

# Dividing the Pie: The Influence of Managerial Discretion Extent on Bonus Pool Allocation\*

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## 1. Introduction

An essential role of management is organizational control, or the process of “ensuring that the organization operates in the intended manner and achieves its goals” (Hilton 2008: 6). Accountants support managers in this role by providing information that forms the basis of performance evaluation and incentive-based contracting. However, managers also have available to them other relevant employee performance information — that is, information not explicitly contracted on because it represents unforeseen circumstances, cannot be jointly verified or requires interpretation or judgment. To incorporate this noncontractible information into compensation decisions, firms often allow managers discretion in determining subordinates’ compensation. Specifically, many firms use discretionary bonus pools as the mechanism via which managers apply discretion in compensation.<sup>1</sup> Whereas the size of a bonus pool (in dollars) is typically based on some predetermined formula, firms vary greatly in the extent to which managers are endowed discretion to allocate that pool (Murphy and Oyer 2003). That is, some plans allow managers full discretion in allocating the bonus pool, whereas other plans allow discretion over only a portion of the total pool, with the remainder contractually allocated by formula. In this paper, we investigate the effect of this important institutional factor — discretion extent — on managers’ discretionary bonus allocations.

To examine the effect of discretion extent, we develop theory on the *processes* by which managers will allocate discretionary bonus pools. Analytic research (e.g., Rajan and Reichelstein 2006) models each bonus pool participant’s allocation as a linear combination of performance measures. This linear combination may be conceptualized as a single, comprehensive measure of performance, in which all relevant (contractible and noncontractible) information is integrated. Based on this conceptualization, one might assume that in

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1. Although we present our contest in terms of firm managers evaluating employees, our research question applies to compensation committees who evaluate the performance of chief executive officers and other executive-level employees.

applying discretion, managers will use an *integrative* approach, in which contractible and noncontractible information is combined into a single, comprehensive performance measure, which is then used as the allocation basis. In this paper, we predict that managers will use a different approach. Specifically, we argue that managers will tend to use a *piecemeal* approach, considering the compensation implications of each information cue separately. To implement this approach, managers will rely on the anchoring heuristic, thereby choosing some piece of information as a starting point for the allocation, and processing additional information cues as qualitative adjustments from that starting point. Following psychology theory, we predict that managers who use such an approach will tend to incorporate noncontractible information to a lesser degree than will those who use an integrative approach.

This process-based theory informs our primary research question — what is the effect of discretion extent on discretionary bonus allocations? We argue that, relative to full discretion, partial discretion more directly signals a purpose for discretion, thereby increasing the salience of the noncontractible information. Therefore, when managers use the anchoring heuristic, we predict that those with partial discretion will incorporate noncontractible information into the discretionary portion of the bonus allocation to a greater degree than managers endowed with full discretion.

We investigate our research questions using a  $2 \times 2$  between-subjects experiment. Graduate business student participants assume the role of a senior manager who must allocate a bonus pool between two employees. We manipulate *discretion extent* (full, partial) such that participants with full discretion allocate the entire bonus pool, while participants with partial discretion allocate half the bonus pool, with the remainder allocated based on reported division profit. We also manipulate the *valence* (positive, negative) of a subset of noncontractible information. That is, when combined with contractible information, this noncontractible information should have either a positive or negative effect on the overall performance evaluation (i.e., relative to an evaluation based only on the contractible information). This manipulation allows us to measure the degree to which participants incorporate noncontractible information into bonus pool allocations.

Our results are consistent with our predictions. In particular, we find that managers are likely to use an anchoring approach when processing information to allocate discretionary bonus pools. In addition, we find that managers who use this approach tend to incorporate noncontractible information to a lesser degree than do those who use other approaches. However, our results suggest that this tendency is mitigated when managers have partial discretion. In particular, we find that among those who use an anchoring approach, participants with partial discretion incorporate noncontractible information in discretionary bonus allocations to a greater degree than do participants with full discretion. Further, this pattern of results holds when we consider *total* bonus pool allocations (i.e., discretionary and nondiscretionary bonus pools combined). While this latter finding is likely sensitive to specific aspects of the bonus plan design, it suggests the potential for total bonus allocations of managers with *less* discretion to ultimately reflect noncontractible information to a *greater* degree.

Our study contributes to the growing literature on subjective performance evaluation and, more specifically, to the literature considering the benefits and costs of discretionary bonus pools (e.g., Baiman and Rajan 1995; Ittner, Larcker, and Meyer 2003; Fisher, Maines, Pfeffer, and Sprinkle 2005; Bol and Smith 2010). In particular, our paper provides evidence on *how* managers use their discretion by examining the process by which managers allocate discretionary bonus pools, as well as the implications of this process. This evidence highlights an obstacle — the manager's allocation process itself — that reduces the incorporation of relevant noncontractible information, thereby circumventing intended

benefits of managerial discretion. Notably, this evidence is lacking in a literature that primarily views managers with discretion over bonus pools as mechanically carrying out the intentions of bonus plan designers.

Further, our theory and findings potentially serve as a mechanism underlying phenomena noted in prior literature on subjective performance evaluation (see Bol 2008 for a related review). Specifically, given that managers who use the anchoring approach incorporate noncontractible information to a lesser degree than managers who use other decision processes, our results provide a potential theoretical explanation for the well-documented centrality and halo biases. For example, our results suggest that a manager who anchors on an equal split of the bonus pool and then adjusts for other information will choose a bonus allocation consistent with the centrality bias (i.e., a bonus allocation that is closer to an equal split than the potentially more differentiating noncontractible information would suggest). Similarly, anchoring on division profit and adjusting for other information yields allocations consistent with a halo effect. That is, one measure of performance, division profit, will be weighted higher, such that positive (negative) performance on this measure will create a positive (negative) halo that affects the overall evaluation.

Finally, our study is important to managers and accountants developing and maintaining incentive systems using discretionary bonus pools. On the surface, it seems that, by expanding the extent of discretion endowed managers, firms could increase consideration of a wide variety of performance-relevant information (i.e., including noncontractible information). However, our paper suggests the opposite. That is, our results imply that *limiting* discretion could facilitate (as opposed to prohibit) managers' incorporation of relevant noncontractible information into bonus allocations.

The remainder of the paper is organized as follows. Section 2 develops the hypotheses. Section 3 presents the experiment. Section 4 reports the results. Section 5 concludes.

## 2. Theory and hypotheses

### *Background and general setting*

Compensation contracts often make pay contingent on *contractible information* — information that is sufficiently precise and verifiable such that it is economically feasible to be contracted upon. However, compensation contracts are often incomplete, in that relevant *noncontractible information* — information that reflects unforeseen circumstances, is subjective, is not verifiable, or is too costly to convert to contractible form — is excluded.<sup>2</sup> The purpose of *discretionary bonus plans*, compensation systems that endow managers with decision rights over bonus allocations to employees, is to mitigate costs associated with incomplete contracts. Specifically, by endowing managers with discretion, a discretionary bonus plan allows managers to incorporate relevant noncontractible information into bonus pool allocation decisions. Thus, managerial discretion creates the opportunity for more informed bonus pool allocations (Murphy and Oyer 2003).

Research in subjective performance evaluation has investigated the benefits and costs of discretionary bonus plans (e.g., Ittner et al. 2003; Murphy and Oyer 2003; Gibbs, Merchant, Van der Stede, and Vargus 2004; Fisher et al. 2005; Rajan and Reichelstein 2006, 2009). For instance, Baiman and Rajan (1995) find that under fairly general conditions, it is in the firm's best interest to make bonus pool allocations contingent on both contractible and subjective, noncontractible measures. Further, Fisher et al. (2005) find that

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2. Empirical evidence indicates that firms use relatively few performance measures in formal contracts, suggesting that it is not economically feasible to contract on other measures. For instance, Banker, Potter, and Srinivasan (2000) document evidence that a large hotel chain limits the number of performance measures formally included in employees' incentive compensation contracts for reasons pertaining to simplicity, reliability, etc.

managerial discretion mitigates employees' free-riding. Rajan and Reichelstein (2006) extend this literature and allow for partial discretion in their examination of the relative weights placed on subjective versus objective measures in optimal contracts. They demonstrate that a discretionary bonus scheme is optimal when relevant subjective measures are available.<sup>3</sup>

However, there are also costs associated with discretion. These costs include undesirable behavior on the part of both managers (e.g., opportunism, as discussed in Fisher et al. 2005) and employees (e.g., propensity to game the evaluation process, as discussed in Prendergast 1999). Prior research has documented such costs. For example, Ittner et al. (2003) describe a field study in which managers with discretion were inconsistent in applying relative weights to performance measures and establishing performance criteria. The firm ultimately eliminated discretion and adopted a purely formulaic bonus plan. Additionally, the analytic literature suggests that the use of subjective measures in discretionary bonus pools potentially imposes risks on agents, and thus results in agency costs (Rajan and Reichelstein 2006).

