

Experimental Research in Managerial Accounting

Geoffrey B. Sprinkle¹ and Michael G. Williamson²

¹*Indiana University, USA*

²*The University of Texas at Austin, USA*

Abstract: We discuss the importance of conducting experimental research in managerial accounting and provide a framework for understanding and assessing the contributions of research in this area. We then use this framework to organize, integrate, and evaluate the existing experimental managerial accounting research. Based on our review and synthesis of the literature, we suggest avenues for future experimental research in managerial accounting.

1. Managerial Accounting and the Role of Experiments

We have three objectives in this paper. Our first objective is to describe the role of experimental research in managerial accounting and provide a framework with which to understand and assess research in this area. Our second objective is to review, synthesize, and evaluate extant experimental research in managerial accounting.¹ Our final objective is to identify and discuss several directions for future experimental research in managerial accounting.

A fundamental purpose of managerial accounting is to enhance firm value by ensuring the effective and efficient use of scarce resources.² Thus, managerial

accounting systems should provide information that improves employees' abilities to make organizationally desirable decisions, thereby enabling employees to achieve the organization's goals and objectives (Caplan, 1988; Horngren et al., 2003).³ Additionally, managerial accounting systems should provide information that helps align the interests of employees with owners by directing employee effort and attention to activities that benefit the organization (Atkinson et al., 1997b; Lambert, 2001). Viewed in this light, the information produced by a managerial accounting system serves two important roles in an organization: (1) to provide some of the necessary information for planning and decision-making, and (2) to motivate individuals (Zimmerman, 2003, p. 4). Respectively, these two roles for managerial accounting information have been referred to as the *decision-facilitating* role and the *decision-influencing* role (Demski & Feltham, 1976).

¹In this regard, our goal is to summarize and organize, rather than exhaustively review prior experimental research in managerial accounting. Readers interested in more detail regarding the results of specific studies should consult excellent summaries of this literature contained in Arnold & Sutton (1997), Bamber (1993), Birnberg & Shields (1989), Kren & Liao (1988), Luft & Shields (2003), Shields (1988, 1997), Young (1988), Young & Lewis (1995), and Waller (1995).

²There are other purposes of managerial accounting. For example, rather than being used in a functionalist sense to support the achievement of owners' objectives, an interpretive perspective of managerial accounting might suggest that managerial accounting practices serve a signaling role by helping individuals and organizations appear rational and efficient, thereby allowing the firm or individuals within the firm to acquire resources, power, and society's support (see, e.g., Carruthers, 1995; Covaleski & Dirsmith, 1988; Covaleski et al., 1996; Scott, 1987). Further, there are numerous

(footnote continued)

organizations for which profit (value) maximization is not necessarily the goal (e.g., charitable organizations, cooperatives, and not-for-profit entities). Moreover, organizations have numerous stakeholders, including customers, employees, lenders, suppliers, owners, and the community in which it is located. Invariably, organizations serve the diverse interests of their various stakeholders, albeit to varying degrees.

³Organizations *per se* do not have goals and objectives. Rather, the individuals who compose an organization or have an interest in the organization's operations have goals and objectives. Following tradition in economics, we ascribe a profit (value) maximization goal to firms and organizations.

It is important to study empirically how both roles of managerial accounting information affect the behavior of individuals who compose organizations. First, organizations repeatedly make judgments and decisions regarding the amount and type of information supplied to employees and, in turn, employees make judgments and decisions based on this information (Demski, 1972; Feltham & Demski, 1970). Further, despite the perfect rationality assumption governing agency models and most models of economic behavior (Baiman, 1990), ample evidence indicates that the judgments and decisions of both producers and users of information frequently are not of the highest quality (Bonner, 1999, 2001). Thus, research in managerial accounting is necessary to help evaluate the quality of the judgments and decisions made within an organization, examine the determinants of decision quality, and report on the efficacy of factors posited to improve judgment and decision performance. Such research provides useful insights into the benefits and costs of managerial accounting practices that are intended to support decision-making within an organization.

Second, an organization's managerial accounting system is used to motivate employees (Baiman, 1982; Young & Lewis, 1995; Zimmerman, 2003). Research in managerial accounting can help determine the extent to which managerial accounting practices actually motivate individuals within an organization and help mitigate the divergence of interests between employees and owners (i.e., mitigate agency problems of moral hazard and adverse selection). Additionally, despite the self-interest assumption governing agency models and most models of economic behavior (Baiman, 1990), evidence indicates that individuals respond to ethical and moral principles in addition to economic incentives (e.g., Camerer, 1997; Evans et al., 2001). In this regard, research in managerial accounting also can help determine the extent to which social motives, individual values, and firms' informal information systems interact with more formal governance procedures in helping to ensure that employees undertake actions in the best interest of the firm.

It frequently is difficult, however, to use archival or field data to assess the effects of an organization's managerial accounting system, either in isolation or in conjunction with other variables, on the behavior of its members. Archival-empirical and field research in managerial accounting often are fraught with methodological and econometric problems (see, e.g., Ittner & Larcker, 2001). First, archival data may be unavailable or difficult to obtain. Second, the

independent variables under investigation may be contaminated because their effects cannot be disentangled from other effects, including self-selection biases and sample-selection biases. Finally, the dependent variables and independent variables typically are measured imprecisely and, thus, can contain both random noise and systematic bias (measurement error). Collectively, these weaknesses can jeopardize the internal validity, construct validity, and statistical conclusion validity of archival or field studies.⁴

Controlled laboratory experiments help overcome these limitations and allow researchers to answer questions that otherwise might go unanswered.⁵ Experimentation involves the active and purposeful manipulation and measurement of variables, thereby enabling the researcher to create a research setting and generate data. By manipulating the independent variables and using the principle of randomization, experiments also allow the investigator to control the research setting and isolate the effects of variables that are confounded in the natural environment. Finally, experiments involve control over measurement. This should lead to a high degree of specificity in the operational definition of variables and precise and objective variable measures.

