signal of trust. The study hypothesizes that the interaction of principal discretion in agent performance evaluation and incentive contract framing has an asymmetric effect on agent effort. More specifically, principal discretion in agent performance evaluation and incentive contract framing increases agent effort under bonus contracts but decreases agent effort under penalty contracts.

The two independent variables, incentive contract frame and principal discretion in agent performance evaluation, are each manipulated at two levels. Contract frame is manipulated with either a positively framed contract that rewarded agents for meeting or exceeding the performance target or a negatively framed contract that penalized agents for failing to meet the performance target. The study maintained monetary equivalence across conditions to isolate the framing effects. Principal discretion in agent performance evaluation is manipulated by either allowing or not allowing principals to adjust the performance target that determined whether agents received the reward or paid the penalty. This manipulation is consistent with practice where firms allow principals to make *ex post* discretionary adjustments to performance measures in incentive contracting (Bol 2008).

The study examines the effect of incentive contract framing and principal discretion in agent performance evaluation on effort using a computer-based experiment with two tasks adapted from Christ et al. (2012). The first task, the task under contract, manipulates both independent variables and uses performance-based pay as defined by

the experimental condition. The study's second task, the task not under contract, is not governed by an incentive contract and measures the trust effect from the first task. The second task allows the principal to have complete discretion over the agent's pay. The manipulation of incentive contract frame and principal discretion in the first task is expected to affect the results in the second task.

The two primary dependent variables are agent effort on the task under contract (the first task) and agent effort on the task not under contract (the second task). Agent effort is represented by the amount of points agents choose to invest in each task. This costly choice meets the definition of effort found in prior research (Fehr et al. 1993). The study also adds in the other factors from the previous two models for the supplemental analysis: perceived fairness and expected disappointment from Hannan et al. (2005) and perceived intrusion, perceived autonomy, signal of questioning competence, signal of questioning integrity, perceived trust, and reciprocal trust from Christ et al. (2012). The study measures these items using agents' responses to questions in the experimental instrument.

The combined model suggests that the interaction of principal discretion in agent performance evaluation with incentive contract frame will decrease (increase) effort under a penalty (bonus) contract frame. The use of the penalty (bonus) contract frame with principal discretion will lead to higher (lower) levels of expected disappointment and perceived intrusion and lower (higher) levels of perceived fairness and perceived autonomy than the use of the penalty (bonus) contract frame without principal discretion. These effects will lead to lower (higher) levels of trust, effort and performance under the

penalty (bonus) contract frame with principal discretion than under the penalty (bonus) contract frame without principal discretion.

Results do not support these predictions. The use of the penalty (bonus) contract frame with principal discretion did not decrease (increase) effort. The use of the penalty contract (bonus) contract frame with principal discretion did not lead to significantly higher (lower) levels of expected disappointment, perceived intrusion and perceived loss of autonomy and lower (higher) levels of perceived fairness than the use of the penalty (bonus) contract frame without principal discretion. Therefore, there were no significant differences in levels of trust, effort and performance between the penalty (bonus) contract frame with principal discretion and the penalty (bonus) contract frame without principal discretion.

This study, however, finds an interaction between principal discretion and contract frame. Specifically, principal discretion increases perceived fairness under a penalty contract frame but not under a bonus contract frame. The results also show that when a penalty contract includes principal discretion, there is no significant difference in perceived fairness between a bonus contract and a penalty contract.

This study extends prior research by showing that perceived fairness brings together the Hannan et al. (2005) and Christ et al. (2012) models. Similar to Hannan et al. (2005), this study finds that effort was greater under a penalty contract than under a bonus contract in a setting without discretion. Also, similar to Christ et al. (2012), this study shows that bonus contracts create a more trusting environment than penalty

contracts. Contrary to prior research, however, this study finds that perceived fairness explains how contract frame affects effort and the trust environment.

This study provides several important contributions to academic literature and practice. First, this study reconciles the theory and findings of Hannan et al. (2005) and Christ et al. (2012). Because prior contract framing studies theorized alternative mediating paths, it was unclear how incentive contract framing shapes agent beliefs. By bringing together the Hannan et al. (2005) and Christ et al. (2012) models, this study helps academics to better understand the underlying mechanisms for how contract framing influences agent beliefs.

Second, the study extends the principal discretion in compensation contracting literature. Prior literature on principal discretion focuses on the benefits and costs of principal discretion without examining whether principal discretion changes the effects of incentive contract framing. The results of this study show that principal discretion in performance evaluation significantly improves the perceived fairness of penalty contracts.

Third, this study is the first to analyze whether and how principals' use of discretionary adjustments to performance measures interacts with incentive contract framing. Prior literature has just begun to examine the different types of principal discretion in incentive contracting (Bol 2008; Hoppe and Moers 2011). Christ et al. (2012) introduces a form of principal discretion that is not based on performance measures. However, in practice, principals use discretion to make *ex post* adjustments to performance measures. Prior literature shows that these two types of principal discretion

have different determinants (Bol 2008; Hoppe and Moers 2011). Therefore, it is important to understand whether and how principals' use of discretionary adjustments to performance measures changes the contract framing effects on agent behavior.

Fourth, the results of the study are important for managers who design and implement incentive contracts. The results of the study suggest that managers who design incentive contracts may want to consider both the use of principal discretion in agent performance evaluation and contract frame (bonus vs. penalty). The study finds that the use of *ex post* discretionary adjustments to performance measures significantly improves the perceived fairness of penalty contracts.

The next chapter reviews the relevant contract framing literature with a focus on Hannan et al. (2005) and Christ et al. (2012) and the literature that examines principal discretion in agent performance evaluation; Chapter 3 develops the hypotheses; Chapter 4 details the research methods used to test the hypotheses; Chapter 5 presents data analysis and the results and Chapter 6 summarizes the results, the study's limitations and future research directions.

Chapter 2 Literature Review

2.1 Chapter Overview

This chapter presents a brief summary of the background literature which is organized into two categories. Section 2.2 summarizes the literature on the effects of incentive contract framing. This section includes a detailed review of Hannan et al. (2005) and Christ et al. (2012). Section 2.3 looks at both the benefits and costs of principal discretion in agent performance evaluation. Section 2.4 concludes with a summary of the chapter.

2.2 Effects of Incentive Contract Framing

2.2.1 Framing

"Framing" refers to the wording of a task that can describe the judgment or decision either in positive or negative terms (Bonner 2008). Tversky and Kahneman (1981) introduced "risky choice" framing with their "Asian disease problem." The "risky choice" frame asked individuals to make a choice between a risky or riskless alternative. Both alternatives were described either in positive or negative terms. Tversky and Kahneman (1981) found a "choice reversal." The majority of individuals chose the riskless alternative when given the positively framed version of the task but chose the risky alternative when given the negatively framed version of the task. Tversky and Kahneman (1981) explained this choice reversal with their theory called "prospect theory." Prospect theory predicts that individuals are risk averse in choices involving gains and risk seeking in choices involving losses (Kahneman and Tversky 1979).

2.2.2 Preference for Bonus Contracts vs. Penalty Contracts

In practice, most incentive contracts are framed as bonus contracts rather than penalty contracts (Luft 1994; Frederickson and Waller 2005; Hannan et al. 2005; Church et al. 2008; Christ et al. 2012; Brink and Rankin 2013). The first study to investigate this topic was Luft (1994). Using an experiment where participants chose between a contract with a flat rate and a series of bonus or penalty incentive contracts, Luft (1994) found that individuals preferred bonus contracts to penalty contracts. The study concluded that principals would have to pay agents more to accept a penalty contract than a bonus contract.

Luft (1994) proposed three possible explanations for the study's results. First, agents preferred bonus to penalty contracts due to loss aversion (Kahneman and Tversky 1979). Because contracts labeled "bonus" aroused a positive "gain" association and contracts labeled "penalty" aroused a negative "loss" association, agents preferred bonus contracts. Second, agents associated nonmonetary payoffs with bonus contracts because contracts labeled a "bonus" had connotations of approval and reward. Third, bonus and penalty contracts in practice have implicit contract terms: "bonus" implies both a guaranteed base amount and an additional future payoff and "penalty" implies that the base amount was uncertain without any future benefit (Luft 1994).

Frederickson and Waller (2005) supported Luft (1994)'s findings that loss aversion caused agents to prefer bonus contracts to penalty contracts. In an experimental setting where principals interacted with agents, Frederickson and Waller (2005) showed that agents in the penalty group demanded higher pay than agents in the bonus group. The study also found that principals accommodated agents' loss aversion by increasing

expected agent pay in the penalty group relative to the bonus group (Frederickson and Waller 2005).

Brink and Rankin (2013) extended Luft (1994) by testing whether risk preference and loss aversion justified why agents prefer bonus contracts to penalty contracts. The study also contributes to prior literature by examining contracts with combinations of bonus, penalty and clawback incentives. Brink and Rankin (2013) found not only that loss aversion and risk preferences explained agents' preferences for bonus contracts but the study also demonstrated that bonus contracts were preferred to contracts framed as combinations of bonus and penalty incentives.

2.2.3 Effect of Contract Framing on Effort in a Contract Setting without Principal Discretion

Several papers examine the effect of contract framing on effort in a contract setting without principal discretion (Hannan et al. 2005; Church et al. 2008; Hossain and List 2012). A contract setting without principal discretion is one that does not allow for principal discretion because the contract specifies the financial obligations of principals to agents for each potential future outcome. Consistent with prospect theory's predictions and loss aversion, all three studies showed that penalty-framed contracts motivated higher effort than bonus-framed contracts.

The purpose of Hannan et al. (2005) was to provide an understanding of whether and how factors underlying agents' preference for bonus contracts affected agent effort. Specifically, the study explored the following questions: 1) does agent effort differ under economically equivalent contracts framed in bonus versus penalty terms and if so, which type of contract results in higher effort and 2) does expected disappointment or perceived fairness mediate any effect of contract frame on agent effort (Hannan et al. 2005)?

The underlying tension for the study came from two opposite predictions. On the one hand, the theory of reciprocity predicts that agent effort will be greater under bonus contracts than under penalty contracts. Agents who view bonus contracts as fairer than penalty contracts will reciprocate by expending more effort under bonus contracts than under penalty contracts (Hannan et al. 2005). In the study's post-experimental questions, Luft (1994) found that agents preferred bonus contracts to penalty contracts because agents viewed bonus contracts as fairer than penalty contracts.

On the other hand, loss aversion (Kahneman & Tversky 1979) predicts that agent effort will be greater under penalty contracts than under bonus contracts. Loss aversion suggests that individuals experience greater disutility from the perceived loss of having to pay a penalty than from the perceived foregone gain associated with not receiving an equivalent bonus (Hannan et al. 2005). Agents who expect to experience greater disutility will expend more effort to avoid the expected outcome than agents who expect to experience less disutility. Therefore agents under penalty contracts will expend greater effort than agents under bonus contracts.

Using an experiment, Hannan et al. (2005) assigned participants to either a bonus or penalty contract. The participants' task was to choose an effort level. The study also asked agents about 1) their degree of expected disappointment about not receiving the bonus or having to pay the penalty and 2) the fairness of their contract. After responding to the expected disappointment and fairness questions, participants were given a description of the contract used in the other condition and were asked whether they preferred the bonus or the penalty contract (Hannan et al. 2005).

The answer to Hannan et al. (2005)'s first research question was that although agents preferred bonus contracts, agent effort was significantly greater under penalty contracts than under bonus contracts. Due to loss aversion, agents expected to be more disappointed about having to pay the penalty than about not receiving the bonus. The greater disappointment resulted in higher agent effort. Therefore, agent effort was greater under penalty contracts than under bonus contracts.

The answer to the study's second research question was that both expected disappointment and perceived fairness mediated the effect of contract frame on effort. However, the expected disappointment effect was stronger than the perceived fairness effect. The expected disappointment effect was due to loss aversion that made agents more averse to having to pay the penalty than foregoing an economically equivalent gain. The perceived fairness effect was due to reciprocity which caused agents under bonus contracts to choose more effort than agents under penalty contracts because agents viewed bonus contracts as fairer than penalty contracts.

Using an experiment without principal discretion, Church et al. (2008) examined the effect of contract frame on effort for a task that led to higher performance with increased effort. Previous research used a traditional "effort choice" setting that did not include performance effects. Church et al. (2008) also tested whether contract frame motivated effort differently in the presence or absence of an effective financial incentive for performance. Church et al. (2008) found that the penalty-framed contract motivated higher task performance for agents whose performance fell within the bonus or penalty range (i.e. where financial incentives were effective in motivating performance). Performance did not differ based on contract frame for agents whose performance

resulted in them receiving either the minimum or maximum payment (i.e. where financial incentives were not effective in motivating performance).

Hossain and List (2012) used a natural field experiment to explore how contract framing increased productivity in a high-tech Chinese consumer electronics company. In a contract setting without principal discretion, the study predicted that workers under the penalty contract would outperform workers under the bonus contract due to loss aversion. Hossain and List (2012) found that workers under the penalty contract significantly outperformed workers under the bonus contract.

2.2.4 Effect of Contract Framing on Effort in a Contract Setting with Principal Discretion

Christ et al. (2012) investigate whether principal discretion affects effort under bonus contracts relative to penalty contracts. Specifically, the study considered whether effort would be greater under bonus contracts than under penalty contracts in a contract setting with principal discretion (Christ et al. 2012). The contract setting allows principal discretion because the incentive contract does not govern all tasks for which the agent is responsible (Christ et al. 2012).

Christ et al. (2012) is important not only because prior literature assumed a contract setting without principal discretion (Luft 1994; Hannan et al. 2005; Church et al. 2008; Hossain and List 2012) but also because most incentive contracts in practice allow principals to have discretion over agent compensation (Christ et al. 2012). In a setting with principal discretion, principal opportunism is possible (Fisher et al. 2005). As a result of principal opportunism, agent effort depends on agents' trust in principals (Christ et al. 2012). If contract frame affects the trust environment, then prior literature examining the effect of contract frame on effort is incomplete (Christ et al. 2012).

The study's experiment manipulated the incentive contract frame as either a bonus contract or a penalty contract that governed only one of two tasks. This type of setting is common in practice because most incentive contracts do not include all of the tasks for which the agent is responsible (Christ et al. 2012). In the first task, principals paid agents for performance based on either a bonus or penalty incentive contract. In the second task, principals paid agents based on their discretion rather than an incentive contract. With principal discretion, trust becomes important in determining agent effort (Christ et al. 2012).

In contrast to a contract setting without principal discretion, agent effort in a contract setting with principal discretion was higher under bonus contracts than penalty contracts. Christ et al. (2012) found that agent effort was higher because bonus contracts created a more trusting environment than penalty contracts. The positive framing of the bonus contract signaled the principal's trust in the agent. This signal increased the agent's trust in the principal which led to increased agent effort on the task not governed by an incentive contract.

Christ et al. (2012) suggest that both contract frame and the use of principal discretion are important when examining the effects of incentive contracts. The results also help to explain why bonus contracts are more common than penalty contracts. Bonus contracts in a contract setting with principal discretion result in higher agent effort than penalty contracts.

This section has advanced two theories of incentive contract framing that describe the effects of incentive contract framing on agent effort. First, in a contract setting without principal discretion, loss aversion explains why penalty contracts elicit greater

agent effort than bonus contracts. Agents experience greater disutility from the perceived loss of having to pay a penalty than from the perceived foregone gain associated with an equivalent bonus (Hannan 2005). Second, in a contract setting with principal discretion, the agent's trust in the principal explains why bonus contracts lead to greater agent effort than penalty contracts (Christ et. al. 2012). Agents interpret the terms of a bonus contract as a signal of trust which leads to greater effort on tasks not governed by the contract as compared to penalty contracts.

In practice, most contracts allow principals to use discretion in evaluating agents. Therefore, the next section examines both the benefits and costs of principal discretion in agent performance evaluation.

2.3 Principal Discretion in Agent Performance Evaluation

2.3.1 Benefits of Principal Discretion in Agent Performance Evaluation

This section discusses the benefits of introducing principal discretion in agent performance evaluation. The benefits include: 1) the mitigation of distortions in incentives 2) agent compensation risk reduction 3) limitation of measure manipulation 4) motivation to adapt behavior and 5) reduction of perceived unfairness (Bol 2008). First, principal discretion in agent performance evaluation compensates for inadequate objective performance measures. Objective performance measures can be inadequate because objective performance measures cannot account for all dimensions of the agent's job (Holmstrom and Milgrom 1991). Discretion allows principals to include aspects of agent performance in the evaluation that are not quantifiable rather than only those aspects that are quantifiable.

Several papers have investigated the role of principal discretion in mitigating incentive distortions (Bol 2008). Murphy and Oyer (2003) examined the role of discretion in executive incentive contracts. The study examines the trade-offs firms face in choosing between imprecise objective measures of individual performance, more accurate but subjective performance measures and broad firm-wide measures. Using a proprietary dataset of executive bonus plans, the study found that discretion was used to adjust for imperfect objective performance measures. Moreover, the study showed that objective measures do not adequately capture the value of manager performance.

In a study by Gibbs et al. (2005), car dealerships used discretion to reward service managers for value-enhancing efforts that were not easily quantified in formula contracts. Service jobs were more difficult to measure than sales jobs because service jobs included measures such as quality of repairs, timeliness of service and customer satisfaction. Car dealerships found it too costly to include all of these measures in the formula bonus. Gibbs et al. (2005) found that using discretion motivated service managers to focus on a wider range of value-enhancing tasks rather than on only those tasks that could easily be quantified.