Related to the net benefit of discretion, our main research purpose is to examine the effect of discretion extent — an important institutional factor that varies across firms — on managers' discretionary bonus allocations. To examine this effect, we consider *how* managers allocate discretionary bonus pools, an issue to which the analytic literature on discretionary bonus pools provides little consideration. Specifically, for purposes of tractability, analytic models simplify the role and behavior of a manager with discretion as mechanistic. That is, the bonus pool allocation resulting from every possible combination of performance measure outcomes is determined *ex ante*, and the manager's *ex post* behavioral response to those outcomes is assumed away. Thus, a secondary motivation for our paper is to understand this *ex post* behavioral response (i.e., how managers actually use discretion).

To investigate our questions, we incorporate the basic elements of related analytic models (e.g., Baiman and Rajan 1995; Rajan and Reichelstein 2006) and the contracting solutions they provide to develop our general setting as follows.<sup>4</sup> Assume a firm's incentive system includes a discretionary bonus plan, in which the total bonus pool is funded based on corporate profit. With full discretion, the allocation of the entire bonus pool is left to the manager's discretion. With partial discretion, half the bonus pool is discretionary while the remaining nondiscretionary portion is formulaically allocated based on reported division profit (i.e., each division's contribution to reported corporate profit).<sup>5</sup> This partial discretion setting is similar to that developed by Rajan and Reichelstein 2006, as well as example plans from practice.<sup>6</sup> For example, Georgia Pacific Corporation's Economic Value

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3. Others have considered partial discretion in contexts other than discretionary bonus pools. For example, Baker, Gibbons, and Murphy (1994) examine the interplay of subjective and objective performance measures in individual incentive contracts, but do not consider the use of bonus pools in multi-agent settings.
  4. It is important to note that our goal is not to test these models, *per se*. Rather, our study complements this research as we investigate a factor that has been necessarily simplified in these models.
  5. Our setting is analogous to one in which the firm calculates formula-based bonuses by individual. Our aggregation of the nondiscretionary and discretionary bonuses is consistent with Murphy and Oyer 2003 who treat the aggregation of these individual bonus arrangements as an implicit bonus pool. See also footnote 23 in Rajan and Reichelstein 2006 (597).
  6. There are two important differences between our partial discretion setting and that of Rajan and Reichelstein 2006. One, in our setting the subjective allocation is non-negative. That is, using Rajan and Reichelstein's 2006 notation, we require that  $w_i + \sum_{j=1}^n w_{ij} \cdot y_j \geq 0$  for each agent  $i$  and for all realizations of  $y_j$  (as opposed to Rajan and Reichelstein's 2006 characterization in which compensation based on subjective measures can reduce that provided via objective measures). Two, in our setting,  $w$  is also a function of the objective measures. This modifies the formula in Rajan and Reichelstein's 2006 footnote 23 to the following:  $w = \alpha \sum_{i=1}^n \sum_{j=1}^n [u_{ij} \cdot x_j]$ . In addition,  $\alpha = \frac{1}{2}$  in our scenario.

Incentive Plan (EVIP) states that “bonuses under the EVIP are composed of two different types of awards, viz., the nondiscretionary annual bonus award. . . and the discretionary long-term bonus award.” Similarly, First Alert, Inc.’s bonus plan, described in the company’s 10-K, provides (a) the formula used to compute program participants’ nondiscretionary bonus and (b) the formula used to compute the total discretionary bonus pool and the parties responsible for determining program participants’ discretionary bonuses.

In assessing employees’ performance and allocating the bonus pool, the manager has available two types of information: contractible and noncontractible. In our scenario, it is economically feasible to contract on reported division profit and corporate profit (i.e., these measures are sufficiently objective, verifiable, and precise). We assume that all other relevant information is noncontractible, by virtue of the fact that firm management has currently chosen to not write explicit contracts on this information (Rajan and Reichelstein 2006). This noncontractible information may be unforeseeable, unverifiable, or subjective, such that it is economically infeasible (even if theoretically possible) to form the basis of contracting. Managers can use discretion to incorporate this noncontractible information into bonus allocations.

### *Managers’ bonus allocation processes*

To understand the role discretion extent plays in bonus pool allocations, it is first essential to understand how managers integrate contractible and noncontractible information. The analytic literature (e.g., Rajan and Reichelstein 2006) models each bonus pool participant’s allocation as a linear combination of all available performance measures. That is, this literature implicitly assumes that all relevant performance information — both contractible and noncontractible — can be combined to yield a single, comprehensive performance measure. This comprehensive performance measure is then used to determine the discretionary bonus pool allocation. We denote this as an *integrative* approach. For example, in our setting, managers could combine the reported division profit with other relevant noncontractible information to arrive at a comprehensive “revised division profit”, which could be used as the basis for bonus pool allocations.<sup>7</sup>

While some managers will use an integrative approach to allocate bonuses, the information-rich nature of the evaluation and compensation task invites an alternate approach. Specifically, allocating a discretionary bonus pool involves processing multiple information cues. In such settings, prior research finds that individuals use a dimensional information processing strategy (as opposed to a holistic or global information processing strategy) when making multiattribute choices, even when a holistic strategy is better suited to the task (Russo and Doshier 1983). That is, when choosing among alternatives, individuals tend to focus on one dimension of each alternative at a time, rather than making a holistic judgment of the alternative, taking into account and synthesizing all dimensions. While the focus of this prior research is binary choices, the findings have direct relevance for our theory and setting. That is, in our setting, managers will focus on each dimension of performance (i.e., each information cue) one at a time, when deciding on a bonus allocation. We label this the *piecemeal* approach. For example, a manager who uses the piecemeal approach might first consider the bonus implications of division profit, and then consider the bonus implications of other, noncontractible information.

Given the information-rich nature of the bonus allocation task, we expect most managers to use the piecemeal approach, as opposed to the integrative approach. Notably, use of the piecemeal approach will naturally give rise to the well-established anchoring and

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7. For expositional purposes, we use the phrase “revised division profit” to refer to the comprehensive performance measure (where applicable) in our setting. We distinguish this from “reported division profit”, which, in our setting, refers to division profit as originally reported, absent any adjustment for noncontractible information.

adjustment heuristic (Tversky and Kahneman 1974; Bazerman 1998).<sup>8</sup> That is, whichever dimension of performance is considered first will serve as a starting point, or anchor. Then, the manager will qualitatively adjust from the anchor for other relevant information. That is, the manager subjectively determines the direction and extent to which each individual performance cue impacts the bonus pool allocations.<sup>9</sup>

A generally robust finding in prior literature is that when decision makers use an anchoring heuristic, they adjust insufficiently, leading to judgments that are biased in the direction of the anchor value (Hastie and Dawes 2001). This finding has potential implications for managers' discretionary bonus pool allocations. Specifically, managers who allocate bonus pools via a piecemeal approach, or (hereafter) *anchoring* approach, will potentially incorporate some information (i.e., information *not* serving as the starting point for the allocation) to a lesser degree than those who use an integrative approach. Thus, the choice of the starting point in an anchoring approach has potential implications for bonus allocations.

In our setting, we expect two anchors to be prevalent: (a) division profit and (b) an equal split of the bonus pool. It is reasonable to expect that managers may choose division profit as the anchor, given its relation to the information used to formulaically fund the bonus pool (i.e., corporate profit). Division profit — the disaggregation of corporate profit — is likely to be perceived as a reasonable representation of employees' respective contributions to the bonus pool. Alternatively, managers may anchor on an equal split of the bonus pool. A body of literature from such areas as economics, psychology, and sociology suggests that individuals have strong preferences for equity (e.g., Kahneman, Knetsch, and Thaler 1986; Luft and Libby 1997; Kachelmeier and Towry 2002). In the absence of information on employees' relative inputs, such preferences for equity likely lead to a consideration of an equal split.<sup>10</sup> Importantly, it is unlikely that noncontractible information will serve as the anchor, due to its previously described information qualities, and thus, it will be incorporated into allocations only via adjustments.