Properly designed experiments are thus useful mechanisms for studying cause-effect relations under pure and uncontaminated conditions (Kerlinger & Lee, 2000). They control for threats to valid inference and allow researchers to draw strong causal inferences regarding the relations between independent and dependent variables of interest (Campbell & Stanley, 1963; Cook & Campbell, 1979; Kerlinger & Lee, 2000). Their virtue lies not only in being able to report on the precise inter-relations of variables but

⁴These weaknesses can also jeopardize the external validity of archival or field studies. For example, there could be an interaction between self-selection and treatment and, thus, the documented cause-effect relations may not generalize to situations in which self-selection is absent.

⁵An *experiment* is a scientific investigation in which [independent] variables are manipulated and their effects on other [dependent] variables are observed (see Campbell & Stanley, 1963; Kerlinger & Lee, 2000). An experiment can be thought of as a deliberate trial used to test causal propositions, where the investigator has control over the independent variables (Cook & Campbell, 1979). Control is achieved by manipulating treatment conditions and, in the case of extraneous independent variables, by random assignment to those conditions.

also in their ability to report on the concomitant processes underlying those relations.⁶

Experiments are also useful complements to analytic work. While analytic models of behavior provide an excellent framework for evaluating both the value of and demand for managerial accounting procedures, they frequently are criticized for their unrealistic assumptions, highly stylized environment, and complex solutions (Baiman, 1982, 1990). Experimental methods allow for a rigorous test of a theory's predictions, behavioral validity, and assumptions (Simon, 1982, 1987; Smith, 1994). Given the inherent flexibility in the experimental approach, researchers can push the model's limits, test for boundary conditions, test competing theories, document anomalies, and offer evidence regarding why actual behavior deviates from that predicted by an economic model (Kachelmeier, 1996; Moser, 1998; Waller, 1994, 1995).

Such research is valuable because it not only reports on the model's predictive ability (Friedman, 1953) but also supplements the insights of the psychological or economic model and may serve as the basis for revising theory so that it better predicts human behavior in organizations (Friedman & Sunder, 1994). In this regard, experiments are useful vehicles for testing theory, refining theory, and, ultimately, building theoretical systems (Kerlinger & Lee, 2000). Thus, over time, there is a symbiotic relationship between theory and evidence; theory and data interact in developing a complete picture of human behavior (Davis & Holt, 1993; Roth, 1995a).

In sum, organizations are a collection of individuals and, as such, organizational welfare is inextricably linked to the judgments, decisions, and actions of its members. Further, an organization's managerial accounting system plays a key role in motivating employees and improving their judgments and decisions. Consequently, it is vital to understand both the decision-facilitating and decision-influencing effects of managerial accounting information, and experiments

are a particularly useful vehicle for studying whether and how managerial accounting practices affect the behavior of individuals within an organization.

The remainder of this paper is organized into four sections. In Section 2, we describe the decision-influencing role of managerial accounting information, review and synthesize the experimental research in this area, and discuss how future research might extend our knowledge regarding the use of managerial accounting information for motivational purposes. In Section 3, we describe the decision-facilitating role of managerial accounting information, review and synthesize the experimental research in this area, and discuss some avenues for future research investigating the use of managerial accounting information for belief revision purposes. In Section 4, we describe how the decision-influencing and decision-facilitating uses of managerial accounting information often are not independent, and suggest research avenues that explore issues connected with using managerial accounting information for both motivational and decision-making purposes. In Section 5, we briefly summarize our main points and offer concluding comments.

2. Decision-Influencing Role of Managerial Accounting Information

The decision-influencing role of managerial accounting information refers to the use of information for motivating employees (Demski & Feltham, 1976). This role for managerial accounting information can be viewed as the use of information to reduce *ex post* (post-decision) uncertainty discussed in Tiessen & Waterhouse (1983), the performance-evaluation use of managerial accounting information discussed in Baiman (1982), and includes the scorekeeping use of information discussed in Simon et al. (1954). The use of managerial accounting information for decision-influencing purposes is intended to influence employee behaviors via the effects that monitoring, measuring, evaluating, and rewarding actions and performance have on motivation.⁷ For example, to motivate employees to control costs, firms might link compensation to performance by providing financial incentives that encourage managers to achieve an actual cost that is less than a budgeted or standard cost.

⁶External validity often is thought to be the Achilles heel of experimentation. That is, questions invariably arise as to the representativeness or generalizability of an experiment's results. Such concerns are not unfounded as experiments may not capture all relevant aspects of the population or setting that could interact with the experimental treatment in affecting the direction or magnitude of the results. In this regard, Cook & Campbell (1979, pp. 74–80) present approaches for enhancing an experiment's external validity. Further, Kerlinger & Lee (2000, p. 581) note that "conceding the lack of representativeness (external validity) the well-done laboratory experiment still has the fundamental pre-requisite of any research: internal validity."

⁷Risk-sharing considerations also are important here as motivation likely is affected by the financial (outcome) risk faced by the individual. More generally, given uncertainty in the relation between employees' actions and their consequences (outcomes and rewards), there is a tradeoff between the provision of incentives and the provision of insurance (risk-sharing).

Additionally, firms might use cost allocations to motivate mutual monitoring, co-operation, or the efficient use of a resource (Zimmerman, 1979, 2003).

