

# The Effect of Honesty and Superior Authority on Budget Proposals

*Frederick W. Rankin*

*Colorado State University*

*Steven T. Schwartz*

*State University of New York at Binghamton*

*Richard A. Young*

*The Ohio State University*

**ABSTRACT:** Research in budgeting suggests that subordinates may exhibit economically significant degrees of honesty, in spite of pecuniary incentives to do otherwise. This study continues the exploration of honesty in budgeting along two dimensions. First, unlike prior experiments, we measure the incremental effect of honesty by manipulating whether budget requests are made in the form of a factual assertion. Second, prior designs may have emphasized the ethical dimension of budgeting by granting the subordinate wide discretion over setting the budget, whereas we manipulate whether the subordinate or the superior has final authority over setting the budget. We find that less slack is created when budget communication requires a factual assertion in the subordinate authority treatment, but not when the superior has final authority. Hence, we find an incremental effect of honesty only when the subordinate has final authority. We conjecture, and provide some evidence, that this is due to subordinates framing the superior authority situation as one of negotiation where each party acts in his or her self-interest, rather than as an ethical dilemma. This view, that budgeting is essentially devoid of ethical considerations, is consistent with some recent characterizations of budget practices.

**Keywords:** *participatory budgeting; honesty; slack; experiment.*

**Data Availability:** *Contact the authors.*

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## I. INTRODUCTION

In decentralized firms, the budgeting process is often the manner in which resources are allocated. For this process to be accomplished efficiently, information must be obtained from subordinates who are in close proximity to resource usage. However, if subordinates' objectives diverge from those of the firm, they may withhold or misrepresent their private information. In fact, agency analyses of the budgeting process assume that in the absence of truth-inducing contracts, subordinates will misrepresent their private information to serve their own interests, regardless of the effect on the firm. Such opportunistic behavior by subordinates greatly reduces the value of the budgeting process (Baiman and Evans 1983; Melumad and Reichelstein 1987).

In contrast, many budgeting studies find that individuals do not misrepresent their private information to the extent predicted, in spite of considerable pecuniary incentives to do so (Chow et al. 1988; Waller 1988; Evans et al. 2001; Hannan et al. 2006). These studies suggest that superiors can take advantage of subordinates' tendency to avoid making untrue factual assertions so as to increase the efficiency of the budgeting process. Evans et al. (2001) point out that if subordinates are reluctant to make untrue factual assertions, then contracts that take this behavior into account would result in greater profit than contracts based on the standard agency assumptions.

Prior research uses the construct of *honesty* to explain the tendency of individuals to avoid making untrue factual assertions, despite explicit or implicit incentives to the contrary (Baiman and Lewis 1989; Evans et al. 2001).<sup>1</sup> We maintain this definition of honesty throughout the paper.

There are two reasons why we undertake a further investigation into the effects of honesty on budgeting. First, previous studies such as Evans et al. (2001) and Hannan et al. (2006) have difficulty isolating the effects of honesty because the reporting behavior of the subordinate directly affects the distribution of wealth between the superior and subordinate. Therefore, deviations from self-interested behavior can be attributed either to honesty or to other nonpecuniary motivations such as preferences for the distribution of wealth. Evans et al. (2001) recognizes the importance of the subordinate's concerns for the distribution of wealth between the superior and subordinate and note the need for further research to refine our understanding of the factors that influence the extent of honesty. We address this issue by manipulating the subordinates' mode of budget communication, including one treatment where a factual assertion is required and another treatment where no factual assertion is required. While other-regarding preferences may operate in both cases, only in the former case should honesty be relevant because only in that case is it possible to make an untrue representation. By exploring both forms of communication, we are able to estimate the incremental effect of honesty.

Second, in nearly all studies of honesty in participative budgeting, subordinates have final authority over setting the budget. Because the superior has no ability to deny funding, the subordinate's budget proposal and the form of the contract in place determine the distribution of the profit.<sup>2</sup> It is possible that this approach encourages subjects to frame the budgeting process as an ethical dilemma, triggering honest and/or other non-pecuniary motivations. In contrast, in most organizations budgets are set through a process that includes negotiation between subordinates and

<sup>1</sup> Our definition is a broad one, including honest behavior due to social conditioning, moral reasoning, and social and environmental cues, among other things. We do not attempt to differentiate among the various motivations for honesty, but doing so in future research may be helpful in furthering our knowledge of budgeting behavior.

<sup>2</sup> In virtually all prior research in participative budgeting, the experimentalist acts as the superior (Young 1985; Waller 1988; Chow et al. 1988; Chow et al. 1991; Young et al. 1993; Chow et al. 1994; 1995; Evans et al. 2001; Stevens 2002; Fisher et al. 2003). Hannan et al. (2006) utilized subject-superiors, but they played no active role. Fisher et al. (2000), Fisher, Maines, Pfeffer and Sprinkle (2002) and Rankin et al. (2003) utilized subject-superiors who did play a role in the setting of budgets; however, these studies were designed to examine aspects of budgeting other than honesty.

superiors (Howell and Sakurai 1992; Anthony and Govindarajan 1994, 383; Fisher, Frederickson, and Peffer 2002). From the subordinate's perspective, this may frame budgeting as a strategic interaction, where each party acts in his or her self-interest, perhaps diminishing an intrinsic motivation to report honestly. In fact, practitioners and academics accuse the budgeting process of being largely devoid of an ethical component (e.g., Jensen 2003; Horngren et al. 2003). For instance, Jensen (2003, 386) provides anecdotal evidence that subordinates view lying and the concealing of information in the budgeting process as a game and, further, notes "that almost no one in this system consciously believes he or she is lying or behaving without integrity." Hence, it is unknown whether honesty would persist in the budgeting process when the superior has final authority over budget approval. We address this issue by administering two levels of budget authority, one where the subordinate has final authority over the budget and one where the superior has final authority over the budget. We further investigate this issue by administering a post-experimental questionnaire, designed to elicit the participants' motivation for their decisions.