Our intuition regarding managers' likely choice of an anchor has significant implications for the degree to which they incorporate noncontractible information. Specifically, a manager who anchors on reported division profit (i.e., contractible information) will adjust

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8. In general, the heuristics and biases literature suggests that individuals rely on judgment and decision heuristics when dealing with cognitively difficult tasks. Similarly, Russo and Doshier (1983) attribute individuals' propensity toward dimensional (as opposed to holistic) information processing as a desire to reduce cognitive effort. Implementing an integrative approach can be cognitively difficult, given, for example, scale differences (e.g., qualitative versus quantitative) or perceived differences in information qualities (e.g., verifiability, precision, etc.). Accordingly, it is important to note that we primarily attribute managers' propensity to use a piecemeal approach to features of the discretionary bonus allocation task as opposed to specific domain-level variables. Thus, we test our hypotheses across two different settings (as discussed in section 3).
  9. The piecemeal approach and the anchoring heuristic are not perfectly analogous, and thus we retain the piecemeal label to more clearly convey the essence of the approach itself. Further, the prevalence of the anchoring heuristic in judgment tasks does not necessarily imply that the piecemeal approach will prevail in the decision-oriented task of allocating bonus pools. The majority of the prior anchoring literature uses a standard experiment design in which participants first consider a comparative assessment (e.g., "is the population of Chicago greater or lesser than 200,000?"), and then provide an absolute estimate of an unknown quantity (e.g., "what is the population of Chicago?"; see Epley and Gilovich 2006 for related discussion). The information environment of such tasks is quite different from that of the bonus pool allocation task. The bonus pool allocation task requires decision makers to consider and potentially incorporate into their decisions multiple information cues. The presence of these multiple information cues allows for the possibility of an integrative approach to bonus pool allocations, which is not applicable to the judgment tasks considered in the prior anchoring literature. Thus, this issue remains an empirical question.
  10. Other anchors potentially exist (e.g., prior year bonus allocations, 100 percent for one employee, etc.). However, we focus our discussion on the two we expect to be most prevalent in our setting. Post hoc analyses of anchors confirm this consideration. Further, the order in which a manager receives information may influence what information serves as the anchor. As described in the next section, we model an end-of-period compensation task, thus avoiding such order effects.

for noncontractible information. Likewise, a manager who anchors on an equal split will adjust for reported division profit, as well as for relevant noncontractible information.<sup>11</sup> Following the anchoring heuristic literature, information that is “adjusted for” (i.e., noncontractible information) is likely to receive less consideration than information that serves as an anchor. In contrast, the general notion of adjustment from an anchor does not apply to managers who use the integrative approach. Rather, given the inherent nature of the integrative approach, these managers more likely explicitly consider the implications of noncontractible information in terms of its effect on comprehensive performance (i.e., as opposed to an adjustment from an anchor allocation). Thus, managers who use the integrative approach will likely incorporate noncontractible information to a greater degree than managers who use the anchoring approach.

To summarize, the information-rich nature of the discretionary bonus pool allocation task setting likely leads managers to process performance information in a piecemeal fashion, and this approach gives rise to the anchoring heuristic. Further, given the information on which managers are likely to anchor, managers’ use of the anchoring approach leads to less incorporation of noncontractible information. This discussion leads to the following hypotheses:

*HYPOTHESIS 1. Managers are more likely to use the anchoring approach as opposed to an integrative approach to make bonus pool allocations.*

*HYPOTHESIS 2. Relative to managers who use an integrative approach, managers who use the anchoring approach will incorporate noncontractible information into bonus pool allocations to a lesser degree.*

### ***Mitigating effect of partial discretion***

As discussed previously, prior analytic research models firms’ use of partial discretion (Rajan and Reichelstein 2006), but makes simplifying assumptions about how managers use discretion. However, managers’ allocation decisions are likely influenced by various aspects of the bonus pool design, including the extent of discretion. In this subsection, we develop theory related to the effect of partial (vs. full) discretion on managers’ incorporation of noncontractible information in bonus pool allocations. As described below, this theory has significant implications for managers who use the (theoretically most prevalent) anchoring approach.

With full discretion, a manager will perceive all information — both contractible and noncontractible — as relevant to his/her task. That is, the perceived task is to consider all relevant information and to incorporate it into the allocation of a single bonus pool. On the other hand, a manager with partial discretion likely interprets a different set of information as relevant. Specifically, the existence of the nondiscretionary pool serves as a signal to the manager that the contractible information used to determine the nondiscretionary bonus allocation has already been considered in employee compensation. This signal decreases the perceived relevance of the contractible information to the allocation of the discretionary bonus pool and implies that the purpose of the discretionary bonus pool is to consider

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11. While the phenomenon of insufficient adjustment is well established, it is not clear that it will occur in the bonus pool allocation setting. Epley and Gilovich (2005, 2006) suggest that the propensity to adjust from an anchor increases when individuals self-generate or choose anchor information (as opposed to being provided an anchor or forced to make a comparative assessment). Extending this notion to our setting, if managers choose their own starting points for the bonus pool allocation, then noncontractible information may be incorporated to a higher degree than anticipated. Thus, despite a vast literature, the empirical question of whether noncontractible information is incorporated to a lesser degree with an anchoring approach relative to an integrative approach remains.

noncontractible information. This, in essence, increases the salience of the noncontractible information for the purpose of discretionary bonus allocations.

Recall that we expect most managers will rely on an anchoring approach, and will incorporate noncontractible information via a qualitative adjustment from an anchor allocation. Recent research suggests that the degree of adjustment increases with the salience of the information serving as the basis for the adjustment. Specifically, Chapman and Johnson (1999) find that when individuals are prompted to consider information inconsistent with an anchor (i.e., when this information is made more salient), insufficient adjustment is mitigated. Applying this finding to our scenario and to managers who use the anchoring approach, if partial discretion increases the salience of noncontractible information, it follows that limiting discretion increases the extent of adjustment for this noncontractible information. Thus, we hypothesize the following:

**HYPOTHESIS 3.** *When using the anchoring approach, managers with partial discretion will incorporate noncontractible information in the allocation of the discretionary portion of the bonus pool to a greater degree than will managers with full discretion.*

Notably, the effect predicted in Hypothesis 3 may be strong enough to drive an interesting result: the total bonus allocations of managers with *less* discretion could ultimately reflect noncontractible information to a *greater* degree. We investigate this empirical question in supplemental analyses reported in section 4.

### 3. Method

#### *Participants and task*

We recruited graduate students from two business schools at universities in the southeastern United States to participate in our study. One hundred seventy participants with an average of four years of work experience and five accounting/finance courses completed the experiment.<sup>12</sup> Given the average work experience and the relevant coursework, we expect these participants to be a reasonable proxy for managers who routinely evaluate employee performance. Participants were randomly assigned to the experiment conditions described below. Each participant was instructed to assume the role of a firm president and informed that the company had two divisions — Control Devices, which contributed 60 percent of the reported annual corporate profit, and Electronics, which contributed 40 percent. Participants were asked to review company performance information and allocate a bonus pool between two division managers (hereafter, employees). The bonus pool was funded at 1 percent of reported annual corporate profit. We chose to model an end-of-period evaluation and compensation decision, which was elicited after all performance information was provided.<sup>13</sup>

#### *Experiment design and independent variables*

We use a  $2 \times 2$  experiment design with *discretion extent* (full, partial) and *valence of noncontractible information* (positive, negative) as between-subject factors. We manipulate

12. Five participants were dropped: three participants failed to complete the materials, and two participants inadvertently switched the divisions when answering the questions.

13. In a more natural setting, a manager might receive information in a sequential fashion, which could influence his/her allocation process and/or the extent to which he/she incorporates noncontractible information. For example, a manager might receive information about an employee's performance of a specific task during an evaluation period, and receive summary accounting measures of performance at the end of an evaluation period. The effect of information order on managers' bonus pool allocations is beyond the scope of our paper. Thus, we modeled participants' task as an end-of-period evaluation and compensation decision, and we presented case information to participants in the same order across all experiment conditions.



