

# Sticks and Carrots: The Effect of Contract Frame on Effort in Incomplete Contracts

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**ABSTRACT:** In this study, we examine the effect of incentive contract framing on agent effort in an incomplete contract setting. Prior research suggests that when governed by complete incentive contracts, agents exert greater effort under penalty contracts relative to bonus contracts. However, in an incomplete contract setting, in which the incentive contract does not govern all tasks for which the agent is responsible, the agent's trust in the principal is relevant. In this setting, we predict that bonus contracts create a more trusting environment, and this effect spills over to tasks not governed by the incentive contract, such that bonus contracts elicit greater effort on these tasks as compared to penalty contracts. We develop and experimentally validate a theoretical model of the effects of contract frame on trust and effort in this incomplete contract setting. The main intuition behind the model is that the framing of an incentive contract affects the degree to which the contract terms are interpreted by the agent as a signal of mistrust. More specifically, penalty contracts engender greater distrust than do bonus contracts and, therefore, when contracts are incomplete, penalty contracts lead to lower effort on tasks not governed by the contract than do bonus contracts.

**Keywords:** *framing; incomplete contracts; control systems; trust; formal control; informal control; bonus; penalty.*

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We dedicate this study to the memory of John Dickhaut in honor of his "profound influence on a generation of graduate students and faculty colleagues" (G. Waymire).

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## I. INTRODUCTION

Incentive contracts are ubiquitous as a means of motivating agent effort and improving firm performance. An incentive contract can be framed as either a bonus that offers an agent a monetary reward if performance goals are met, or as a penalty that reduces monetary payouts if performance goals are not met. Historically, bonus contracts have been more common in practice than penalty contracts.<sup>1</sup> Accounting research provides initial insights into agent *preferences* for bonus contracts (i.e., positively framed contracts) relative to penalty contracts (i.e., negatively framed contracts). Luft (1994) finds that agents prefer bonus contracts to economically equivalent penalty contracts. A potential explanation for this preference is loss aversion (Kahneman and Tversky 1979), the notion that the disutility experienced from a loss is greater than the utility experienced from a gain of the same magnitude. While agent preferences for bonus contracts are consistent with the predominance of bonus contracts observed in practice, principals choose incentive contracts based not solely on the preferences of agents, but rather on the efficiency with which various contracts induce desired agent effort levels.

While a large literature in psychology, economics, and accounting examines the effort-inducing effects of bonus contracts, few studies examine the effort-inducing effects of penalty contracts. One exception is Hannan et al. (2005), who find that despite stated preferences for bonuses, agents exert greater effort under penalty contracts so they can avoid paying the penalty. Hossain and List (2012) similarly find field evidence of greater effort under a penalty contract relative to a bonus contract. Authors of both studies conclude that the same loss aversion that induces a preference for bonus contracts induces higher effort under penalty contracts. Given the effort-inducing advantage of penalty contracts over bonus contracts documented by prior research, it is unclear why most organizations employ bonus contracts instead of penalty contracts. Indeed, Hannan et al. (2005) call for additional research to further understand the costs and benefits of each type of incentive contract. The purpose of this study is to examine whether contract completeness affects the effort-inducing efficiency of bonus contracts relative to penalty contracts. Specifically, we examine whether, in incomplete contract settings where trust is paramount to the agent's effort decision, bonus contracts, by creating a more trusting environment, can elicit greater effort as compared to penalty contracts.

Importantly, prior literature examining the effects of incentive contracts on agent effort (and agency theory in general) assumes a complete contract setting. A complete contract is one that fully specifies the obligations of the principal to provide monetary rewards to the agent for each potential future performance outcome. Moreover, these contractual terms can be enforced in a court of law (Baiman 1982). In such a setting, there is no discretion and, hence, no role for trust between the principal and agent (Casadesus-Masanell and Al-Najjar 2001). However, in practice, many incentive contracts are incomplete, allowing the principal some degree of discretion over the agent's monetary rewards. Discretion allows for opportunism on the part of the principal (e.g., Fisher et al. 2005) and, thus, introduces the possibility that the agent's trust in the principal will affect agent effort. Therefore, to the extent that contract frame—either bonus or penalty—affects the trust environment, the prior literature examining the effect of contract frame on employee effort is incomplete.

In this paper, we extend prior research by examining the effect of incentive contract framing in an incomplete contract setting. Whereas contract incompleteness can occur in various forms, in our setting, the contract is incomplete because it governs only one of two tasks for which the employee

<sup>1</sup> While the use of bonus contracts has historically dominated that of penalty contracts, interest in and the use of contracts that combine elements of both bonuses and penalties, so-called “bonus-malus” contracts, is on the rise. For example, UBS AG executives and board members have been working under a bonus-malus contract since 2009 (Associated Press 2008). Use of bonus-malus contracts in the U.S. is also increasing as a result of U.S. legislators' promotion of “clawback provisions” aimed at excessive CEO compensation (e.g., Hosking 2008; Lublin 2010).

is responsible. Such settings are quite common because modern jobs are usually multi-faceted, with employees required to perform multiple tasks. These tasks vary in the degree to which their performance can be measured, and so when incentive contracts are used, they generally govern only a subset of the employees' tasks. In our laboratory setting, the agent performs an initial task for which performance-based payouts are enumerated by an incentive contract. We manipulate the incentive contract frame—either a bonus contract or a penalty contract—while maintaining economic equivalence between these contract types. We then introduce a second task that is not governed by the incentive contract and for which the principal has full discretion over the agent's compensation. With such discretion, trust becomes a potentially important determinant of agent effort on the second task. In this incomplete contract setting, we find that the contract frame manipulated in the first task affects effort measured in the second task in the opposite direction as that found in prior literature (e.g., Hannan et al. 2005), and this effect can be attributed to the effect of contract frame on the trust environment. Specifically, both trust and agent effort is lower in the penalty contract condition as compared to the bonus contract condition.

This study contributes to the framing literature by documenting that the effect of contract frame on employee effort depends on the nature of the contractual setting. Prior literature shows that under complete contracting, where there is no role for trust, employee effort is likely to be higher under a penalty contract as compared to a bonus contract (Hannan et al. 2005). However, in settings of incomplete contracting (e.g., where there is discretion in monetary payouts), trust plays an important role. Bonus contracts create a more trusting environment, and this effect can spill over to tasks not governed by the incentive contract, such that bonus contracts elicit greater effort on these tasks as compared to penalty contracts. This result is important to managers implementing incentive contracts because it suggests that both contract frame (e.g., bonus versus penalty) and the degree of contract incompleteness (e.g., the use of discretion) must be considered in designing incentive compensation plans.

This study also contributes to a second, separate stream of literature that examines the effect of formal controls, such as incentive contracts, on trust, an important informal control. In general, this literature documents the unintended negative effects of formal controls on trust (e.g., Das and Teng 1998, 2001; Enzle and Anderson 1993; Malhotra and Murnighan 2002). However, this literature generally focuses on negatively framed formal controls. By contrast, our results show that the effect of formal controls on trust will depend on whether the formal controls are *framed* positively or negatively, with the result that positively framed controls can actually increase agents' trust relative to no control.

The remainder of the paper is organized as follows: In Section II, we review relevant literature and develop the hypotheses. In Section III, we describe the experimental method. Results are provided in Section IV. Section V discusses implications of the study and provides areas for further research.

## II. BACKGROUND AND THEORY DEVELOPMENT

A large body of literature examines how individuals' decisions are influenced by the way in which information is framed (e.g., Tversky and Kahneman 1981; Levin et al. 1998). Framing can occur on many dimensions. For example, Tenbrunsel and Messick (1999) examine whether decision makers frame a decision to invest in pollutant-reducing technology as a business decision or an ethical decision. They demonstrate that a formal sanction for the undesirable behavior of violating pollutant regulations causes decision makers to frame the technology investment decision as a business decision rather than an ethical decision, resulting in less technology investment and more regulatory violations.<sup>2</sup>

Accounting research focuses primarily on the positive versus negative framing of incentive contracts, providing insights into agent preferences for, and responses to, positively framed bonus

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<sup>2</sup> For a thorough discussion of framing effects, see Levin et al. (1998).

contracts relative to negatively framed penalty contracts.<sup>3,4</sup> Luft (1994) shows that experimental participants have a propensity to choose a bonus contract over a monetarily equivalent penalty contract. She offers several interpretations of this result. First, participants may prefer a bonus over a penalty contract because of loss aversion (Kahneman and Tversky 1979), the notion that the disutility experienced from a loss is greater than the utility experienced from a gain of the same magnitude. Thus, participants have preferences for bonus contracts because subjective valuations of the monetary payoffs are greater under the gain frame induced by the wording of the bonus contract. Second, Luft posits that there are different *nonmonetary* benefits associated with bonus and penalty wording that affect agent preferences. Bonuses are associated with praise and reward, while penalties are associated with condemnation and disapproval, the former being preferred over the latter.