More generally, the use of managerial accounting information for decision-influencing purposes is intended to help solve organizational control problems and therefore ensure that employees exhibit organizationally desirable behaviors (Merchant, 1985; Sunder, 1997). Control problems exist within organizations because owners presumably wish to maximize firm value, whereas employees are posited to maximize their own utility, which typically has been portrayed in theoretical research as consisting of two arguments: wealth and effort (leisure). Employees therefore are assumed to have different goals from owners, resulting in a divergence of interest between self-interested and co-operative behavior that leads to an agency problem (Baiman, 1982; Jensen & Meckling, 1976; Ross, 1973). When properly structured incentives are absent, an agency problem will lead to a loss in efficiency and a reduction in firm value (agency costs).

There are two general classes of agency problems: hidden action (moral hazard) and hidden information (adverse selection). A moral hazard problem arises when owners cannot observe the actions (e.g., effort levels) of work-averse employees and must therefore evaluate performance and base compensation contracts on imperfect surrogates of behavior (Arrow, 1985; Baiman, 1982). An adverse selection problem arises when employees have private information regarding, for example, their skill level or a state of nature that is of value to the firm, yet they use this information to increase their welfare at the expense of the firm's welfare (Arrow, 1985; Baiman, 1982). Both moral hazard and adverse selection problems are characterized by information asymmetry between employees and owners.

The use of managerial accounting information for decision-influencing purposes is intended to overcome these information-based problems within organizations and therefore reduce agency costs. Thus, a primary function of managerial accounting information is to mitigate the inherent conflict of interest between employees and owners and motivate employees to maximize firm value (Indjejikian, 1999). As discussed next, much experimental research has examined whether managerial accounting practices help solve control problems and encourage employees to act in the organization's interests.

2.1. Summary of Prior Research

The previous discussion related to the decision-influencing use of managerial accounting information

raises two inter-related questions. First, do individuals act opportunistically (i.e., behave in a self-interested manner)? That is, do agency problems actually exist? Second, to what extent do managerial accounting practices help mitigate agency problems related to moral hazard and adverse selection?

With regard to the first question, there is evidence that individuals act opportunistically and behave in a self-regarding manner, thereby suggesting that firms may suffer a loss in efficiency because of agency problems. For example, Berg et al. (1992) document that individuals shirk when effort levels are unobservable and individuals are offered a flat-wage contract. Additionally, the results of Baiman & Lewis (1989) and Berg et al. (1990) indicate that individuals will misrepresent their private information for rather small increases in personal wealth (e.g., \$0.25; also see Harrell & Harrison, 1994). Collectively, these results suggest that individual values and social norms such as honesty or an ingrained work-ethic are unlikely to completely mitigate self-interested behavior.⁸ Accordingly, we turn our attention to the second question, and review experimental research that examines whether managerial accounting practices and procedures help mitigate adverse selection and moral hazard problems.⁹

2.1.1. Hidden Information (Adverse Selection)

Several experimental studies in managerial accounting have examined settings in which employees have private information regarding firm operations, a state of nature, or their own productivity (skill level) that, if honestly revealed or shared, would increase firm value. In a broad sense, this research can be put into two separate streams. Both streams primarily are concerned with the use of standards and budgets to extract private information from employees. Below, we briefly summarize the prior research in each stream.

The first stream of research examines employees' motivation to exploit their informational advantage by creating budgetary slack. Budgetary slack represents a discrepancy between what the employee actually expects to occur and what actually is revealed

⁸See Luft (1997) for additional empirical evidence that is consistent with individuals behaving in a self-interested (opportunistic) manner.

⁹Later in this section, we revisit the issue of whether individuals have preferences for nonpecuniary factors such as honesty, fairness, and equity. Understanding the extent to which social motives and values interact with formal managerial accounting practices in solving agency problems is an important avenue for future research.

(or where the budget is set).¹⁰ Employees are motivated to create budgetary slack to improve their performance evaluations and compensation, shirk, consume perquisites, or hedge against uncertainty in the environment (Baiman & Demski, 1980; Cyert & March, 1963; Merchant, 1998; Williamson, 1969). Theoretically, the creation of slack is posited to reduce firm value because it can lead to inefficient resource allocation and the use of compensation schemes and budgets that are less than optimally motivating. Incentives and opportunities to create budgetary slack exist in the organization, though, when firms use budget-based contracts and employees participate in the budgeting process (Baiman and Evans, 1983; Demski & Feltham, 1978; Jensen, 2003).

Prior experimental research has shown that several factors affect individuals' propensity to create budgetary slack, and therefore exploit their informational advantage to bias budgets in their favor. For example, the degree of information asymmetry is related to slack, with higher levels of information asymmetry leading to higher slack (Waller, 1988; Young, 1985).¹¹ Research in this area also indicates that risk preferences affect the amount of slack, with risk-averse individuals creating the most slack (Young, 1985). Additionally, research has explored the creation of slack under group incentives, reporting that the type of competitive feedback can affect group slack levels (Young et al., 1993). Finally, research indicates that slack is affected by whether budgets are unilaterally or participatively set by the employee, imposed by

the superior, or negotiated and, once set, whether the budget can be renegotiated (Fisher et al., 2000; Rankin et al., 2003; Young, 1985).

The majority of the research in the first stream, though, examines whether standards and budgets can be used to motivate the truthful revelation of private information or, more specifically, examines the efficacy of "truth-inducing" budget-based pay schemes in reducing budgetary slack (e.g., Groves, 1973; Groves & Loeb, 1979; Weitzman, 1976). Research in this area indicates that "truth-inducing" pay schemes generally are effective in reducing budgetary slack and misrepresentations of private information (e.g., Chow et al., 1988, 1991, 1994, 1995; Waller, 1988; Waller & Bishop, 1990). There are, though, several factors that have been found to moderate the effectiveness of truth-inducing pay schemes, including risk preferences (Waller, 1988), the degree of information asymmetry (Chow et al., 1988), the imposition of a ratchet (Chow et al., 1991), and a probabilistic management audit (Chow et al., 1995).