Gibbs et al. (2009) showed that firms used discretion as a response to weaknesses in available objective performance measures. Their car dealership survey data analyzed the incentive system for managers of several car dealerships. They found that car dealerships used incentive systems of multiple performance measures and additional discretionary bonuses to adjust for weaknesses in the objective performance measures.

Second, principal discretion lowers agent compensation risk (Bol 2008). Objective performance measures can be noisy due to factors outside the control of agents.

Noisy performance measures require that principals pay a risk premium to risk-averse agents. Principals can use discretionary adjustments to noisy performance measures to filter out the compensation effects of the uncontrollable events.

Hoppe and Moers (2011) showed that boards of directors used discretionary adjustments to address the contracting problem of risk. Discretionary adjustments were "the *ex ante* option to *ex post* override a formula (Hoppe and Moers 2011)." Hoppe and Moers (2011) used compensation contract data from SEC proxy statements. Specifically, the study found that firms used discretionary adjustments to reduce risk by adjusting for uncontrollable events. The study also found that firms increased their use of discretionary bonuses as performance measures became noisier.

Using car dealership compensation survey data, Gibbs et al. (2004) examined whether principals used discretion in awarding bonuses to reduce risk. Risk may be due to uncontrollable factors such as organizational interdependencies or to uncontrollable events that increased the difficulty of performance targets. They found that the use of discretionary bonuses was related to the extent of organizational interdependencies and to the difficulty of the formula bonus target.

Maas, van Rinsum and Towry (2011) studied the willingness of managers to obtain additional costly information to better assess individual contributions to the team. They found that because of concerns for fairness and trust reciprocity, managers used their discretion to obtain this additional information as the team measure became a noisier measure of individual performance.

Third, principal discretion reduces measure manipulation (Bol 2008). Objective measures are susceptible to manipulation (Holmstrom and Milgrom 1991; Ittner et al.

2003). Because agents know which actions affect objective performance measures, agents can use this information to their benefit at the expense of the firm. Discretion allows principals to limit measure manipulation because principals can use their discretion to punish agents who attempt to manipulate measures. Also principals can use discretion to make adjustments *ex post* rather than limit their evaluations to the *ex ante* objective performance measures. Knowing this, agents have less incentive to manipulate objective performance measures.

Several papers address the role of principal discretion in reducing measure manipulation. Gibbs et al. (2004) was unable to show that the use of discretion was related to the manipulability of the objective measures. Woods (2012) did not find that principals were more likely to adjust downward for unexpectedly high objective performance measures the more manipulable the measure. On the other hand, Gibbs et al. (2009) found that car dealerships were more likely to use discretion the more manipulable the performance measure. Gibbs et al. (2009) also showed that car dealerships weighted more heavily those measures that had the least amount of manipulation.

Indjejikian and Matejka (2011) demonstrated that firms relied more on performance evaluation that used principal discretion in determining local managers' bonuses when those local managers had greater influence over the design of internal accounting systems. When managers had greater influence over the design of internal accounting systems, the managers obtained private information that could be used to the managers' benefit at the expense of the firm. Principals used their discretion in

performance evaluations to protect themselves against agents' manipulation of accounting measures.

Fourth, principal discretion motivates adaptive agent behavior (Bol 2008). A basic purpose of incentive contract design is to align agent incentives with the goals of the principal. When new information becomes available after the contract is finalized, agent incentives may become distorted. Discretion allows principals to incorporate this new information to restore the alignment of principals' goals and agents' incentives. Principals can incentivize changes to agent performance with the use of either subjective weights or discretionary adjustments to performance measures.

Hoppe and Moers (2011) found that boards of directors used subjective weights to assure goal congruity in CEO incentive contracts. The study defined subjective weights as the *ex ante* absence of any formula in a contract. A congruity problem existed when agents' optimal course of action was difficult to know because of environmental unpredictability. Subjective weights addressed the congruity problem because subjective weights allowed principals the flexibility to incorporate any information that was relevant at the time of agent performance evaluation rather than only the information that was available when the contract was signed.

Using car dealership survey data, Gibbs et al. (2009) examined whether dealerships weighted performance measures with uncontrollable risk less than performance measures with more controllable risk. Controllable risk was defined as environmental uncertainty that agents can react to and uncontrollable risk was defined as environmental uncertainty that agents cannot react to (noise). Gibbs et al. (2009) found

that dealerships used discretion to weight more heavily those performance measures with controllable risk than performance measures with uncontrollable risk.

Bol et al. (2015) showed that principals were less willing to make discretionary adjustments to agent performance measures for an uncontrollable event when future event likelihood is high than when it is low. Using an experiment, the study manipulated the event likelihood and measured the discretionary adjustment made by the principal. The results show that principals used their discretion strategically in order to induce agent innovation (Bol et al. 2015).

Fifth, principal discretion reduces perceived unfairness (Bol 2008). The justice literature distinguishes two types of fairness: procedural justice is the fairness of the process used to determine an outcome and distributive justice is the fairness of the outcome (Folger and Konovsky 1989). The lack of either type of fairness can decrease agent motivation, which can impact agent performance negatively. Principals can use discretion to reduce perceived unfairness by adjusting for uncontrollable effects on performance measures. Bol and Smith (2011) examined whether principals used discretion in subjective agent evaluation to adjust for the effects of an uncontrollable measure. The study found that principals used discretion to adjust for the impact of uncontrollable events on the objective performance measure. More specifically, principals used discretion to adjust agent performance evaluations upward when the uncontrollable factor led to unfavorable outcomes for agents. However, principals did not adjust downward when the uncontrollable factor led to favorable outcomes for agents (Bol and Smith 2011).

Principals can also use discretion to reduce perceived unfairness when a high level of compensation interdependence exists. Compensation interdependence exists when performance measures and compensation of one agent affects those of other agents (Bol et al. 2015). Bol et al. (2015) examined whether principals would be less likely to make discretionary adjustments for a negative uncontrollable event when doing so would punish those agents who were unaffected by the negative uncontrollable event. The study found that concerns for fairness reduced principals' willingness to punish unaffected agents.

2.3.2 Costs of Principal Discretion in Agent Performance Evaluation

Although principal discretion in agent performance evaluation has several benefits, principal discretion can also be costly. This section discusses the following costs of principal discretion: 1) reneging 2) inaccurate assessments 3) influence activities and 4) uncertainty about performance measures (Bol 2008).

The first cost of principal discretion is reneging. Reneging occurs when contracted performance is not rewarded (Prendergast 1993). Principals may not pay agents because contracts with performance evaluation subject to principal discretion are not legally enforceable. If agents expect principals not to pay, agents will not provide effort. Therefore, agents' reneging concerns are costly to the principal.

Principals can address agents' reneging concerns by committing to fixed bonus pools (Bol 2008). When using bonus pools, principals commit *ex ante* to allocate a specified total bonus amount. Because the total bonus is determined by objective measures that are contractible, principals no longer have incentives to renege. Principals

then use non-contractible information to allocate the amounts in the bonus pools between agents.

Baiman and Rajan (1995) used an analytical model to identify the ideal conditions under which principals can incorporate this non-contractible information. Baiman and Rajan (1995) showed that as long as the non-contractible information was informative about at least one agent, the use of bonus pools resulted in a strict Pareto improvement. The size of the pool was determined by an explicit formula *ex ante* and principals committed *ex ante* to pay the entire amount of the pool. However, the allocation of the pool was left to principal discretion. The use of the non-contractible information motivated agents to exert effort.

Fisher et al. (2005) used an experiment to provide empirical support for Baiman and Rajan's (1995) model. Fisher et al. (2005) examined whether principal discretion over the *size* of the total compensation pool and/or the *allocation* of this pool affected opportunism by principals and agents. Giving principals full discretion over both decisions reduces agent opportunism but not principal opportunism (Fisher et al. 2005). Fisher et al. (2005) found that firm output and agent compensation were greater as long as principals had discretion over the allocation of the pool but not the size of the pool.

Rajan and Resichelstein (2006) extended Baiman and Rajan (1995) and showed that the use of bonus pools involved an additional agency cost relative to the benchmark of optimal contracts based on objective information only. Agents incurred additional risk because each agent's pay depended on the performance of other agents covered by the bonus pool (Bol 2008). Rajan and Reseichelstein (2006) found that this additional

agency cost decreased as the precision of subjective information increased or as the number of agents increased.

Rajan and Reichelstein (2009) studied the structure of optimal bonus pool arrangements when bonus pools used both objective and subjective performance measures. The study demonstrated that principals obtained the optimal bonus pool arrangement when principals ignored subjective information for all but the lowest possible objective outcome. Also, Rajan and Reichelstein (2009) provided evidence that the bonus pool corresponding to the lowest objective outcome was always paid out in full to agents unless the subjective metric assumed the worst possible outcome.

Ederhof (2010)'s analytical model extended Rajan and Reichelstein (2009) by showing that firms were more likely to pay discretionary bonuses when the outcome of the contractible measure was either low or high but not when the contractible measure was in the middle. Ederhof (2010) hypothesized that discretionary bonuses disclosed the board's assessment of non-contractible performance measures and that non-contractible measures were correlated with contractible measures. When contractible measures were high or low, principals had more certainty about agent performance than when contractible measures were in the middle so the additional agency cost of discretionary bonuses was lower.

The second cost of principal discretion is inaccurate performance assessments. Most principals are not the residual claimants of agents' outputs so principals have little incentive to renege. However, principals can use discretion to serve their self-interests which can lead to inaccurate or biased performance assessments (Prendergast and Topel 1993; Bol 2011).

Many studies show that performance evaluations with principal discretion are subject not only to systematic bias but also to bias due to personal attributes of agents (Kingsbury 1922, Thorndike 1949, Feldman 1981). Two well-known systematic biases are centrality bias and leniency bias. Centrality bias refers to the tendency to compress performance ratings, and leniency bias refers to the tendency to inflate performance ratings (Bol 2011). Moers (2005) demonstrated that performance measure diversity and discretion in performance measurement led to more compressed ratings and to more lenient performance ratings.

Inaccurate performance evaluations are costly to the principal for three reasons. First, inaccuracies in performance evaluations can lead to less productivity because inaccuracies weaken the link between pay and performance (Prendergast 1999). As a result, performance evaluation bias reduces incentives for agent effort. Bol (2011) showed that centrality bias decreased agent motivation which decreased agent performance.

Second, inaccurate assessments are costly to the principal because they can lead to favoritism which negatively affects the perceived fairness of the compensation contract (Bol 2008). Favoritism leads to lower perceived procedural justice for other agents. Lower perceived procedural justice decreased agent motivation and organizational commitment (McFarlin & Sweeney 1992; Prendergast and Topel 1993). With data from a leading international financial services provider, Ittner et al. (2003) demonstrated that the use of subjectivity in weighting scorecard measures led agents to complain about favoritism in bonus awards. The perceived unfairness led agents to question the firm's

use of the scorecard for compensation purposes (Ittner et al. 2003). Eventually the firm stopped using the balanced scorecard.

Third, inaccurate assessments are costly to the principal because they can lead to personnel issues. Low performing agents may get promoted at the expense of high performing agents that may lead other agents who feel discriminated against to resign (Bol 2008). Sebald (2014) demonstrated that agents retaliated when subjective assessments were below agent expectations. In an experiment, agents' reactions to principals' subjective feedback depended on agents' self-perception.

Four reasons explain why principals tend to assess performance inaccurately. First, the use of accompanying performance measures may lead to inaccurate assessments. Moers (2005) demonstrated that the use of multiple objective performance measures and the use of subjective performance measures were related to more compressed ratings and more lenient ratings. Bol and Smith (2011) examined how principals' subjective performance evaluations were affected by the level and controllability of an objective performance measure on a separate aspect of agent performance. The study found that principals' subjective evaluations were significantly higher when the objective level of the other performance measure was relatively high. Woods (2012) showed that principals' subjective adjustments to objective performance measures were influenced by prior subjective agent evaluations.

A second reason for inaccurate assessments is the strength of the principal-agent relationship (Bol 2008). Principals may refrain from giving harsh but accurate performance assessments to avoid damaging their relationships with agents. Using incentive plan data from a financial service provider, Bol (2011) found that the strength

of agent-principal relationship positively affected centrality bias and leniency bias. Specifically, principals gave less compressed and less lenient ratings when the principal - agent relationship was weaker (Bol 2011).

A third reason for inaccurate assessments is high information gathering costs (Bol 2008). Assessing performance can be costly to principals because principals must invest time to evaluate agents. To avoid confrontation with agents who may question their performance assessments, principals inflate performance ratings (Bernardin et al. 2000). Bol (2011) showed that information gathering costs led to centrality bias and leniency bias.

A fourth reason for inaccurate assessments is the cognitive limitations of principals (Bol 2008). Cognitive limitations may lead to bias as a result of failing to make sufficient adjustments. Bailey et al. (2011) demonstrated that principals failed to make sufficient adjustments when principals incorporated non-contractible information. The study investigated the effect of discretion extent on discretionary bonus allocations by using either full discretion (allocation of the entire bonus pool) or partial discretion (allocation of some of the bonus pool). Bailey et al. (2011) found that principals used an anchoring approach to allocate discretionary bonuses rather than integrate both contractible and non-contractible information into a single comprehensive measure. With full discretion, principals tended to anchor on a subset of information and failed to adequately incorporate the non-contractible information (Bailey et al. 2011). The principals' use of an anchoring approach may help to explain principals' propensity toward the halo effect. The halo effect is a cognitive bias that may occur when 1) principals weight one measure of performance higher than another performance measure

and 2) positive performance on the favored measure creates a positive halo that affects the overall evaluation (Bailey et al. 2011).

The third cost of principal discretion is influence activities (Bol 2008). Agents may try to influence principals to increase the likelihood of more favorable assessments. Influence activities may take many forms including ingratiation. Ingratiation is behavior designed to increase principals' liking of agents or to make agents appear friendly to get what agents want (Higgins, Judge and Ferris 2003). Influence activities are costly to principals because agents spend time and effort trying to influence principals instead of being productive. Other costs of influence activities include inefficient decision-making and deadweight losses in firm value (Milgrom 1988; MacLeod 2003).

Du et al. (2012) studied Chinese government evaluations of Chinese state-owned enterprises (SOEs) and found that influence activities affected performance evaluations positively. To assess the level of influence activities, Du et al. (2012) used the political connections of the SOEs' top executives and the geographic proximity between the Chinese government central offices and the SOE headquarters. The study found that the level of political connections and geographic proximity positively affected the SOEs' evaluation scores.

The fourth cost of principal discretion is agent uncertainty about performance measures (Bol 2008). When principals use discretion, agents may not know what behaviors or outcomes principals expect. This ambiguity creates uncertainty about performance measures. Uncertainty about performance measures may decrease agent motivation which can lead to decreased agent effort. Uncertainty about performance

measures is costly to principals because uncertainty reduces the incentive effect of compensation contracts (Bol 2008).

Ittner et al. (2003) showed that allowing subjectivity in balanced scorecard weighting led to performance measure uncertainty. Measures that were predictive of future financial performance were ignored and too much weight was put on measures that were not predictive. The study found that criteria were changed from quarter to quarter and factors other than the chosen performance measures were included in the evaluation.

This section discussed both the benefits and costs of principal discretion in agent performance evaluation. On the one hand, principal discretion compensates for inadequate objective performance measures, reduces agent compensation risk, limits performance measure manipulation, motivates adaptive agent behavior and reduces perceived unfairness. On the other hand, principal discretion may lead to reneging by the principal, inaccurate performance assessments, influence activities and uncertainty about performance measures.

2.4 Chapter Summary

Incentive contract framing influences agents' judgments and behavior. Studies show that even though agents prefer incentive contracts framed as bonuses rather than penalties, incentive contracts without principal discretion that are framed as penalties led to higher agent effort than contracts framed as bonuses. However, in practice, many incentive contracts allow for principal discretion. Principal discretion introduces benefits and costs that may change agent behavior. For example, incentive contracts with principal discretion that are framed as bonuses led to higher agent effort than incentive contracts framed as penalties (Christ et al. 2012).

Because studies on the effects of incentive contract framing such as Hannan et al. (2005) and Christ et al. (2012) use different mechanisms, it is unclear how incentive contract framing shapes agent behavior. Christ et al. (2012) suggests that future research examine when the effect of one mechanism might outweigh the other. To more fully understand how contract framing affects agent behavior, the next chapter hypothesizes 1) how the two models fit together and 2) how the use of principal discretion in agent performance evaluation affects the new combined model.