We find that less slack is created when budget communication requires a factual assertion, but only when the subordinate has final authority over the budget. This finding is consistent with the results of Evans et al. (2001) and Hannan et al. (2006). Because our experimental design facilitates the study of the incremental effect of honesty, our results better demonstrate that honesty may be relevant beyond other nonpecuniary motivations. Standard agency theory maintains the information communicated should not be affected by whether the communication does or does not require a factual assertion. However, our results support the claim made in Evans et al. (2001) that honesty is relevant and that the reporting environment should be designed to take into consideration all aspects of preferences, both pecuniary and nonpecuniary.

In contrast, we do not observe a significant incremental effect of honesty when the superior has final authority. That is, the amount of budgetary slack is similar, regardless of whether budget communication requires the subordinate to make a factual assertion. The apparent reason for this result is that when superiors have final authority, subordinates are motivated primarily by strategic concerns, namely the fear of having their budget proposals rejected. Participant responses to our post-experimental questionnaire confirm that when superiors have final authority, subordinates are concerned with having their budget proposal rejected. Moreover, subordinates' concerns for the welfare of superiors are lower when superiors have authority over the budget. This is consistent with the theory of "crowding out," which suggests that extrinsic control in the form of superior authority will diminish the intrinsic motivation to display honesty in budgeting.

Although superior authority reduces the incremental effect of honesty, budgets contain less slack and superiors' earnings are greater than when subordinates have final authority. This is the case regardless of the mode of budget communication. This result regarding the benefits of formal control is consistent with recent findings. For instance, Evans et al. (2001) find that an optimal hurdle rate contract, in which the project is rejected if the report is above the hurdle, results in greater superior earnings than a trust contract, in which production is guaranteed irrespective of the subordinate's report. Rankin et al. (2003) find that allowing superiors to commit *ex ante* to a hurdle rate results in greater superior earnings than allowing subordinates *ex post* discretion over budget approvals. Finally, in a somewhat different context, Coletti et al. (2005) find that strong controls can enhance trust among individuals and improve performance in collaborative work environments.

The remainder of the paper is organized as follows. Section II describes our setting and predictions. Section III develops our experimental design. Section IV presents the results of the experiment. Section V presents limitations, implications, and conclusions.

## II. HYPOTHESIS DEVELOPMENT

### Setting

The research design for this study is adapted from a setting used in several studies on budgeting (e.g., Antle and Eppen 1985; Evans et al. 2001; Rankin et al. 2003; Hannan et al. 2006). The implementation of an investment project requires the presence of a subordinate who receives information about the project and a superior whose role is to provide cash. Both the revenue and the probability distribution of the project's cost are known by the subordinate and superior. Subsequently, the subordinate learns the cost of the project and submits a budget to the superior. The superior never learns the actual cost of the project. If the project is implemented, then the subordinate consumes as slack the difference between the funding provided by the superior and the actual cost of the project.<sup>3</sup> The superior receives the residual. If the project is not funded, then both parties receive a zero payout from the project.

Our budgeting task is well suited to the study of honesty. Unlike many previous studies, there is no uncertainty on the part of the subordinate when he submits his budget. Therefore, divergences from standard agency predictions can more clearly be attributed to nonpecuniary motivations, such as honesty, rather than to risk preferences. In addition, the superior never learns the true cost, so impression management is less of an issue.

We manipulate two features of this budgeting setting. First, we manipulate the mode of budget communication. In particular, subordinates' budgets take one of two forms: one that requires a factual assertion and one that does not. In the former case, subordinates report the project's cost and in the latter case, subordinates simply propose a portion of the project's profit to be returned to the superior. That is, in the latter case, the budget takes the form of an offer. Thus, if due to ethical considerations subordinates experience disutility from making explicit misrepresentations of fact, we would expect budgets to contain less slack when reporting requires subordinates to make factual assertions. This manipulation is related to Baiman and Lewis (1989), who allow participants to choose between making an implied assertion about their skill and an otherwise identical contract that contains no implied assertion.

We also manipulate whether the subordinate or superior has final authority over the budget. When the subordinate has final authority, he submits a budget that is automatically accepted. When the superior has final authority, the subordinate submits a budget that the superior either accepts or rejects.<sup>4</sup> While in practice, budget negotiation entails a more complex give-and-take structure, our assignment of final budget authority has the advantage of establishing an unambiguous economic benchmark prediction: The superior will accept any budget that gives her positive earnings and subordinates will therefore propose a budget that results in superiors receiving a minimal amount of earnings.<sup>5</sup>

### Hypotheses

Prior research demonstrates that in budget settings similar to ours subordinates trade off pecuniary and nonpecuniary payoffs. Evans et al. (2001) use a measure that they call the percentage of honesty—the percentage of profit available to, but unclaimed by, subordinates. In their

<sup>3</sup> In our setting profit is defined as the difference between revenue and cost for funded projects. Slack is defined as that portion of the profit that the subordinates attempt to capture for themselves via their choices.