*discretion extent* (full, partial) so that participants with full discretion allocate the entire bonus pool, while participants with partial discretion allocate half the total bonus pool, with the remainder allocated based on reported division profit. Specifically, in the full discretion condition, participants were informed they would distribute the entire bonus pool. In the partial discretion condition, participants were informed they were to distribute 50 percent of the bonus pool, while the remaining 50 percent was distributed based on division profit (i.e., 60 percent to Control Devices and 40 percent to Electronics).<sup>14</sup> We manipulate the *valence* (positive, negative) of a subset of noncontractible information for each division, such that when combined with contractible information, the noncontractible information should have either a positive or negative effect on the overall division performance. The noncontractible information for Control Devices has the opposite valence from the information for Electronics. For expositional purposes, however, we refer to the *valence of noncontractible information* condition using its effect on Control Devices. For example, the positive noncontractible information condition refers to the scenario in which the noncontractible information should have a positive effect on the overall evaluation of the Control Devices employee, and a negative effect on the overall evaluation of the Electronics employee.

Our *valence* manipulation allows us to infer the extent to which participants incorporate noncontractible information. Specifically, we manipulate only a subset of noncontractible information, and thus, any difference in bonus pool allocations across *valence* conditions is attributable to differential incorporation of manipulated noncontractible information.<sup>15</sup> As discussed subsequently, the inherent nature of discretion makes this approach necessary for maintaining internal validity. That is, an individual participant's allocation is difficult to predict, given that his/her allocation decision is likely a function of myriad factors. Thus, while it is difficult to draw a conclusion from participants' allocation in a single *valence* condition, a comparison across *valence* conditions provides a reliable measure of the degree to which participants incorporate noncontractible information.

### ***Experiment design features***

An inherent difficulty associated with endowing participants with discretion is that participants' decisions likely vary significantly (i.e., participants are free to use whatever perspectives, policies, etc., they wish). To overcome this difficulty, we have embedded specific features in our experiment design. While some of these features forgo mundane realism, they strengthen our ability to provide an internally valid test of our theory. One, as aforementioned, our *valence* manipulation allows us to infer the degree to which participants incorporate noncontractible information without extensive reliance on a normative benchmark. Two, we limit the information provided to participants such as prior-period financial information, current period budgets, and forward-looking measures to increase the salience of revised division profit as a comprehensive performance measure. Finally, we develop a scenario in which the manipulated noncontractible information is fully

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14. We made the discretionary portion equal in size to the nondiscretionary portion so as to avoid inducing differential assessments of importance of discretion or related factors. Further, as described subsequently, this design choice ensures that partial-discretion managers' opportunity to incorporate noncontractible information is not completely curtailed.

15. Broadly defined, noncontractible information includes any information that is not contracted on. In our setting, this includes all of the experiment case information (e.g., division revenues, division names, etc.), with the exception of contractible information (i.e., corporate profit and, in the partial discretion condition, division profit). With the exception of the manipulated information (discussed subsequently), all information was held constant across experiment conditions.

quantifiable, and therefore can be integrated with contractible information to develop a comprehensive performance measure.

Further, to test the robustness of our theory, we use two different settings.<sup>16</sup> In Setting 1, the manipulation of noncontractible information relates to unpredictable opportunity costs in a transfer price scenario in which the Control Devices division sold a component to the Electronics Division. In Setting 2, the manipulated noncontractible information relates to unforeseen environmental shocks, resulting in uncontrollable cost changes for both divisions. As aforementioned, the *valence* of the divisions' manipulated noncontractible information was opposite for the two divisions.<sup>17</sup>

#### 4. Results

##### *Process coding*

As part of the experiment, participants documented the reasoning behind their bonus allocation decisions.<sup>18</sup> We use these self-described *decision processes* to test our hypotheses. Accordingly, two of the authors and one independent coder read and classified participants' descriptions of their allocation processes. All coders were blind to experiment conditions and the independent coder was blind to our hypotheses. All coders followed coding guidelines communicated in a 16-page coding instruction booklet, which included coding examples from earlier pilot studies. Discrepancies in coding across coders were resolved via discussion. All coding by the two authors and the independent coder resulted in inter-rater reliability (i.e., Cohen's Kappa) scores that exceed a generally acceptable threshold of 0.80 (Stokes, Davis, and Koch 2000). Thus, we expect the coded classifications to be a reasonable proxy for participants' allocation processes.

Participants' self-described *decision processes* fell into one of three categories: anchoring, integrative, or did not describe/other. Participants who use an allocation process that establishes a starting point for the allocation (in percentage or dollar-amount terms) and qualitatively adjusts upward or downward for other information are categorized as using an anchoring approach. For example, we coded the participant who described the following decision process as using the anchoring approach:

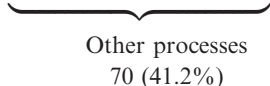
Originally, CD had 60 percent of the total profit. But they would have gotten more if they could have sold in the outside market so I gave them an extra 10 percent.

Meanwhile, participants who calculate a revised division profit measure by quantifying the effect of the manipulated noncontractible information are categorized as integrative. For example, we coded the participant who described the following decision process as using the integrative approach:

Basically, I refigured COGS to reflect the situations that were not in the managers' control and then reworked the profit, giving the bonus based on the newly calculated profit.

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16. Both settings were based loosely on a case entitled *Bay Industries* (Allen, Brownlee, Haskins, and Lynch 2005).
17. The proportion of participants coded as using an anchoring approach did not differ across settings ( $\chi^2 = 0.25$ ,  $p = 0.88$ ). Further, we tested our hypotheses at the setting level, and results are inferentially identical to those reported at the aggregate level. Given this, we focus our analyses and discussion of results at the aggregate level (i.e., Setting 1 and Setting 2 combined).
18. Alternatively, we could have elicited participants' process and reasoning using verbal protocol analysis. We chose to not use that approach, however, because we did not want to interrupt participants' task performance (i.e., detract from participants' natural responses to the information).

TABLE 1  
Coded bonus allocation process by setting for all participants

<i>Setting</i> <sup>a</sup>	<i>Bonus allocation process</i> <sup>b</sup>			Total
	Anchoring	Integrative	Other/did not describe	
Setting 1	49 (58.3%)	21 (25.0%)	14 (16.7%)	84 (100.0%)
Setting 2	51 (59.3%)	19 (22.1%)	16 (18.6%)	86 (100.0%)
Aggregate	100 (58.8%)	40 (23.5%)	30 (17.7%)	170 (100.0%)
				
		Other processes 70 (41.2%)		

**Notes:**

<sup>a</sup> *Setting* refers to the context of the case materials representing one of two different sources of noncontractible information: opportunity costs (Setting 1) or idiosyncratic environmental shocks (Setting 2). Aggregate refers to combined data from both settings.

<sup>b</sup> *Bonus allocation process* refers to coding of participants in one of three categories: (i) Anchoring — refers to participants who used an allocation decision process that uses some piece of information as an explicit or implicit starting point and then qualitatively adjusts for other information; (ii) Integrative — refers to participants who used an allocation process that bases bonus allocations on revised division profit, calculated by quantifying the effect of the manipulated, setting-specific noncontractible information; and (iii) Other/did not describe — refers to all other participants (i.e., they did not provide a description, or could not be coded as anchoring or integrative). The latter two categories are combined and referred to as Other processes.

Finally, participants who did not describe a decision process or who could not be reliably coded as anchoring or integrative are categorized as did not describe/other.<sup>19</sup>

**Tests of hypotheses**

*Hypothesis 1*

Hypothesis 1 predicts that managers are more likely to use an anchoring approach as opposed to an integrative approach to incorporate noncontractible information into bonus allocations. To test Hypothesis 1, we use the coded decision process described above. As reported in Table 1, 100 of 170 participants (58.8 percent) described an anchoring approach, 40 of 170 participants (23.5 percent) described an integrative approach, and 30 of 170 participants (17.7 percent) described different processes or did not sufficiently describe their processes. The presence of this third category raises the question of the appropriate comparison for testing Hypothesis 1. We take the conservative approach of including participants in the “did not describe/other” category with those using the integrative approach.<sup>20</sup> Combining

19. Our coding of participants’ descriptions is conservative with respect to categorizing participants as anchoring, as a participant who processes information cues separately but attempts to quantify noncontractible information is coded as integrative. For example, if a participant described a process where he or she first considered division profit as the allocation basis, but then *quantitatively* adjusted for other information by calculating the impact of other factors on division profit, the process is coded as integrative. In addition, we attempted to further classify the 30 participants who did not provide sufficient descriptions via review of any available information (e.g., notes on experiment case materials, actual bonus allocations, etc.), but could not reliably classify these participants.