Hannan et al. (2005) extend Luft (1994) by examining the effects of bonus versus penalty contracts on agent effort. The authors find that despite the agent's stated preferences for bonuses, as documented in Luft (1994), agents exert greater effort under penalty contracts. Hossain and List (2012) similarly find field evidence that workers in a Chinese high-tech manufacturing facility exert greater effort under a penalty contract relative to a bonus contract.

In both Hannan et al. (2005) and Hossain and List (2012), agents' effort choices are consistent with the loss aversion explanation of agent preferences for bonus contracts offered by Luft (1994). Specifically, the authors conclude that agents exert greater effort to avoid the loss associated with paying a penalty as compared to effort aimed at receiving the gain of a bonus. Importantly, however, Hannan et al. (2005) and Hossain and List (2012) are both conducted in a complete contract setting such that the contracts fully specify the agent payouts for each potential outcome; that is, the principal has no discretion over payouts. Yet, as Kreps (1990) notes, it is more characteristic of firms to have incomplete contracts, in which agents take actions without completely specified payouts from the principal. Luft (1994) uses the concept of incomplete contracts to offer a third interpretation for her finding of agent preferences for bonus contracts. Consistent with Kreps (1990), she acknowledges that contracts are typically incomplete, and that agents take actions, in part, based on potential monetary rewards, such as a discretionary bonus, for increased effort and performance beyond the contracted monetary rewards.

When contracts are complete, there is no discretion on the part of the principal and, hence, no effort-inducing role for trust between the principal and agent (Casadesus-Masanell and Al-Najjar 2001). However, when contracts are incomplete, as they are in most firms (Kreps 1990), the principal has some degree of discretion over the agent's monetary rewards, which allows for opportunism on the part of the principal (e.g., Fisher et al. 2005). In this setting—and in contrast to the complete contract setting of Hannan et al. (2005) and Hossain and List (2012)—the agent's trust in the principal becomes paramount in the agent's effort choice.<sup>5</sup> The question then becomes whether bonus and penalty contracts differentially affect the agent's trust in the principal. In the following paragraphs, we develop a theoretical model that describes the mechanisms by which

<sup>3</sup> See Bonner (2008) for a discussion describing accounting research focused on framing effects.

<sup>4</sup> The importance of framing as a characteristic of formal controls, more generally, is evident in the extant management control frameworks. For example, Jensen and Meckling (1992) include both positively framed outcome controls (i.e., "rewards") and negatively framed outcome controls (i.e., "punishments") as important control tools that organizations use to align incentives of managers with owners. Similarly, Ouchi and Maguire's (1975) outcome controls may be framed either positively (a bonus for goal achievement) or negatively (a penalty for lack of achievement). These and other frameworks (e.g., Merchant and Van der Stede 2007; Simons 1995) suggest that control framing is an important characteristic of formal control.

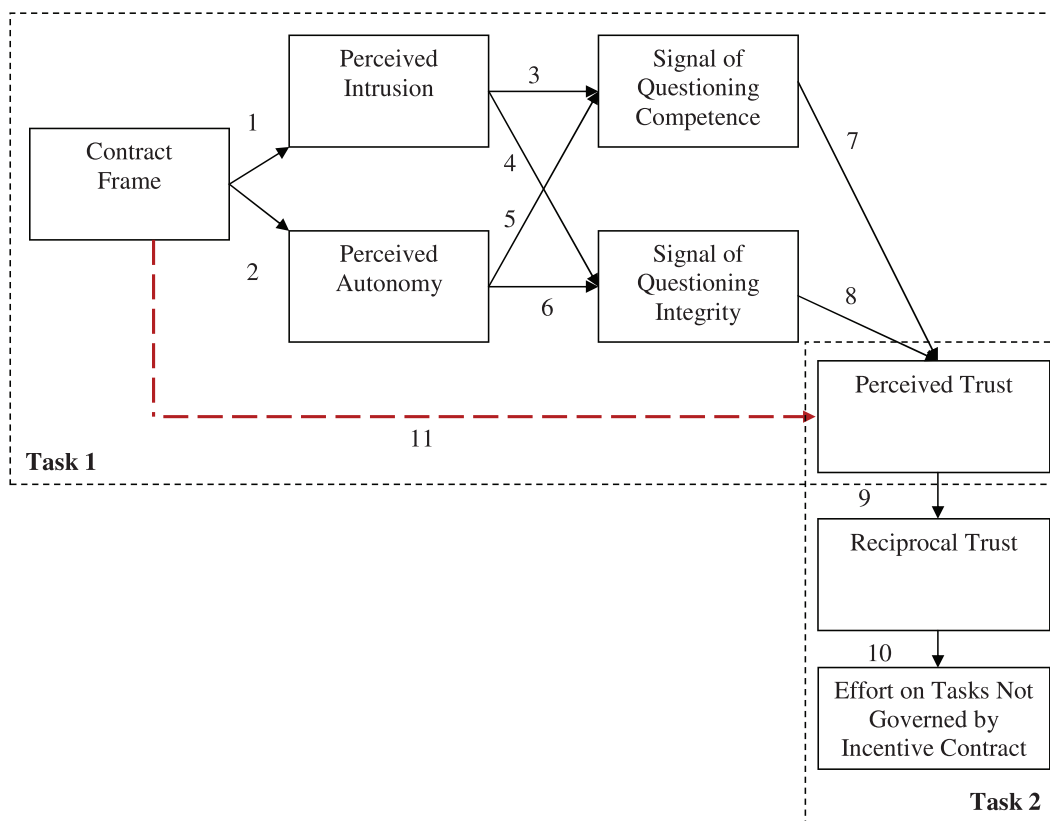
<sup>5</sup> While our primary construct of interest is trust, we acknowledge that this construct is highly related to other affect-based constructs such as fairness, perceived justice, or "liking" (Huang and Mumighan 2010). For example, accounting research (Kadous et al. 2011) demonstrates that auditors are more likely to trust advisors with whom they feel a strong personal affiliation. Therefore, it would be difficult, if not impossible, to fully separate trust from these other related constructs.

contract frame is expected to affect the trust environment and, ultimately, agent effort (see Figure 1).

Prior trust research has generally examined the effects of negatively framed formal controls. This research indicates that the implementation of a negatively framed formal control damages the trust environment (e.g., Das and Teng 1998; Enzle and Anderson 1993; Inkpen and Currall 1998; Malhotra and Murnighan 2002). Negatively framed controls damage the trust environment because they are perceived as being intrusive and as reducing the autonomy of the agent (Christ et al. 2008). Negatively framed controls often involve close observation or significant oversight, both of which may interfere with the agent's normal processes and activities and cause him or her to feel intruded upon. Further, negatively framed controls may limit the agent's decision rights, either directly, by curtailing certain behaviors, or indirectly, by attaching incentives to the outcomes of those decisions, leading to a perceived loss of autonomy.

Based on these general results, we likewise predict that framing an incentive contract negatively as a penalty contract will lead to perceived intrusion and a loss of autonomy by the agent. However, we posit that framing an incentive contract positively as a bonus contract will reduce, and perhaps even reverse, these adverse effects. Specifically, we expect that the agent's perception of intrusion (Figure 1, Path 1) and loss of autonomy (Path 2) will be lower under a bonus

**FIGURE 1**  
**Theoretical Model for the Effect of Contract Frame on Effort**



contract than under a penalty contract. In fact, the agent may interpret the implementation of a bonus contract as a signal of the principal's intent to reward the agent for increased effort by sharing the resulting gains.

To the degree that an agent feels that controls intrude upon his or her actions and restrict his or her autonomy, these controls signal the principal's beliefs regarding the agent. Specifically, the principal's control choices signal the degree to which he or she questions the agent's integrity (Paths 4 and 6) and/or competence (Paths 3 and 5). First, by implementing controls that are more intrusive or more constraining on the agent's autonomy, a principal signals the expectation that the agent will intentionally engage in opportunistic behavior, such as shirking, cheating, stealing, etc. In this manner, the principal is sending a signal to the agent that he or she is questioning the agent's integrity. Second, more intrusive and more constraining controls may also indicate that the principal questions the agent's competence; that is, whether the agent is able to sufficiently complete the task or meet the required standards because of potential deficiencies in the necessary skill, aptitude, or tools, despite the agent's best intent and sufficient effort. Thus, the effect of contract frame will flow through, such that under a bonus contract, the agent will be less inclined to believe that the principal is questioning his or her competence and integrity than under a penalty contract.