<sup>4</sup> A contract that gives the subordinate discretion over the distribution of profit implicitly relies on an assumption of commitment. In particular, the superior commits to accept any budget report. When the superior has final authority, we assume that commitment is either not feasible or that commitment is feasible, but that the superior chooses to retain the right to reject budget reports.

<sup>5</sup> Having superiors either accept or reject projects most readily corresponds to situations involving significant incremental changes in operating budgets or to capital projects, as opposed to core operating budgets.

study, the amount of profit returned to superiors ranges from 49 percent under a trust contract to 22 percent under a hurdle contract. They take significant measures to maintain subordinate anonymity to ensure the permanence of information asymmetry. Hannan et al. (2006) study face-to-face reporting and manipulate the degree of asymmetric information between subordinates and superiors. Using the same metric as Evans et al. (2001), they find that the proportion of profits returned to superiors ranges from 59 percent to 75 percent.

It is important to note that in both of the above studies the researchers attribute entirely to honesty any deviations from budgets that maximize slack, even though it is possible that other nonpecuniary motivations such as fairness are also relevant. Our budget communication manipulation addresses the question of whether a communication system that requires a factual assertion has incremental value relative to other nonpecuniary motivations.

Another interpretation is our manipulation allows us to explore whether the mode of budget communication affects how subordinates frame the decision task. The theory of decision framing (Cialdini 1996; Tenbrunsel and Messick 1999; Fehr and Gächter 2002) suggests institutional features may serve as environmental cues that determine how individuals mentally frame the budgeting process. When budget communication requires a factual assertion, subordinates might frame the budgeting task as conveying information to the superior. In contrast, when budget communication does not require a factual assertion, it induces the subordinate to frame the budgeting task as merely proposing an allocation of the profit. Therefore, budget communication that requires a factual assertion should make the issue of honesty more relevant. If this framing effect occurs and honesty has an incremental effect, then slack will be lower when budget communication requires a factual assertion. One might then say that honesty can serve as an intrinsic control on budgetary slack.

Whether the superior or subordinate has final authority may also have a framing effect on the subordinate. We base this conjecture on evidence from past budgeting research and simple bargaining situations that have a structure similar to ours. Fisher et al. (2000) explore slack creation when subordinates have final authority and when superiors have final authority. Compared to cases where subordinates have final authority, there is less subordinate effort when superiors impose their final authority over setting budgets, even when controlling for pecuniary incentives.<sup>6</sup> Their results provide evidence that the assignment of final authority to either subordinates or superiors may frame the budgeting task differently. In our setting, subordinate authority may frame the task in a way that highlights subordinates' ethical concerns. That is, when subordinates have final authority over the allocation of the profit, they may view the budgeting task as an ethical dilemma and this could highlight honesty and other nonpecuniary motivations. In consequence, the subordinate may demonstrate more regard for the superior. In contrast, when the superior has final authority, the subordinate must consider the superior's reaction to his budget. That is, it becomes important that the subordinate's allocation of profit *appears* to be fair and reasonable to the superior to avoid rejection, and it may become relatively less important whether the subordinate considers it to *actually* be fair to the superior. Hence, superior authority may induce the subordinate to frame the budgeting task as a strategic interaction devoid of ethical concerns.

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<sup>6</sup> It is important to specify differences between their setting and ours. They use multiple rounds of negotiation and, in the case of a negotiation impasse, the party with final authority imposes a budget. In our budget setting, superior authority entails the submission of a budget by the subordinate that the superior either accepts or rejects. As mentioned earlier, while this form of superior authority lacks some of the richness of the negotiation found in Fisher et al. (2000), it is consistent with Evans and Moser's (2005) suggestion that it is advantageous for research designs to have a clear economic prediction against which to compare actual behavior.

The main effect of our budget authority manipulation is similar to the differences between ultimatum and dictator games.<sup>7</sup> Specifically, superiors' ability to reject the budget is essentially equivalent to the responder's veto power over proposals in ultimatum games. In contrast, under subordinate authority the subordinate's position resembles that of proposer in a dictator game, wherein all proposals must be accepted. On average, compared to dictator games, proposers offer much more of the available surplus and receivers' earnings are considerably greater in ultimatum games.<sup>8</sup> Hence, findings from these bargaining games suggest that final authority on the part of the superior can serve as an extrinsic control and reduce the amount of slack created by the subordinate.

To summarize, prior research suggests that subordinates' nonpecuniary motivations (intrinsic control) and a superior with final budget authority (extrinsic control) reduce slack. We further conjecture that superior final authority may diminish the role of nonpecuniary motivations. We develop this line of thought somewhat further as we analyze the interaction of our two treatment manipulations.

Our conjectures regarding the interaction of our treatment manipulations are related to the theory of motivational crowding (Frey and Jegen 2001). The theory of motivational crowding specifies a systematic interaction between extrinsic and intrinsic motivation. Specifically, extrinsic controls are thought to devalue intrinsically motivated behavior. For example, extrinsic controls may lead some to believe that they no longer are expected to display intrinsically motivated behavior, or that the superior does not value intrinsically motivated behavior. In our budgeting setting, crowding out suggests that extrinsic controls will diminish the intrinsic motivation to display honesty in budgeting.

The above discussion leads to the following hypotheses. Our first hypothesis maintains that when subordinates have final authority, honesty will have an incremental effect, thus reducing slack. That is, slack will be lower when budget communication requires a factual assertion.

**H1:** When subordinates have final budget authority, slack will be less when budgeting requires a factual assertion than when it does not require a factual assertion.