Chapter 3 Hypotheses Development

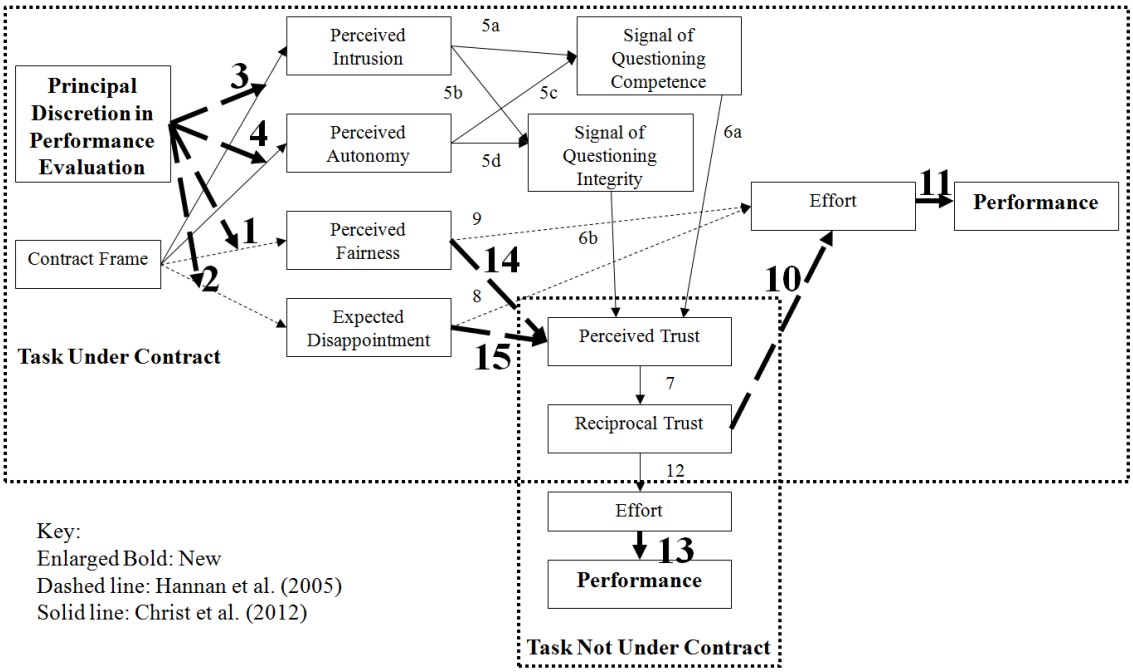
3.1 Chapter Overview

This chapter combines the Hannan et al. (2005) and Christ et al. (2012) models and adds principal discretion in agent performance evaluation to hypothesize how contract framing affects agent behavior. Section 3.2 illustrates the overall model for the study. Section 3.3 explains the model and Section 3.4 presents the study's hypotheses. Section 3.5 concludes with a summary of the hypotheses.

3.2 Model Overview

The figure below illustrates the model for the study:

Figure 3: Model Overview



3.3 Explanation of the Model

This section explains the model found in Figure 3. Each subsection explains a single path in the model.

3.3.1 Effect of Contract Frame and Principal Discretion on Perceived Fairness (Path 1)

Principals usually evaluate agent performance to determine reward outcomes (Bol 2008). Principal discretion in agent performance evaluation means that principals use subjective judgment to assess performance. Principal judgment may be based on personal impressions, feelings and options, rather than on external facts (Bol 2008). Procedural justice is the fairness of the process used to determine an outcome whereas distributive justice is the fairness of the outcome (Folger and Konovsky 1989). An important element of procedural justice in agent performance evaluation is consistency (Prendergast & Topel 1993). Principal discretion, however, opens the door to inconsistency. The use of principal discretion in agent performance evaluation can lead to low perceptions of procedural justice by managers (Bellavance 2013).

Incentive contracts are formal controls that can be framed either as a bonus that offers agents a monetary reward if performance goals are met or as a penalty that reduces monetary payouts if performance goals are not met (Christ et al. 2012). Luft (1994) attributes the differences in agent preferences for bonus and penalty contracts to loss aversion (Kahneman and Tversky 1979). Loss aversion describes the finding that individuals experience greater disutility from the perceived loss associated with paying a penalty than from the perceived forgone gain associated with not receiving an equivalent bonus (Hannan et al. 2005). Loss aversion suggests that having to pay a penalty under a

penalty contract is a less favorable outcome than foregoing a similar sized bonus under a bonus contract.

In general, people expect and want procedures to be fair and outcomes to be favorable. People will be more likely to begin to ask questions and look for information to make sense of their situations when outcomes are unfavorable (Pyszcznski & Greenberg 1981). When people are looking to make sense of their situations, external cues that address their information needs are especially influential. When an outcome is unfavorable, the level of procedural fairness provides information that can make sense of the situation (Brockner and Wiesenfield 1996). Therefore, people will react to unfavorable outcomes more than they will to favorable outcomes by closely examining the procedures that gave rise to those outcomes. This will increase the effect of perceived procedural fairness on their interpretation of and reaction especially to negative outcomes.

Under a favorable outcome such as a bonus contract, people will be less likely to seek additional information to make sense of the situation because the situation is favorable. It follows that the level of procedural fairness will not influence people's fairness perceptions. Therefore the use of principal discretion will not moderate people's fairness perceptions of a bonus contract.

When an outcome is unfavorable such as a penalty contract, people are more likely to seek information to make sense of their situations. The level of procedural fairness will provide external cues to address people's information needs. Lower (higher) levels of procedural fairness lead to lower (higher) perceived fairness than higher (lower)

levels of procedural fairness. The existence of principal discretion leads to lower levels of procedural fairness than the absence of principal discretion (Bellavance 2013). It follows that the existence (absence) of principal discretion leads to lower (higher) perceived fairness that increases (decreases) the negative effect of the penalty frame. Therefore the negative effect of a penalty contract is greater when accompanied by principal discretion.

Taken together, agents under a penalty contract will report lower levels of perceived fairness than agents under a bonus contract. Also principal discretion will moderate the relationship between contract type and perceived fairness such that using a penalty contract will reduce perceived fairness more with the use of principal discretion than without the use of principal discretion (Path 1).

3.3.2 Effect of Contract Frame and Principal Discretion on Expected Disappointment (Path 2)

Attribution theory explains how people make causal explanations. When considering the principal's choice of incentive contract, attribution theory suggests that agents are more likely to attribute the principal's choice of incentive contract to the personal characteristics of the principal rather than to situational factors (Ross 1977). This tendency of perceivers to over emphasize causality to internal factors in the actor rather than to situational factors is commonly known as correspondence bias or fundamental attribution error (Green et al. 1985). Agents have an unfavorable view of penalty contracts due to loss aversion. Attribution theory suggests that agents will have a negative view of the principal's decision to implement a penalty contract. Therefore agents will attribute negative character qualities to those principals who choose to

implement penalty contracts. This attribution will affect agents' interpretation of principal discretion. Instead of viewing principal discretion as a way to help agents, agents will view principal discretion as a way to further penalize them. Therefore, agents will expect to be more disappointed when the penalty contract includes principal discretion than when the penalty contract does not include principal discretion.

In summary, agents under a penalty contract with discretion will expect to be more disappointed about having to pay a penalty than agents under a bonus contract with discretion will expect to be about not receiving an economically equivalent bonus. Also principal discretion will moderate the relationship between penalty contract and expected disappointment such that agents under a penalty contract will have higher expected disappointment with the use of principal discretion than without the use of principal discretion (Path 2).

3.3.3 Effect of Contract Frame and Principal Discretion on Perceived Intrusion (Path 3)

Intrusion is defined as "interference with normal processes and activities" (Christ et al. 2008). Intrusion can be invasive and possibly disruptive, with the controlling party engaging in some kind of participation or interference in the controlled party's processes and activities. Change management research documents the disruptive nature of mandatory management innovations (Christ et al. 2008). Specifically, a "loss of routine" or a "destruction of existing habit" that results from management innovations plays an important role in the process of change and in the level of resistance to change (Christ et al. 2008). Similarly, the intrusiveness of a control system plays an important role in

whether the control system impacts the level of trust in an organization (Christ et al. 2008).

The trust literature shows the effects of negatively framed controls. Negatively framed controls damage trust (Das and Teng 1998; Enzle and Anderson 1993; Malhotra and Murnighan 2002) because they are perceived as interfering with agents' normal processes and activities (Christ et al. 2008). The effects of framing an incentive contract negatively as a penalty contract are similar to the effects of negatively framed controls (Christ et al. 2012). It follows that agents will report higher levels of perceived intrusion under penalty contracts than under bonus contracts.

Attribution theory suggests that agents faced with a penalty contract will attribute negative qualities to principals (see above). Attribution theory explains that people attribute the cause of another person's negative behavior to his or her negative character qualities rather than to situational factors. For example, someone's anger is because he or she is bad-tempered. If agents perceive the principal's selection of a penalty contract as intrusive (Christ et al. 2012) then attribution theory suggests agents will attribute the selection of a penalty contract to the principal's intrusive personality. This attribution will affect agents' interpretation of principal discretion in agent performance evaluation. Instead of viewing principal discretion as a way to help agents, agents will view principal discretion negatively due to their view of the principal's personality. Therefore, agents will have higher levels of perceived intrusion when the penalty contract includes principal discretion than when the penalty contract excludes principal discretion.

Taken together, agents under a penalty contract will report higher levels of perceived intrusion than agents under a bonus contract. Also principal discretion will moderate the relationship between penalty contract and perceived intrusion such that using a penalty contract will increase perceived intrusion more with the use of principal discretion than without the use of principal discretion (Path 3).

3.3.4 Effect of Contract Frame and Principal Discretion on Perceived Autonomy (Path 4)

Formal controls reduce agent autonomy (Das and Teng 1998). That is, a formal control limits the decision rights of agents by specifying clear boundaries which may include specific behaviors, operations or activities (Christ 2008). In general, when individuals feel that their freedoms are being restricted, individuals have negative reactions. Psychological Reactance Theory (Brehm and Brehm 2013) provides a framework for understanding the psychological effects of restrictions to freedoms. The theory assumes that a person has a set of free behaviors and will experience a form of psychological arousal called reactance whenever any of those behaviors are eliminated or threatened with elimination. The person who experiences reactance will be motivated to restore the specific freedom that was lost or threatened. Reactance may lead to hostility or aggression toward the threatening agent of the restriction.

Implementation of a negatively framed control damages the trust environment (Das and Teng 1998; Enzle and Anderson 1993; Malhotra and Murnighan 2002). Negatively framed controls damage the trust environment because agents perceive that negatively framed controls reduce autonomy (Christ et al. 2008). The effects of framing an incentive contract negatively as a penalty contract are similar to the effects of

negatively framed controls (Christ et al. 2012). It follows that agents will report lower levels of perceived autonomy under penalty contracts than under bonus contracts.

Attribution theory suggests that agents faced with penalty contracts will attribute negative qualities to principals (see above). Because agents perceive a loss of autonomy with penalty contracts, they will interpret the principal's decision to implement the penalty contract as a controlling behavior. If agents perceive the principal's selection of a penalty contract as a controlling behavior, then attribution theory suggests that agents will attribute the principal's controlling behavior to the principal's controlling personality. This attribution will influence agent interpretation of principal discretion. Instead of viewing principal discretion as a way to help agents, agents will view principal discretion as a way for the principal to control the agent. Therefore, agents will have lower levels of perceived autonomy when the penalty contract includes principal discretion than when the penalty contract excludes principal discretion.

In summary, agents will report lower levels of perceived autonomy under a penalty contract than under a bonus contract. Also principal discretion will moderate the relationship between penalty contract and perceived autonomy such that using a penalty contract will decrease perceived autonomy more with the use of principal discretion than without the use of principal discretion (Path 4).

3.3.5 Effect of Perceived Autonomy and Perceived Intrusion on Signals of Questioning Integrity and Questioning Competence (Paths 5a, 5b, 5c, 5d)

When agents feel that controls are intrusive or decrease agents' perceived autonomy, agents will interpret these controls as signals of principals' beliefs about agents (Christ et al. 2012). As agents' perceived loss of autonomy decreases and

perceived intrusion increases, agents are more inclined to believe that principals are questioning agent integrity and competence (Christ et al. 2012). More specifically, agents will perceive that principals are questioning their competence (Path 5a) and their integrity (Path 5b) more as perceived intrusion increases. Also, agents will perceive that principals are questioning their competence (Path 5c) and their integrity (Path 5d) more as perceived autonomy decreases.

3.3.6 Effect of Signals of Questioning Integrity and Questioning Competence on Perceived Trust (Paths 6a, 6b)

To the degree that principals question agent integrity and competence, agents will perceive less trust from principals regardless of the level of principal discretion (Das and Teng 2001; Christ et al. 2012). Specifically, agents who perceive more questioning of their competence will report lower levels of perceived trust from principals than agents who perceive less questioning of their competence from principals (Path 6a). Also, agents who perceive more questioning of their integrity will report lower levels of perceived trust from principals than agents who perceive less questioning of their integrity from principals (Path 6b).

3.3.7 Effect of Perceived Trust on Reciprocal Trust (Path 7)

Social projection theory states that individuals have a tendency to expect similarities between themselves and others (Krueger 1998). This leads individuals to base what they think others will do on their own beliefs. It follows that principals will expect agents to behave the way principals themselves would behave. Therefore, principals' signals of trust (mistrust) in agents are signals of the principals' trustworthiness (lack of trustworthiness). Trust can generate the very behavior that might

logically seem to be its precondition and distrust can lead to behavior that bolsters the validity of the distrust (Gambetta 1988). Because trust is reciprocal (Gambetta 1988), agents will decrease trust in principals as the level of perceived trust from principals diminishes regardless of the presence or absence of principal discretion. Therefore, agents who perceive less trust from principals will trust principals less than agents who perceive more trust from principals (Path 7).

3.3.8 Effect of Expected Disappointment on Effort for Task Under Contract (Path 8)

Conventional economic theory assumes that agents who have higher incremental utility for money will work harder for money than those who have lower incremental utility for money (Hannan et al. 2005). It follows that if agents who have higher incremental utility for money do not receive the higher payment (i.e. because they had to pay the penalty or forego the bonus), they will experience a greater reduction in utility than those who have a lower incremental utility for money (Hannan et al. 2005). "Expected disappointment" relates to this decrease in utility from having to pay a penalty or by not receiving a bonus. Therefore greater expected disappointment will result in higher agent effort (Path 8).

3.3.9 Effect of Perceived Fairness on Effort for Task Under Contract (Path 9)

The theory of reciprocity suggests that individuals who feel that they are treated fairly by another party will reciprocate by treating the other party kindly in return (Goranson and Berkowitz 1966). It follows that agents who perceive their contract to be fairer will choose a higher level of effort than those who perceive their contract to be less fair (Hannan et al. 2005). The reciprocity will persist for both bonus and penalty

contracts regardless of the level of principal discretion in agent performance evaluation. Therefore agents who perceive their contracts to be less fair will expend lower effort than agents who perceive their contracts to be more fair (Path 9).

3.3.10 Effect of Reciprocal Trust on Effort for Task Under Contract (Path 10)

When reciprocal trust is low, agents perceive that pay is less certain than when reciprocal trust is high. When agent pay is less certain, agents carry more risk than when agent pay is more certain. When agents bear more risk, agents want more pay for equal work which makes agents work less for equal pay. Therefore agents who reciprocate less trust will expend lower effort than agents who reciprocate more trust (Path 10).

3.3.11 Effect of Effort for Task Under Contract on Performance (Path 11)

When skill is held constant and the task is effort sensitive, increased effort leads to an improvement in the rewarded dimension of task performance (Bonner & Sprinkle 2002). Incentives increase agent desire to increase performance. This desire to increase performance motivates agents to exert effort because increases in effort are expected to lead to increases in expected performance. Therefore, agent performance will increase with effort on task under contract (Path 11).

3.3.12 Effect of Reciprocal Trust on Effort for Task Not Under Contract (Path 12)

In the task not under contract that allows principal discretion over agent compensation, agent trust in principals to reward agents becomes important in agent effort choice due to principal opportunism (Fisher et al. 2005). When trust is low, agents have less expectancy that agent effort will be rewarded by principals and will choose less effort. In contrast, when trust is high, agents will have a higher positive expectancy that

agent effort will be rewarded by principals (Christ et al. 2012). Therefore agent effort on task not under contract will increase as reciprocal trust increases (Path 12).

3.3.13 Effect of Effort for Task Not Under Contract on Performance (Path 13)

Holding skill constant, increased effort leads to improvements in performance (Bonner & Sprinkle 2002). It follows that agent performance on the task not under contract will increase as effort increases (Path 13).

3.3.14 Effect of Perceived Fairness on Perceived Trust (Path 14)

To the degree that agents perceive that their contracts are unfair, agents will perceive that they are being treated unfairly by the principal. Agents who perceive that they are being treated unfairly by the principal will perceive less trust from the principal.

3.3.15 Effect of Expected Disappointment on Perceived Trust (Path 15)

Martinez and Zeelenberg (2015) found that increased disappointment induced higher initial transfers in a trust game due to loss aversion. Thinking of disappointment led first movers to avoid feelings of disappointment. To avoid feelings of disappointment, first movers avoided disappointing others. To avoid disappointing others, first movers transferred more money.

Similarly, to the degree that agents expect disappointment, agents will avoid feelings of disappointment. To avoid feelings of disappointment, agents will avoid disappointing the principal. To avoid disappointing the principal, agents will perceive

trust from the principal. It follows that greater expected disappointment will result in greater perceived trust. [2]

3.4 Hypotheses

This section presents the study's four research hypotheses based on the model presented in Section 3.3. Each subsection explains one of the four hypotheses.