To the degree that the agent believes his or her competence and/or integrity are being questioned, he or she will perceive less trust from the principal (Paths 7 and 8) (Das and Teng 2001). Further, because trust is reciprocal (Bradach and Eccles 1989; Gambetta 1988; Zand 1981), we expect the agent's trust in the principal to be higher under a bonus contract as compared to a penalty contract. Specifically, social projection theory suggests that individuals have a tendency to expect that others will behave similarly to themselves (Krueger 1998). According to this theory, the principal expects the agent to behave as he or she would and, thus, the principal's signal of trust in the agent reveals the principal's own trustworthiness to the agent. Therefore, by implementing a penalty contract that signals mistrust in the agent, the principal signals that he or she is likewise not trustworthy. In contrast, by implementing a bonus contract that signals trust, the principal provides a signal that he or she is trustworthy. Thus, agents working under a penalty contract will be less likely to trust the principal than will agents working under a bonus contract. That is, trust will be reciprocal (Path 9).

This reciprocity effect has been described in prior research that suggests that when one party feels (mis)trusted, it is likely to feel (mis)trust in return (e.g., Bradach and Eccles 1989; Gambetta 1988). For example, Christ et al. (2008) use an inter-organizational strategic alliance scenario to experimentally examine the effects of formal controls on trust. They show that formal controls have a negative effect on the controlled party's perceived trust (i.e., the extent to which the controlled party feels trusted by the controlling party), and a reciprocal negative effect on the controlled party's reciprocal trust in the controlling party. We extend this finding to the single firm, principal-agent setting. We predict that agents working under a penalty contract will perceive less trust and will, thus, reciprocate less trust relative to those working under a bonus contract.

In contrast to the complete contract setting of Hannan et al. (2005) and Hossain and List (2012), in our setting, the incentive contract does not govern all tasks. The principal has discretion over the agent's monetary rewards for the ungoverned tasks, allowing for opportunism on the part of the principal (e.g., Fisher et al. 2005). As a result, the agent's trust in the principal to reward the agent for effort becomes paramount in the agent's effort choice for the ungoverned tasks (Path 10). Because the agent's trust in the principal is damaged when the principal implements a penalty contract, the agent will have a pessimistic expectation of the extent to which effort will be rewarded by the principal's discretionary payout. By contrast, because the agent's trust in the principal is less damaged and instead is preserved or even enhanced when the principal implements a bonus contract, the agent will have a more positive expectation of the extent to which effort will be rewarded by the principal's discretionary payout.



Taken together (see Figure 1), we predict that agents working under a bonus contract will exert greater effort on tasks not governed by the incentive contract than will those working under a penalty contract.<sup>6</sup> This leads to our primary research hypothesis:

**H1:** In an incomplete contract setting, agent effort on tasks not governed by the incentive contract will be greater under a bonus contract as compared to a penalty contract.

### III. EXPERIMENTAL METHOD

#### Experimental Design

We test our hypothesis and theoretical model using a computer-based experiment in an incomplete contract setting. Our experiment has two tasks, with performance-based pay for the first task defined by an incentive contract framed as either a bonus or penalty, depending on the experimental condition. Pay for the second task is at the complete discretion of the principal. We recruited 220 participants from graduate and undergraduate accounting classes of a highly ranked U.S. business school to participate in this study. Fifty-two percent of participants were female and 48 percent were male, and the average age was 20.4 years.

We use a 2 (Contract Frame)  $\times$  2 (Contract Implementation) plus 1 (Baseline) between-subjects experimental design to test our hypotheses. For our first variable—Contract Frame—we manipulate the type of contract that the principal has the option to implement for the first task: a positively framed contract that rewards agents for meeting performance targets with a bonus payment (hereafter, *bonus contract*), and a negatively framed contract that penalizes agents for missing the target (hereafter, *penalty contract*). We maintain monetary equivalence across contract frame conditions so that we can isolate the hypothesized framing effects from our model. The Contract Frame conditions are described in detail in the “Task 1 of the Experiment” subsection, below. The second variable—Contract Implementation (*Yes*, *No*)—is measured rather than manipulated, and represents the principal’s decision to implement the incentive contract. Allowing the principal to select the contract is important because this choice signals the principal’s trust in the agent (Christ 2012). As we will describe, our primary analysis relates only to the conditions in which the principal chose to implement the incentive contract. As a result, we do not analyze observations in the *bonus contract/no implementation* and *penalty contract/no implementation* conditions.

Finally, the “plus 1” condition is a baseline condition (hereafter, *fixed wage*) in which principals are not given the opportunity to implement an incentive contract for Task 1, and no bonuses or penalties are mentioned to the participants. The growing stream of literature examining the effects on trust of formal controls, including incentive contracts, compares agent behavior with and without formal control, taking as given a negatively framed formal control. To better reconcile our contract frame findings to this stream of literature, we include this *fixed wage* condition so that we can compare the effects on trust of the two contract frames versus a condition in which no incentive contract is imposed. Note that the agents in this *fixed wage* condition faced the same fixed wage contract as those in bonus and penalty conditions for whom the principals chose not to implement the incentive contract.

At the beginning of the study, each participant was randomly assigned to the role of either principal or agent and remained in the same role throughout the entire study.<sup>7</sup> Before beginning, the computer randomly matched participants into anonymous pairs of one principal and one agent.

<sup>6</sup> Lazear (1991) also suggests that bonus wording conveys an expectation of effort beyond a desired level, while penalty wording conveys an expectation for effort only up to a certain level. The differential expectations conveyed by the bonus contract will further serve to motivate greater effort on the part of the agent.

<sup>7</sup> To ensure that labels did not unnecessarily influence the behavior of participants, agent and principal participants were referred to as Participant A and Participant B, respectively, throughout the experiment.

Participants earned points based on the decisions that they and their partners made, as described below. The points were converted to cash and paid to the participants at the end of the study according to the following formula: U.S.\$ Payment = (Points earned  $\times$  0.025). At the beginning of the study, each principal was endowed with 250 points, and each agent with 850 points in the *bonus contract* condition, and 1,000 points in the other conditions. These differential endowments reflect that over the course of the experiment, the principals had the opportunity to gain more net points than did the agents. Further, these different endowments ensure that when the principal chooses to implement an incentive contract, the *bonus contract* and *penalty contract* conditions are monetarily equivalent from the agent's perspective.

### Task 1 of the Experiment

In Task 1, the agent selected a portfolio of investments for the principal.<sup>8</sup> That is, the principal earned the returns from the portfolio, but the agent chose the specific investments to be included in the portfolio and paid for the chosen investments from his or her endowment. While we acknowledge that in a real-world investment setting, the agent would not normally pay the cost of investments, this setting provides a useful laboratory scenario for testing our theory.<sup>9</sup> Specifically, we follow prior literature (e.g., Fehr et al. 1993) and use the cost of the investment to operationalize the agent's effort, which also allows us to vary that cost across the various investment opportunities.

Each agent was presented with 30 possible investments. From these 30 investment choices, the agent's task was to select and pay for one share each of ten investments. That is, the agent selected ten different investments, each of which earned points for the principal. The principal's expected returns were, thus, maximized if the agent selected shares of the ten investments with the highest expected returns in the next period.

There were two types of investments from which the agent could choose, "Bell" investments and "Whistle" investments.<sup>10</sup> Each Bell share cost the agent 10 points and each Whistle share cost the agent 25 points. Agents were provided with a graphical representation of the previous 19 periods of returns in the form of points per share for each of the 30 possible investments. Figure 2 depicts the history of points per share returned for one representative Bell (Panel A) and one representative Whistle (Panel B) investment.<sup>11</sup>

Whistle shares, while more expensive, had a higher average expected return. This was the basis of the control problem in the scenario. Specifically, the principals preferred that shares with higher returns, the Whistle shares, be selected, but the agents, who paid for the investments, preferred to

<sup>8</sup> For Task 1 of the experiment, we designed a cognitively challenging and engaging task for the agents, instead of using an abstract task as in the previous contract framing literature (e.g., Hannan et al. 2005). We chose this task because of the prior finding that formal controls influence employee trust because they are perceived to be intrusive and to limit the agent's autonomy (Christ et al. 2008). It is unlikely that these effects would manifest if agents engaged in an abstract effort choice.