Our next hypothesis maintains that when budget communication does not require a factual assertion, superior authority will serve as an extrinsic control, thus reducing slack.

**H2:** When budgeting does not require a factual assertion, slack will be less when superiors have final authority over budget approval than when subordinates have final authority.

Our first two hypotheses investigate the effects of budget communication and budget authority in isolation. Our interaction argument leads us to predict that when more formal control is introduced, in the form of the superior's ability to reject budget proposals, it will interfere with the subordinate's intrinsic motivation to be honest. Therefore, we predict that budget communication that requires a factual assertion will reduce slack more when subordinates have final authority than when superiors have final authority.

<sup>7</sup> An ultimatum game is one in which a proposer offers a split of a surplus to a receiver. If the receiver accepts, then the proposed split is implemented. If the receiver rejects the offer, then both parties receive nothing. A dictator game is identical except the receiver cannot reject the proposal.

<sup>8</sup> The current interpretation of behavior in ultimatum games is that proposers offer something close to what they believe is the minimum amount that the receiver will accept. Further, the rejection and acceptance of offers by receivers is motivated by a simple trade-off between the utility that they get from a monetary payoff that requires accepting a proposer's offer and the utility that they get from rejecting a proposer's offer and, thus, preventing him from receiving a monetary payoff (Camerer 2003).

**H3:** The decrease in slack associated with budgets requiring a factual assertion will be less when superiors have final authority over budget approval than when subordinates have final authority.

### III. EXPERIMENTAL DESIGN

The experimental design employed a  $2 \times 2$  factorial design obtained by crossing two modes of budget communication (Factual Assertion and No Factual Assertion) with two forms of budget authority (Subordinate Authority and Superior Authority). Both factors were manipulated between participants. Participants were undergraduate students from a large university. Each treatment employed 30 participants. Participants were separated by partitions and interacted anonymously through a computer network. Experimental sessions lasted approximately one hour. Participants were remunerated with U.S.\$0.01 dollars for every \$0.01 experimental dollar earned. The average pay was approximately \$19.

#### Overview

The instrument was adapted from several related studies (Evans et al. 2001; Rankin et al. 2003; Hannan et al. 2006). Participants were assigned the role of superior or subordinate and kept the same role throughout the experiment.<sup>9</sup> The task involved a project that, if funded, yielded revenue of \$2.00. The cost of the project (in dollars) followed a uniform distribution with positive support on  $\{0.00, 0.01, 0.02, \dots, 1.99, 2.00\}$ . After learning the cost each subordinate communicated anonymously to the superior. Prior to the funding decision the subordinate learned the cost, but the superior never learned the cost. These facts were explained to all participants in all treatments.

Participants interacted for 20 rounds. After each round, superiors and subordinates were randomly re-matched. This was done to simulate a one-shot setting, while providing participants with substantial experience. Prior to the experimental sessions we randomly generated 15 cost sequences. To facilitate comparisons across treatments, the same 15 cost sequences were used in each experimental treatment. The mean cost across all 20 rounds was 97.85 in each treatment. At the end of each session each participant was remunerated in private with cash. To ensure that we would not know the earnings of any specific individual, a third party placed the cash in an envelope, which participants claimed via unique participant numbers. All aspects of the experiment were common knowledge among all participants with the exception of the actual costs, which were the private information of the subordinates.

#### Budget Communication Manipulation

In the budget communication manipulation the subordinate either proposed an allocation of the project's profit to the superior (No Factual Assertion treatments), or reported the project's cost to the superior (Factual Assertion treatments). In the No Factual Assertion treatments, after observing the actual cost, the subordinate could allocate any portion of the project's profit between zero and the total profit generated by the project ( $\$2.00 - \text{actual cost}$ ) to the superior. If the project was implemented, then this allocation determined the payoffs of the subordinate and superior. In the Factual Assertion treatments, subordinates observed the actual cost and then submitted a cost report to the superior. If the project was implemented, then the superior received \$2.00 minus the reported cost and the subordinate received the reported cost minus the actual cost. The subordinate was free to report however he or she wished, but the computer program would not allow the report

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<sup>9</sup> In the experiment we used the terms *manager* and *owner*. For consistent exposition we will continue to use the labels subordinate and superior, respectively.

to be less than the actual cost.<sup>10</sup> In addition, in all treatments the subordinate received a \$1.00 payment each round, regardless of whether the project was implemented. The \$1.00 payment served as a wage and allowed the subordinate to be compensated, even if he returned all of the profits to the superior.<sup>11</sup>

### Budget Authority Manipulation

The budget authority manipulation was operationalized as follows. In the Subordinate Authority treatments, which are similar to those used in [Evans et al. \(2001\)](#) and [Hannan et al. \(2006\)](#), the superior's only task was to observe the subordinate's budget communication.<sup>12</sup> In the Superior Authority treatments, the superior has the option to either accept or reject the subordinate's budget. Table 1 summarizes the experimental design and hypotheses.

## IV. RESULTS

We begin with a summary analysis of the experimental data, followed by tests of the hypotheses. We also explore participants' motivations in more detail by analyzing responses to a post-experiment questionnaire and by analyzing the effect of the treatment manipulations on the superiors' earnings.