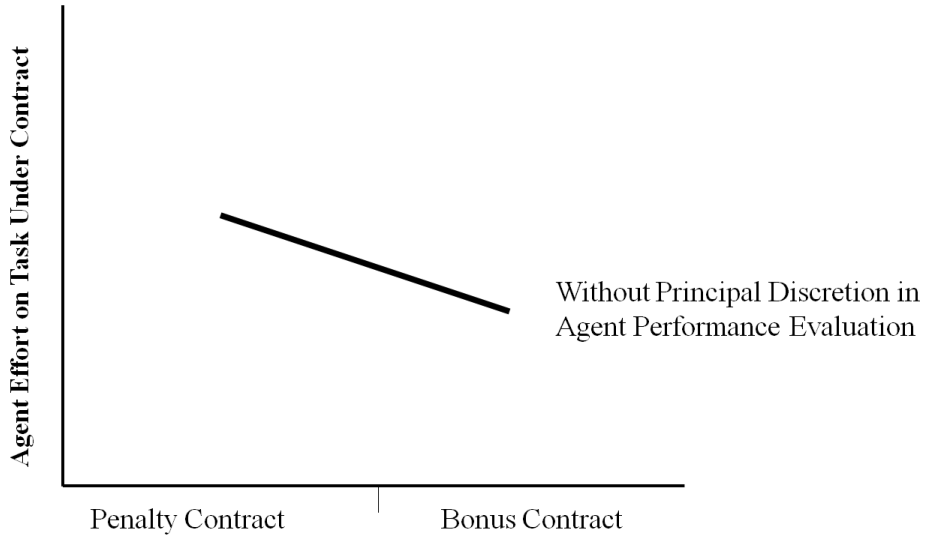
3.4.1 Effect of Contract Frame on Agent Effort for Task Under Contract

In a setting without principal discretion, agent trust is not required for the task under contract because the incentive contract specifies the payout for each potential outcome. Expected disappointment will be higher under a penalty contract than under a bonus contract (Path 2). Therefore, agent effort on the task under contract will be greater under a penalty contract than under a bonus contract because greater expected disappointment will result in higher agent effort (Path 8). The study's first hypothesis is formally stated below and illustrated in Figure 4:

> **H1**: Agent effort on the task under contract will be greater under a penalty contract than under a bonus contract.

[2] Because Martinez and Zeelenberg (2015) used a trust game and because Task 2 in this study is a trust game, this study expects similar results. Therefore, agents would trust more with higher expected disappointment. If agents trust more and because trust is reciprocal, perceived trust would be higher.

Figure 4: Predicted Effect of Contract Type on Agent Effort for Task Under Contract



3.4.2 Effect of Contract Frame and Principal Discretion on Agent Effort for Task Under Contract

This subsection adds principal discretion in agent performance evaluation to the setting discussed in Section 3.4.1. The agent's trust in the principal becomes important in the agent's effort decision for the task under contract because the principal has discretion over the agent's performance evaluation. Under a penalty (bonus) contract, the interaction of principal discretion with contract frame leads to lower (higher) perceived fairness (Path 1), higher (lower) expected disappointment (Path 2), higher (lower) levels of perceived intrusion (Path 3) and lower (higher) levels of perceived autonomy (Path 4).

Reduced perceived fairness leads to lower (higher) perceived trust (Path 14), lower (higher) reciprocal trust (Path 7) and lower (higher) effort (Paths 9 and 10). The perceived intrusion and perceived autonomy effects lead to higher (lower) levels of

questioning competence and questioning integrity (Paths 5a, 5b, 5c and 5d), lower (higher) perceived trust (Paths 6a, 6b), lower (higher) reciprocal trust (Path 7) and lower (higher) effort (Path 10). Taken together, the study predicts that agent effort on the task under contract will be lower (higher) under a penalty contract with (without) principal discretion. Also agent effort on the task under contract will be higher (lower) under a bonus contract with (without) principal discretion.

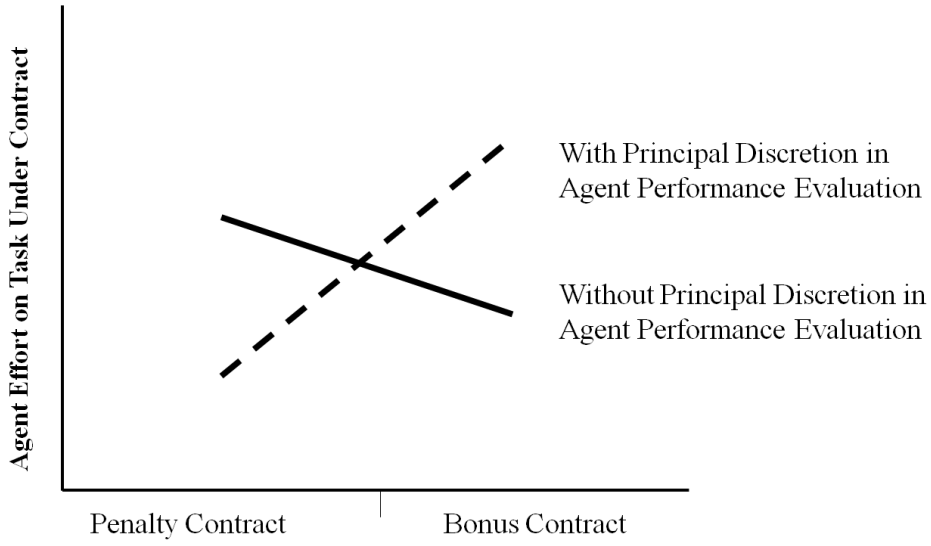
Notwithstanding this prediction, one reason why principal discretion in agent performance evaluation may result in a main effect instead of an interaction effect is loss aversion. The greater expected disappointment from the interaction of principal discretion and the penalty contract frame (Path 2) may increase aversion to disappointment. Aversion to disappointment may increase the desire to not disappoint the principal. The desire to not disappoint the principal may lead to higher perceived trust (Path 15), higher reciprocal trust (Path 7) and higher effort (Paths 8 and 10). Principal discretion then would increase effort on the task under contract for both penalty and bonus contracts.

Attribution theory, however, suggests that agents attribute negative personal qualities to the principal as a result of the principal's choice to implement a penalty contract. The attribution of negative personal qualities to the principal will diminish the desire to not disappoint the principal. It follows that the negative effect on effort of lower perceived fairness, lower perceived autonomy and higher perceived intrusion will dominate the positive effect of loss aversion on effort.

The study's second hypothesis follows and is illustrated in Figure 5:

H2: Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.

Figure 5: Predicted Effect of Contract Type and Principal Discretion on Agent Effort for Task Under Contract



3.4.3 Effect of Contract Frame on Agent Effort for Task Not Under Contract

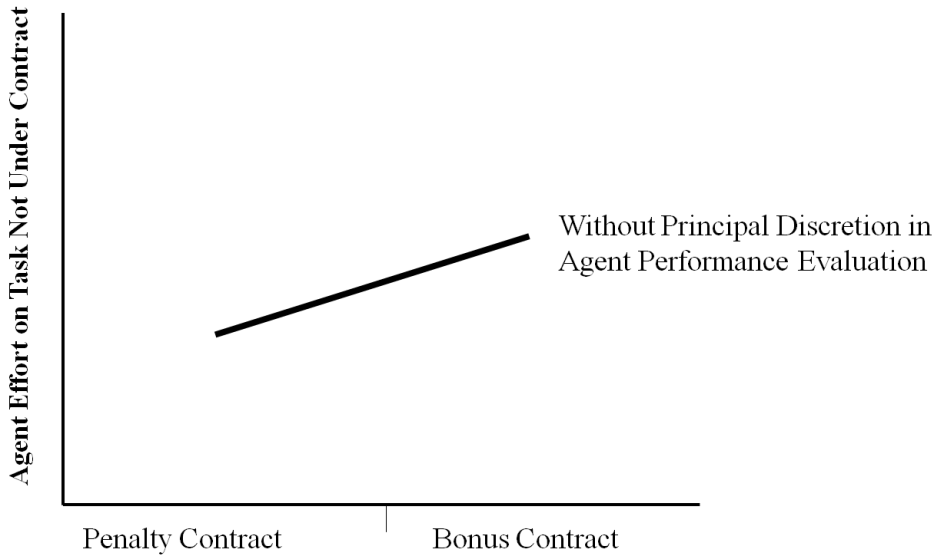
In a setting in which the incentive contract does not govern all tasks for which the agent is responsible, the agent's trust in the principal becomes important in the agent's effort decision for the task not under contract. This setting requires trust because the principal has discretion over the agent's compensation for the ungoverned task. A penalty (bonus) contract leads to lower (higher) perceived fairness (Path 1), higher (lower) expected disappointment (Path 2), higher (lower) levels of perceived intrusion (Path 3) and lower (higher) levels of perceived autonomy (Path 4).

Higher expected disappointment leads to higher (lower) perceived trust (Path 15), higher (lower) reciprocal trust (Path 7) and higher (lower) effort (Path 12). The perceived fairness, perceived intrusion and perceived autonomy effects will dominate the

expected disappointment effect (based on Christ et al. 2012). The perceived fairness effect leads to lower (higher) perceived trust (Path 14), lower (higher) reciprocal trust (Path 7) and to lower (higher) effort (Path 12). The perceived intrusion and perceived autonomy effects lead to higher (lower) levels of questioning competence and questioning integrity (Paths 5a, 5b, 5c and 5d), lower (higher) perceived trust (Paths 6a, 6b), lower (higher) reciprocal trust (Path 7) and lower (higher) effort (Path 12). This leads to the study's third hypothesis which is illustrated in Figure 6:

H3: Agent effort on the task not under contract will be greater under a bonus contract than under a penalty contract.

Figure 6: Predicted Effect of Contract Type on Agent Effort for Task Not Under Contract



3.4.4 Effect of Contract Frame and Principal Discretion on Agent Effort for Task Not Under Contract

This subsection now adds principal discretion in agent performance evaluation to the setting discussed in Section 3.4.3. The agent's trust in the principal is important in the agent's effort decision for the task not under contract because the principal has

discretion over both the agent's performance evaluation and the agent's compensation for the ungoverned task. Under a penalty (bonus) contract, the interaction of incentive contract frame and principal discretion in agent performance evaluation leads to lower (higher) perceived fairness (Path 1), higher (lower) expected disappointment (Path 2), higher (lower) levels of perceived intrusion (Path 3) and lower (higher) levels of perceived autonomy (Path 4).

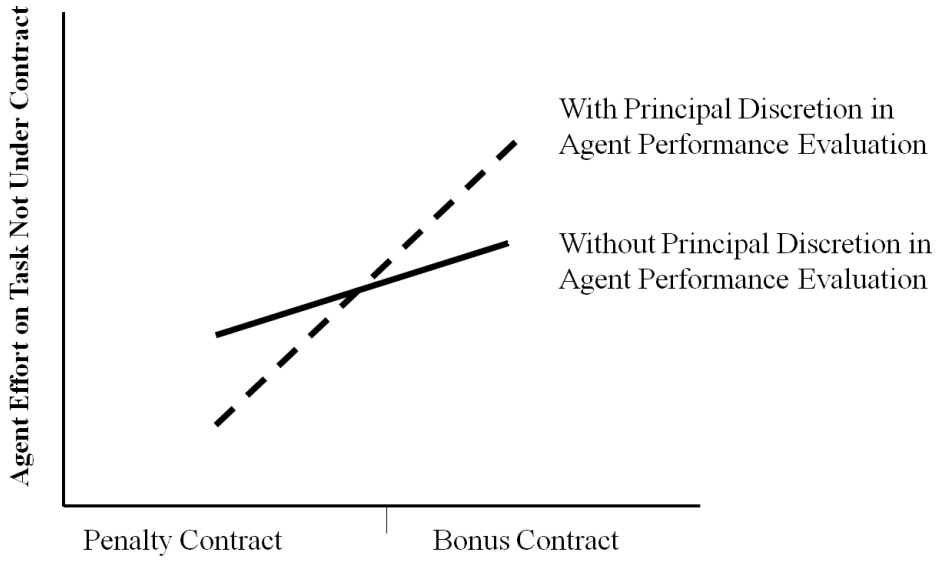
Lower perceived fairness leads to lower (higher) perceived trust (Path 14), lower (higher) reciprocal trust (Path 7) and lower (higher) effort (Path 12). The perceived intrusion and perceived autonomy effects lead to higher (lower) levels of questioning competence and questioning integrity (Paths 5a, 5b, 5c and 5d), lower (higher) perceived trust (Paths 6a, 6b), lower (higher) reciprocal trust (Path 7) and lower (higher) effort (Path 12). Taken together, the study predicts that agent effort on the task not under contract will be lower (higher) under a penalty contract with (without) principal discretion. Also agent effort on the task not under contract will be higher (lower) under a bonus contract with (without) principal discretion.

Notwithstanding this prediction, one reason why principal discretion in agent performance evaluation may result in a main effect instead of an interaction effect is loss aversion. The greater expected disappointment from the interaction of principal discretion and the penalty contract frame (Path 2) may increase aversion to disappointment. Aversion to disappointment may increase the desire to not disappoint the principal. The desire to not disappoint the principal may lead to higher perceived trust (Path 15), higher reciprocal trust (Path 7) and higher effort (Path 12). Principal discretion then would increase effort on the task not under contract for both penalty and bonus contracts.

Attribution theory, however, suggests that agents attribute negative personal qualities to the principal as a result of the principal's choice to implement a penalty contract. The attribution of negative personal qualities to the principal will diminish the desire to not disappoint the principal. It follows that the negative effect on effort of lower perceived fairness, lower perceived autonomy and higher perceived intrusion will dominate the positive effect of loss aversion on effort. The study's last hypothesis follows and is illustrated in Figure 7:

H4: Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task not under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.

Figure 7: Predicted Effect of Contract Type and Principal Discretion on Agent Effort for Task Not Under Contract



Notwithstanding this prediction, one reason why the study may not find the expected interaction for the task not under contract is because workplace norms might influence agent interpretation of principal discretion. Workplace norms may play an

important role especially for tasks that are not under contract. For example, workplace norms related to cooperation, trust and reciprocity may mitigate the negative effect of principal discretion under a penalty contract. Alternatively, workplace norms related to lack of cooperation, mistrust and lack of reciprocity may lessen the positive effect of principal discretion under a bonus contract.

3.5 Chapter Summary

This chapter combines the Hannan et al. (2005) and Christ et al. (2012) models and adds principal discretion in agent performance evaluation to hypothesize how contract framing affects agent behavior. These hypotheses are summarized in the following table:

Table 1: Hypotheses Summary

	Effect of Contract Frame on Agent Effort for Task Under Contract
H1:	Agent effort on the task under contract will be greater under a penalty contract than under a bonus contract.
	Effect of Contract Frame and Principal Discretion on Agent Effort for Task Under Contract
H2:	Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.
	Effect of Contract Frame on Agent Effort for Task Not Under Contract
H3:	Agent effort on the task not under contract will be greater under a bonus contract than under a penalty contract.
	Effect of Contract Frame and Principal Discretion on Agent Effort for Task Not Under Contract
H4:	Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task not under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.

Agent effort on the task under contract is hypothesized to be greater under a penalty contract than under a bonus contract. Agent effort on the task under contract should be lower (higher) under a penalty (bonus) contract with principal discretion than without principal discretion. Agent effort on the task not under contract is expected to be greater under a bonus contract than under a penalty contract. Agent effort on the task not under contract should be lower (higher) under a penalty (bonus) contract with principal discretion than without principal discretion. The next chapter describes the research methodology used to test these predictions.

Chapter 4 Research Method

4.1 Chapter Overview

This chapter describes the research methods used to test the hypotheses developed in Chapter 3 and is structured as follows: Section 4.2 explains the experimental design. Section 4.3 describes the participants, tasks and procedures used in the experiment. Sections 4.4 and 4.5 explain the operationalization of the independent and dependent variables, respectively. Section 4.6 provides descriptions of items found in the complete theoretical model as illustrated in Figure 3. Section 4.7 provides a summary of the chapter.

4.2 Experimental Design

The study uses a 2 (Contract Frame) x 2 (Principal Discretion) between-participants experimental design. Contract Frame is an incentive contract framed either as a bonus contract (hereafter, *bonus contract)* or as a penalty contract (hereafter, *penalty contract). Bonus contract* pays agents a bonus if their performance meets or exceeds the performance target. *Penalty contract* requires agents to pay a penalty if their performance fails to meet the performance target. The study manipulates the second variable - Principal Discretion - by using either an *ex ante* performance target (hereafter, *no principal discretion*) or an *ex post* performance target set by the principal (hereafter, *principal discretion*). The four experimental conditions are: *bonus contract/no principal discretion, bonus contract/principal discretion, penalty contract/no principal discretion*

and *penalty contract/principal discretion*. Two dependent variables are then measured: 1) agent effort on the task under contract and 2) agent effort on the task not under contract. The following table summarizes the 2 x 2 research design.

Table 2: Experimental Design

		Contract Frame	
		Bonus	**Penalty**
Principal Discretion	**No**	Cell 1	Cell 3
	Yes	Cell 2	Cell 4

4.3 Administration of the Experiment

Participants were randomly assigned to one of the four experimental conditions. Unlike Christ et al. (2012), the experiment used a confederate to be the principal rather than a one-to-one pairing between principals and agents. Based on the theory from Chapter 3, the study does not depend on the ratio of agents to principals. Also, whether the principal is a confederate should not affect the results because the principal does not interact with the agents. The study relies on agents believing that the principal is a person who chooses their contracts. This is important because this choice signals the principal's trust in the agent (Christ et al. 2012). The principal's role and principal's compensation scheme in this study are identical to the principal's role and principal's compensation scheme found in Christ et al. (2012).

To make sure that results were not affected by labels, the study referred to the agent role and the principal role as Participant A and Participant B, respectively. Participants remained in the agent role throughout both tasks of the experiment. The

experiment used a single-period model to control for reputation and other social effects that were not the focus of the study.

4.3.1 Participants

Participants were 117 undergraduate students from a large public university who were recruited through the business school's research participation program. Participants received research participation credit and also had the opportunity to earn monetary compensation through their participation in the study.

4.3.2 Task 1 and Task 2 Descriptions

Participants began the experiment with an endowment. Agents in the *bonus contract* conditions were endowed with 850 points and agents in the *penalty contract* conditions started with 1,000 points. The principal began with 250 points in all experimental conditions. At the end of the experiment, participants were paid using the following formula: .025 x Earned Points = Payment in U.S. dollars.