<sup>9</sup> The contextualized economic games used to examine our research question are not intended as a literal representation of how firms do (or should) organize investment decisions. While the experimental task is an abstraction from reality, it is the theory that we wish to generalize. The design of this task is important in that it provides evidence about the theoretical constructs of interest despite any shortcomings it has in its reflection of mundane realism. For further discussion, see Friedman and Sunder (1994, 10–12) and Kachelmeier and King (2002).

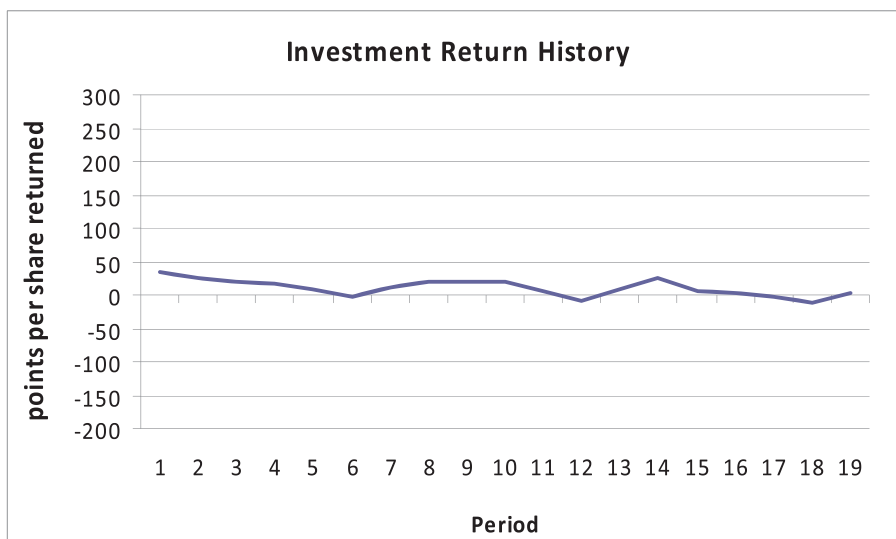
<sup>10</sup> An alternative approach would have been to have the agent select between one Whistle and one Bell investment. We chose to have agents select ten investments (from a total of 30 investments) because we wanted the task to be intellectually stimulating to the agents. Specifically, in order to examine agents' beliefs about the intrusiveness and autonomy-limiting nature of the contract, it was necessary for them to be actively engaged in the task. Therefore, the task itself needed to be a significant undertaking and cognitively difficult.

<sup>11</sup> We constructed each investment's return history using either a long-term trend or a cyclical pattern, plus a noise parameter. Thus, the expected return for the next period was calculated as the expected value for the next point in the series given the underlying historical pattern.

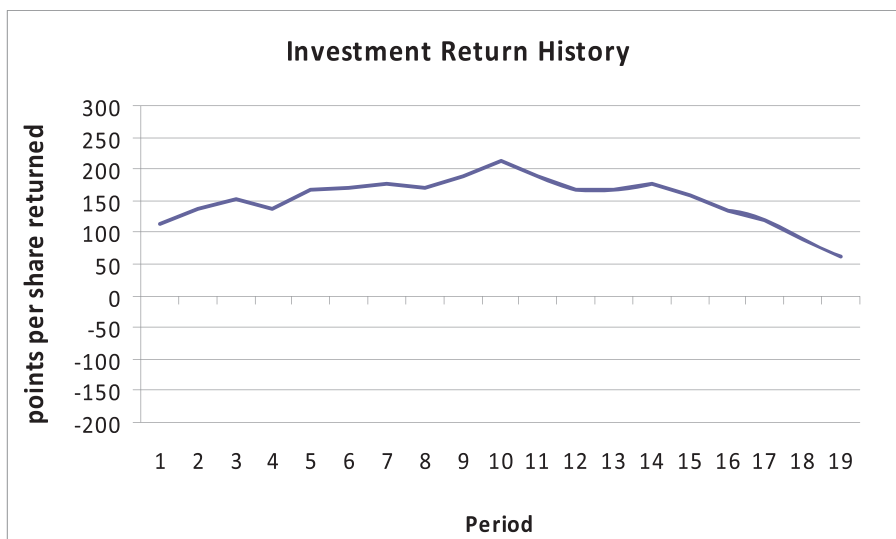


**FIGURE 2**  
**Sample Investment Graphs**

**Panel A: An Example of the Investment History for One Bell Investment**



**Panel B: An Example of the Investment History for One Whistle Investment**



select the cheaper Bell shares. The expected return for the next period for Bell shares was, on average, 20 points per share across all Bell investments, whereas the expected return for the next period for Whistle shares was, on average, 50 points per share across all Whistle investments. Importantly, any individual investment could earn considerably more or less than the average.

Specifically, the expected return for the 15 individual Bell investments ranged from  $-8$  to  $48$ , and the expected return for the 15 individual Whistle investments ranged from  $-6$  to  $106$ .

In the two Contract Frame conditions, principals chose whether or not to implement an incentive contract prior to the agents' investment decision. Implementation of the incentive contract cost the principal 50 points. The incentive contract, if implemented, either established a bonus for the agent if total returns met or exceeded a minimum return (*bonus contract* condition), or established a penalty for the agent if total returns failed to meet a minimum return (*negative contract* condition). In the *fixed wage* condition, the principal was not given the opportunity to implement an incentive contract; that is, neither a bonus nor a penalty was mentioned to the participants.

In the *bonus contract* condition, if the principal elected to implement the incentive contract, the agent received an extra 150 points if the total return of all ten shares selected met or exceeded 500 points. No bonus points were paid to the agent if the total return was less than 500 points. The bonus was paid from the administrator's fund, not deducted from the principal's endowment.<sup>12</sup> Likewise, for the *penalty contract* condition, the agent was required to pay 150 points if the total return of all ten shares selected was less than 500. No penalty points were paid if the total return equaled or exceeded 500 points. The penalty was paid to the administrator's fund, not added to the principal's earnings. The *bonus* and *penalty contracts* provided monetarily equivalent incentives for the agents, so that any differences in reported trust perceptions following Task 1 or observed effort on Task 2 were due to the signaling effects of the contracts.<sup>13</sup> The summary of points that could be earned by each participant for Task 1 is presented in the experimental materials provided in Appendix A.

After the principal decided whether or not to implement an incentive contract, the agent was notified of this decision. At this point, the agent made the investment choices, and the investment payoff was determined by the administrator. Note, however, that actual returns were not revealed to participants until the end of the second task of the experiment. We withheld this information from all participants so that the agent's behavior on Task 2 would be influenced only by the framing of the contract imposed by the principal, and would not be affected by his or her earnings from Task 1.

Following Task 1, we solicited information using a post-experimental questionnaire. Participants responded to several questions intended to capture additional variables included in our formal model. Specifically, each agent indicated, on a 100-point Likert scale ranging from "not at all" to "a great deal," the extent to which he or she (1) felt that the principal questioned his or her integrity (Signal of Questioning Integrity), (2) felt that the principal questioned his or her competence (Signal of Questioning Competence), (3) felt that the principal trusted him or her (Perceived Trust),<sup>14</sup> (4) trusted the principal (Reciprocal Trust), (5) felt the principal intruded upon

<sup>12</sup> This design choice ensured that the principal's cost of implementing the contract was held constant (at 50 points) across all conditions. An alternative approach would have been to have the principal pay from his or her account all costs, including the agent's total compensation (including wages, bonuses, and penalties) and to increase the principal's pay level to cover these costs. We chose not to take this approach because it would have complicated the experimental task considerably, and as long as the included costs were held constant across conditions, we are aware of no theories to suggest that this approach would affect our results.

<sup>13</sup> Note that the incentive contracts were designed to be fairly weak controls, in the sense that they do not provide the agent clear incentives to choose the optimal investment portfolio. This design choice, along with the absence of mutually observable actions, allows us to isolate the signaling effect of the contracts as distinct from the economic benefit documented in Coletti et al. (2005) and, thus, to investigate the difference between the signals engendered by the penalty contract as compared to the bonus contract.