### Summary Analysis

The results for the four treatments are summarized in Table 2 and Figure 1. Table 2 reports summary statistics for all experimental treatments over all 20 rounds. Slack is measured as the amount of slack implied by the subordinate's budget communication regardless of whether the

**TABLE 1**  
**Experimental Design**

		Budget Authority	
		Superior Authority (SUP-A)	Subordinate Authority (SUB-A)
Budget Communication	No Factual Assertion (NFA)	NFA/SUP-A	NFA/SUB-A
	Factual Assertion (FA)	FA/SUP-A	FA/SUB-A

**Hypothesis 1:** Effect of budget communication with Subordinate Authority.

H1:  $\text{Slack}(\text{FA}, \text{SUB-A}) < \text{Slack}(\text{NFA}, \text{SUB-A})$ .

**Hypothesis 2:** Effect of budget approval authority with No Factual Assertion.

H2:  $\text{Slack}(\text{NFA}, \text{SUP-A}) < \text{Slack}(\text{NFA}, \text{SUB-A})$ .

**Hypothesis 3:** Effect of interaction between budget approval authority and budget communication.

H3:  $\text{Slack}(\text{NFA}, \text{SUP-A}) - \text{Slack}(\text{FA}, \text{SUP-A}) < \text{Slack}(\text{NFA}, \text{SUB-A}) - \text{Slack}(\text{FA}, \text{SUB-A})$

<sup>10</sup> The restriction that the subordinate could not understate the cost or allocate more than the project's profit prevented the subordinate from receiving a negative payoff from the investment.

<sup>11</sup> Without a wage, the participants would be placed in a position where there would be extreme tension between their payoff and preferences to report honestly. A wage was also used in [Evans et al. \(2001\)](#), [Hannan et al. \(2006\)](#), and [Stevens \(2002\)](#) for the same reason. Note that the wage has no effect on the economic predictions.

<sup>12</sup> In [Evans et al. \(2001\)](#) the superiors were hypothetical. We have subject-superiors in all of our treatments.

**TABLE 2**  
**Summary of Mean (Std. Dev.) Results**

<b>Treatment</b>	<b>Slack per Round</b>	<b>Subordinate<sup>a</sup> Earnings per Round from Project</b>	<b>Superior Earnings per Round from Project</b>	<b>Superior Rejection Rate</b>
Subordinate Authority/No Factual Assertion	\$0.829 (0.512)	\$0.829 (0.512)	\$0.192 (0.172)	NA
Subordinate Authority/Factual Assertion	\$0.643 (0.532)	\$0.643 (0.532)	\$0.379 (0.419)	NA
Superior Authority/No Factual Assertion	\$0.537 (0.408)	\$0.474 (0.432)	\$0.417 (0.305)	30.7%
Superior Authority/Factual Assertion	\$0.516 (0.388)	\$0.464 (0.420)	\$0.431 (0.326)	30.7%

<sup>a</sup> Both subordinate and superior mean per round earnings include all rounds regardless of whether the project was accepted or rejected.

superior accepted the project.<sup>13</sup> The mean maximum potential slack across all 20 rounds was \$1.02 for each of our four treatments.<sup>14</sup> Both subordinate and superior mean, per-round earnings include all rounds, regardless of whether the project was accepted or rejected.

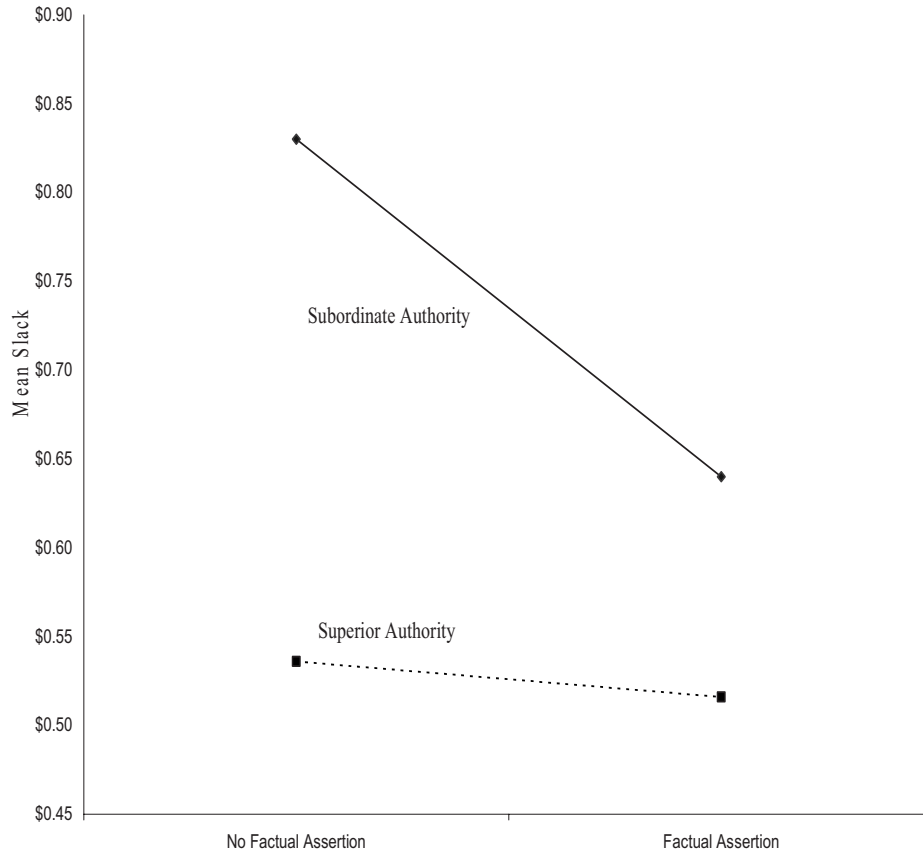
Several aspects of the results are immediately apparent. In the Subordinate Authority treatments we find the familiar result that slack is far less than the greatest possible amount. However, in these treatments, slack decreases about 23 percent when budgeting requires the subordinate to make a factual assertion (submit a cost report). In contrast, as illustrated in Figure 1, in the Superior Authority treatments we find little difference in slack across different forms of budget communication. Interestingly, in both Superior Authority treatments the amount of slack is consistent with subordinates focusing on an equal split of the mean maximum possible slack. Hence, when the superior has final budget authority, it appears that honesty does not play an important role in the budgeting process.