Participants in the experiment completed two computerized tasks which were both adapted from Christ et al. (2012). The first task required agents to select a portfolio of investments for the benefit of the principal. Agents paid for the investments using points from their endowment. Agents could earn a bonus or pay a penalty depending on whether their portfolio achieved a performance target. In the two principal discretion conditions, *bonus contract/principal discretion*, and *penalty contract/principal discretion,* the principal could adjust *ex post* the performance target that determined whether agents received a bonus or paid a penalty.

The first task followed prior literature (e.g. Christ et al. 2012; Fehr et al. 1993) and represented agent effort using a costly choice. The operationalization of effort was

consistent with the agency theory definition of effort (Baiman 1982). Investing in shares was an effort choice that was controlled by agents, resulted in disutility (agents paid for the shares) and increased the probability of reaching the target outcome (Christ et al. 2012, Hannan et al. 2005).

The second task was a modified trust game with agent pay determined entirely by the principal rather than by incentive contracts. Agents purchased investments on behalf of the principal and then the principal decided how much of the investment returns to share with the agent. Similar to Task 1, agents' costly choices represented a measure of agent effort (Christ et al. 2012; Fehr et al. 1993).

4.3.3 Task 1 Procedures

The experimental procedure for Task 1 consisted of nine steps.

1) Enter the Experiment

Participants entered the room and the administrator assigned each participant to a computer station. Once seated, participants were told to follow the instructions on the computer screen.

2) Read the Overview of the Study

Participants read and learned the instructions for both roles (either Participant A or Participant B). After participants had finished reading the instructions, the computer randomly assigned participants to their experimental condition.

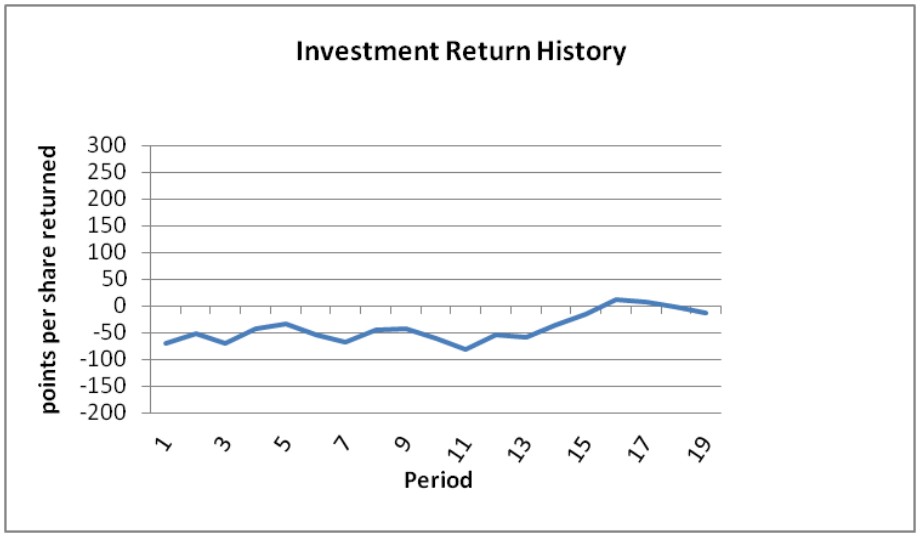
3) Learn about the Agent Investment Decision

Agents had the task of selecting a portfolio of investments from 30 possible investments and paying for their portfolio using their endowment. The goal was to maximize the returns for the principal by selecting the 10 shares that were expected to

make the highest returns in the next period. Agents selected and paid for one share each of 10 different investments which earned points for the principal.

The two types of investments that agents could choose from were either "Bell" or "Whistle" investments. Agents paid 10 points for each Bell share and 25 points for each Whistle share. Although Whistle shares cost more, Whistle shares earned higher returns than Bell shares. Because agents paid for the investments from their endowment, agents preferred to purchase the cheaper Bell shares. The principal, however, favored the more expensive Whistle shares because the Whistle shares earned higher returns. On average, the 15 Bell shares earned approximately 20 points per share in the next period and the 15 Whistle shares earned approximately 50 points per share in the next period. The study provided participants with graphical representations of the previous 19 periods of returns (points per share) for each of the 30 possible investments. The graphs did not show the expected returns for the next period. For example, the graph below shows one investment's return history of points per share (Christ et al. 2012):

Figure 8: Sample Investment Return History



4) Learn about the Principal Contract Implementation Decision

The principal decided which type of control system to implement prior to agents' investment decisions. The control system established a bonus or penalty system that either included or did not include principal discretion. In all four experimental conditions, bonuses (penalties) were paid from (to) an administrators fund rather than from (to) the principal's endowment. This kept the principal's cost of contract implementation (at 50 points) constant across all conditions.

5) Learn about the Principal Discretion Decision (*Discretion* Conditions Only)

Participants learned that the principal could decide whether and how much to adjust the performance target which determined whether or not agents received a bonus in the *bonus contract* condition or paid a penalty in the *penalty contract* condition. The principal could set the target anywhere between 400 and 600 points after they had learned how many points the agent had earned. The principal and agents received this information near the end of the study (after the end of Task 2).

6) Learn about the Agent Compensation Scheme

The agent compensation scheme is illustrated in Table 3:

Table 3: Agent Compensation Scheme

		Bonus Contract	**Penalty Contract**
No Principal Discretion	Total Share Returns < 500	850 points - Cost of Shares	1000 points – Cost of Shares -150 penalty points
	Total Share Returns >= 500	850 points - Cost of Shares + 150 bonus points	1000 points – Cost of Shares
Principal Discretion	Total Share Returns < Performance Target Selected by Principal	850 points - Cost of Shares	1000 points – Cost of Shares -150 penalty points
	Total Share Returns >= Performance Target Selected by Principal	850 points - Cost of Shares + 150 bonus points	1000 points – Cost of Shares

Agents began with an endowment of 850 points in the two *bonus contract* conditions and 1,000 points in the two *penalty contract* conditions. Agents paid for the 10 shares selected (10 points for each Bell share and 25 points for each Whistle share) from this fund. Agents could earn or lose points depending on their assigned condition.

In the *bonus contract/no principal discretion* condition, agents received a 150-point bonus if the total amount of points earned from the 10 shares equaled or exceeded 500 points. If the total return from the 10 shares was less than 500 points, agents did not receive a bonus. In the *bonus contract/principal discretion* condition, agents received a

150-point bonus if the total amount of points earned from the 10 shares equaled or exceeded the performance target selected by the principal. If the total return from the 10 shares was less than the selected target, agents did not receive a bonus.

For example, suppose the agent chose 7 Bell shares and 3 Whistle shares. Also assume that the returns for these investments exceeded 500 points in the *bonus contract/no principal discretion condition* or exceeded the performance target selected by the principal in the *bonus contract/principal discretion* condition. The agent's payoff will equal 850 – (7 x 10) – (3 x 25) + 150 = 855 points. If the returns for the investments were less than 500 in the *bonus contract/no principal discretion condition* or were less than the performance target selected by the principal in the *bonus contract/principal discretion condition*, the agent's payoff will equal 850 – (7 x 10) – (3 x 25) = 705.

In the *penalty contract/no principal discretion* condition, agents paid a penalty of 150 points if the total return from their selected investments was less than 500 points. If the return from the investments was 500 points or above, then agents did not pay a penalty. In the *penalty contract/principal discretion* condition, agents paid a penalty of 150 points if the total return from their selected investments was less than the performance target selected by the principal. If the total return from the 10 shares equaled or exceeded the performance target selected by the principal, then agents did not pay a penalty.

For example, suppose the agent chose 7 Bell shares and 3 Whistle shares. Also assume that returns for these investments were less than 500 points in the *penalty contract/no principal discretion* condition or were less than the performance target selected by the principal in the *penalty contract/principal discretion condition*. The

agent's payoff will equal 1000 – (7 x 10) – (3 x 25) – 150 = 705 points. If the total return for the investments exceeded 500 in the *penalty contract/no principal discretion* condition or the performance target selected by the principal in the *penalty contract/principal discretion* condition, the agent's payoff will equal 1000 – (7 x 10) – (3 x 25) = 855.

6) Learn about the Principal Compensation Scheme

The principal compensation scheme is illustrated in Table 4:

Table 4: Principal Compensation Scheme

		Bonus Contract	**Penalty Contract**
No Principal Discretion	Total Share Returns < 500	250 points + total share returns – 50 points for cost of control system	250 points + total share returns – 50 points for cost of control system
	Total Share Returns >= 500	250 points + total share returns – 50 points for cost of control system	250 points + total share returns – 50 points for cost of control system
Principal Discretion	Total Share Returns < Performance Target Selected by Principal	250 points + total share returns – 50 points for cost of control system	250 points + total share returns – 50 points for cost of control system
	Total Share Returns >= Performance Target Selected by Principal	250 points + total share returns – 50 points for cost of control system	250 points + total share returns – 50 points for cost of control system

The principal was endowed with 250 points in all conditions. The principal received the total return from the 10 shares selected by the agent. Because the principal chose to implement the control system, the principal paid 50 points. The number of points the principal earned depended on the total return of the shares selected by the agent: Principal points = 250 points + total return on shares selected by the agent – cost of control system. For example, suppose the total return of the 10 shares selected by the agent was 400. The principal's payoff will equal 250 + 400 – 50 = 600 points.

7) Answer Questions

Participants completed a series of questions to test their understanding of the two roles and the compensation schemes and were required to answer these questions correctly before continuing.

8) Make Contract Implementation (Principal) or Investment Decisions (Agents)

The principal randomly assigned participants to either a bonus or penalty control system that either included or did not include principal discretion. The computer then informed agents of the principal's decision. Agents then viewed the graphs and made investment decisions. In order not to affect the Task 2 results, actual returns from Task 1 were not made known to participants until after the end of Task 2.

9) Complete Task 1 Questionnaire

Agents used a 100-point Likert scale ranging from "not at all" to "a great deal" to indicate their perception of: 1) how fair their contracts were and 2) how disappointed they will be if they did not receive the bonus or had to pay the penalty (Hannan et al. 2005). Using the same scale, agents also specified how much: 1) the principal intruded into their decisions 2) they had decision-making autonomy 3) the principal questioned their

competence 4) the principal questioned their integrity 5) the principal trusted them and 6) they trusted the principal (Christ et al. 2012).

4.3.4 Task 2 Procedures

The experimental procedure for Task 2 consisted of five steps.

1) Read Overview of Task

Participants began with the points remaining from the first task but participants did not know their exact point totals. They learned that they had at least 600 points remaining to complete Task 2.

2) Learn about Agent Investment Decision

Agents decided how many Horn shares to purchase (instead of Bell shares and Whistle shares). Unlike Task 1, agents knew the return per Horn share for the next period (30 points per share) and agents were able to purchase from 0 to 50 Horn shares (instead of only one share) using their endowments. The principal earned the returns from the Horn shares. All participants learned that the principal was allowed to share any amount of the Horn investment returns with the agent.

3) Learn about Principal Pay Decision

The principal learned the number of shares the agent purchased and then decided how much to return to the agent.

4) Answer Questions

Participants completed a short series of questions to test their understanding of the task and were required to answer these questions correctly before continuing.

5) Make Horn Investment Decision

Agents decided how many Horn shares to purchase. The computer notified the principal of the amount purchased by the agent. The principal then used his discretion to decide how much to return to the agent. Reciprocity theory suggests that the amount returned by the principal to the agent would be in proportion to the amount initially transferred by the agent to the principal (Falk & Fishbacher 2006).

After the completion of Task 2, the principal learned the total returns from Task 1 for the agents assigned to the *principal discretion* experimental conditions. The principal used his discretion to choose a target level between 400 and 600 points. Agents paid (did not pay) the penalty if their point total was below (above) the target level chosen by the principal in the *penalty contract/principal discretion* condition. Agents did not receive (received) the bonus if their point total was below (above) the target level chosen by the principal in the *bonus contract/principal discretion* condition.

Participants then completed an exit questionnaire that included demographic and manipulation check questions. Participants were paid and then dismissed.

4.4 Operationalization of the Independent Variables

The two independent variables, contract frame and principal discretion in agent performance evaluation, were manipulated between subjects. All independent variables were explained in the initial instructions provided to the participants. Participants were required to correctly answer questions to show their understanding before they continued the experiment.

4.4.1 Incentive Contract Frame

Incentive contract frame was manipulated by using either a contract frame that rewards agents who meet or exceed a certain performance target with a bonus (*bonus contract*) or a contract frame that penalizes agents who fail to meet a certain performance target with a penalty (*penalty contract*). The study maintained economic equivalence across contract frame conditions.

4.4.2 Principal Discretion in Agent Performance Evaluation

Principal discretion in agent performance evaluation was manipulated by using either an *ex ante* performance target (*no principal discretion*) or an *ex post* performance target set by the principal (*principal discretion*). In the two *no principal discretion* conditions, the study used a performance target of 500 points to determine whether agents received a bonus or paid a penalty. In the two *principal discretion* conditions, the study allowed (but did not require) the principal to choose a performance target between 400 to 600 points. The principal was allowed to make the adjustment after knowing the agent's performance.

Consistent with how discretionary adjustments are used in practice, the study intentionally created *ex ante* uncertainty in two different ways. First, the study informed participants that the principal was not required to adjust the performance target. This created uncertainty as to whether the principal would use discretion. Second, the condition stated that the principal could select any performance target between 400 and 600 points. This created uncertainty as to the level of the performance target.

4.4.3 Summary of Independent Variables

The following table summarizes the manipulations of the independent variables:

Table 5: Operationalization of Independent Variables

Independent Variable	Manipulations	
• Contract Frame	Bonus Contract	-Agents receive a bonus of 150 points if performance meets or exceeds a performance target.
	Penalty Contract	-Agents pay a penalty of 150 points if performance fails to meet a performance target
• Principal Discretion	No Principal Discretion	-Performance target to determine bonus or penalty is set *ex ante* at 500 points
	Principal Discretion	-Principal chooses the performance target that determines whether agents receive a bonus or pay a penalty (between 400 – 600)

4.5 Operationalization of the Dependent Variables

The study measured two dependent variables: agent effort on the task under contract and agent effort on the task not under contract. The following table summarizes the measurement of the dependent variables.

Table 6: Operationalization of Dependent Variables

Dependent Variables	Operational Definition
• Effort on Task Under Contract	Total cost of all shares purchased in Task 1
• Effort on Task Not Under Contract	Total number of Horn investments purchased in Task 2

4.6 Other Items in the Complete Theoretical Model

The complete theoretical model (see Figure 3) uses agents' responses from the Task 1 Questionnaire as well as the total number of points earned by agents for each of

the two tasks. All questions from the Task 1 Questionnaire used a 100-point Likert scale ranging from "not at all" to "a great deal." The following table summarizes the other items in the complete theoretical model:

Table 7: Other Items in the Complete Theoretical Model

Item	Item Description
• Perceived Fairness	To what extent agents thought that their contracts were fair
• Expected Disappointment	To what extent agents thought they will be disappointed if they had to pay the penalty or did not receive the bonus
• Perceived Autonomy	To what extent agents felt that they had the autonomy to make decisions
• Perceived Intrusion	To what extent agents felt that the principal had intruded on agents' decisions
• Signal of Questioning Competence	To what extent agents felt that the principal questioned agents' competence
• Signal of Questioning Integrity	To what extent agents felt that the principal questioned agents' integrity
• Perceived Trust	To what extent agents felt trusted by the principal
• Reciprocal Trust	To what extent agents trusted the principal
• Performance on Task Under Contract	Total number of points in Task 1
• Performance on Task Not Under Contract	Total number of points in Task 2

4.7 Chapter Summary

This chapter described the experimental design, the participants in the experiment, the experimental tasks and procedures, the operationalization of the independent and dependent variables and the other items in the complete theoretical model. The experimental design combined the Hannan et al. (2005) and Christ et al. (2012) models and added principal discretion in agent performance evaluation. The first task of the experiment manipulated both the contract frame and the use of principal discretion. The

principal paid agents using either a bonus or penalty contract and either did or did not have discretion to change the performance target which determined whether agents received a bonus or paid a penalty. The second task was a modified trust game where pay was at the discretion of the principal. The expected statistical tests that will be used to analyze the study's four hypotheses and to test the complete theoretical model (see Figure 3) are presented in the next chapter.

Chapter 5 Data Analysis and Results

5.1 Chapter Overview

Section 5.2 explains the determination of the sample size and checks the data for random assignment, normality and equal variances. Section 5.3 tests the four hypotheses generated in Chapter 3. Section 5.4 tests the complete theoretical model as depicted in Figure 3. Section 5.5 concludes with a summary of the results.

5.2 General Analysis

An a priori power analysis was conducted to determine the total sample size required for the study. The effect sizes from both Hannan et al. (2005) and Christ et al. (2012) were used to estimate the effect size for the power analysis. The effect size for Hannan et al. (2005) was medium (d =.55) and the effect size for Christ et al. (2012) was large (d =.77). When alpha is set at .05 along with a medium effect size for eta squared set at .0625 and power set at .80, it was determined that that a total sample size of 116 was required for a MANOVA with four groups (i.e. n =29 pairs for each group).

This study has two categorical independent variables, contract frame and principal discretion in agent performance evaluation and two continuous dependent variables, agent effort for the task under contract and agent effort for the task not under contract. Multivariate analysis of variance (MANOVA) should be used to examine the relationship between categorical independent variables and two or more dependent variables (Huck 1974) if the data meet three requirements: 1) random assignment of participants to the study conditions 2) all groups come from normal populations and 3) all groups come from populations with equal variances. If the data fail to meet these requirements, then

nonparametric tests should be used. The next two sections. 5.2.1 and 5.2.2 examine whether the data meet these three requirements.