The second stream of research examining issues related to adverse selection investigates how well various budget-based incentive contracts serve as screening mechanisms and, thus, their ability to attract the most able (highest skilled) employees (e.g., Rothschild & Stiglitz, 1976). Budget-based compensation contracts can help reveal private information to the firm because they allow individuals to self-select contracts based on their relative skill or ability. Thus, employees can signal their productivity (or effort) level via the compensation contract they select (Spence, 1973, 1974). This process helps avoid an inefficient pooling equilibrium, and both employees and organizations benefit because the most able employees receive higher wages while organizations reap increases in production efficiency.

In managerial accounting, the seminal work in this area was done by Chow (1983). Chow (1983) found that compensation contracts containing an explicit link between pay and performance (budget-based contracts) were more likely to attract higher skilled employees than contracts without such a link (lower skilled subjects chose fixed pay contracts). Chow's (1983) findings have been confirmed by numerous other studies in managerial accounting; there appears to be a strong correlation between contract selection and skill levels (e.g., Baiman & Lewis, 1989; Berg et al., 1990), whereby individuals with higher skill levels are more likely to choose compensation contracts with higher performance incentives (e.g., Dillard & Fisher, 1990; Shields & Waller, 1988; Waller & Chow, 1985). Additionally, research has shown that factors such as risk preferences, a controllability filter, and state

¹⁰More generally, *slack* typically is defined as the provision of resources beyond the minimum required (or expected to be required) to complete a task (Antle & Eppen, 1985; Cyert & March, 1963). Further, while we focus on employees' motivation to create slack, organizations also may be motivated to create slack. Slack can be beneficial to the organization by reducing manager tension, increasing organizational resiliency to change, and by making available some resources that can be used for innovation (Merchant, 1998, p. 219; also see Merchant & Manzoni, 1989). Cyert & March (1963) also suggest that organizational slack can protect the firm against uncertainty in the environment (e.g., holding excess safety stock in inventory to ensure that stockouts do not arise). Thus, it is important to remember *slack* is a multifaceted construct that embodies both negative and positive connotations.

¹¹However, this positive relationship may only exist in environments that already have high levels of information asymmetry between employees and managers. In environments with low levels of information asymmetry, research finds either a negative or no relationship between information asymmetry and budgetary slack (Hannan et al., 2004; Stevens, 2002).

uncertainty can interact with an individual's skill level in determining the choice of compensation contracts (Shields et al., 1989; Waller & Chow, 1985). Finally, research in this area indicates that the contract selection process not only reveals something about the skill levels of employees but also reveals something about the concomitant effort component as well (Waller & Chow, 1985).

In summary, certain managerial accounting procedures and practices, such as the use of budgets and standards in conjunction with compensation contracts based on these budgets and standards, have been found to be useful in either explicitly or implicitly extracting private information from employees. Thus, certain managerial accounting practices appear to be quite useful in reducing the level of information asymmetry between owners and employees. Research also informs us, though, that there are many factors (e.g., risk preferences, ratchet effect) that interact with these practices in determining the extent to which they foster the truthful revelation of private information.

2.1.2. Hidden Action (Moral Hazard)

Several experimental studies in managerial accounting also have examined the use of managerial accounting practices and procedures in motivating effort, performance and, more generally, desired actions from employees. Much of this research has been directed toward understanding the efficacy of budgets and standards against which employees are evaluated and compensated in solving moral hazard problems. Such research is important given that the use of budgets and standards for performance evaluation and compensation comprises a major aspect of most organizations' managerial control systems (Hopwood, 1976). Other research in this area has focused on the implications various incentive contracts have on firm profit in situations of interest to managerial accountants (e.g., transfer pricing). Below, we briefly summarize the prior research in this area.

One extensively studied topic, although not so much by managerial accounting researchers, is the effect assigned goals have on performance. A consistent finding from the goal-setting literature is that specific and challenging goals lead to higher performance than easy goals or no goals (see, e.g., Locke & Latham, 1990; Locke et al., 1981). In the accounting literature, similar findings have been reported by Chow (1983), Hirst & Yetton (1999), and Rockness (1977). These findings have implications for the practice of managerial accounting because firms employ budgets and standards that contain explicit

production, revenue, and cost goals. Thus, the goals contained in accounting budgets and standards may not only serve to evaluate and reward performance, but also may have motivational properties *per se*. That is, independent of their effect on compensation, research consistently documents that goals serve to direct individual attention and actions to increase effort toward successful task completion. Such findings are particularly noteworthy since neo-classical economic theory predicts that, absent a link between goals and some extrinsic reward, the mere presence of a goal and the associated difficulty of the goal will not affect performance because there are no wealth or effort effects (i.e., goals have no intrinsic value *per se*).

Independent of their goal-setting effects and their ability to attract employees with higher skill levels, a number of studies in managerial accounting have examined how alternative incentive-based compensation contracts affect individual effort and performance relative to fixed pay contracts. For example, several studies report that budget-based compensation contracts yield higher levels of individual performance than fixed pay contracts (e.g., Bailey et al., 1998; Chow, 1983; Tuttle & Burton, 1999; Waller & Chow, 1985), suggesting that, above and beyond the goals contained in budgets and standards, further improvements in performance can be obtained by linking compensation to performance. Additionally, experimental research in managerial accounting indicates that piece-rate schemes also have positive effects on effort and performance (e.g., Bailey et al., 1998; Chow, 1983; Sprinkle, 2000).¹² Despite such findings, a recent and comprehensive review of the effects of financial incentives on performance reveals that performance-based monetary incentives are not always helpful in solving moral hazard problems, with only 50 percent of the experiments reviewed indicating positive effects of financial incentives on performance (Bonner et al., 2000; see also Camerer & Hogarth, 1999). Factors such as task complexity and the type of incentive scheme have been shown to interact with financial incentives in determining task performance (Bonner & Sprinkle, 2002; Bonner et al., 2000; Scott & Tiessen, 1999).