Table 2 also demonstrates that superiors reject a non-negligible fraction of budget proposals even though by doing so they forfeit profit. Also, note that while slack in the Superior Authority treatments is uniformly lower than it is in the Subordinate Authority treatments, there is less of a difference in the earnings of superiors. The smaller difference in earnings reflects the opportunity cost to the superior of rejecting budget proposals, which occurs only in the Superior Authority treatments. We analyze this phenomenon in more detail below.

<sup>13</sup> For all statistical tests related to slack, we use the difference between the cost implied by the subordinate's budget communication and the actual cost, regardless of whether the budget was accepted.

<sup>14</sup> Recall, that we used the same 15 cost sequences in each treatment. Hence, each treatment has the same mean actual cost and same mean actual maximum possible slack.

**FIGURE 1**  
**Results**  
**Mean Slack**



### Tests of Hypotheses

For all hypothesis tests, rather than treating multiple responses by the same participant as independent, we calculate mean slack for each subordinate-participant over all rounds, so each subordinate-participant serves as an independent observation.<sup>15</sup> Table 3, Panel A reports statistical tests of H1 and H2 and Panel B reports the test of H3.

### Effect of Budget Communication

Our first hypothesis maintains that when the subordinate holds authority over the budget slack will be less when communication requires a factual assertion than when communication does not

<sup>15</sup> We also analyzed our data using a repeated-measures ANOVA to check for a period effect. Period was significant, but did not interact with the between-subjects factors. Further, we analyzed mean slack over time, grouping the data by rounds 1–5, 6–10, etc. There is no apparent pattern except for the slight dip in the second interval for all treatments due to the higher cost draws and, hence, lower available slack. Mean available slack in the intervals is 104.78, 92.97, 106.73 and 104.11, respectively.

**TABLE 3**  
**Tests of Hypotheses**

**Panel A: Tests of H1 and H2**

Hypothesis 1: Effect of budget communication

	t-statistic	p-value
H1: Slack(FA , SUB-A) < Slack(NFA , SUB-A)	1.81	0.0202

Hypothesis 2: Effect of budget approval authority

	t-statistic	p-value
H2: Slack(NFA , SUP-A) < Slack(NFA , SUB-A)	5.9	0.0001

**Panel B: Tests of H3**

Hypothesis 3: Interaction between budget authority and budget communication

H3: Slack(NFA , SUP-A) – Slack(FA , SUP-A) &lt; Slack(NFA , SUB-A) – Slack(FA , SUB-A)

	F-statistic	p-value
Authority	14.9	0.0003
Communication	3.62	0.0001
Authority * Communication	2.34	0.1316

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FA = Factual Assertion;  
NFA = No Factual Assertion;  
SUP-A = Superior Authority; and  
SUB-A = Subordinate Authority.

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require a factual assertion. Support for this hypothesis would provide evidence that honesty serves as an intrinsic control on slack creation. Mean slack in the Subordinate Authority/Factual Assertion treatment is \$0.643 and \$0.829 in the Subordinate Authority/No Factual Assertion treatment. The null hypothesis of equal mean slack under both forms of budget communication treatments is rejected in favor of less slack in the Subordinate Authority/Factual Assertion treatment ( $t = 1.81$ ,  $p = 0.0202$ , one-tailed). Hence, when subordinates have final budget authority, honesty has an incremental effect that significantly reduces slack. This finding supports H1. Further, because we employ an experimental design that facilitates the investigation of the incremental effect of honesty, we can more clearly demonstrate the effect of honesty when subordinates have final budget authority. Providing evidence of an effect of honesty in addition to other nonpecuniary motivations is valuable because it has direct implications regarding whether a budgeting system that requires a factual assertion has incremental value to the firm.

***Effect of Budget Approval Authority***

Our next hypothesis maintains that when budget communication does not require a factual assertion, slack will be less when the superior has final budget authority than when the subordinate has final authority. As seen in Table 2, mean slack in the Subordinate Authority/No Factual Assertion treatment is \$0.829, but only \$0.537 in the Superior Authority/No Factual Assertion treatment. The null hypothesis of equal mean slack under both treatments is rejected in favor of less slack in the Superior Authority/No Factual Assertion treatment ( $t = 5.9$ ,  $p = 0.0001$ , one-

tailed). This finding supports H2. Hence, when the mode of budget communication is unable to exploit a tendency to exhibit some honesty, because it does not require a factual assertion, formal control in the form of superior authority significantly reduces slack.

It is also important to note that in the Superior Authority/No Factual Assertion treatment, the amount of slack claimed as a percentage of the total surplus falls as actual costs rise. In contrast, we find that in the Subordinate Authority/No Factual Assertion treatment the amount of slack claimed as a percentage of the total surplus stays remarkably consistent across cost levels. This is consistent with subordinates' choice of slack being motivated, in part, by the fear of having their budget proposals rejected.