20. Results of hypotheses tests excluding the did-not-describe/other category are inferentially identical.

these categories likely overstates the number of participants using an integrative approach and, thus, makes it more difficult to find support for Hypothesis 1. The number of participants using an anchoring approach is significantly higher ( $\chi^2 = 5.29$ ,  $p = 0.02$ ) than the number of participants who do not (i.e., the participants using an integrative approach and those who did not describe — collectively labeled other processes).<sup>21</sup> These results support Hypothesis 1. Therefore, we conclude that managers are more likely to use an anchoring approach than they are to use an integrative approach.

### *Hypothesis 2*

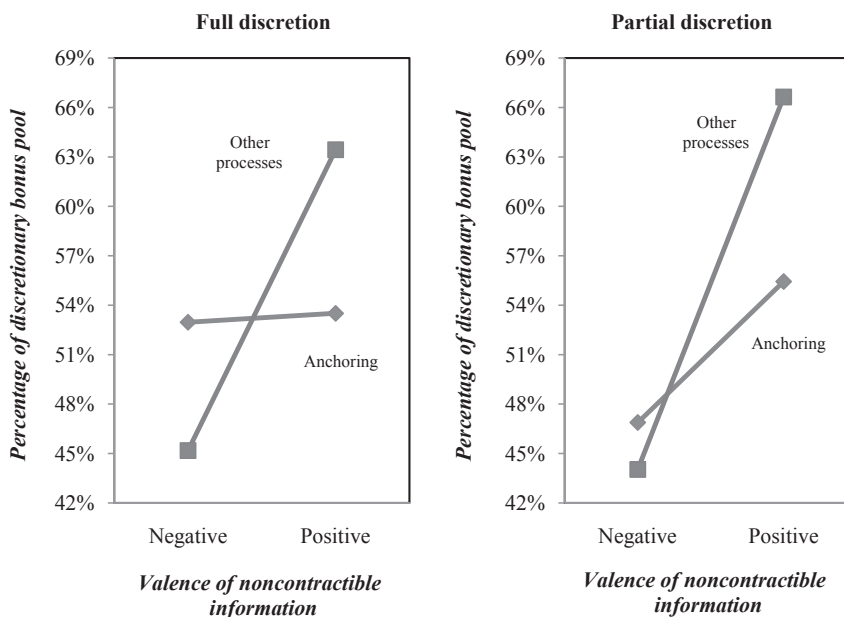
Hypothesis 2 predicts that managers who use an anchoring approach incorporate noncontractible information into bonus pool allocations to a lesser degree than managers who use an integrative approach. To test this hypothesis, we compare the *percentage allocations of the discretionary bonus pool* awarded to the Control Devices employee of participants coded as using an anchoring approach to the allocations of all other participants (thus using the same conservative approach described above).<sup>22,23</sup> Recall that the discretionary portion is 50 percent (100 percent) of the total bonus pool for partial- (full-)discretion participants. As depicted in the left graph of Figure 1, the bonus allocations for full-discretion anchoring participants appear to differ only slightly across *valence* conditions. That is, the slope of the line connecting the *valence* conditions for anchoring participants is relatively flat. This suggests that there is little difference in the allocations of these participants, and thus little consideration given to the manipulated noncontractible information. This result is in stark contrast to allocations of full discretion participants using other processes, for which the slope is steeper, suggesting greater incorporation of noncontractible information.

To test for significance in this pattern, we conduct an analysis of variance (ANOVA) using *valence of noncontractible information* (positive, negative) and *bonus allocation process* (anchoring, other processes) as independent factors. The dependent measure is the *percentage of the discretionary bonus pool* allocated to Control Devices. As reported in panel A of Table 2, the interaction is significant ( $F = 21.06$ ,  $p < 0.01$ , one-tailed), which suggests that anchoring participants incorporate noncontractible information to a lesser degree than do other participants. To corroborate this analysis, we use contrast coding (Buckless and Ravenscroft 1990). Contrast weights are as follows:  $-1$  for negative/anchoring,  $+1$  for positive/anchoring,  $-2$  for negative/other processes, and  $+2$  for positive/other processes. As reported in panel B of Table 2, the planned contrast is statistically significant ( $F = 12.01$ ,  $p < 0.01$ ) and simple effects tests indicate that the bonus allocations of anchoring participants do not differ significantly across *valence* conditions

21. All reported  $p$ -values are two-tailed unless otherwise indicated.

22. Given that participants are required to allocate the entire bonus pool to the two divisions, no information is lost focusing on the Control Devices allocation.

23. Of the participants coded as anchoring, 90 percent used division profit (35 percent) or an equal split (55 percent) as the anchor. This distribution appears to vary by discretion extent condition. Specifically, 52 percent (48 percent) of the anchoring full-discretion participants were coded as anchoring on division profit (equal split), while 24 percent (76 percent) of the anchoring partial discretion participants were coded as anchoring on division profit (equal split). While our design precludes us from pinpointing the underlying reasoning for this apparent difference across discretion extent conditions, one could speculate that, given the presence of the nondiscretionary bonus pool, partial-discretion participants are more likely to consider reported division profit to have already been compensated, and thus, a less relevant starting point for the discretionary bonus pool allocation. Regardless of the underlying explanation for this difference, we report tests of Hypothesis 2 separately for both discretion extent conditions. Results of analyses collapsed across discretion extent conditions are inferentially identical.

**Figure 1** Percentage of discretionary bonus pool by Allocation process and Discretion extent for all participants**Note:**

See Table 2 notes for variable definitions.

( $p = 0.82$ ) while the bonus allocations of participants using other processes are significantly different across valence conditions ( $p < 0.01$ ). This analysis supports Hypothesis 2.<sup>24</sup> Therefore, we conclude that, relative to managers who use an integrative approach, managers who use an anchoring approach incorporate noncontractible information to a lesser degree.

*Additional analysis for Hypothesis 2*

While subjectivity, by its very nature, makes it difficult to prescribe what is objectively correct, we designed our experiment to allow for the calculation of a comprehensive performance measure that combines relevant contractible information with the manipulated noncontractible information. While we do not claim this allocation is optimal, we rely on this benchmark in a supplemental test of Hypothesis 2. For purposes of this supplemental test, we first combined reported division profit with the manipulated noncontractible information (as provided in the experiment case) to develop a comprehensive performance measure for each setting. This calculation is consistent with the integrative approach, in which a comprehensive performance measure is calculated prior to considering the bonus allocations. Then, we applied the resulting measure to the discretionary

24. Results of analyses using partial-discretion participants, as presented in Figure 1 and panels C and D of Table 2, are analogous to those using full-discretion participants, with two exceptions. One, the bonus allocations of partial-discretion anchoring participants differ significantly across valence conditions ( $p < 0.01$ ). Two, given negative valence noncontractible information, anchoring participants allocations do not significantly differ from allocations of participants who use other processes ( $p = 0.32$ ). Despite these two exceptions, the overall pattern of partial-discretion participants' discretionary bonus allocations supports Hypothesis 2.