<sup>14</sup> We follow prior literature and measure perceived and reciprocal trust using single-item Likert scale questions. However, we acknowledge that trust is a complex and difficult-to-measure construct and, therefore, this variable may capture other related factors, such as the perceived fairness of the principal, general effect, perceived justice, etc. To partially capture these constructs, we also include in our empirical model a direct path from Contract Frame to Perceived Trust (Figure 1, Link 11) that does not go through our theoretically motivated paths related to trust signaling (i.e., perceptions of intrusion, autonomy, questioning competence, and questioning integrity).

his or her decisions (Perceived Intrusion), and (6) felt he or she had decision-making autonomy (Perceived Autonomy).<sup>15</sup>

## Task 2 of the Experiment

While the focus of Task 1 was on the effects of contract framing on perceived and reciprocal trust (Figure 1, Links 1–9, 11), Task 2 provided the primary dependent variable, Effort on Tasks Not Governed by the Incentive Contract. The principal's discretion over pay for Task 2 made the agent's trust relevant (Figure 1, Link 10). In Task 2, participants retained the same partners and roles, and continued with the same contextual setting in which agents made investments on behalf of principals. Each participant began Task 2 with the total number of points he or she had at the end of Task 1 following the investment decisions made by the agent. Although the participants did not know the exact number of points they had earned up to this point because they had not yet been told the returns from the shares selected by the agent, they were told that each agent had a minimum of 600 points with which to make an additional investment, as guaranteed to be the case by design.

Task 2 was a contextualized version of the standard "trust game," as defined by McCabe et al. (2003), with the agent moving first and the principal moving second. In Task 2, the agent made an additional investment for the principal. This investment decision was different from the prior investment decisions in several important ways. First, there was only one type of investment, a "Horn" investment, which cost the agent 10 points per share, whereas in Task 1, some investments cost 10 points and some cost 25 points per share. Second, the return per Horn share investment was known to be 30 points, whereas in Task 1, the return per share was uncertain, with expected returns based on the history of past returns. Third, the agent could purchase from zero to 50 shares of the Horn investment, whereas in Task 1, the agent could only select one share each of ten different investments. Note that the guaranteed bank of 600 points for each agent is enough to invest in the full 50 Horn shares at 10 points per share.

The agent's choice of the number of Horn investments to make is our measure of costly agent effort. We follow a large literature that operationalizes agent effort using a costly choice (e.g., Fehr et al. 1993), based on the simplifying assumptions of analytical models that individuals have utility for wealth and leisure (see Baiman 1982).<sup>16</sup> Importantly, investing in Horn shares is an effort choice that is controlled by the agent, results in disutility (because the cost of the shares is borne by the agent), and is correlated positively with output in the form of the principal's return. Thus, the investment in Horn shares meets the definition of effort used in the agency theory literature, as outlined by Baiman (1982).

As in Task 1, the principal earned the returns from the portfolio, equal to 30 points  $\times$  the number of shares of the Horn investment purchased by the agent. As in the standard trust game, after learning how many shares the agent purchased, the principal could then pay any amount of the

<sup>15</sup> Several recent studies have examined whether eliciting participants' beliefs about trust prior to a traditional trust game affect subsequent trusting behavior (Guerra and Zizzo 2004; Zizzo 2008). Results of these studies indicate that participants' trusting behavior exhibited in the trust game does not differ significantly when beliefs are elicited as compared to conditions when there is no belief elicitation.

<sup>16</sup> The first mover investment in a trust game is a widely used measure of behavior within a trust environment (Camerer 2003, 85–100). We employ the first mover investment as a simple and straightforward measure of effort. Alternative design choices for this experiment would require less reliable measures of effort (e.g., time spent on the task) that are likely to be affected by other factors outside of the experiment (e.g., a preference for completing the experiment quickly). Recent research in accounting has compared the operationalizations of effort as cost with real-effort tasks in an experiment on reciprocity, and finds that people react similarly to both operationalizations of effort (Bruggen and Strobel 2007). Although prior literature consistently operationalizes effort as a linearly increasing cost to the agent, we acknowledge that the cost of effort is not necessarily linear and that this is a limitation of this research design.

**TABLE 1**  
**Descriptive Statistics**

Means (standard deviations in <i>italics</i> )	Fixed Wage n = 30 <sup>a,b</sup>	Bonus Contract n = 25 <sup>a,c</sup>	Penalty Contract n = 24 <sup>a,c</sup>
Effort on Tasks Not Governed by Incentive Contract <sup>d</sup>	24.80 <i>17.98</i>	33.92 <i>17.22</i>	21.44 <i>15.18</i>
H1: Test of Mean Difference in Effort between Bonus and Penalty Conditions (t = 12.48, p < 0.01)			
Perceived Intrusion <sup>e</sup>	32.50 <i>26.71</i>	31.04 <i>32.64</i>	60.00 <i>31.98</i>
Perceived Autonomy <sup>e</sup>	74.83 <i>25.31</i>	74.58 <i>23.95</i>	57.20 <i>31.46</i>
Signal of Questioning Competence <sup>e</sup>	52.50 <i>23.22</i>	46.46 <i>30.20</i>	58.80 <i>25.51</i>
Signal of Questioning Integrity <sup>e</sup>	54.67 <i>29.39</i>	49.79 <i>32.01</i>	56.40 <i>27.41</i>
Perceived Trust <sup>e</sup>	52.83 <i>24.41</i>	68.96 <i>24.09</i>	24.48 <i>23.52</i>
Reciprocal Trust <sup>e</sup>	56.67 <i>28.39</i>	65.42 <i>21.41</i>	32.00 <i>26.34</i>

<sup>a</sup> The number of participants is twice the number of observations reported here because one observation requires two participants.

<sup>b</sup> This column includes observations from the *fixed wage* condition, but not those from the *penalty* and *bonus contract* conditions when the principal chose not to implement the incentive contract.

<sup>c</sup> We report the descriptive statistics only from those dyads in which the principals chose to impose the incentive contract because these are the observations used for our hypothesis test.

<sup>d</sup> Effort is measured using the number of Horn shares A Participants purchased during Task 2 of the experiment.

<sup>e</sup> Participants responded to the following questions using a 100-point Likert scale:

- 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)

return back to the agent, such that monetary payouts for agent effort are at the complete discretion of the principal. Importantly, the principal could choose to keep all of the returns and pay nothing to the agent. Thus, the principal had the opportunity to behave opportunistically, making the agent's trust in the principal an important determinant of the agent's chosen effort.

Without obligation to return anything, standard economic theory predicts that the principal would pay none of the Horn investment returns to the agent. Anticipating this, the agent would not invest in any Horn shares; i.e., exert no effort. Thus, any positive level of effort in the form of investment by the agent in costly Horn shares critically depends on the level of the agent's trust in the principal to return at least the cost of the Horn shares (McCabe et al. 2003).

Following completion of Task 2, participants were given a questionnaire that included demographic information and manipulation checks regarding the extent to which they understood the tasks completed. Participants received their respective payoffs resulting from decisions made in both parts of the experiment and were dismissed. Descriptive statistics for variables defined above are provided in Table 1.

## IV. RESULTS

### Hypothesis Test

Our primary interest is in examining the effect of contract frame on effort for a task not governed by the incentive contract. Our primary test of H1 compares effort on Task 2 (i.e., the number of Horn shares purchased) when the principal chose to implement the bonus contract, to effort when the principal chose to implement the penalty contract. Thus, for this analysis, we ignore the *fixed wage* condition, as well as those observations in the *bonus contract* and *penalty contract* conditions for which the principal chose not to implement the incentive contract. Consistent with H1, agents exert greater effort in the *bonus contract* condition than in the *penalty contract* condition (see Table 1, means = 33.92 and 21.44, respectively). This difference is statistically significant ( $t = 12.48$ ,  $p < 0.01$ ). Thus, when a task is not governed by the incentive contract, we find that the contract frame affects agent effort in the opposite direction to that found in prior literature (e.g., Hannan et al. 2005). To further assess whether the effort difference between the bonus and penalty contract conditions can be attributed to the hypothesized effect of contract frame on the trust environment, we test the complete theoretical model depicted in Figure 1 in the following section.

### Test of Complete Theoretical Model

We use structural equations-based path analysis to estimate our theoretical model depicted in Figure 1. Note that in addition to the ten model paths described in the theoretical development of H1, we also include in the model an additional path by which bonus and penalty contracts differentially affect the trust environment, separate from the posited signaling path that is our primary focus (Figure 1, Path 11). This additional general path captures other affect-based constructs by which contract framing may affect the trust environment.<sup>17</sup> We acknowledge, however, that this path will likely only partially capture these constructs, as their influence might also be embedded in the signaling path.