Experimental research in managerial accounting also has documented that the manner in which pay is linked to performance has implications for inducing organizationally desirable actions. For example,

¹²Further, Farrell et al. (2005) suggest that piece-rate schemes can even increase performance in environments where the incentives of employees are aligned with those of the firm by making the actions that increase firm value more transparent to employees.

Luft (1994) shows that individuals prefer otherwise economically equivalent incentives framed in bonus terms rather than penalty terms, suggesting that further efficiencies in contracting can be achieved by considering the language employed in compensation contracts. Additionally, in multi-person settings research indicates that exploiting common uncertainty in the environment via the use of relative performance evaluation can enhance performance over compensation schemes based solely on individual performance (Chow & Haddad, 1991; Frederickson, 1992).¹³ Finally, in transfer pricing settings experimental research demonstrates that both the nature of the compensation scheme and the mechanism employed can influence the transfer price and quantity selected, and therefore influence the likelihood that individuals will make decisions that maximize firm profit (see, e.g., Chalos & Haka, 1990; DeJong et al., 1989; Ghosh, 1994, 2000; Greenberg et al., 1994; Luft & Libby, 1997).¹⁴

In summary, managerial accounting practices and procedures, such as the use of budgets and standards as well as linking rewards to performance, have been found to be helpful in solving problems of moral hazard. Additionally, research in this area suggests that the manner in which pay is linked to performance (i.e., the type of incentive scheme) can affect effort levels and resulting task performance (see, e.g., Bonner et al., 2000). Finally, similar to research examining adverse selection issues, research examining moral hazard issues reports that individual, task, and environmental variables frequently interact with performance-evaluation and compensation schemes in determining effort and performance levels (e.g., Bonner & Sprinkle, 2002; Bonner et al., 2000).¹⁵

¹³Sayre et al. (1998), however, document some negative consequences on the investment decisions made by individuals working under a tournament incentive scheme (which is an extreme form of relative performance evaluation) when the cohort size is greater than two.

¹⁴Under certain transfer pricing mechanisms (e.g., Hirschleifer, 1956; Ronen & McKinney, 1970), this research relates more to the adverse selection problem than the moral hazard problem. That is, in contrast to negotiation, these mechanisms operate by attempting to obtain the truthful revelation of supply and demand information from divisions so that corporate headquarters can set the optimal transfer price and quantity. We include the transfer pricing studies in the moral hazard section, though, because much of this research uses a negotiated setting where the concern is to get bargaining parties to make decisions that are in the best interest of the firm.

¹⁵Such variables include skill, task complexity, and assigned goals. For example, assigned goals, on average, have addi-

2.2. Directions for Future Research

There are numerous possible avenues for further inquiry regarding studying the decision-influencing role of managerial accounting practices and procedures in controlled laboratory settings. We concentrate our attention on two broad areas: (1) social motives and values, and (2) performance-evaluation and reward systems.

2.2.1. Social Motives and Values

Most prior experimental research in managerial accounting examines whether and how *formal* accounting controls help overcome moral hazard and adverse selection problems. Collectively, these studies show that commonly used managerial accounting practices help align the interests of employees and owners. However, these studies tend to ignore that managerial accounting information is only one piece of the puzzle, and that organizations may use informal information systems and rely upon socially mediated rewards and individual values to also mitigate contracting frictions (see, e.g., Noreen, 1988).

More generally, it is important to examine social motives and values because individuals make decisions in a broad social context that serves to frame behavior and outcomes. One's actions frequently and unavoidably shape, and are shaped by, the actions of others. Further, while individuals' objective functions almost surely include preferences for personal wealth accumulation, they also often include preferences for the welfare of others and/or conformance with norms of social and moral conduct (see, e.g., Baron, 2000; Thaler, 1992). In turn, preferences for non-pecuniary and other-regarding factors could exacerbate or mitigate the need for certain managerial accounting practices, thereby altering the managerial accounting information that is collected and used to motivate individuals.

(*footnote continued*)

tive positive effects on effort and performance over monetary incentives. This suggests that organizations should employ performance targets (goals) in conjunction with monetary incentives to motivate employees. However, Bonner & Sprinkle (2002) find evidence of an interaction between the difficulty of the goal and the type of incentive scheme. Specifically, compared to piece-rate schemes, performance typically is better under budget-based schemes when goals are moderate, but not when goals are difficult. This evidence has implications regarding whether assigned goals and incentives should be kept as separate motivating mechanisms or whether incentives should be linked to goal attainment.

For example, research in economics, organizational behavior, and psychology suggests that individuals value concepts of fairness and equity.¹⁶ Collectively, this research suggests that individuals frequently are willing to sacrifice personal wealth to achieve outcomes that they perceive to be fair or equitable. Research in managerial accounting has tended to ignore such preferences (Luft, 1997).¹⁷ One possible reason for this is that agency models generally assume that the manner in which gains to trade are apportioned is not valuable for contracting.¹⁸ In most agency models the principal (owner) is designated as the residual claimant: agents receive their market wage (in expectation), and the principal receives any surplus from the agency relationship. Preferences for fairness and equity could, though, alter the nature of contracting within the firm.