TABLE 2  
Tests of Hypothesis 2

**Panel A:** Analysis of variance (ANOVA) results for *Percentage of discretionary bonus pool*<sup>a</sup> — Full discretion<sup>b</sup>

Source of variation	SS	df	MS	<i>F</i>	<i>p</i>
<i>Valence of noncontractible info</i> <sup>c</sup>	1,665.27	1	1,665.27	23.67	< 0.01
<i>Bonus allocation process</i> <sup>d</sup>	21.77	1	21.77	0.31	0.58
<i>Valence</i> × <i>Allocation process</i>	1,481.58	1	1,481.58	21.06	< 0.01*
Error	5,628.41	80	70.36		

**Panel B:** *Bonus allocation* for *Valence*<sup>c</sup> × *Process*<sup>d</sup> contrast — Full discretion<sup>b</sup>

	MS	<i>F</i>	<i>p</i>
<i>Bonus allocation</i> <sup>a</sup>	845.19	12.01	< 0.01
Error	70.36		

Simple effects	Mean Difference	<i>p</i>
Positive/Anchoring vs. Negative/Anchoring <sup>c,d</sup>	0.53	0.82
Positive/Anchoring vs. Positive/Other processes	9.94	< 0.01
Positive/Anchoring vs. Negative/Other processes	8.32	< 0.01
Negative/Anchoring vs. Negative/Other processes	7.79	< 0.01
Negative/Anchoring vs. Positive/Other processes	10.47	< 0.01
Positive/Other processes vs. Negative/Other processes	18.26	< 0.01

**Panel C:** ANOVA results for *Percentage of discretionary bonus pool*<sup>a</sup> — Partial discretion<sup>b</sup>

Source of variation	SS	df	MS	<i>F</i>	<i>p</i>
<i>Valence of noncontractible info</i> <sup>c</sup>	5,042.89	1	5,042.89	56.95	< 0.01
<i>Bonus allocation process</i> <sup>d</sup>	362.57	1	362.57	4.10	0.05
<i>Valence</i> × <i>Allocation process</i>	1,024.92	1	1,024.92	11.58	< 0.01*
Error	7,260.50	82	88.54		

**Panel D:** *Bonus allocation* for *Valence*<sup>c</sup> × *Process*<sup>d</sup> contrast — Partial discretion<sup>b</sup>

	MS	<i>F</i>	<i>p</i>
<i>Bonus allocation</i> <sup>a</sup>	1,891.00	21.36	< 0.01
Error	88.54		

Simple effects	Mean Difference	<i>p</i>
Positive/Anchoring vs. Negative/Anchoring <sup>c,d</sup>	8.56	< 0.01
Positive/Anchoring vs. Positive/Other processes	11.20	< 0.01
Positive/Anchoring vs. Negative/Other processes	11.40	< 0.01
Negative/Anchoring vs. Negative/Other processes	2.85	0.32
Negative/Anchoring vs. Positive/Other processes	19.76	< 0.01
Positive/Other processes vs. Negative/Other processes	22.61	< 0.01

(The table is continued on the next page.)

TABLE 2 (Continued)

**Notes:**

- \* One-tailed basis; all other reported *p*-values are on a two-tailed basis.
- <sup>a</sup> *Percentage of discretionary bonus pool (Bonus allocation)* is the percentage of the discretionary bonus pool allocated to Control Devices. For partial (full) discretion participants, the discretionary bonus pool is 50 percent (100 percent) of the total bonus pool.
- <sup>b</sup> *Discretion extent* (full or partial) refers to our manipulation of bonus pool design. Full discretion refers to the condition in which participants allocated 100 percent of the bonus pool. Partial discretion refers to the condition in which participants allocated 50 percent of the bonus pool (while 50 percent of the bonus pool is determined formulaically).
- <sup>c</sup> *Valence of noncontractible information* (positive or negative) refers to our manipulation of a subset of noncontractible information. In the positive (negative) condition, noncontractible information, when combined with reported division profit, should have a positive (negative) effect on the overall evaluation of performance for the Control Devices employee.
- <sup>d</sup> *Bonus allocation process* refers to coding of participants as anchoring or other processes. Anchoring refers to participants who used an allocation decision process that uses some piece of information as an explicit or implicit starting point and then qualitatively adjusts for other information. Other processes refers to participants in either of the following two categories: (i) an integrative approach, which refers to participants who used an allocation process that bases bonus allocations on revised division profit, calculated by quantifying the effect of the manipulated, setting-specific noncontractible information and (ii) did not describe /other, which refers to all other participants (i.e., they did not provide a description, or could not be coded as anchoring or integrative).

bonus pool to determine a *revised division profit allocation*.<sup>25</sup> Finally, to perform our analysis at the aggregate level, we calculated a weighted average across the two settings based on the number of participants in each setting.

Averaging across both settings, the revised division profit allocation is 70.2 percent (46.3 percent) for the positive (negative) *valence* condition, and thus the expected difference across *valence* conditions is 23.9 percent (i.e., 70.2% – 46.3%). If, on the other hand, participants are using an anchoring approach *and* are adjusting for noncontractible information from the anchor (and therefore, incorporating noncontractible information to a lesser degree relative to the integrative approach), we would expect the difference across conditions to be less than this benchmark difference. Thus, we compare the difference in participants' actual allocations across *valence* conditions with the difference reflected in the revised division profit allocation. For full discretion participants, the difference in the actual bonus allocations across the two *valence* conditions is 0.6 percent. This difference is statistically smaller than the revised division profit measure difference of 23.9 percent ( $t = -10.5$ ,  $p < 0.01$ ).<sup>26</sup> These results further corroborate our test of Hypothesis 2.

25. We made an additional adjustment to the revised division profit allocation in Setting 2. Because participants may not have viewed the hypothetical cost fluctuations as completely uncontrollable, we adjusted the revised division profit allocation to include participants' assessments of cost fluctuation controllability. The complete calculations for the revised division profit allocation for all experiment conditions are available from the authors.

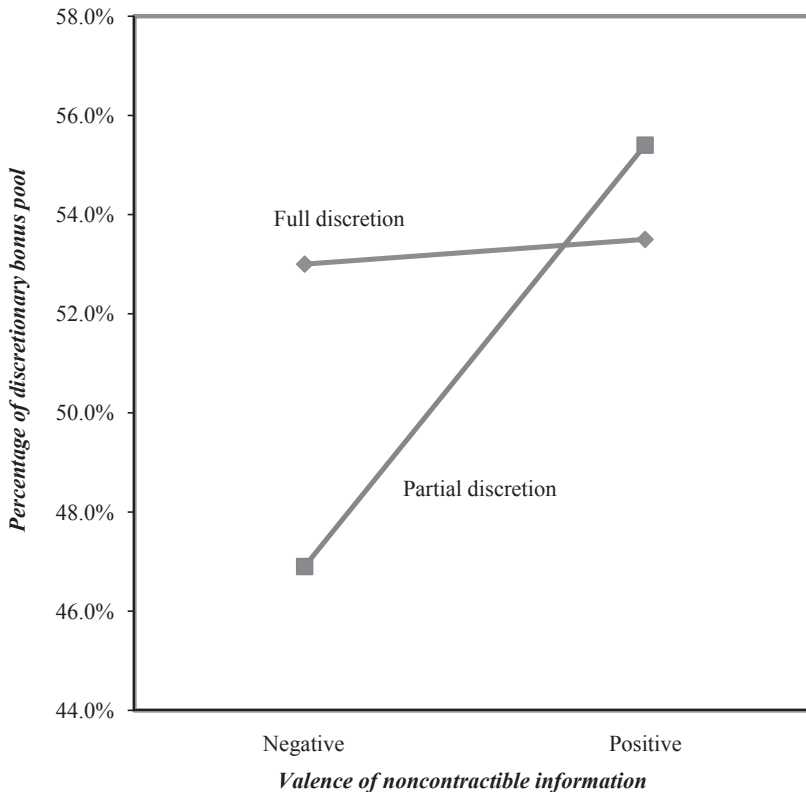
26. As with our main test of Hypothesis 2, results of similar analyses for partial-discretion participants are inferentially identical.

### Hypothesis 3

Hypothesis 3 predicts that, given use of the anchoring approach, partial discretion mitigates managers' propensity to incorporate noncontractible information to a lesser degree. To test this hypothesis, we compare the *discretionary bonus allocations* of anchoring participants across *discretion extent* conditions. As depicted in Figure 2, the percentage allocations for full discretion participants appear to differ only slightly across *valence* conditions. In contrast, partial discretion participants' allocations differ to a greater extent.

