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Information system precision and honesty in managerial reporting: A re-examination of information asymmetry effects

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ABSTRACT

Hannan, Rankin, and Towry (2006, HRT hereafter) propose that an information system is capable of affecting honesty in the manager's budget report by reducing information asymmetry between the manager and the owner regarding the level of honesty in the budget. They find that going from no information system to a coarse information system *increases* honesty in managerial reporting. However, they also report evidence that going from a coarse information system to a precise information system *decreases* honesty in managerial reporting. We extend HRT's study in two ways. First, we extend their behavioral theory by incorporating the possibility that reducing information asymmetry could increase the manager's preference for honesty in the budget (Koford & Penno, 1992; Bicchieri, 2006). Second, we note that HRT held information system accuracy constant at a relatively low level, which is another source of information asymmetry. Thus, we test the robustness of HRT's negative precision result by manipulating information system precision and accuracy at two levels using a computerized version of their manual experiment. We find that information system precision increases honesty in managerial reporting and that this positive precision effect is weaker under low information system accuracy. A supplemental analysis suggests that our data are generally similar to HRT's data in our two low accuracy conditions and that their negative precision result is attributable to an unusual period effect in their coarse information system condition.

1. Introduction

Participative budgeting is a common method by which large, decentralized firms elicit private information from lower level managers for planning and control purposes (Shields & Shields, 1998; Libby & Lindsay, 2007, 2010). Agency models in Antle and Eppen (1985) and Antle and Fellingham (1995) demonstrate that the optimal contract makes use of the manager's budget and that the efficiency of that contract can be improved by an information system that provides an independent signal of production cost. Given the high cost or infeasibility of contracting on the information signal in practice (Arya, Glover, & Sivaramakrishnan, 1997; Williamson, 1975), experimental researchers have examined non-contractual effects of an information system related to reductions in information asymmetry (Cardinaels, 2016; Hannan et al., 2006). To date, however, researchers have not provided consistent evidence that reductions in information asymmetry alone increase honesty in managerial reporting. In a single-period production setting, for example, Young (1985) and Chow, Cooper, and Waller (1988) find no significant effect of reductions in information asymmetry on budgetary slack. In a multi-period production setting, Stevens (2002) finds that going from no disclosure to the disclosure of the current period budget reduces budgetary slack but adding the disclosure of prior period production does not reduce budgetary slack further.

Hannan et al. (2006, HRT hereafter) argue that the failure of previous experimental studies to provide consistent evidence that reductions in information asymmetry increase honesty in managerial reporting may be attributable to complexities in the relation (theory) or inadequacies in experimental design (empirical evidence). They address the gap in theory and empirical evidence by developing a behavioral theory of the effect of information systems on honesty in managerial reporting and then testing that theory in an experimental budgeting setting. HRT extend Antle and Fellingham's (1995) agency model by assuming that the signal from the information system is not contracted on and that both the owner and the manager have a constant preference for an honesty norm. Given these assumptions, they propose that a manager trades off the benefits of appearing honest against the benefits of misrepresentation in determining the budget report. HRT find that

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going from no information system to a coarse information system *increases* honesty in managerial reporting. However, they also report evidence that going from a coarse information system to a precise information system *decreases* honesty in managerial reporting. They conclude that increasing the precision of the information system caused the cost of appearing honest to increase beyond perceived benefits for some managers. Researchers have labeled HRT's precision result "surprising" (Salterio & Webb, 2006, p. 928), "unintuitive," and "paradoxical" (Luft & Shields, 2010, p. 227), and have called for further research examining the robustness and generalizability of their result (Salterio & Webb, 2006, p. 929).

Researchers have argued that the most fruitful way to examine the robustness and generalizability of a published result is to conduct an "improvisational replication" that departs in carefully justified ways from the original study (Bamber, Christensen, & Gaver, 2000; Kane, 1984). Prior studies have identified two features of an information system that affect its ability to reduce information asymmetry: precision and accuracy (Banker & Kauffman, 2004; Haka, Luft, & Ballou, 2000; Hilton, 1981; Motro & Smets, 2012). Precision denotes the range of possible values produced by the system and accuracy denotes the probability that the range contains the true value.[1] Antle and Fellingham (1995) develop a positive theoretical relation between information system precision and honesty in managerial reporting based on traditional agency assumptions and contracting on the information system signal.[2] Antle and Fellingham assume, however, that the cost range provided by the system contains the true value with 100% probability. In contrast, HRT set this probability at only 70% across all their experimental conditions. Further, other agency theorists have argued that accounting information systems could reinforce social norms and professional culture (Koford & Penno, 1992). The possibility for an information system to increase a manager's preference for an honesty norm was not considered by HRT. This motivates a re-examination of both HRT's behavioral theory and experimental evidence.