Specifically, distributional (allocative) concerns might increase transaction (contracting) costs. For instance, a common property of performance-based compensation contracts is that employee compensation and owner compensation are correlated; since pay is linked to performance, when employees earn more (less) owners also earn more (less).¹⁹ Depending on the sharing parameter, individuals receiving performance-based incentives might experience competing motivations. When the employee's share of rents is low, the employee's desire to maximize personal wealth conflicts with the desire to achieve equity and reduce the difference between his/her payoff and the owner's payoff. It is unclear how such a conflict will be resolved, and personal wealth considerations may be displaced by fairness and equity considerations, possibly suggesting that alternative allocative arrangements or alternative contract forms or means

of motivation need to be employed. More generally, there are numerous instances where equity and fairness considerations might have implications for organizational design and the nature of managerial accounting practices.²⁰ Thus, it becomes important to understand whether (and how) the relative distribution of rewards, in addition to the absolute distribution of rewards, affects the ability of budgets, standards, and performance-based contracts to motivate individuals to reveal private information or exert high levels of effort.

Concerns for equity naturally lead to issues of reciprocity, or the desire to reward kind acts and punish hostile acts. Research in economics and psychology has demonstrated both forms of reciprocity. Negative reciprocity has been observed in ultimatum bargaining games (Camerer & Thaler, 1995; Roth, 1995b) and public goods games (Fehr & Gächter, 2000a), while positive reciprocity has been observed in trust or gift-exchange games (e.g., Berg et al., 1995; Fehr et al., 1993, 1997). Such reciprocal motivations can have implications for managerial accounting.

Akerlof (1982, 1984), for example, models a situation where employees and owners engage in mutual gift exchange. The owner gives employees a wage that exceeds the market-clearing wage and, in kind, employees give owners higher than "normal" levels of effort. Fehr et al. (1993, 1997) and Hannan (2005) report results consistent with this prediction: as the fixed wages (rents) offered by experimental employers increase, the effort levels of experimental employees increase. Effort levels are significantly higher than enforceable levels (those dictated by pure monetary self-interest) even though all parties know *ex ante* that experimental employers cannot *ex post* reward such behavior. Hannan (2005) also documents that it can be rational for organizations to rely on norms of reciprocity since, on average, higher wages lead to higher surplus and higher firm (residual) profit. Finally, Fehr et al. (1997) report that, if allowed to do so, experimental employers also will reciprocate by *ex post* rewarding employees who exert high levels of effort and punishing workers who shirk (even though both acts are costly to employers). Anticipating this [reciprocal] behavior from employers, employees provide even higher levels of effort. Collectively, these results demonstrate that reciprocity can serve as effort elicitation and contract enforcement mechanisms.

¹⁶See, e.g., Adams (1965), Blount (1995), Bolton & Ockenfels (2000), Kagel et al. (1996), Kahneman et al. (1986), Loewenstein et al. (1989), Milgrom & Roberts (1992), Rabin (1993), and Vecchio (1984).

¹⁷A notable exception is Evans et al. (1994) who find that owners of a resource are willing to sacrifice personal wealth in order to prevent being "cheated." Additionally, Luft & Libby (1997) and Greenberg & Greenberg (1997) have found that managers are concerned about how equitably profits are distributed among divisions in transfer pricing contexts (also see Moser et al. (1995) who examine how preferences for equity and fairness affect taxpayer compliance decisions).

¹⁸To the extent agency models do address these resource allocation issues, they are used to extract additional rents from agents (see, e.g., Arya et al., 1996; Balakrishnan, 1995).

¹⁹For example, owner and employee pay often is positively correlated under profit-sharing plans, gain-sharing plans, and piece-rate plans.

²⁰See, in particular, Luft (1997) for an in-depth discussion regarding how fairness and ethical concerns might affect managerial accounting practices and procedures.

The previous discussion raises a question regarding how explicit incentive contracts, which frequently are used to mitigate agency problems, affect reciprocal motivation. On the one hand, experimental research demonstrates that incentive contracts can enhance employees' willingness to engage in reciprocal co-operation (Coletti et al., 2005; Lazzarini et al., 2004). Incentive contracts can be designed to induce an employee to take actions that benefit others in the organization. However, those benefiting from the employee's induced acts may attribute the behavior of the employee not to the control system *per se* but to the inherent kindness of the employee. In turn, this increases reciprocity (Coletti et al., 2005).

On the other hand, research suggests that incentive contracts can actually reduce (crowd-out) employees' willingness to engage in reciprocal co-operation (Fehr & Gächter, 2001; Tenbrunsel & Messick, 1999). Employers using incentive contracts tend to rely on the "stick" (explicit penalties for non-compliance) rather than the "carrot" (generous wage offers) as a means for motivating employees, possibly creating an "atmosphere of threat and distrust" (Fehr & Gächter, 1998, 2000b). Employees react negatively to this action—their effort levels decrease significantly, as does aggregate surplus.²¹ Experimental research in managerial accounting can help reconcile these competing perspectives by providing important insights regarding whether or more precisely when explicit contracts based on managerial accounting information foster or destroy reciprocity and co-operation.

²¹Fehr & Gächter (2001) also report that, while the overall surplus was lower when incentive contracts were in place, firm profit was actually higher because the provisions in the incentive contract (a penalty paid by the employee to the firm if the employee was caught shirking) allowed the firm to retain a larger share of the smaller available surplus. That said, the positive distributive effects from the employer's standpoint were not ubiquitous, and in numerous instances the trust contract yielded higher firm profit than the incentive contract. Moreover, future research is needed to examine whether this finding is parameter-specific or, more generally, whether it replicates under alternative production functions, incentive contracts, and tasks. As reported in Fehr & Gächter (2000b, p. 177), such results may not generalize to settings where employers actually are allowed to choose between explicit and implicit contracts (firm profit is higher under the implicit contract). Finally, Fehr & Gächter (2001) discuss that their experiment framed the explicit incentives as a *penalty* and that, if framed as a *reward*, explicit incentives may not destroy, but actually enhance voluntary cooperation. These observations underscore the importance of examining how attributes (or types) of incentive schemes affect cooperation.