To test for the significance of this pattern, we conduct an ANOVA, using *valence* (positive, negative) and *discretion extent* (full, partial) as independent factors. The dependent measure is the *percentage of the discretionary bonus pool* allocated to Control Devices. As reported in panel A of Table 3, the interaction is significant ( $F = 5.45$ ,  $p = 0.01$ , one-tailed), which suggests that, among those participants who use an anchoring approach, partial-discretion participants incorporate noncontractible information into their discretionary bonus allocation to a greater degree than do full-discretion participants. To corroborate this analysis, we again use contrast coding. Contrast weights are as follows:  $-1$  for negative/full discretion,  $+1$  for positive/full discretion,  $-2$  for negative/partial discretion, and  $+2$  for positive/partial discretion. The planned contrast is statistically significant ( $F = 4.29$ ,  $p < 0.01$ ) and simple effect tests indicate that the discretionary bonus

**Figure 2** Percentage of discretionary bonus pool by Discretion extent for anchoring participants



**Note:**

See Table 2 notes for variable definitions.



TABLE 3  
Tests of Hypothesis 3<sup>a</sup>

<b>Panel A:</b> Analysis of variance results for <i>Percentage of discretionary bonus pool</i> — Anchoring					
Source of variation	SS	df	MS	<i>F</i>	<i>p</i>
<i>Valence of noncontractible info</i>	505.69	1	505.69	6.99	0.01
<i>Discretion extent</i>	105.90	1	105.90	1.46	0.23
<i>Valence × Discretion extent</i>	393.96	1	393.96	5.45	0.01*
Error	6,944.61	96	72.34		

<b>Panel B:</b> <i>Bonus allocation</i> for <i>Valence × Discretion extent</i> contrast — Anchoring			
	MS	<i>F</i>	<i>p</i>
<i>Bonus allocation</i>	310.51	4.29	< 0.01
Error	72.34		

Simple effects	Mean difference	<i>p</i>
Positive/Full discretion vs. Negative/Full discretion	0.53	0.82
Positive/Full discretion vs. Positive/Partial discretion	1.93	0.39
Positive/Full discretion vs. Negative/Partial discretion	6.63	0.01
Negative/Full discretion vs. Negative/Partial discretion	6.09	0.02
Negative/Full discretion vs. Positive/Partial discretion	2.47	0.32
Positive/Partial discretion vs. Negative/Partial discretion	8.56	< 0.01

**Notes:**

\* One-tailed basis; all other reported *p*-values are on a two-tailed basis.

<sup>a</sup> Please see Table 2 notes for variable definitions.

allocations of participants in the negative valence/partial discretion condition are significantly different from the other three conditions (all  $p \leq 0.02$ ). At the same time, the simple effect tests indicate that the discretionary bonus allocations of participants in the remaining three conditions are not statistically different (all  $p \geq 0.32$ ).<sup>27</sup> This analysis supports Hypothesis 3. Therefore, we conclude that managers with partial discretion incorporate noncontractible information into their discretionary bonus allocations to a greater degree than do managers with full discretion.

**Supplementary analysis***Total bonus allocations*

An important implication of Hypothesis 3 relates to the degree to which noncontractible information is ultimately reflected in managers' *total* bonus pool allocations. That is, the question remains whether the total bonus allocations of managers with partial discretion ultimately reflect noncontractible information to a greater degree than do those of

27. The ordinal (as opposed to disordinal) nature of this interaction is likely due to participants' propensity to use different starting points (i.e., equal split versus division profit) and the experiment case bonus plan parameters (i.e., nondiscretionary bonus allocation of 60 percent to the Control Devices employee, 50 percent of the total bonus pool is discretionary, etc.). Given these parameters and participants' starting points, the ordinal nature of this interaction is not surprising.

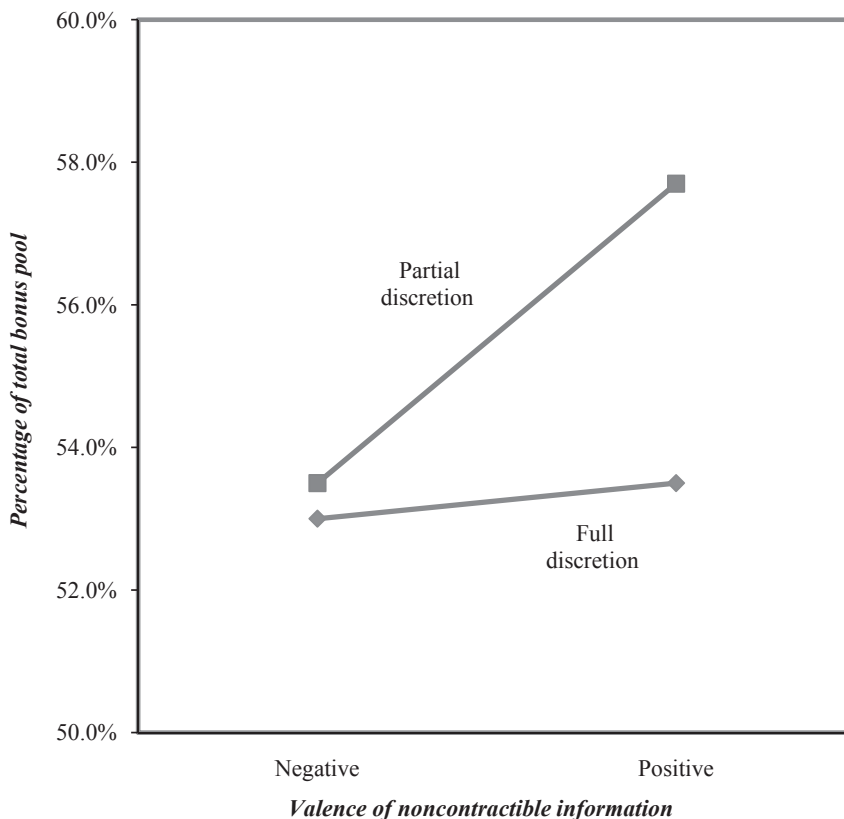
managers with full discretion. This question is important given that, in our setting, partial discretion participants are informed of the nondiscretionary bonus allocation prior to the discretionary allocation. Thus, partial discretion participants have the opportunity — if so desired — to back into a discretionary bonus allocation to attain a desired *total* bonus allocation. In other words, (at least some) partial-discretion participants' target consideration may have been the *total* bonus allocation. To test for this implication, we perform analyses similar to those reported for our main test of Hypothesis 3, but our comparisons are based on the *total* bonus allocations of anchoring participants with partial discretion to those of anchoring participants with full discretion.

Notably, this potential result is partially a function of two aspects of the bonus plan design. One factor is the proportion of the total bonus pool that is discretionary versus nondiscretionary. The second factor is the nondiscretionary bonus pool allocation as determined by contractible information. For a manager with partial discretion, these factors jointly limit the degree to which noncontractible information is ultimately reflected in the total bonus pool allocation, by determining the minimum and maximum amounts that may be allocated to each employee participating in the bonus pool.<sup>28</sup> However, to the extent that a manager with partial discretion backs into a discretionary allocation in order to achieve a desired total bonus pool allocation, our consideration of the extent to which anchoring participants' *total* bonus allocations reflect noncontractible information complements our results pertaining to Hypothesis 3.

As depicted in Figure 3, in contrast to full discretion participants' allocations, partial-discretion participants' total bonus allocations differ to a greater extent across *valence* conditions. To test for the significance of this pattern, we conduct an ANOVA, using *valence of noncontractible information* (positive, negative) and *discretion extent* (full, partial) as independent factors. The dependent measure is the *percentage of the total bonus pool* allocated to Control Devices. As reported in panel A of Table 4, the interaction is marginally significant ( $F = 2.07$ ,  $p = 0.08$ , one-tailed). To examine this result further, we use contrast coding based on the same weights used for our test of Hypothesis 3. The planned contrast is statistically significant ( $F = 3.12$ ,  $p = 0.03$ ), confirming that the total bonus allocations of partial discretion participants vary across *valence* conditions to a greater degree than the allocations of full discretion participants. Further, simple effect tests indicate that the bonus allocations of participants in the positive valence/partial discretion condition are significantly different from the other three conditions (all  $p \leq 0.02$ ). At the same time, the simple effect tests indicate that the bonus allocations of participants in the remaining three conditions are not statistically different (all  $p \geq 0.77$ ).