We begin our study by re-examining the implications of HRT's behavioral theory. This involves carefully reviewing the assumptions and corner solutions of their theory. HRT's assumption that both the owner and the manager have a constant preference for an honesty norm introduces a behavioral benefit to appearing honest that causes the manager to compare the cost and benefit of appearing honest in the budget. The assumption of constant preferences for an honesty norm, which is consistent with statements in Stevens (2002) that such preferences form an "intrinsic control" for opportunistic behavior, results in a non-linear relation whereby high levels of precision lead to lower managerial honesty. More recently, however, experimental studies have found evidence that situational factors can increase preferences for honesty in a budgeting setting by making an honesty norm more salient (Douthit & Stevens, 2015; Hobson, Mellon, & Stevens, 2011). This supports the conjecture by Koford and Penno (1992) that accounting information systems may be capable of reinforcing social norms and professional culture. We incorporate this new evidence and recent social norm theory (Bicchieri, 2006) to argue that reducing information asymmetry between the manager and the owner regarding the level of honesty in the budget could increase the manager's preference for an honesty norm. We discuss the implications of this assumption, and argue that it supports a consistently positive relation between information system precision and honesty in managerial reporting. Given that reducing information asymmetry in HRT's experimental budgeting setting also increases the cost of appearing honest, their experimental setting provides a strong test of the ability of a precise information system to reinforce an honesty norm.

Next, we re-examine HRT's experimental evidence of a negative relation between information system precision and honesty in managerial reporting. We identify three factors that may have affected their result: uncontrolled social interaction, the presence of a distributional fairness norm, and the presence of relatively low information system accuracy (70% accurate). In our improvisational replication of their experimental study, therefore, we attempt to control for the first two factors and manipulate the third. To control for uncontrolled social interaction, we utilize a computerized version of HRT's manual experiment but maintain the manual presentation of the budget to incorporate their "social approval" behavioral construct. To control for the presence of a distributional fairness norm, which was particularly evident in HRT's no information system condition (Salterio & Webb, 2006), we make the relative pay of the owner opaque to control for the equal-split focal point (Douthit & Stevens, 2015). We carefully follow all other aspects of HRT's experimental study, including using students from the same major southeastern university. Using this experimental setting, we test the robustness of HRT's precision result by manipulating information system precision and accuracy using a 2×2 factorial design. We vary information system precision at two levels from coarse to precise, as in HRT, and we vary information system accuracy at two levels from 70% to 90% accurate.

Consistent with the theoretical argument that a precise information system has the ability to reinforce an honesty norm, we find that the precise information system increases managerial honesty relative to the coarse system. Consistent with our assertion that the accuracy of the information system represents another source of information asymmetry, we find that this positive precision effect is weaker under low accuracy (70% accurate) relative to high accuracy (90% accurate). An analysis of exit questionnaire responses suggests that participants across all four experimental conditions shared the belief that it would be unethical to overreport the production cost in the budget, consistent with the activation of an honesty norm in our experimental setting. However, participants under the joint condition of a precise information system with high accuracy were more motivated to appear honest in their budget than the other three experimental conditions. We also perform a mediation analysis and find that perceived information asymmetry partially mediates the effect of information system precision on honesty in managerial reporting, consistent with our theory. Given that our experimental results appear inconsistent with HRT's finding that a more precise information system *decreases* honesty, we perform a supplemental analysis comparing our data to their data. This supplemental analysis suggests that our data are generally similar to HRT's data in our two low accuracy conditions and that their precision result is attributable to an unusual period effect in their coarse information system condition.

This study provides new theory and experimental evidence that is useful to explain prior experimental results and help researchers design more powerful tests of information system effects. HRT highlight the failure of previous studies to provide consistent evidence that reductions in information asymmetry reduce misreporting in the budget (Chow et al., 1988; Stevens, 2002; Young, 1985). Similar to HRT's study, we attempt to explain these mixed results by advancing both theory and empirical evidence. In particular, our study advances theory in management accounting by incorporating recent social norm theory suggesting that reductions in information asymmetry can increase preferences for honesty in the budget (Bicchieri, 2006). Our study advances the empirical evidence of information asymmetry effects on honesty in managerial reporting by controlling or manipulating aspects of previous experimental studies that may have made it difficult to detect this effect. Because increasing the precision of the information system increases the cost of appearing honest, HRT's experimental setting provides a strong test of the ability of an information system to reduce the cost of organizational control by reinforcing social norms

[1] Although the two terms precision and accuracy can be synonymous in colloquial use, they are deliberately contrasted in the fields of science, engineering, and statistics (Taylor, 1999). Thus, an information system can be precise but not accurate, accurate but not precise, neither, or both.

[2] Antle and Fellingham (1995) show that when the information system produces a signal of cost, and cost is uniformly distributed and the signal is a cost range equal in length, reducing the cost range provided by the system increases the ability of the optimal hurdle contract to induce honest reporting from the manager.