Concepts such as reciprocity also relate to suggestions made by Simon (1991) that individuals are motivated to work hard because they identify with an organization's goals, take pride in their work, and exhibit loyalty to the organization (see also Hirshleifer, 1977; Waller, 1994). Such notions may help explain why the goal-setting literature finds that specific and challenging goals, in and of themselves, motivate individuals to achieve higher levels of performance (Locke & Latham, 1990). Moreover, as part of the employment relation, individuals may simply obey authority, thus accepting (internalizing) the duties and responsibilities commensurate with their position and, thus, make decisions that are in the best interest of the organization.

Numerous other social motives and values also may affect the efficacy of managerial accounting procedures and contracting within the firm. For example, Arrow (1974, p. 23) suggests that there is an element of trust in every transaction and that trust is an "important lubricant of a social system."²² Reputational considerations also could lead to a reduction in the deadweight loss associated with the inherent nature of second-best contracts (Fama, 1980). As Baiman (1990, p. 356) notes, reputation may serve "as a substitute for or complement to formal governance structures" and has "a number of potentially interesting managerial accounting implications."²³

²²There is an extensive literature on trust and its meaning. Some authors treat trust in a calculative fashion and view it as a subset of risk. Gambetta (1988, p. 217), for example, refers to trust as "a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action. When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in cooperation with him." Presumably, the foundation for trust and the subjective probability likely are numerous: they could relate to the economic incentives in place, social norms such as reliance on reciprocity, values, history, culture, institutions, and so on. Other researchers (e.g., Williamson, 1993) view trust as being far less calculative and much more personal. For detailed discussions of trust, its meaning, and its effects on economic transactions see Coleman (1990), Gambetta (1988), Kramer and Tyler (1996), and Williamson (1993).

²³The construct *reputation* likely encompasses both pecuniary and nonpecuniary elements. In repeated transactions, individuals may wish to develop a reputation for "doing the right thing" because the economic gains to doing so exceed, for example, the costs associated with renegeing (possible loss of future profitable transactions) and writing and enforcing detailed contracts. There also can be a purely social aspect

Moreover, it is possible that trust and reputation systematically alter the managerial accounting information that is collected and used for performance evaluation and motivation. Additional social motives and values that seem important in managerial accounting settings include, but certainly are not limited to altruism, authority, dignity, honesty, competitiveness, loyalty, retribution, culture, and work norms.²⁴

In real-world transactions, it is likely that numerous social motives and values operate in tandem with economic self-interest to govern decisions and actions. This not only makes it difficult to sort out the various factors that impinge on motivation but also makes it difficult to determine whether behavior is driven by pecuniary (e.g., anticipation of some future gain) or non-pecuniary (pure other-regarding) factors. In this regard, experimental methods can be particularly valuable because they can isolate (examine) certain motives and control for other motives and extraneous factors. Additionally, experimental methods allow researchers to cull-out non-economic motivations from economic motivations.²⁵ From a managerial accounting perspective, our comparative advantage is not so much in examining whether social motives and values affect behavior. Rather, our role is to examine whether such motives and values affect the design of managerial accounting practices and use of managerial accounting information.

In summary, many rewards and penalties take social forms, and individuals often exhibit preferences for ethical behavior (Arrow, 1985). Collective action problems are ubiquitous, and social norms drive behavior as much as explicit contractual agreements (Ostrom, 1998). It is important to study such social motives and values in managerial accounting because these factors may help explain why certain procedures are observed in practice and also may suggest changes in the design of managerial accounting procedures. Such research could help explain differences between the contracts observed in the real-world and those studied in theory (and in numerous

experiments), why employment contracts are incomplete, and why employees often are motivated to exert effort even when their actions do not seemingly contribute toward their (immediate) economic self-interest. Moreover, such research would help paint a more complete picture of when, why, and how managerial accounting information is helpful in solving control problems. Additionally, such research would aid theory development and be useful in filling the repeated calls for research that integrates both economic and psychological factors (see, e.g., Kachelmeier, 1996; Merchant et al., 2003; Moser, 1998; Waller, 1994, 1995).

2.2.2. Performance-Evaluation and Reward Systems

Few would deny that managerial accounting is an integral and expansive component of an organization's performance-evaluation and reward system. Given the broad set of organizational control problems such systems are intended to resolve, experimental research in managerial accounting has been rather narrowly focused. Specifically, prior experimental research in managerial accounting typically has examined: (1) single, one-dimensional tasks, (2) single-person tasks, (3) a single type of incentive scheme (usually budget- or standard-based), and (4) single-sided control problems. Below, we discuss the importance of conducting research that moves beyond these boundaries.

First, extant experimental research in managerial accounting typically employs a single, one-dimensional task, yet employees usually perform several different tasks as part of their jobs or a single task with several dimensions of performance (Baker, 1992; Feltham & Xie, 1994; Hemmer, 1996; Holmström & Milgrom, 1991). For instance, production employees frequently are responsible for both the quantity and quality of output. In such settings, organizations need to both motivate high levels of effort from employees and direct employees' effort toward their various responsibilities. Consequently, the performance-evaluation and reward system serves both a motivational role and an informational role (see, e.g., Merchant, 1998).

It frequently is very difficult, however, to measure all relevant dimensions of performance with equal precision because the performance on certain tasks or facets thereof are likely to be more difficult to capture or verify. This renders the set of performance measures incomplete or hard to contract on, thereby complicating the design of performance-evaluation and reward systems (Kreps, 1997). *Ceteris paribus*, as the difficulty of measuring any particular facet of

(footnote continued)

of reputation as individuals may care deeply about how others interpret their actions irrespective of whether these interpretations affect future economic transactions. In either situation, reputation may serve a role in ensuring that agreements and contracts are honored.