These results suggest that, given the use of an anchoring approach, the total bonus allocations of managers with partial discretion ultimately reflect noncontractible information to a greater degree than managers with full discretion. While the robustness of this result is likely partially a function of specific aspects of the bonus pool design, our results document

28. Suppose, for example, that 90 percent of the total bonus pool is nondiscretionary, and that the nondiscretionary pool is being split 80 percent/20 percent between two employees participating in the bonus pool. Mechanically, the first of these employees must receive at least 72 percent ( $90\% \times 80\%$ ) of the total bonus pool and the second must receive at least 18 percent ( $90\% \times 20\%$ ). If the noncontractible information heavily favors the latter of the two employees, the evaluating manager may feel strongly that this employee should receive a large bonus allocation. However, due to the design of the bonus pool, the maximum allocation that the latter participant may receive from the total bonus pool is 28 percent (18 percent from the nondiscretionary portion, plus the full 10 percent from the discretionary portion). On the other hand, a manager with full discretion could allocate up to 100 percent of the total bonus pool to the latter employee. Thus, in such a scenario, the proportion of the total pool that is nondiscretionary and the nondiscretionary pool allocation constrain the extent to which noncontractible information is reflected in the total bonus pool allocation.

**Figure 3** Percentage of total bonus pool by Discretion extent for anchoring participants**Note:**

See Table 2 notes for variable definitions.

the potential for an important effect of discretion extent — managers with *less* discretion ultimately incorporate noncontractible information to a *greater* degree.

*Influence of incentives*

One possible explanation for participants' propensity to use an anchoring approach and/or minimally consider noncontractible information is the lack of incentives. That is, participants may have relegated the noncontractible information to a qualitative adjustment simply because they did not have an incentive to engage in more formal calculations. To test this potential explanation, we provided partial-discretion condition case materials from Setting 2 to 40 graduate business students, none of whom participated in the original experiment, as a graded class assignment. The additional pressure to analyze employee performance and to justify the bonus pool allocation provides an explicit incentive to exert effort (see Libby, Salterio, and Webb 2004).<sup>29</sup> Results are inferentially identical to those from the primary experiment.

29. We chose Setting 2 and the partial discretion condition for this investigation because these are the conditions where we saw the greatest number of participants using an anchoring approach. Therefore, we allow incentives the best chance to increase effort and thus reduce participants' propensity to use this approach. Participants were instructed that their submitted work would be reviewed for clarity, completeness of the materials, and soundness of logical argument. Note that the graded assignment provided incentives to thoroughly analyze employee performance and justify allocations, but did not suggest that there was a correct answer.

TABLE 4  
Implications of Hypothesis 3<sup>a</sup>

<b>Panel A:</b> Analysis of variance results for <i>Percentage of total bonus pool</i> — Anchoring					
Source of variation	SS	df	MS	<i>F</i>	<i>p</i>
<i>Valence of noncontractible info</i>	140.90	1	140.90	3.43	0.07
<i>Discretion extent</i>	135.60	1	135.60	3.30	0.07
<i>Valence × Discretion extent</i>	85.22	1	85.22	2.07	0.08*
Error	3,946.11	96	41.11		

<b>Panel B:</b> <i>Bonus allocation</i> for <i>Valence × Discretion extent</i> contrast — Anchoring			
	MS	<i>F</i>	<i>p</i>
<i>Bonus allocation</i>	128.20	3.12	0.03
Error	41.11		

Simple effects	Mean difference	<i>p</i>
Positive/Full discretion vs. Negative/Full discretion	0.53	0.77
Positive/Full discretion vs. Positive/Partial discretion	4.22	0.02
Positive/Full discretion vs. Negative/Partial discretion	0.05	0.98
Negative/Full discretion vs. Negative/Partial discretion	0.49	0.80
Negative/Full discretion vs. Positive/Partial discretion	4.75	0.01
Positive/Partial discretion vs. Negative/Partial discretion	4.27	0.02

**Notes:**

\* One-tailed basis; all other reported *p*-values are on a two-tailed basis.

<sup>a</sup> See Table 2 notes for variable definitions.

## 5. Discussion

In this study, we examine the influence of discretion extent on managers' allocations. To inform this examination, we develop and test theory related to the processes via which managers allocate discretionary bonus pools. In our setting, which is characterized by the presence of multiple information cues, we find that managers generally use a piecemeal approach when allocating discretionary bonus pools, which gives rise to the anchoring heuristic. That is, when processing performance information, managers tend to choose a starting point and then qualitatively adjust from this starting point for noncontractible information. This approach is in contrast to an integrative approach, in which a manager integrates contractible and noncontractible information into a single, comprehensive performance measure. Importantly, we find that managers who use an anchoring approach incorporate noncontractible information into bonus pool allocations to a lesser degree than those who use an integrative approach. At first blush, one might assume that firms can increase consideration of noncontractible information by expanding the extent of discretion endowed managers. However, our theory and results suggest just the opposite. We find greater consideration of noncontractible information under partial discretion than under full discretion. Thus, our results imply that limiting discretion can facilitate managers' incorporation of relevant noncontractible information into bonus allocations.

Our study is subject to some limitations. Most importantly, we examine managers' bonus pool allocations under specific circumstances (e.g., relevant noncontractible information is quantifiable, has particular settings, etc.). Our theory may not generalize to

bonus plans and/or settings not explicitly considered in this study. For instance, our finding that managers with *less* discretion incorporate noncontractible information in total bonus pool allocations to a *greater* degree is likely to be sensitive to the degree of discretion endowed managers, as well as the nondiscretionary bonus allocation. In addition, many of our experiment design choices maintain internal validity, but inherently limit the scope of our study. For instance, our choice to use a relatively sparse information environment and quantifiable noncontractible information potentially limits the generalizability of our theory. While the qualitative nature of some noncontractible information may preclude a manager from using an integrative approach, it is an empirical question as to how the extent to which noncontractible information is quantifiable influences the degree to which such information is incorporated in discretionary bonus allocations. Finally, other factors may influence managers' propensity to incorporate noncontractible information. For example, a manager's experience with processing different types of noncontractible information may influence the process used and/or the degree to which he or she incorporates such information. As another example, our choice to model an end-of-year evaluation and compensation task may limit the generalizability of our theory pertaining to the anchors used for bonus pool allocations. For example, the order in which information is received may influence managers' anchor (i.e., managers could potentially start with noncontractible information which they receive during the year).

Many aspects of our study (including, but not limited to, the limitations) implicitly establish future research opportunities. For instance, we do not investigate the influence of discretion extent on managers' approach to allocating discretionary bonus pools. Future research could consider this and other related implications of discretion extent on managers' allocation behavior. As another example, future research might more deeply consider how managers' allocation process relates to other phenomena noted in prior literature on subjective performance evaluation. In particular, as discussed earlier, our finding related to managers' use of an anchoring approach is consistent with findings in prior literature on managers' propensity toward the centrality bias and the halo effect. Future research could explore the potential for our theory related to managers' use of an anchoring approach as a facilitator, or partial explanation for, managers' behavior documented in prior literature. Finally, future research could investigate employees' responses (i.e., effort and/or performance) to managers' use of discretion. Employees may be proactive in providing favorable noncontractible information to their superiors, and such behavior may vary across different levels of discretion extent and/or given their perceptions of managers' allocation processes.

With this paper, we answer calls from Ittner and Larcker (1998: 228) and Sprinkle (2003: 305) for research on managerial discretion in performance evaluation and compensation. In doing so, we contribute in multiple ways to the growing literature on subjective performance evaluation and, more specifically, to the literature considering the benefits and costs of discretionary bonus pools (e.g., Baiman and Rajan 1995; Ittner et al. 2003; Fisher et al. 2005). One, our theory and findings related to *how* managers use their discretion potentially serve as a means of understanding underlying phenomena noted in prior literature, namely centrality bias and halo effect (i.e., see Bol 2008 for a discussion). Two, and more directly, our study highlights an obstacle — the manager's allocation process itself — that impedes the incorporation of relevant noncontractible information, thereby circumventing intended benefits of managerial discretion. More notably, we demonstrate that this obstacle can be (at least partially) overcome by limiting discretion. The practical implication of this finding is that while some discretion may be essential to allow for the consideration of noncontractible information, full discretion might be too much of a good thing. In all, our paper is important to academics who study subjective performance evaluation and discretionary bonus pools, as well as managers and accountants developing and implementing incentive systems using discretionary bonus pools.

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### **Supporting Information**

Additional Supporting Information may be found in the online version of this article:

**Data S1:** Key to Experiment Materials.

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