5.2.1 Random Assignment

Participants randomly signed up for seven experiment sessions over two days. All four experimental conditions were run in each session. Participant demographics were collected in the post-experimental questionnaire to assure that participants were randomly distributed across the four experimental conditions. Not finding any differences in participant demographics across experimental conditions provides support to the assumption of random assignment. The following table summarizes the mean responses by cell:

Table 8: Participant Demographics by Experimental Condition

	Bonus Contract/ No Principal Discretion	**Bonus Contract/ Principal Discretion**	**Penalty Contract/ No Principal Discretion**	**Penalty Contract/ Principal Discretion**	**P Value**
Age	20.3	20.8	20.0	21.2	.22
Gender	1.50	1.64	1.57	1.35	.14
Experience	.68	1.25	.61	1.89	.21

Experience is the number of years of full-time work experience. Gender is coded "0" for male and "1" for female. All demographic variables were not significantly different across cells. This analysis suggests that the participants were randomly assigned to experimental treatments.

5.2.2 Compliance with ANOVA's Normality and Equal Variance Assumptions

The Shapiro-Wilk test was used to test whether the data for the two dependent variables come from populations with normal distributions. The null-hypothesis of this test is that the population is normally distributed. Therefore, if the p-value is greater than .05, the null hypothesis that the data come from a normally distributed population cannot be rejected. The p-value for Effort on Task Under Contract,1.0, and Effort on Task Not Under Contract, .18, are both greater than .05. This would suggest that the data come from a normally distributed population.

The standard deviations across cells suggest that the variables meet the equal variances assumption. These statistics are in Table 9:

Table 9: Dependent Variable Standard Deviations by Cell

	Bonus Contract/ No Principal Discretion	Bonus Contract/ Principal Discretion	Penalty Contract/ No Principal Discretion	Penalty Contract/ Principal Discretion
Standard Deviation				
Effort on Task Under Contract	13.49	13.31	17.24	16.53
Effort on Task Not Under Contract	14.74	14.58	18.20	15.81

5.3 Tests of Hypotheses

This section examines whether each hypothesis was supported or not supported.

5.3.1 Effect of Contract Frame on Agent Effort for Task Under Contract

In a contract setting without principal discretion, agent trust is not required for the task under contract because the incentive contract specifies the payout for each potential outcome. Expected disappointment will be higher under a penalty contract than under a bonus contract. Therefore, agent effort on the task under contract will be greater under a penalty contract than under a bonus contract because greater expected disappointment will result in higher agent effort. Hypothesis 1 states:

> **H1**: Agent effort on the task under contract will be greater under a penalty contract than under a bonus contract.

Table 10: Mean Effort on Task Under Contract by Experimental Condition

		Contract Frame	
		Bonus	**Penalty**
Principal Discretion	**No**	173.0	179.5
	Yes	171.25	175.0
		172.16	177.29

Using a t-test, the mean effort on the task under contract in the *penalty contract* condition, 177.29, was significantly higher ($t = 1.82$, $p = .03$) than in the *bonus contract* condition, 172.16. This result supports Hypothesis 1.

5.3.2 Effect of Contract Frame and Principal Discretion on Agent Effort for Task Under Contract

This subsection adds principal discretion in agent performance evaluation to the previous hypothesis from Section 5.3.1. The agent's trust in the principal becomes important in the agent's effort decision for the task under contract because the principal has discretion over the agent's performance evaluation. Attribution theory suggests that agents attribute negative (positive) personal qualities to the principal as a result of the

principal's choice to implement a penalty (bonus) contract. The attribution of negative (positive) personal qualities to the principal diminishes (increase) agent effort.

The study's second hypothesis follows:

H2: Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.

The mean effort on the task under contract in the *bonus contract/no principal discretion* condition, 173.0, was higher than in the *bonus contract/principal discretion* condition, 171.25. Also, the mean effort on the task under contract in the *penalty contract/no principal discretion* condition, 179.5, was higher than in the *penalty contract/principal discretion* condition, 175. Although the difference was in the correct direction for the *penalty contract* conditions, the difference was not in the correct direction for the *bonus contract* conditions. The overall differences are not statistically significant ($F = 1.59$, $p = .19$) and Hypothesis 2 is not supported.

Table 11: Effect of Frame and Discretion on Effort for Task Under Contract

Panel A: ANOVA on Effort for Task Under Contract

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Model	3	1113.558	371.186	1.5931	0.1950
Error	113	26328.750	232.998		
C. Total	116	27442.308			

Panel B: Effect Tests on Effort for Task Under Contract

Source	DF	Sum of Squares	F Ratio	Prob > F
Frame	1	767.6432	3.2946	0.0722
Discretion	1	285.4117	1.2250	0.2707
Frame*Discretion	1	55.2570	0.2372	0.6272

One reason for this result may be that the effort measure, Effort on Task Under Contract, did not provide enough variance to show different levels of effort. The number of points used to purchase Bell and Whistle shares were grouped mainly around only five amounts, 205, 190, 175, 160 and 145. Five levels may not have been enough to show significant effort differences across four different experimental conditions. The frequency for each level of Effort on Task Under Contract is shown in the following table:

Table 12: Distribution Count of Effort for Task Under Contract

Points	Frequency	Percent
130	1	.85
145	6	5.13
160	30	25.64
175	44	37.61
190	30	25.64
205	5	4.27
220	1	.85
Total	**117**	**100.00**

5.3.3 Effect of Contract Frame on Agent Effort for Task Not Under Contract

In a setting in which the incentive contract does not govern all tasks for which the agent is responsible, the agent's trust in the principal becomes important in the agent's effort decision for the task not under contract. This setting requires trust because the principal has discretion over the agent's compensation for the ungoverned task. A penalty (bonus) contract leads to lower (higher) perceived fairness, higher (lower) expected disappointment, higher (lower) levels of perceived intrusion and lower (higher) levels of perceived autonomy. These effects lead to lower (higher) reciprocal trust and lower (higher) effort.

This leads to the study's third hypothesis:

H3: Agent effort on the task not under contract will be greater under a bonus contract than under a penalty contract.

Table 13: Mean Effort on Task Not Under Contract by Experimental Condition

		Contract Frame	
		Bonus	**Penalty**
Principal Discretion	**No**	28.23	27.30
	Yes	32.32	27.38
		30.21	27.34

Using a t-test, the mean effort on the task not under contract in the *bonus contract* condition, 30.21, was not significantly higher ($t = -.98$, $p = .16$) than in the *penalty contract* condition, 27.34. This result does not support Hypothesis 3.

Loss aversion may explain the lack of support for Hypothesis 3. A significant discrepancy exists between participants in the *penalty contract* and *bonus contract* conditions who chose the highest effort level for the Task not under Contract (50 horn

shares). Participants who chose this highest level of effort were 25% of the total number of participants. Participants in the *bonus contract* condition had significantly higher Reciprocal Trust and significantly lower Expected Disappointment than participants who chose the highest effort level in the *penalty contract* condition. These results suggest that participants in the *penalty contract* condition who chose the highest effort level may have thought that choosing a higher effort level would result in a higher return.

5.3.4 Effect of Contract Frame and Principal Discretion on Agent Effort for Task Not Under Contract

This subsection now adds principal discretion in agent performance evaluation to the setting discussed in Section 5.3.3. The agent's trust in the principal is important in the agent's effort decision for the task not under contract because the principal has discretion over both the agent's performance evaluation and the agent's compensation for the ungoverned task. Attribution theory suggests that agents would attribute negative (positive) personal qualities to the principal as a result of the principal's choice to implement a penalty (bonus) contract. The attribution of negative (positive) personal qualities to the principal would diminish (increase) agent effort.

The study's last hypothesis follows:

H4: Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task not under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.

The mean effort on Task Not Under Contract was higher in the *bonus contract/principal discretion* condition, 32.3, than in the *bonus contract/no principal discretion* condition, 28.23. Also, the mean effort on Task Not Under Contract was nearly the same in the *penalty contract/principal discretion* condition, 27.38, as compared to the

penalty contract/no principal discretion condition, 27.30. Although the difference was in the correct direction for the *bonus contract* conditions, the difference was not in the correct direction for the *penalty contract* conditions. The overall differences were not statistically significant (F = .64, p = .59) and Hypothesis 4 is not supported.

Table 14: Effect of Frame and Discretion on Effort for Task Not Under Contract

Panel A: ANOVA on Effort for Task Not Under Contract

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Model	3	482.698	160.899	.6348	0.5941
Error	113	28642.601	253.474		
C. Total	116	29125.299			

Panel B: Effect Tests on Effort for Task Not Under Contract

Source	DF	Sum of Squares	F Ratio	Prob > F
Frame	1	252.2285	0.9951	0.3206
Discretion	1	126.8946	0.5006	0.4807
Frame*Discretion	1	117.4187	0.4632	0.4975

One reason for the lack of support for Hypothesis 4 is similar to the reason for Hypothesis 3. In the group of participants who chose the highest effort level for Task Not Under Contract (50 horn shares), Expected Disappointment was significantly higher in the *penalty contract/principal discretion* condition than in the *penalty contract/no principal discretion* condition. Participants may have thought that choosing a higher effort level would result in a higher return. Choosing the highest effort level may have been an attempt to recoup expected financial losses from the first task.

5.4 Test of Complete Theoretical Model

To further assess the underlying reason for why effort is different between the penalty and bonus contract frame conditions, the study uses path analysis with structural equation modeling methodology (SEM) to estimate the model found in Figure 3. The study also uses path analysis with structural equation modeling methodology (SEM) to assess whether contract frame and principal discretion interact and how the interaction affects any of the variables found in the model.

Table 15 provides descriptive statistics for all of the variables in the complete model as depicted in Figure 3:

Table 15: Descriptive Statistics for the Complete Model

Means (standard deviations in italics)	**Bonus Contract/ No Principal Discretion** **n = 30**	**Bonus Contract/ Principal Discretion** **n = 28**	**Penalty Contract/ No Principal Discretion** **n = 30**	**Penalty Contract/ Principal Discretion** **n = 29**
Effort on Task Under Contract[a]	173.00 *13.49*	171.25 *13.31*	179.50 *17.24*	175.00 *16.53*
Effort on Task Not Under Contract[b]	28.23 *14.74*	32.32 *14.58*	27.30 *18.20*	27.38 *15.81*
Perceived Fairness[c]	72.20 *23.40*	74.39 *16.47*	56.97 *26.93*	70.76 *21.55*
Expected Disappointment[c]	74.37 *30.28*	77.71 *23.00*	81.97 *23.37*	74.93 *32.83*
Perceived Intrusion[c]	33.77 *23.10*	46.04 *28.53*	38.73 *31.77*	39.79 *29.63*
Perceived Autonomy[c]	76.10 *20.03*	69.00 *24.06*	73.13 *21.46*	73.86 *23.29*
Signal of Questioning Competence[c]	51.57 *34.14*	51.29 *28.92*	55.90 *30.14*	46.90 *27.35*
Signal of Questioning Integrity[c]	44.00 *32.57*	41.68 *30.22*	45.23 *30.76*	36.48 *26.48*
Perceived Trust[c]	55.10 *30.46*	44.43 *26.77*	41.93 *27.15*	38.62 *26.70*
Reciprocal Trust[c]	52.27 *28.83*	53.86 *26.17*	46.53 *25.91*	43.07 *20.26*

[a]Effort on Task Under Contract is measured using the number of points participants used to purchase Bell and Whistle shares during Task 1 of the experiment.

[b]Effort on Task Not Under Contract is measured using the number of Horn shares participants purchased during Task 2 of the experiment.

[c]Participants answered the following questions using a 100-point Likert scale (0 = not at all to 100 = a significant amount):

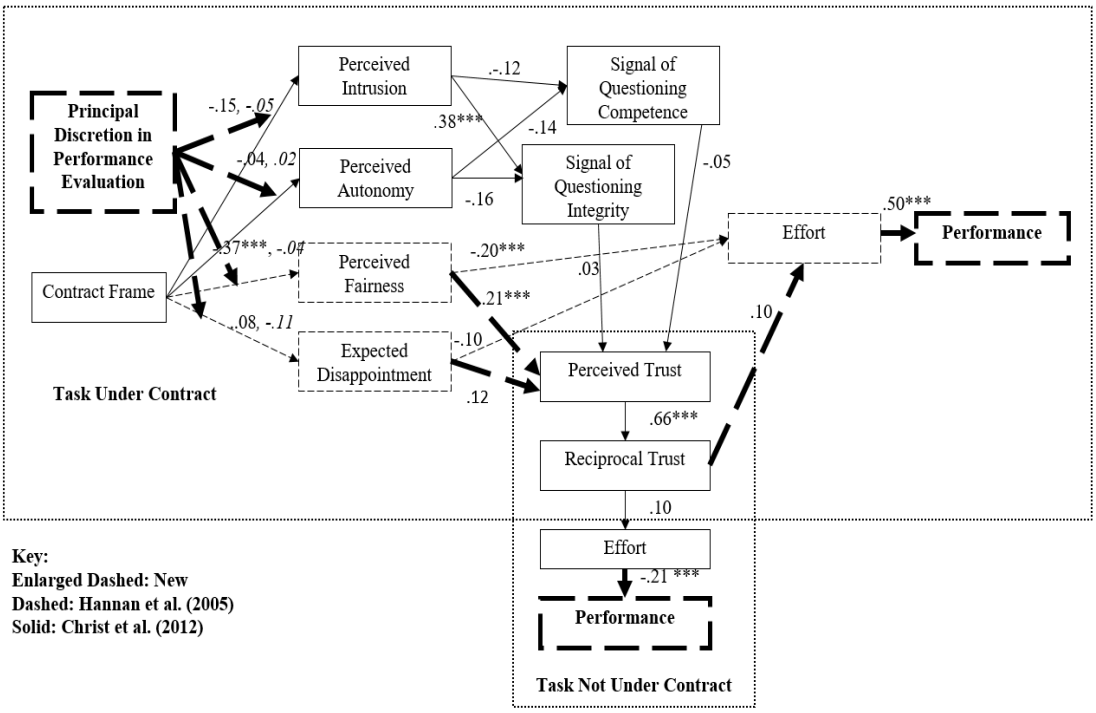
- To what extent do you feel that Participant B's control system is fair? (Perceived Fairness)
- To what extent would you be disappointed if you did not receive the bonus or had to pay the penalty? (Expected Disappointment)
- To what extent do you feel that Participant B has intruded on your decisions? (Perceived Intrusion)
- To what extent do you feel that you have the autonomy to make decisions? (Perceived Autonomy)
- To what extent do you feel that Participant B questions your competence? (Signal of Questioning Competence)
- To what extent do you feel that Participant B questions your integrity? (Signal of Questioning Integrity)
- To what extent do you feel that Participant B trusts you? (Perceived Trust)
- To what extent do you trust Participant B (Reciprocal Trust)

To assess the data for the complete model, the study uses the Shapiro-Wilk test to test for the normality of the data. The test shows that the data for all of the variables are not distributed normally except for Effort on Task Under Contract, Effort on Task Not Under Contract and Reciprocal Trust. The study transforms the data for all of the variables using a log transformation.

To assess whether the data fits the complete model, the study uses a goodness of fit test. The Comparative Fit Index (CFI) indicates the relative improvement in fit of the model compared to the null model (Kline 2005). The Comparative Fit Index for the complete model is .92 which is above the recommended minimum value of .90 or greater (Kline 2005). The fit of the complete model is confirmed with the Root Mean Square Error of Approximation test. The Root Mean Square Error of Approximation (RMSEA) is related to residuals in the model (Kline 2005). RMSEA values range from 0 to 1 with a smaller RMSEA value indicating a better fit. RMSEA for the complete model is .05 which is below the acceptable maximum of .06 (Kline 2005). Thus, the model provides a good fit for the data.

The standardized path coefficients and statistical significance for the complete model are presented in Figure 9:[3]

Figure 9: Test of Full Model: Interaction of Contract Frame and Principal Discretion



Results indicate that there is an interaction between principal discretion and contract frame and this interaction has a significant effect on Perceived Fairness. Specifically, Perceived Fairness is significantly lower for the *penalty contract/no principal discretion* condition as compared to the *bonus contract/no principal discretion* (-.37, $p < .01$). When principal discretion is included, Perceived Fairness is not significantly different between the *penalty contract/principal discretion* and *bonus contract/principal discretion* conditions (-.04, $p = .70$). Path analysis confirms that the

[3] To test for the interaction between contract frame and principal discretion, the study estimates the model for two groups: *no principal discretion* and *principal discretion*. Each of the four hypothesized interactions contain two standardized path coefficients, one for each group. The first coefficient is the coefficient for the *no principal discretion* group and the second coefficient is for the *principal discretion* group.

effect of Contract Frame on Effort on Task Under Contract, as discussed in Section 5.3.1, occurs through Perceived Fairness. Contract Frame is negatively associated with Perceived Fairness (-.37, $p < .01$). Perceived Fairness is negatively associated with Effort on Task Under Contract (-.20, $p < .01$). The combination of these paths demonstrates that Effort on Task Under Contract is higher under a penalty contract than under a bonus contract.

Path analysis also shows that the effect of Contract Frame on Reciprocal Trust occurs through Perceived Fairness. Perceived Fairness is positively associated with Perceived Trust (.21, $p < .01$). Perceived Trust is positively associated with Reciprocal Trust (.66, $p < .01$). The combination of these two paths shows that Perceived Trust is lower (higher) under a penalty (bonus) contract frame than under a bonus (penalty) contract frame.

In sum, the interaction between contract frame and principal discretion impacts the perceived fairness of the contract. Principal discretion has a significant positive effect on perceived fairness only under a penalty contract. The results also show that principal discretion eliminates the differences in perceived fairness between a bonus contract and a penalty contract.