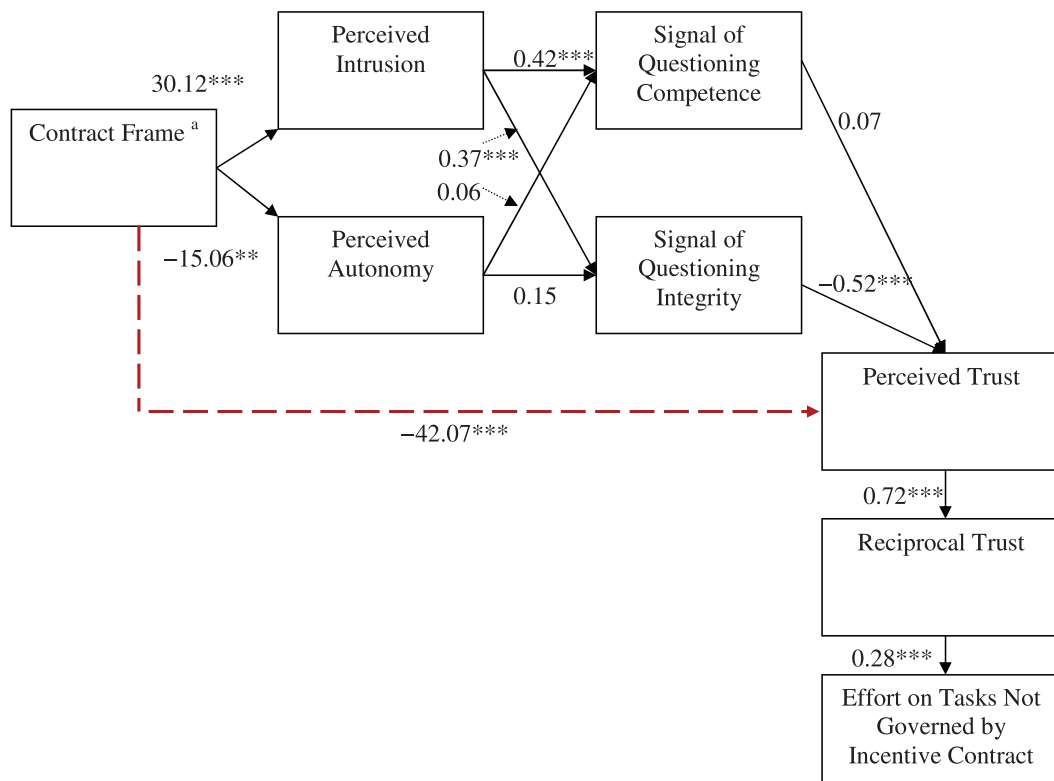
To assess the model, we conduct a test of goodness of fit. The Comparative Fit Index (CFI), a measure of the proportion of improvement of the fit of our model to the null model, is 0.965, which is above the generally accepted minimum value of 0.95 (Byrne 2001). We further confirm the model's goodness of fit with a traditional Chi-square test ( $\chi^2 = 10.76$ ,  $p = 0.71$ ), and an Incremental Fit Index (1.02) that is above the recommended minimum of 0.95 (Byrne 2001). Thus, the model provides a good fit for describing the relations in the data.

The standardized path coefficients and statistical significance are presented for the estimated model in Figure 3. As expected, results indicate that participants perceive a greater sense of intrusion (30.12,  $p < 0.01$ ) and less autonomy (−15.06,  $p < 0.05$ ) under a penalty contract than under a bonus contract. Greater Perceived Intrusion is positively associated with the Signal of Questioning Competence (0.42,  $p < 0.01$ ) and the Signal of Questioning Integrity (0.37,  $p < 0.01$ ). In addition, when the agent feels that his or her integrity is being questioned, Perceived Trust is reduced (−0.52,  $p < 0.01$ ).<sup>18</sup>

<sup>17</sup> Affect is a response to a stimulus that presents as either a positive or negative mood or emotional reaction (Fiske and Taylor 1991). While, to our knowledge, prior research does not examine an affective reaction to control system implementation, research in accounting does document that affective reactions can have significant effects on capital budgeting (Kida et al. 2001; Moreno et al. 2002; Sawers 2005) and inventory valuation decisions (Chung et al. 2008).

<sup>18</sup> The effect of contract frame on perceived trust flows through the signal that the principal is questioning the agent's integrity rather than the agent's competence. This is likely because this study examines incentive contracts, which are a form of outcome control. Formal controls can affect behavior by providing both motivation and direction (Merchant and Van der Stede 2007). Outcome controls, while being an effective motivational tool, are less useful for providing direction than are behavior controls. Therefore, outcome controls, regardless of whether they are positively or negatively framed, are less likely than behavior controls to be interpreted as a signal that the principal is questioning the agent's competence.

**FIGURE 3**  
**Test of Full Model: Comparison of Penalty and Bonus Contract Conditions**



\*\*,\*\*\* Indicate significance at the 0.05 and 0.01 levels, respectively (one-tailed).

This figure shows the results of the path analysis. The standardized path coefficient and corresponding one-tailed significance are shown next to each path. Goodness of fit is measured through the Comparative Fit Index (0.965), which is above the generally accepted minimum value of 0.95 (Byrne 2001) and confirmed with a traditional Chi-square test ( $\chi^2 = 10.76$ ,  $p = 0.71$ ), an Incremental Fit Index (1.02), and a Root Mean Square Error of Approximation (0.00).

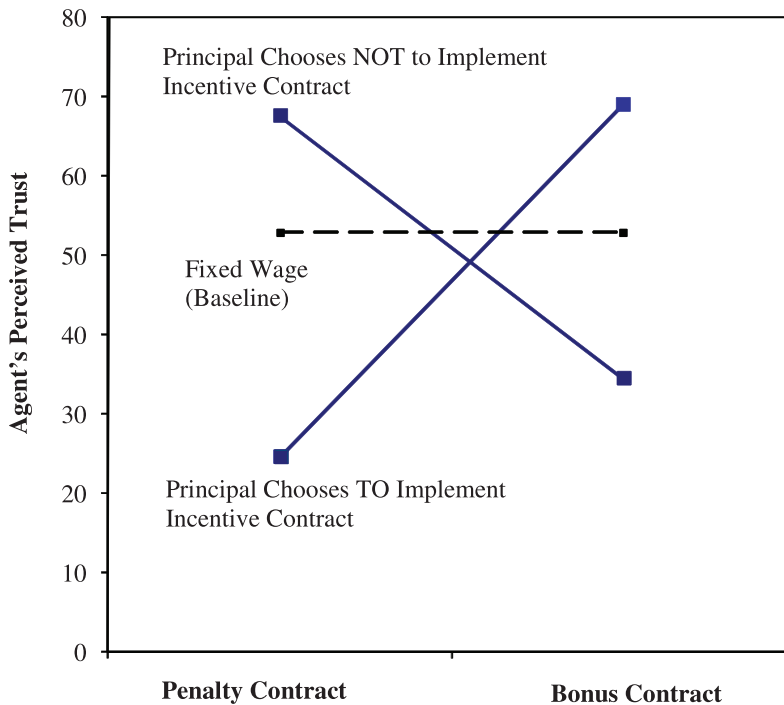
<sup>a</sup> The data used in this analysis include observations only from the *penalty* and *bonus contract* conditions when the principal chose to implement the incentive contract. Contract Frame assumes a value of 0 for the *bonus contract* condition, and 1 for the *penalty contract* condition.

The results also show that trust is reciprocal. As the agent's Perceived Trust increases, his or her Reciprocal Trust for the principal also increases (0.72,  $p < 0.01$ ). Finally, when we test the link between the agent's Reciprocal Trust and the agent's Effort on Task 2, we find the expected positive relation between the agent's Reciprocal Trust and the agent's Effort (0.28,  $p < 0.01$ ). The general path from Contract Frame to Perceived Trust is negative and significant (-42.07,  $p < 0.01$ ), documenting a negative effect on trust of a penalty contract as compared to a bonus contract, incremental to the signaling effect we hypothesize. While not the primary focus of our study, we expect that this path may reflect a more negative affective reaction to the implementation of the penalty contract as compared to the bonus contract.