### ***Effect of Interaction between Budget Approval Authority and Budget Communication***

Our final hypothesis maintains that honest behavior will decrease slack less under the Superior Authority treatments than under the Subordinate Authority treatments. Support for this hypothesis would provide evidence that when the superior has final budget authority subordinates' strategic concerns become relatively more important than ethical concerns. In the Subordinate Authority treatments slack decreases 23 percent, from \$0.829 when communication does not require a factual assertion, to \$0.643 when a factual assertion is required. Conversely, in the Superior Authority treatments slack decreases only 4 percent, from \$0.537 when communication does not require a factual assertion, to \$0.516 when a factual assertion is required. Table 3 reports the results of an ANOVA analysis. The results indicate an insignificant interaction between Budget Authority and Budget Communication; however, this is not a directional test. Therefore, the F-statistic is converted to a t-statistic to make directional inferences. The null hypothesis of no difference is rejected in favor of a greater difference in the Subordinate Authority treatments ( $t = 1.53$ ,  $p = 0.0658$ , one-tailed).<sup>16</sup> This finding supports H3 and is consistent with the idea that formal authority has a crowding effect on the intrinsic motivation to behave honestly. In the next section, we explore the subordinates' various motivations in more detail.

### ***Analysis of Responses to a Post-Experiment Questionnaire***

To gain a better understanding of subordinate behavior, we administered a post-experiment questionnaire to explore potential pecuniary and nonpecuniary motivations underlying participants' behavior. Responses range from 1 (strongly disagree) to 7 (strongly agree). Table 4 presents the six questions asked of the participants and the mean responses, by treatment.

First, we pool the data by budget authority. The mean response to the question, "I wanted to treat the owner fairly" is 4.00 in the Subordinate Authority treatments and 3.03 in the Superior Authority treatments. Compared to the Superior Authority treatments, concerns for treating the superior fairly are significantly greater in the Subordinate Authority treatments ( $t = 2.46$ ,  $p = 0.0084$ , one-tailed). In contrast, the mean response to the question, "I was concerned that the owner desired to be treated fairly" is 2.73 in the Subordinate Authority treatments and 4.4 in the Superior Authority treatments. This concern is significantly greater in the Superior Authority treatments than in the Subordinate Authority treatments ( $t = 4.89$ ,  $p = 0.0001$ , one-tailed). In the Superior Authority treatments, this question provides some evidence of subordinates' concerns about having their budget proposals rejected. Also, compared to the Subordinate Authority treatments (mean = 3.97), participants in the Superior Authority treatments (mean = 4.53) showed mildly more concern with maximizing their own earnings ( $t = 1.47$ ,  $p = 0.0729$ , one-tailed).

We also use the post-experiment questionnaire to compare attitudes toward honesty in the Subordinate Authority/Factual Assertion treatment and the Superior Authority/Factual Assertion

<sup>16</sup> See McNeil et al. (1996) and Kachelmeier and Towry (2002) with regard to extending the usual logic of a one-sided hypothesis test to directional tests of interactions between two factors.

**TABLE 4**  
**Mean (Std. Dev.) Responses to Post-Experiment Questionnaire**

	<b>Subordinate Authority/No Factual Assertion</b>	<b>Subordinate Authority/ Factual Assertion</b>	<b>Superior Authority/No Factual Assertion</b>	<b>Superior Authority/ Factual Assertion</b>
I wanted to be honest.	NA	3.60 (1.93)	NA	2.60 (0.88)
I wanted to treat the owner fairly.	4.07 (2.27)	3.93 (1.44)	2.73 (0.77)	3.34 (0.96)
I was concerned that the owner desired to be treated fairly.	2.67 (1.45)	2.80 (0.98)	3.60 (1.02)	5.20 (1.17)
I was concerned that the owner would reject my offer.	NA	NA	4.53 (1.03)	5.67 (0.87)
I wanted to maximize my earnings.	3.93 (1.53)	4.00 (2.07)	4.40 (1.15)	4.67 (0.79)
I wanted to maximize profits.	2.13 (1.15)	3.26 (1.48)	2.53 (0.81)	2.33 (1.08)

Participants responded on a scale of 1 through 7, where 1 = Strongly Disagree, ..., 7 = Strongly Agree.

treatment. In particular, we compare responses to the question: "I wanted to be honest." The response is significantly greater ( $t = 1.77$ ,  $p = 0.0440$ , one-tailed) in the Subordinate Authority/Factual Assertion treatment (mean = 3.6) than in the Superior Authority/Factual Assertion treatment (mean = 2.6). This finding from the Factual Assertion treatments is consistent with our conjecture that honesty concerns are relatively more important when subordinates have final authority over setting the budget. In addition, the results from the question on the desire to treat the owner fairly indicate that equity concerns in general are less important when superiors have final budget authority than when subordinates have final authority.

### Analysis of Superiors' Earnings

Though not addressed in the formal hypotheses, of clear interest is the effect of the treatment manipulations on the earnings of the superior. Mean superior earnings are found in Table 2. Pair-wise t-tests for the four treatment combinations yield six comparisons, with each treatment combination contributing 15 independent observations. We find that the Subordinate Authority/No Factual Assertion treatment has significantly lower mean superior earnings than the three other treatments (all p-values < 0.05, two-tailed). However, there are no significant differences between the other treatment combinations. One implication of this result is that, compared to the Subordinate Authority/Factual Assertion treatment, either requiring a factual assertion (cost report) or having a superior with authority over budget approval functions equally well in increasing superior earnings.