Also, effort on a task under a penalty contract is higher than effort on a task under a bonus contract. Contrary to prior research, the higher effort under a penalty contract is a result of how agents view the perceived fairness of their contract rather than through the effect of expected disappointment (Hannan et al. 2005).

Results also show that a penalty contract has a negative effect on the trust environment and this effect lowers perceived trust and reciprocal trust. In contrast to

prior research, the negative effect of a penalty contract occurs through how agents view the fairness of their contract rather than through the signaling effect found in Christ et al. (2012).

5.5 Summary of Results

This section discusses the results of the test of the hypotheses and the results of the path analysis. The results of the test of the hypotheses are listed in the following table:

Table 16: Summary of Results of Tests of Hypotheses

	Effect of Contract Frame on Agent Effort for Task Under Contract	
H1:	Agent effort on the task under contract will be greater under a penalty contract than under a bonus contract.	Supported
	Effect of Contract Frame and Principal Discretion on Agent Effort for Task Under Contract	
H2:	Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.	Not Supported
	Effect of Contract Frame on Agent Effort for Task Not Under Contract	
H3:	Agent effort on the task not under contract will be greater under a bonus contract than under a penalty contract.	Not Supported
	Effect of Contract Frame and Principal Discretion on Agent Effort for Task Not Under Contract	
H4:	Principal discretion in agent performance evaluation will moderate the relationship between incentive contract and agent effort on the task not under contract such that agent effort under a penalty (bonus) contract will be lower (higher) with principal discretion than without principal discretion.	Not Supported

Agent effort on the task under contract was significantly greater in the *penalty contract* condition than in the *bonus contract* condition. This result supports Hypothesis 1.

Agent effort on the task under contract in the *penalty contract/principal discretion* condition was not significantly lower than in the *penalty contract/no principal discretion* condition. Also, agent effort on the task under contract in the *bonus contract/principal discretion* condition was not significantly higher than in the *bonus contract/no principal discretion* condition. These results do not support Hypothesis 2.

Agent effort on the task not under contract was not significantly greater in the *bonus contract* condition than in the *penalty contract* condition. Hypothesis 3 is not supported.

Agent effort on the task not under contract was not significantly lower in the *penalty contract/principal discretion* condition than in the *penalty contract/no principal discretion* condition. Also, agent effort on the task not under contract was not significantly higher in the *bonus contract/principal discretion* condition than in the *bonus contract/no principal discretion* condition. These results do not support Hypothesis 4.

Structural equations-based path analysis of the complete model (see Figure 9) shows that the interaction between contract frame and principal discretion affects perceived fairness. Further analysis of the model indicates that effort for a task under contract is higher under a penalty contract than under a bonus contract. Also, perceived trust and reciprocal trust are lower under a penalty contract than under a bonus contract.

The contribution of these results is discussed in Chapter 6.

Chapter 6 Summary

6.1 Chapter Overview

This chapter provides a summary of the results and discusses their implications and limitations. Section 6.2 summarizes the research questions and the findings of the study. Section 6.3 explains the limitations of the study. Section 6.4 suggests areas for future research.

6.2 Summary and Implications

6.2.1 Summary

The design of incentive compensation plans is critical to a company's success. An incentive contract can be framed as either a bonus that rewards agents for achieving certain performance goals or as a penalty that decreases compensation if agents fail to meet performance goals. The effect of bonuses and penalties on agent effort remains unclear because prior research shows varied results that depend not only on the contractual setting but also on how effort is measured. In a contract setting without principal discretion, agent effort on a task under contract was higher under penalty contracts than under bonus contracts (Hannan et al. 2005). However, in a contract setting with principal discretion, bonus contracts induce greater effort than penalty contracts on a subsequent task not under contract (Christ et al. 2012). A number of differences between these two studies exist that make the results difficult to compare.

This study combines the two models from prior literature to examine the means by which incentive contract framing affects effort. This study uses an experiment to vary both the incentive contract frame and the two contract settings within the same study.

This study then examines the effect of this manipulation on the two different effort measures. As a result, this study addresses the need to understand the underlying mechanisms for how incentive contract framing affects agent effort.

Principal discretion in agent performance evaluation is commonly used with incentive contracts in practice. Principal discretion in agent performance evaluation means that principals use subjective judgment rather than objective measures to assess agent performance. Prior research suggests that principal discretion can have either positive or negative effects on agent effort. Principal discretion may increase agent effort because principal discretion reduces compensation risk and improves incentive alignment (Bol 2008). Alternatively, principal discretion may decrease agent effort because principal discretion may introduce bias that can blur the link between pay and performance (Bol 2008; Bol et al. 2011).

The joint effect of incentive contract frame and principal discretion in agent performance evaluation on agent effort, however, has not been studied. The question remains as to whether the effect of principal discretion on agent effort varies according to the contract frame. This study uses the new model to examine whether and how incentive contract framing and principal discretion interact to impact agent effort. This study predicts that agents will interpret the use of principal discretion in agent performance evaluation differently under a penalty contract than under a bonus contract and that their interpretation will affect their effort.

This study, however, does not find the predicted interaction of incentive contract frame and principal discretion on agent effort. Specifically, the use of the penalty contract (bonus) contract frame with principal discretion did not lead to a significantly

lower (higher) level of effort than the use of the penalty (bonus) contract frame without principal discretion. Not finding the expected interaction may be due to a weak measure for effort. Therefore, the lack of results due to a weak measure would not necessarily affect finding other results.

Importantly, this study finds an interaction between principal discretion in agent performance evaluation and contract frame. Results of an experiment show that the interaction of principal discretion and contract frame influences how agents view the perceived fairness of their incentive contract. Specifically, principal discretion increases perceived fairness under a penalty contract frame but not under a bonus contract frame. The results of this study also show that the use of principal discretion eliminates the differences in perceived fairness between a bonus contract and a penalty contract.

This results of this study suggest that the use of principal discretion in agent evaluation is more important when an outcome is unfavorable than when an outcome is favorable. Under a favorable outcome such as a bonus contract, people are less likely to seek additional information to make sense of their situation because the situation is favorable. When an outcome is unfavorable such as a penalty contract, people seek additional information to make sense of their situation. The level of procedural fairness provides information that can make sense of the situation. Principal discretion can improve procedural fairness because principals can use their discretion to adjust for the effects of uncontrollable events. Principal discretion then improves perceived fairness especially under an unfavorable outcome such as a penalty contract.

This study also extends prior research by showing that perceived fairness is critical for understanding how incentive contract frame affects effort and trust. The results of this study suggest that perceived fairness explains how contract frame affects effort across the different contract settings of the Hannan et al. (2005) and Christ et al. (2012) models. Specifically, perceived fairness provides not only the primary link between contract frame and effort on a task under contract in Hannan et al. (2005) but also the primary link between contract frame and trust in Christ et al. (2012).

The results of this study document that perceived fairness is the primary path by which contract frame affects effort on a task under contract. The study finds that effort on a task under contract was greater under a penalty contract than under a bonus contract. The primary path by which this occurs, however, is not expected disappointment (Hannan et al. 2005) but perceived fairness. Perceived fairness is lower under a penalty contract than under a bonus contract. Effort on the task under contract is negatively associated with perceived fairness. The results suggest that the unfairness of the penalty contract increases the desire to avoid paying the penalty. This increased desire to avoid paying the penalty results in higher effort on the task under a penalty contract than under a bonus contract.

The results of this study also show that perceived fairness is the primary path by which contract frame affects trust. The study finds that perceived trust is higher under a bonus contract than under a penalty contract. The primary path by which this occurs, however, is not the signaling path of Christ et al. (2012) but the path of perceived fairness. Perceived fairness is higher under a bonus contract. Perceived trust is positively associated with perceived fairness. The results of this study, then, show that

perceived fairness explains not only how contract frame affects effort on the task under contract but also how contract frame affects trust.

6.2.2 Implications

Improving how agents view contracts is important for managers who design and implement incentive contracts. These results suggest that principal discretion in agent performance evaluation offsets the perceived lack of fairness of penalty contracts. Increasing the perceived fairness of penalty contracts will help managers to design better incentive compensation plans.

The results of this study contribute to the incentive contract framing literature by documenting that principal discretion in agent performance evaluation changes the perceived unfairness of penalty contracts. Prior literature shows that agents view bonus contracts as fairer than penalty contracts (Hannan et al. 2005). However, this study shows that the use of principal discretion increases the perceived fairness of a penalty contract to nearly the same level as a bonus contract.

The results of this study also contribute to a second stream of literature that examines principal discretion in agent performance evaluation. This literature documents various benefits and costs of principal discretion and generally focuses on the principal's decision to use discretion. By contrast, the results of this study show the effects of principal discretion on agents. Specifically, the results show that principal discretion in agent performance evaluation could significantly reduce the differences in perceived fairness between a bonus contract and a penalty contract.

6.3 Limitations of the Study

The study used a computerized laboratory setting that was designed to improve the study's internal validity. This setting, however, creates several potential limitations regarding the study's external validity.

The first limitation to generalizability is the use of student participants. Student participants may react differently than employees who are have prior experience with contracts or principal discretion in agent performance evaluation. A second threat to external validity is the process used to introduce principal discretion. The process takes place anonymously so that participants are not permitted contact with the principal. The experiment did this to control for reputation effects that are outside the scope of this study. A third limitation is that the financial incentives for the study are not in proportion to financial incentives found in a real world setting. The pay incentives were designed to be consistent with past research (Christ et al. 2012) so that insights from this study could be interpreted incrementally.

In conclusion, this study is not designed to be directly generalizable to a real world incentive compensation context. The contribution of the study is to show the effects of manipulating only the use of principal discretion in agent performance evaluation and incentive contract frame on agent perceived fairness.

6.4 Future Research Directions

The results of this study suggest several avenues for future research. First, the study did not find the expected effect of the interaction between principal discretion in agent performance evaluation and contract frame on agent effort for a task under contract.

The measure for effort on the task under contract did not provide enough variance to measure effort for the task under a contract. Future research could determine whether and how an interaction between principal discretion and contract frame affects agent effort on the task under contract by improving the measure used to determine the effort on the task under contract.

Second, the study was not able to determine whether an interaction between principal discretion in agent performance evaluation and contract frame affects effort for the task not under contract. Loss aversion may have contributed to the mixed results. Future research could determine whether and how an interaction between principal discretion and contract frame affects agent effort for a task not under contract by exploring other kinds of tasks not under contract.

Third, this study employed an experiment with a single period. Although the results show that principal discretion improves agent perceived fairness of a penalty contract, it is unclear whether this benefit would continue if the principal and agents engaged in a multi-period experiment. Future research could examine whether the joint effect of principal discretion and incentive contract frame continues to influence agent perceived fairness even after the principal responds to the agent in the next period.

Finally, the study introduced principal discretion with the use of an ex-post adjustment to an objective performance measure. However, prior literature suggests that other types of principal discretion are common in practice (Hoppe and Moers 2011). Future research could explore whether different kinds of principal discretion would have the same effect found in the current study.

Appendix A: Experimental Materials

Part 1 Instructions

DECISION MAKING STUDY

Please do not use your browser's back button at any time.

Please click the "Next" button to continue.

INSTRUCTIONS

General

You are about to participate in a study on decision making. Please read the instructions carefully because the amount of money you earn will depend in part on your decisions. Also there will be several short quizzes on these instructions to ensure your understanding, and you will not be able to continue until you accurately complete the quizzes, so please pay close attention.

Please turn off cell phones and similar devices now.

Please do not talk at all during this experiment.

If you have any questions, please raise your hand and the Administrator will answer you in private.

Please click the "Next" button to continue.

Overview of the Study

This is a computerized decision making study. We expect the entire session to last approximately 60 minutes, during which time you will be required to answer questions and make decisions.

In this study, **you will assume the role of Participant A**. You will be matched with someone else in the room who will assume the role of Participant B. You will not be told who you are paired with either during or after the study.

You will earn points which can be affected by decisions made by you and/or the person with whom you are paired. These points will be converted to cash and **you will be paid the cash amount before you leave today.** Points will be converted to cash using the following formula:

US $ Payment = (Points earned x .025).

- If you earn 200 points, you will receive US $5.00
- If you earn 500 points, you will receive US $12.50
- If you earn 1000 points, you will receive US $25.00

Please click the "Next" button to continue.

Bonus No Discretion Instructions

Initial Decisions

Overview

As a first step, you will have the task of selecting a portfolio of investments for Participant B. That is, Participant B will earn the returns from the portfolio, but you will choose the specific investments to be included in the portfolio. You will also pay for the investments, but will be given a fund from which to pay.

More specifically, at the start of the study,

- **You** will be given 850 points and
- **Participant B** will be given 250 points.

Your initial fund is larger because you must pay for the investments and Participant B will receive the returns from the investments.

The following instructions will describe in detail the decisions made by you and Participant B.

Please click the "Next" button to continue.

Your Task

You have the task of selecting the portfolio of investments. You will be presented with 30 possible investments. From these 30 investment choices, you ***must select and pay for 1 share each of 10*** of these investments, which will earn points for Participant B. Participant B will hold the shares for one period only and so Participant B's returns will be maximized if you select the 10 shares that are expected to make the highest returns in the next period.

NOTE: You must select 10 different investments and buy exactly one share each of these investments.

Please click the "Next" button to continue

There are two types of investments, BELL investments and WHISTLE investments. The cost per share depends on the investment type.

- Each **BELL** share selected will cost you **10 points**.
- Each **WHISTLE** share selected will cost you **25 points**.

WHISTLE shares are more expensive because on average they are expected to return more per share in the next period than BELL shares. Specifically, BELL shares will earn an average return of 20 points per share, whereas WHISTLE shares will earn an average return of 50 points per share.

Importantly, this is only an average and any individual investment can earn considerably more or less than the average (as you can see by looking at the graphical representations of the investment return history which are provided to you on the large, folded documents and described on the laminated document next to your keyboard).

Please take a moment to review the laminated document. Click the "Next" button after you have read the information on the laminated document.

Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **bonus system** in which you will receive an extra 150 points if the total return of all shares chosen by you is greater than or equal to **500 points**. You will not receive any bonus points if the total return is less than 500 points. The bonus will be paid from the administrator's fund. That is, the bonus will not be deducted from Participant B's fund.

After Participant B decides whether or not to implement a control system, you will be notified of this decision.

Please click the "Next" button to continue.

Your Summary of Points

You will receive an initial fund of 850 points. From this fund, you will pay for the 10 shares you have selected (10 points for each BELL share and 25 points for each WHISTLE share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by you. Thus the payoffs to you for this initial decision are as follows:

	No Control System	**Control System**
Total Share Returns < 500	850 points - Cost of Shares	850 points - Cost of Shares
Total Share Returns >=500	850 points - Cost of Shares	850 points - Cost of Shares + 150 bonus points

For example, suppose Participant B implements the control system and you choose 6 BELL shares and 4 WHISTLE shares. Also assume that the returns for these investments equal or exceed 500 points. Your payoff will equal 850 - (6 x 10) - (4 x 25) + 150 = 840 points.

If Participant B does not implement the control system or the returns for the investments are less than 500, your payoff will equal 850 - (6 x 10) - (4 x 25) = 690 points.

Please click the "Next" button to continue.

Participant B

Participant B will receive the total return from the 10 (ten) shares chosen by you. Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **bonus system** for you.

If Participant B chooses to implement a control system, the cost to Participant B is 50 points.

Summary of Points - Participant B

The total number of points that **Participant B** earns will depend on the total return of the shares chosen by you, and whether or not Participant B chose to implement a control system. Thus the payoffs to Participant B are as follows:

	No Control System	**Control System**
Total Share Returns < 500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
Total Share Returns >=500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

Please click the "Next" button to continue.

Bonus No Discretion Choose Investments

Please wait to see whether Participant B has chosen to implement a control system. Your computer will go to a different screen when Participant B responds.

While you are waiting, please take a few moments to review the graphical representations of the investment histories for the possible investments.

Participant B HAS imposed a control system that provides you with a 150-point bonus if your investments yield a return >= 500 points.

Your task is to choose 10 investment projects to invest in from the 30 investments. Please review the graphical representations of the investment histories for the possible investments. Then write down your 10 choices using the provided paper and pencil.

After you click the "Next" button, you will have the opportunity to enter your selections.

When you are ready, please click the "Next" button.

Please select 10 investment projects to invest in from the 30 investments listed below. To see the entire list of projects, please scroll down until you see the "Next" button. When you are finished, please click the "Next" button.

BELL (10 points each)

- ☐ Investment Project A
- ☐ Investment Project B
- ☐ Investment Project C
- ☐ Investment Project D
- ☐ Investment Project E
- ☐ Investment Project F
- ☐ Investment Project G
- ☐ Investment Project H
- ☐ Investment Project I
- ☐ Investment Project J
- ☐ Investment Project K
- ☐ Investment Project L
- ☐ Investment Project M
- ☐ Investment Project N
- ☐ Investment Project O

WHISTLE (25 points each)

- ☐ Investment Project P
- ☐ Investment Project Q
- ☐ Investment Project R
- ☐ Investment Project S
- ☐ Investment Project T
- ☐ Investment Project U
- ☐ Investment Project V
- ☐ Investment Project W
- ☐ Investment Project X
- ☐ Investment Project Y
- ☐ Investment Project Z
- ☐ Investment Project AA
- ☐ Investment Project BB
- ☐ Investment Project CC
- ☐ Investment Project DD

Bonus Discretion Instructions

Initial Decisions

Overview

As a first step, you will have the task of selecting a portfolio of investments for Participant B. That is, Participant B will earn the returns from the portfolio, but you will choose the specific investments to be included in the portfolio. You will also pay for the investments, but will be given a fund from which to pay.