In sum, consistent with our expectations, the penalty contract has a negative effect on the trust environment, and this effect spills over to tasks not governed by the incentive contract, such that



**FIGURE 4**  
**Supplemental Test of Agent's Perceived Trust under the Bonus and Penalty Contract Conditions versus the Fixed Wage (Baseline) Condition**



This figure shows the average agents' Perceived Trust across conditions and across the decisions of principals to implement or not implement the incentive contract. The average Perceived Trust in the *fixed wage condition* (in which the principal was not given the opportunity to implement an incentive contract) is represented by the horizontal line labeled "Fixed Wage (Baseline) Condition." The other two lines on the graph represent the Perceived Trust reported by agent participants in the *penalty* and *bonus contracts* conditions. Specifically, the positively sloped line represents agents' Perceived Trust when principals chose to implement the contract, and the negatively sloped line represents agents' Perceived Trust when principals chose not to do so.

bonus contracts elicit greater effort on these tasks as compared to penalty contracts. This effect occurs both through the signaling effect we posit, as well as through an additional link that captures other mechanisms, such as perceived unfairness or negative affect. Thus, contrary to prior research on contract framing, we document that in an incomplete contract setting when the agent is vulnerable to the principal's decisions and, therefore, must exhibit trust when determining his or her effort level, penalty contracts lead to diminished effort.

### Supplementary Tests

#### *Comparison to Fixed Wage (Baseline) Condition*

In our *fixed wage* condition, where no incentive contract is available for implementation, the average Perceived Trust is 52.83 on a 100-point Likert scale, which we represent in Figure 4 by the horizontal dashed line. The other two lines on the graph represent the Perceived Trust reported by agent participants in the *penalty contract* and *bonus contract* conditions. The positively sloped line

represents agents' Perceived Trust when principals chose to implement an incentive contract, and the negatively sloped line represents agents' Perceived Trust when principals chose not to do so.

Because our primary interest is in examining the effects of contract frame on trust and effort, our main analysis compares the two points on the upward-sloping line. That is, we compare the situation in which the principal has chosen to implement a bonus contract to the situation in which he or she has chosen to implement a penalty contract. We include the *fixed wage* condition for benchmarking purposes. Our analyses ignore the points on the downward-sloping line, which reflects the principal's choice to not implement an incentive contract, for two reasons. First, in typical business settings, employees would not be aware of an explicit choice to not implement an incentive contract. Second, a practical reason for ignoring the downward-sloping line is that the number of observations is quite low. Recall that these observations are the byproduct of the principal's endogenous choice of whether to implement an incentive contract; a choice crucial to the experimental design (cf. Christ 2012). However, because only seven principals in the *bonus contract* condition and 24 principals in the *penalty contract* condition chose to not implement the contract, any conclusions drawn from these observations would be unreliable.

By including the *fixed wage* condition, we are able to compare our results to prior studies examining the effects of formal control on trust (e.g., Das and Teng 1998, 2001; Enzle and Anderson 1993; Malhotra and Murnighan 2002). As previously described, this literature generally finds a negative relation between formal control and trust, suggesting that there are unintended consequences to implementing a formal control; namely, the degradation of the trust environment, which ultimately diminishes firm performance. However, this literature focuses on negatively framed formal controls, such as a penalty contract or audits of performance, and has not considered the effects of positively framed formal controls, such as a bonus contract.

Consistent with the prior literature, we find that relative to the *fixed wage* condition, the *penalty contract* condition results in lower levels of both Perceived Trust and Reciprocal Trust (see Table 1), and all contrasts are statistically significant at  $p < 0.01$  (untabulated). Thus, we confirm that penalty contracts, which are negatively framed formal controls, do have unintended consequences of diminished trust. However, Perceived Trust is significantly higher in the *bonus contract* condition than in the *fixed wage* condition, at  $p < 0.05$  (untabulated). There is no statistically significant difference between the *bonus contract* and *fixed wage* conditions for Reciprocal Trust. The results of these comparisons indicate that contrary to prior research, which did not differentiate between control frames, when *positively* framed formal controls are imposed, there is no degradation (and in the case of Perceived Trust, there is actual enhancement) of the trust environment.

### ***Principal Implementation Decisions***

While our main goal is to examine the effects of contract frame on the trust environment and agent effort, our data also provide insight into the contract implementation decisions of the principals. Principals appear to strategically anticipate the effect of their contract choice on agent behavior. Specifically, 78 percent (25 of 32) of principals in the *bonus contract* condition chose to implement the contract, compared to 49 percent (24 of 49) in the *penalty contract* condition. Thus, principals are more likely to choose to implement the Task 1 incentive contract when doing so is more likely to lead to higher effort in Task 2 (untabulated,  $F = 6.34$ ,  $p < 0.05$ ).

## **V. DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH**

Organizations implement incentive contracts to induce desirable employee effort. While incentive contracts framed as bonuses and penalties are found in practice, bonus contracts are much more prevalent. Accounting research examining the effects of contract frame finds that despite

employees' stated preferences for bonus contracts, employees exert greater effort under penalty contracts, resulting in greater firm profitability when penalty contracts are employed (Hannan et al. 2005; Hossain and List 2012). Thus, there has been a disconnect between the dominance of bonus contracts in practice with these prior research findings. Importantly, we note that prior literature on contract framing assumes a complete contract setting. In practice, employment contracts are often incomplete, leaving some components of employee pay to the discretion of the principal. In such incomplete contract settings, an agent's trust in his or her principal is an important determinant of effort.

This study examines the effect of contract framing on effort in an incomplete contract setting and, thus, considers trust as a mediating variable. We find evidence that for a task not governed by the incentive contract, agents exert greater effort under bonus contracts relative to penalty contracts. Analysis of a comprehensive theoretical model we developed based on the formal control/trust literature reveals that the relation between contract frame and effort depends on the level of trust induced by the implementation of a bonus or penalty contract.

The results of this study contribute to the incentive contract framing literature and help explain why bonus contracts are more common in practice than penalty contracts, despite evidence that penalty contracts elicit greater effort. Our findings suggest that it is important to consider both the bonus versus penalty contract frame and the completeness of the contract when designing incentive compensation plans.

The results of this study also contribute to a second stream of literature examining the effects of formal controls, such as incentive contracts, on trust. Studies in this stream of literature often conclude that formal controls have unanticipated consequences of deteriorating the trust environment, resulting in lower effort. However, this literature has focused primarily on negatively framed formal controls, such as penalty contracts, but has not considered the effects of positively framed formal controls, such as bonus contracts. Our results reveal that the frame of the formal control influences whether the control is perceived by the agent to be a signal of distrust and affects agent behavior.

The results of this study suggest several avenues for future research. First, this study and several prior studies on the effects of incentive contract framing (e.g., Luft 1994; Hannan et al. 2005) analyze the various mechanisms through which framing may influence agent behavior. However, because each study focuses on a different mechanism, it is unclear when the effect of one mechanism might outweigh the others and when managers should implement a bonus versus a penalty contract. Future research should explore these mechanisms further to determine in which settings the effect of each mechanism is likely to dominate.

Second, although the principals in our study choose whether or not to impose an incentive contract, the framing of the contract available to the principal in each condition is determined exogenously by the experimenters. In practice, principals choose whether to frame an incentive contract as a bonus or penalty. It is possible that the endogeneity of the framing decision might moderate agents' response to it, resulting in more positive or more negative reactions to an endogenously chosen bonus or penalty contract. This should not pose a threat to the validity of our study, because it works against our finding results. However, future research should consider both the agent's response to the contract frame chosen by management, as well as the factors that the principal considers when choosing the contract frame. Similarly, research examining the characteristics of principals who choose bonus versus penalty contracts may be fruitful. For example, are certain types of principals more likely to be trusting, and do they, therefore, exhibit a consistent preference for bonuses or penalties?

Third, we document a somewhat surprising result that the implementation of a bonus contract positively influences perceptions of being trusted, separate and distinct from the signaling effect we hypothesize. While not the focus of this study, the reasons for this result are worthy of additional

study. One possibility is that agents' preference for fairness results in a favorable reaction to the bonus contract. A second possibility is that agents have a general affective reaction to this type of formal control. Managers often rely on affective evaluations as a basis for making judgments (Schwartz 2002). This "affect heuristic" may moderate the effect of contract framing on perceived trust. Our results may suggest that, incremental to the negative signaling effect we posit, negatively framed formal controls create negative affect, deteriorating the trust environment. Positively framed controls, on the other hand, appear to induce positive affect, leading to greater trust. The investigation of this result is a promising area for future research.

Fourth, our experiment constitutes a one-shot trust game. Although the results show that effort is highest when a bonus contract is implemented, it is unclear whether this benefit would remain if the principal/agent pairs engaged in repeated trust games. Future research could investigate whether contract frame continues to influence effort even after the principal has had the opportunity to take advantage of the agent's trust.