## V. CONCLUSIONS

We find that when the subordinate has final authority over the budget, slack is significantly less when budget communication requires a factual assertion. The significance of this finding is that, while prior studies such as [Evans et al. \(2001\)](#) conclude that honesty plays a role in the

budgeting process, it demonstrates an effect from honesty distinct from other nonpecuniary motivations. Therefore, our study suggests it would be beneficial to incorporate honesty into the design of the budgeting process, despite opposite conclusions based on agency theory and the early findings of [Baiman and Lewis \(1989\)](#).

However, we also find that when the superior has final authority, there is no significant difference in the amount of slack created by requiring a factual assertion. Hence, we do not observe an incremental effect from honesty when the superior has final authority. Questionnaire data provide evidence that this results from subordinates framing the situation as negotiation rather than as an ethical dilemma. More precisely, we find that concerns for fairness are greater when the subordinates have final authority. When the superiors have final authority, subordinates demonstrate concern that their proposals will be rejected. This result is consistent with the results from [Fisher et al. \(2000\)](#), who found formal controls such as the superiors imposing their final authority over budget negotiations reduced the subordinate's willingness to put effort into a productive task.

Finally, we find that formal control in the form of superior final authority is beneficial to the firm, in spite of the deleterious effect it has on nonpecuniary preferences. This last result is consistent with results from prior budgeting studies such as [Evans et al. \(2001\)](#) and [Rankin et al. \(2003\)](#). Taken together our three primary findings seem to indicate that the design of budgeting systems requires a delicate balance between promoting nonpecuniary motivations and administering formal controls.

As with all laboratory experiments, the results of this experiment generalize only as far as its design captures important aspects of the setting one wishes to understand. Although along some dimensions we implement a somewhat richer environment than previously administered, we still cannot replicate the cultural aspects that influence behavior within an organization. It is argued that corporate culture can have a profound effect in mitigating undesired behavior. A second limitation involves the manner in which superiors exercise their authority. The authority to reject budget proposals is a simplistic version of the give-and-take that often occurs in budget negotiations. However, a simplified task is desirable in the administration of an experiment because it limits participant confusion, provides greater experimental control, and leads to unambiguous economic predictions. A third limitation is that this paper focuses exclusively on strategic uncertainty, while in practice subordinates may face uncertainty about the future at the time they submit budgets. Hence, even an honest, risk-averse individual may have incentive to build slack into his budget. In other words, such an individual may view his budget as more than just a matter of whether to tell the truth. A fourth possible limitation is that due to the nature of our manipulations, we thought that it was inappropriate to ask honesty-related questions in the No Factual Assertion treatments; in retrospect, it might have been interesting had we done so.

Although our experiment had a more complete mode of strategic interaction than many prior studies, it still provides a rather stark setting in which to study honesty. Further research may focus on richer settings that have such attributes as iterated bargaining, face-to-face communication, and the potential for repeated interactions.

## APPENDIX

### Instructions for Factual Assertion/Superior Authority Treatment

#### INTRODUCTION

Welcome and thank you for participating in this experiment. Your pay will depend on the decisions you make during the experiment. At the end of today's session, you will be paid in private and in cash. It is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you.

Before the first decision round begins participants will be assigned as owners or managers. Half of the participants will be assigned as owners and half of the participants will be assigned as managers. You remain as either an owner or manager for all decision rounds. Each of you has an assigned subject number. *At the beginning of each decision round subjects are randomly paired by subject numbers.* There will be 20 decision rounds.

### OVERVIEW

Each period the cost of implementing a project is randomly determined and revealed only to the manager. The cost is randomly drawn each period from the set of possible costs (0,1,2,...,200). These numbers represent pennies (i.e., 200 = \$2.00). Each number is equally likely to be drawn each period. The manager learns the cost. The owner *never learns the cost.* If implemented, the project yields revenue of 200.

### OWNERS' TASK

For each decision round the owner receives a cost report from the manager. The owner either gives the manager nothing or an amount equal to the manager's reported cost.

### MANAGERS' TASK

The manager observes the actual cost. After observing the actual cost, the manager reports a cost to the owner. The reported cost cannot be less than the actual cost. The owner either gives the manager nothing or an amount equal to the manager's reported cost. Since the project yields revenue of 200, the payoff to the owner is 200 minus the amount given to the manager if the project is implemented, and 0 otherwise. The payoff to the manager is the amount received from the owner minus the actual cost if the project is implemented, and 0 otherwise. In addition the manager will receive a payment of 100 each period.

### SUMMARY AND SEQUENCE OF EVENTS

The cost is randomly drawn each period from the set of possible costs (0,1,2,...,200). Each number is equally likely to be drawn each period. The manager learns the actual cost and submits a cost report to the owner. The reported cost must be equal to or greater than the actual cost. The owner either gives the manager nothing or an amount equal to the manager's reported cost. At the beginning of each decision round subjects are randomly paired by subject numbers. There will be 20 decision rounds.

### Example

If the actual cost is 50, then the total profit is  $200 - 50 = 150$ . The manager can report any cost between 50 and 200. If the manager reports 133, then the owner either (1) rejects the report and so the manager and owner receive nothing, or (2) accepts the report, gives 133 to the manager, thus the owner earns  $200 - 133 = 67$  and the manager earns  $100 + (133 - 50) = 183$ . That is, if the report is rejected, then the manager and owner receive nothing from the project. If the report is accepted, then the manager receives the fixed payment of 100 plus the difference between the reported cost and actual cost ( $133 - 50$ ).

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