More specifically, at the start of the study,

- **You** will be given 850 points and
- **Participant B** will be given 250 points.

Your initial fund is larger because you must pay for the investments and Participant B will receive the returns from the investments.

The following instructions will describe in detail the decisions made by you and Participant B.

Please click the "Next" button to continue.

Your Task

You have the task of selecting the portfolio of investments. You will be presented with 30 possible investments. From these 30 investment choices, you ***must select and pay for 1 share each of 10*** of these investments, which will earn points for Participant B. Participant B will hold the shares for one period only and so Participant B's returns will be maximized if you select the 10 shares that are expected to make the highest returns in the next period.

NOTE: You must select 10 different investments and buy exactly one share each of these investments.

Please click the "Next" button to continue.

There are two types of investments, BELL investments and WHISTLE investments. The cost per share depends on the investment type.

- Each **BELL** share selected will cost you **10 points**.
- Each **WHISTLE** share selected will cost you **25 points**.

WHISTLE shares are more expensive because on average they are expected to return more per share in the next period than BELL shares. Specifically, BELL shares will earn an average return of 20 points per share, whereas WHISTLE shares will earn an average return of 50 points per share.

Importantly, this is only an average and any individual investment can earn considerably more or less than the average (as you can see by looking at the graphical representations of the investment return history which are provided to you on the large, folded documents and described on the laminated document next to your keyboard).

Please take a moment to review the laminated document. Click the "Next" button after you have read the information on the laminated document.

Please click the "Next" button to continue.

Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **bonus system** for you in which you will receive an extra 150 points if the total return of all shares chosen by you meets or exceeds the **performance target set by Participant B** (between 400 - 600 points). You will not receive any bonus points if the total return is less than the performance target set by Participant B. The bonus will be paid from the administrator's fund. That is, the bonus will not be deducted from Participant B's fund.

After Participant B decides whether or not to implement a control system, you will be notified of this decision.

Please click the "Next" button to continue.

Your Summary of Points

You will receive an initial fund of 850 points. From this fund, you will pay for the 10 shares you have selected (10 points for each BELL share and 25 points for each WHISTLE share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by you. Thus the payoffs to you for this initial decision are as follows:

	No Control System	**Control System**
Total Share Returns < Target set by Participant B (between 400 - 600 points)	850 points - Cost of Shares	850 points - Cost of Shares
Total Share Returns >= Target set by Participant B (between 400 - 600 points)	850 points - Cost of Shares	850 points - Cost of Shares + 150 bonus points

For example, suppose Participant B implements the control system and you choose 6 BELL shares and 4 WHISTLE shares. Also assume that the returns for these investments equal or exceed the performance target set by Participant B. Your payoff will equal 850 - (6 x 10) - (4 x 25) + 150 = 840 points.

If Participant B does not implement the control system or the returns for the investments are less than the performance target set by Participant B, your payoff will equal 850 - (6 x 10) - (4 x 25) = 690 points.

Please click the "Next" button to continue.

Participant B

Participant B will receive the total return from the 10 (ten) shares chosen by you. Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **bonus system** for you.

If Participant B chooses to implement a control system, the cost to Participant B is 50 points

Summary of Points - Participant B

The total number of points that **Participant B** earns will depend on the total return of the shares chosen by you, and whether or not Participant B chose to implement a control system. Thus, the payoffs to Participant B are as follows:

	No Control System	**Control System**
Total Share Returns < Target set by Participant B (between 400 - 600 points)	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
Total Share Returns >= Target set by Participant B (between 400 - 600 points)	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

Please click the "Next" button to continue.

Bonus Discretion Choose Investments

Please wait to see whether Participant B has chosen to implement a control system. Your computer will go to a different screen when Participant B responds.

While you are waiting, please take a few moments to review the graphical representations of the investment histories for the possible investments.

Participant B HAS imposed a control system that provides you with a 150-point bonus if your investments yield a return >= the performance target set by Participant B (between 400 - 600 points).

Your task is to choose 10 investment projects to invest in from the 30 investments. Please review the graphical representations of the investment histories for the possible investments. Then write down your 10 choices using the provided paper and pencil.

After you click the "Next" button, you will have the opportunity to enter your selections.

When you are ready, please click the "Next" button.

Please select 10 investment projects to invest in from the 30 investments listed below. To see the entire list of projects, please scroll down until you see the "Next" button. When you are finished, please click the "Next" button.

BELL (10 points each)

- ☐ Investment Project A
- ☐ Investment Project B
- ☐ Investment Project C
- ☐ Investment Project D
- ☐ Investment Project E
- ☐ Investment Project F
- ☐ Investment Project G
- ☐ Investment Project H
- ☐ Investment Project I
- ☐ Investment Project J
- ☐ Investment Project K
- ☐ Investment Project L
- ☐ Investment Project M
- ☐ Investment Project N
- ☐ Investment Project O

WHISTLE (25 points each)

- ☐ Investment Project P
- ☐ Investment Project Q
- ☐ Investment Project R
- ☐ Investment Project S
- ☐ Investment Project T
- ☐ Investment Project U
- ☐ Investment Project V
- ☐ Investment Project W
- ☐ Investment Project X
- ☐ Investment Project Y
- ☐ Investment Project Z
- ☐ Investment Project AA
- ☐ Investment Project BB
- ☐ Investment Project CC
- ☐ Investment Project DD

Penalty No Discretion Instructions

Initial Decisions

Overview

As a first step, you will have the task of selecting a portfolio of investments for Participant B. That is, Participant B will earn the returns from the portfolio, but you will choose the specific investments to be included in the portfolio. You will also pay for the investments, but will be given a fund from which to pay.

More specifically, at the start of the study,

- **You** will be given 1000 points and
- **Participant B** will be given 250 points.

Your initial fund is larger because you must pay for the investments and Participant B will receive the returns from the investments.

The following instructions will describe in detail the decisions made by you and Participant B.

Please click the "Next" button to continue.

Your Task

You have the task of selecting the portfolio of investments. You will be presented with 30 possible investments. From these 30 investment choices, you ***must select and pay for 1 share each of 10*** of these investments, which will earn points for Participant B. Participant B will hold the shares for one period only and so Participant B's returns will be maximized if you selects the 10 shares that are expected to make the highest returns in the next period.

NOTE: You must select 10 different investments and buy exactly one share each of these investments.

Please click the "Next" button to continue.

There are two types of investments, BELL investments and WHISTLE investments. The cost per share depends on the investment type.

- Each **BELL** share selected will cost you **10 points**.
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Please take a moment to review the laminated document. Click the "Next" button after you have read the information on the laminated document.

Please click the "Next" button to continue.

Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **penalty system** in which you will pay 150 points if the total return of all shares chosen by you is less than **500 points**. You will not have to pay any penalty points if the total return is greater than or equal to 500 points. The penalty will be paid to the administrator's fund. That is, the penalty will not be added to Participant B's fund.

After Participant B decides whether or not to implement a control system, you will be notified of this decision.

Please click the "Next" button to continue.

Your Summary of Points

You will receive an initial fund of 1000 points. From this fund, you will pay for the 10 shares you have selected (10 points for each BELL share and 25 points for each WHISTLE share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by you. Thus the payoffs to you for this initial decision are as follows:

	No Control System	**Control System**
Total Share Returns < 500	1000 points - Cost of Shares	1000 points - Cost of Shares - 150 penalty points
Total Share Returns >= 500	1000 points - Cost of Shares	1000 points - Cost of Shares

For example, suppose Participant B implements the control system and you choose 6 BELL shares and 4 WHISTLE shares. Also assume that the returns for these investments are less than 500 points. Your payoff will equal 1000 - (6 x 10) - (4 x 25) - 150 = 690 points.

If Participant B does not implement the control system or the returns for the investments equal or exceeds 500 points, your payoff will equal 1000 - (6 x 10) - (4 x 25) = 840 points.

Please click the "Next" button to continue.

Participant B

Participant B will receive the total return from the 10 (ten) shares chosen by you. Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **penalty system** for you.

If Participant B chooses to implement a control system, the cost to Participant B is 50 points.

Summary of Points - Participant B

The total number of points that **Participant B** earns will depend on the total return of the shares chosen by you, and whether or not Participant B chose to implement a control system. Thus the payoffs to Participant B are as follows:

	No Control System	**Control System**
Total Share Returns < 500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
Total Share Returns >=500	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

Please click the "Next" button to continue.

Penalty No Discretion Choose Investments

Please wait to see whether Participant B has chosen to implement a control system. Your computer will go to a different screen when Participant B responds. While you are waiting, please take a few moments to review the graphical representations of the investment histories for the possible investments.

Participant B HAS imposed a control system that penalizes you 150 points if your investments yield a return < 500 points.

Your task is to choose 10 investment projects to invest in from the 30 investments. Please review the graphical representations of the investment histories for the possible investments. Then write down your 10 selections using the provided paper and pencil.

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BELL (10 points each)

- ☐ Investment Project A
- ☐ Investment Project B
- ☐ Investment Project C
- ☐ Investment Project D
- ☐ Investment Project E
- ☐ Investment Project F
- ☐ Investment Project G
- ☐ Investment Project H
- ☐ Investment Project I
- ☐ Investment Project J
- ☐ Investment Project K
- ☐ Investment Project L
- ☐ Investment Project M
- ☐ Investment Project N
- ☐ Investment Project O

WHISTLE (25 points each)

- ☐ Investment Project P
- ☐ Investment Project Q
- ☐ Investment Project R
- ☐ Investment Project S
- ☐ Investment Project T
- ☐ Investment Project U
- ☐ Investment Project V
- ☐ Investment Project W
- ☐ Investment Project X
- ☐ Investment Project Y
- ☐ Investment Project Z
- ☐ Investment Project AA
- ☐ Investment Project BB
- ☐ Investment Project CC
- ☐ Investment Project DD

Penalty Discretion Instructions

Initial Decisions

Overview

As a first step, you will have the task of selecting a portfolio of investments for Participant B. That is, Participant B will earn the returns from the portfolio, but you will choose the specific investments to be included in the portfolio. You will also pay for the investments, but will be given a fund from which to pay.

More specifically, at the start of the study,

- **You** will be given 1000 points and
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Your initial fund is larger because you must pay for the investments and Participant B will receive the returns from the investments.

The following instructions will describe in detail the decisions made by you and Participant B.

Please click the "Next" button to continue.

Your Task

You have the task of selecting the portfolio of investments. You will be presented with 30 possible investments. From these 30 investment choices, you ***must select and pay for 1 share each of 10*** of these investments, which will earn points for Participant B. Participant B will hold the shares for one period only and so Participant B's returns will be maximized if you select the 10 shares that are expected to make the highest returns in the next period.

NOTE: You must select 10 different investments and buy exactly one share each of these investments.

Please click the "Next" button to continue.

There are two types of investments, BELL investments and WHISTLE investments. The cost per share depends on the investment type.

- Each **BELL** share selected will cost you **10 points**.
- Each **WHISTLE** share selected will cost you **25 points**.

WHISTLE shares are more expensive because on average they are expected to return more per share in the next period than BELL shares. Specifically, BELL shares will earn an average return of 20 points per share, whereas WHISTLE shares will earn an average return of 50 points per share.

Importantly, this is only an average and any individual investment can earn considerably more or less than the average (as you can see by looking at the graphical representations of the investment return history which are provided to you on the large, folded documents and described on the laminated document next to your keyboard).

Please take a moment to review the laminated document. Click the "Next" button after you have read the information on the laminated document.

Participant B will have the opportunity to implement the control system prior to your investment decision. The control system establishes a **penalty system** for you in which you will pay 150 points if the total return of all shares chosen by you is less than the **performance target set by Participant B** (between 400 - 600 points). You will not have to pay any penalty points if the total return is greater than or equal to the performance target set by Participant B. The penalty will be paid to the administrator's fund. That is, the penalty will not be added to Participant B's fund.

After Participant B decides to implement the control system, you will be notified of this decision.

Please click the "Next" button to continue.

Your Summary of Points

You will receive an initial fund of 1000 points. From this fund, you will pay for the 10 shares you have selected (10 points for each BELL share and 25 points for each WHISTLE share). Further, the points will depend on whether or not Participant B chose to implement a control system and, if a control system has been implemented, the total return of the shares chosen by you. Thus the payoffs to you for this initial decision are as follows:

	No Control System	**Control System**
Total Share Returns < Target set by Participant B (between 400 - 600 points)	1000 points - Cost of Shares	1000 points - Cost of Shares - 150 penalty points
Total Share Returns >= Target set by Participant B (between 400 - 600 points)	1000 points - Cost of Shares	1000 points - Cost of Shares

For example, suppose Participant B implements the control system and you choose 6 BELL shares and 4 WHISTLE shares. Also assume that the returns for these investments are less than the performance target set by Participant B. Your payoff will equal 1000 - (6 x 10) - (4 x 25) - 150 = 690 points.

If Participant B does not implement the control system or the returns for the investments equal or exceed the performance target set by Participant B, your payoff will equal 1000 - (6 x 10) - (4 x 25) = 840 points.

Please click the "Next" button to continue.

Participant B

Participant B will receive the total return from the 10 (ten) shares chosen by you. Participant B will have the opportunity to implement a control system prior to your investment decision. The control system, if implemented, establishes a **penalty system** for you.

If Participant B chooses to implement a control system, the cost to Participant B is 50 points.

Summary of Points - Participant B

The total number of points that **Participant B** earns will depend on the total return of the shares chosen by you, and whether or not Participant B chose to implement a control system. Thus the payoffs to Participant B are as follows:

	No Control System	**Control System**
Total Share Returns < Target set by Participant B (between 400 - 600 points)	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
Total Share Returns >= Target set by Participant B (between 400 - 600 points)	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

Please click the "Next" button to continue.

Penalty Discretion Choose Investments

Please wait to see whether Participant B has chosen to implement a control system. Your computer will go to a different screen when Participant B responds. While you are waiting, please take a few moments to review the graphical representations of the investment histories for the possible investments.

Participant B HAS imposed a control system that penalizes you 150 points if your investments yield < the performance target set by Participant B (between 400 - 600 points).

Your task is to choose 10 investment projects to invest in from the 30 investments. Please review the graphical representations of the investment histories for the possible investments. Then write down your 10 selections using the provided paper and pencil.

After you click the "Next" button, you will have the opportunity to enter your selections.

When you are ready, please click the "Next" button.

Please select 10 investment projects to invest in from the 30 investments listed below. To see the entire list of projects, please scroll down until you see the "Next" button. When you are finished, please click the "Next" button.

BELL (10 points each)

- ☐ Investment Project A
- ☐ Investment Project B
- ☐ Investment Project C
- ☐ Investment Project D
- ☐ Investment Project E
- ☐ Investment Project F
- ☐ Investment Project G
- ☐ Investment Project H
- ☐ Investment Project I
- ☐ Investment Project J
- ☐ Investment Project K
- ☐ Investment Project L
- ☐ Investment Project M
- ☐ Investment Project N
- ☐ Investment Project O

WHISTLE (25 points each)

- ☐ Investment Project P
- ☐ Investment Project Q
- ☐ Investment Project R
- ☐ Investment Project S
- ☐ Investment Project T
- ☐ Investment Project U
- ☐ Investment Project V
- ☐ Investment Project W
- ☐ Investment Project X
- ☐ Investment Project Y
- ☐ Investment Project Z
- ☐ Investment Project AA
- ☐ Investment Project BB
- ☐ Investment Project CC
- ☐ Investment Project DD

Task 2 Instructions

CONTINUING DECISIONS

Overview

You are still in the same role.

In addition, you are paired with the same person. The identification of participants will continue to be anonymous throughout the study.

You will start this part with whatever points you have in your fund following the prior set of decisions. (Note that you do not know the amount exactly, because we have not told you the returns from the shares you have selected. However, you still have a minimum of 600 points with which to make investments.)

You will now have the opportunity to earn more points based on the choices made by you and the person with whom you are paired.

Please click the "Next" button to continue.

Your Task

You now have the task of deciding on one additional investment for Participant B. This investment decision is different from the prior investment decisions in several important ways:

There is only one type of investment: a HORN investment.

Each HORN share costs 10 points (whereas in prior decisions, some investments cost 10 points and some cost 25 points).

The return per share in the next period is known to be 30 points (whereas in the prior decisions, the return per share in the next period was unknown and had to be predicted based on the history of past returns).

You can purchase anywhere from 0 to 50 shares of the HORN investment (whereas in the prior decisions, you could only select one share each of 10 different investments).

Participant B will earn the returns from the portfolio. *However, Participant B will have the opportunity to share the return from the investment with you (whereas in the prior decisions, Participant B kept the total return).*

Please click the "Next" button to continue.

Participant B

After learning how many shares you have purchased, Participant B will be given the opportunity to pay any amount of the return to you. Remember that Participant B will earn 30 points for each HORN share that you purchase.

After Participant B earns the return, Participant B will decide how much of the total return to give back to you. Participant B can return to you anything from 0 to the total amount.

Please click the "Next" button to continue.

Task 2 Treatment

You have at least 600 points remaining from Part 1.

You can now purchase between 0 - 50 shares of the HORN Investment. Each share of HORN Investment will cost you 10 points.

Each share of the HORN Investment automatically returns 30 points. Participant B will earn all of the returns from the shares of HORN Investment that you buy.

However, Participant B can share any amount of the returns with you.

Please move the slider along the bar below with your mouse to indicate how many shares of the HORN investment you would like to buy. After you are finished, please click the "Next" button.

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