Finally, our model is based on agents' beliefs regarding principals' motivation for implementing the incentive contract. However, prior research suggests that if agents do not interpret the implementation of the formal control as a signal of distrust, they will not respond negatively (Christ 2012). Therefore, future research should consider whether the effects of the bonus and penalty contracts found in the current paper hold if the principal is able to credibly signal that he or she trusts the agent.

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## APPENDIX A

### EXPERIMENTAL INSTRUMENT

#### General Instructions for All Conditions

##### INSTRUCTIONS

Participant #: \_\_\_\_\_

##### GENERAL

You are about to participate in a study on decision making. Please read these 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.

If you have any questions, you should first read back through the instructions. If you continue to have questions after all the instructions are read, please raise your hand and the Administrator will answer you in private.

Unless you are asking a question to the Administrator in private, **please do not talk** at all, during this experiment.

##### 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 either Participant A or Participant B. You will remain in the same role throughout the entire study. We will tell you which role you will assume after you read the first set of instructions.

Before you begin, the computer will randomly match participants into pairs (of one Participant A and one Participant B). The pairings are anonymous. 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:

$$\text{US \$ Payment} = (\text{Points earned} \times .025)$$

**Task 1 Overview for [Bonus Contract] [Penalty Contract] [Fixed Wage] Conditions****Initial Decisions*****Overview***

As a first step, Participant A 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 Participant A will choose the specific investments to be included in the portfolio. Participant A will also pay for the investments, but will be given a fund from which to pay. More specifically, at the start of the study,

- **Participant A** will be given [850] [1,000] [1,000] points, and
- **Participant B** will be given 250 points.

Participant A's initial fund is larger, because Participant A 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 Participant A and Participant B. Because you do not yet know to which role you will be assigned, it is important for you to pay close attention to both sets of instructions.



## Task 1 Agent Investment Decision Description for All Conditions




### Participant A

**Participant A** has the task of selecting the portfolio of investments. Participant A will be presented with 30 possible investments. From these 30 investment choices, Participant A **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 Participant A selects the 10 shares that are expected to make the highest returns in the next period.

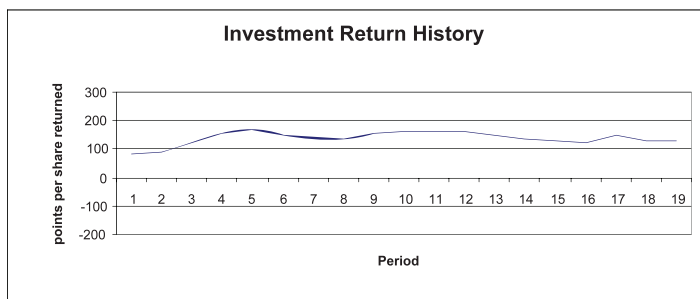
NOTE: Participant A must select 10 different investments, and buy exactly one share of each of these investments.

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 Participant A 10 points.
- Each  (whistle) share selected will cost Participant A 25 points.

 (whistle) shares are more expensive, because on average they are expected to return more per share in the next period. 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 enclosed, and described below).

Both participants will be provided with a graphical representation of the previous 19 periods of returns (points per share) for each of the 30 possible investments. For example, the history of points per share returned for one investment available for selection might look like this:





#### [Below for Bonus Contract and Penalty Contract Conditions Only]

Participant B will have the opportunity to implement a control system prior to Participant A's investment decision. The control system, if implemented, establishes a [bonus] [penalty] system for Participant A in which Participant A will [receive an extra 150 points if the total return of all shares chosen by Participant A meets or exceeds 500 points] [be required to pay 150 points if the total return of all shares chosen by Participant A is less than 500]. [No bonus points would be paid to Participant A if total return is less than 500 points.] [No penalty points would be paid if total return equals or exceeds 500 points.] The [bonus] [penalty] will be paid [from] [to] the administrator's fund. That is, the [bonus] [penalty] will not be [deducted from] [added to] Participant B's fund.



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

### Task 1 Summary of Participant A Points Earned for [Bonus Contract] [Penalty Contract] Conditions

#### Summary of Points – Participant A

Participant A will receive an initial fund of [850] [1,000] points. From this fund, Participant A will pay for the 10 shares 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 Participant A. Thus, the payoffs to Participant A for this initial decision are as follows:



	No control system	Control system
<b>Total Share Returns &lt; 500</b>	[850 points - Cost of Shares]  [1,000 points - Cost of Shares]	[850 points - Cost of Shares]  [1,000 points - Cost of Shares - 150 penalty points]
<b>Total Share Returns &gt;= 500</b>	[850 points - Cost of Shares]  [1,000 points - Cost of Shares]	[850 points - Cost of Shares + 150 bonus points]  [1,000 points - Cost of Shares]



For example, suppose Participant B implements the control system and Participant A chooses 6  (bell) shares and 4  (whistle) shares. Also assume that the returns for these investments [exceed] [are less than] 500 points. Participant A's payoff will equal  $[850 - (6 \times 10) - (4 \times 25) + 150 = 840 \text{ points}]$   $[1000 - (6 \times 10) - (4 \times 25) - 150 = 690 \text{ points}]$ .

If Participant B does not implement the control system, or the returns for the investments [are less than] [exceed] 500, Participant A's payoff will equal  $[850 - (6 \times 10) - (4 \times 25) = 690]$   $[1000 - (6 \times 10) - (4 \times 25) = 840]$ .

### Task 1 Summary of Participant A Points Earned for Fixed Wage Condition

#### Summary of Points – Participant A

**Participant A** will receive an initial fund of 1000 points. From this fund, Participant A will pay for the 10 shares selected (10 points for each  (bell) share and 25 points for each  (whistle) share).

For example, suppose Participant A chooses 6  (bell) shares and 4  (whistle) shares. Participant A's payoffs will equal:  $1000 - (6 \times 10) - (4 \times 25) = 840 \text{ points}$ .

**Task 1 Principal Contract Implementation Decision Description for [Bonus Contract] [Penalty Contract] Conditions (omitted for Fixed Wage condition)**

**Participant B**

**Participant B** will receive the total return from the 10 (ten) shares chosen by Participant A.

As described in the instructions for Participant A, Participant B will have the opportunity to implement a control system prior to Participant A's investment decision. The control system, if implemented, establishes a [bonus] [penalty] system for Participant A.

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

**Task 1 Summary of Participant B Points Earned for [Bonus Contract] [Penalty Contract] Conditions**

**Participant B**

**Participant B** will receive the total return from the 10 (ten) shares chosen by Participant A.

As described in the instructions for Participant A, Participant B will have the opportunity to implement a control system prior to Participant A's investment decision. The control system, if implemented, establishes a [bonus] [penalty] system for Participant A.

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 Participant A, and whether or not Participant B chose to implement the control system. Thus, the payoffs to Participant B are as follows:

	<b>No control system</b>	<b>Control system</b>
<b>Total Share Returns &lt; 500</b>	250 points + total share returns	250 points + total share returns - 50 points for cost of control system
<b>Total Share Returns ≥ 500</b>	250 points + total share returns	250 points + total share returns - 50 points for cost of control system

## Task 1 Summary of Participant B Points Earned for Fixed Wage Condition

### 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 Participant A. Specifically, Participant B will earn 250 points, plus the total returns from the shares chosen by Participant A. That is:

Participant B points = 250 points + total return on shares chosen by Participant A

## Task 2 Overview for All Conditions

### CONTINUING DECISIONS

#### Overview

You are still in the same role as before – either Participant A or Participant B.




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 don't know the amount exactly, because we have not told you the returns from the shares selected by Participant A. However, each Participant A still has 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.

#### Participant A

**Participant A** now has 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:

1. There is only one type of investment: a  (horn) investment.
2. Each  (horn) share costs 10 points (whereas in prior decisions, some investments cost 10 points and some cost 25 points).
3. 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).
4. Participant A can purchase anywhere from 0 to 50 shares of the  (horn) investment (whereas in the prior decisions, Participant A could only select one share each of 10 different investments).
5. Participant B will earn the returns from the portfolio. **However, Participant B will have the opportunity to share the return from the investment with Participant A (whereas in the prior decisions, Participant B kept the total return).**

#### Participant B

After learning how many shares Participant A purchased, **Participant B** will be given the opportunity to pay any amount of the return to Participant A. The return will equal 30 points X the number of shares of the  (horn) investment purchased by Participant A, and Participant B can share (i.e., give back) anything from 0 to the total return with Participant A.



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