²⁴For discussions regarding these, and other, factors see Abbink et al. (2000), Arrow (1974), Baron (2000), Elster (1989), Evans et al. (2001), MacCrimmon & Messick (1976), Rutledge & Karim (1999), and Williamson (1985, 1996).

²⁵See, e.g., Nikias et al. (2004) and Williamson (2005).

performance increases, economic theory informs us that the desirability of providing financial incentives decreases, so much so that some have posited that a flat-wage contract may be optimal in multi-dimensional task situations (Holmström & Milgrom, 1991). This analytic result, though, hinges on two assumptions: (1) individuals derive utility from work activities, and (2) individuals receiving incentive contracts focus excessively on the rewarded dimension of performance (incentives lead to a severe misallocation of effort among tasks).²⁶

Experimental evidence in managerial accounting suggests that individuals do indeed derive utility from work activities (e.g., Sprinkle, 2000). Additionally, archival-empirical evidence from firms suggests that there can be dysfunctional responses to compensation schemes and that employees often will allocate a disproportionate amount of their effort to the dimensions of their job that are most objectively measured (see, e.g., Prendergast, 1999). It is unclear, though, how this tradeoff actually is resolved and whether an optimal contract in a multi-task setting is a fixed wage contract, a performance-based contract, or some combination thereof. Experimental research in managerial accounting could assess this tradeoff and the extent to which extrinsic incentives lead to an inefficient allocation of effort among an employee's various responsibilities.

Such research could improve our understanding of whether commonly used compensation schemes have unintended consequences such as causing employees to fundamentally change the activities they perform or to reallocate their efforts in ways that harm the organization. In turn, this has implications for job design and how decision rights should be partitioned in an organization. This also has clear implications for the design of responsibility accounting systems and whether, for example, organizations should seek to change employees' opportunity costs by limiting the tasks and activities assigned to them. Such research also could facilitate the design and development of performance measures and how precise they need to be to motivate the desired levels and allocations of effort (see, e.g., Banker & Datar, 1989).

At a more fundamental level, the multi-dimensional task contracting problem frequently reduces to motivating employees to innovate and take risks (Holmström, 1989). Managers can be exposed to

both compensation risk and human capital risk when the various dimensions of performance are not equally sensitive to their effort (Milgrom & Roberts, 1992). Even when the dimensions of performance are equally sensitive to effort, managers frequently must select from a menu of projects that vary greatly in both risk and expected return. For example, managers frequently engage in capital budgeting decisions in which they evaluate and select among investments that differ in the timing, magnitude, and riskiness of cash flows. In these situations, the accounting performance measurement and reward system not only needs to motivate high levels of effort from employees, but also needs to encourage the appropriate level of risk taking (i.e., encourage employees to maximize expected performance).

When examining the multi-dimensional task contracting problem, recent experimental research in managerial accounting highlights the importance of decomposing employee performance into its effort and risk-taking components. Specifically, Sprinkle et al. (2005) illustrated that increasing the difficulty of the budget level embedded within budget-based incentive contracts can have opposing effects on employee effort and risk taking. Thus, examining the relationship between budget level difficulty and a measure that co-mingles the effort and risk-taking choice of the employee would prove difficult.²⁷ Future research could continue to investigate the effects of incentive systems on employee effort and risk taking independently. This research could examine which incentive schemes, or combinations and dimensions thereof, induce managers to take appropriate levels of risk (i.e., select projects that maximize expected value) while concurrently motivating high levels of effort.

In this vein, experimental research in managerial accounting also might consider examining dependent variables and outcome measures other than budget slack and performance quantity. For example, researchers could explore how managerial accounting practices (1) affect employees' propensity to help co-workers; (2) lead employees to voluntarily enhance their knowledge, skills, and abilities; (3) affect conscientious work habits; (4) promote adherence to rules and regulations; (5) enhance loyalty to the organization; and (6) affect employees' propensity to

²⁶Further, it is assumed that when pay is not contingent on performance, employees will allocate their efforts according to the organization's wishes.

²⁷For example, prior studies' use of measures that co-mingle the effort and risk-taking choice of the employee may contribute to the mixed results of the prior literature examining the relationship between budget level difficulty and employee performance (Locke & Latham, 1990; Merchant & Manzoni, 1989).

change, innovate, and learn.²⁸ While such outcome measures may not have immediate effects on performance, they may signal future levels of profitability and ultimately are critical to a firm's long-run success and viability (Fisher, 1995; Kaplan & Norton, 1996). Moreover, it is vital to understand the dynamic (multi-period) effects that managerial accounting practices have on motivation as well as the rate and type of learning (see, e.g., Indjejikian, 1999; Shields, 1997). This is particularly important given the repeated nature of most managerial decision problems.

Second, future experimental research in managerial accounting should pay greater attention to incentive issues in workgroups and teams. Team-based structures increasingly are used in organizations, yet few experimental studies in managerial accounting have examined performance-evaluation and compensation issues in group settings (Atkinson et al., 1997a).²⁹ Compared to a single-person setting, there are additional issues to consider in a team-based (group) setting. For example, organizing production in teams can result in benefits due to improved coordination of information, skills and effort, mutual monitoring, and improved risk-sharing; there are, though, additional control problems to consider, including free-riding, collusion, and a loss of information regarding individual performance (Alchian & Demsetz, 1972; Arya et al. 1997; Balakrishnan et al., 1998; Itoh, 1991; Ramakrishnan & Thakor, 1991). The actual manner in which these theoretical benefits and costs associated with team-based production translate into realized performance is unclear, and experimental research examining these issues across different production settings, group incentive schemes, and communication and monitoring arrangements would be valuable (Fisher, 1994; Nalbantian & Schotter, 1997).

For example, the use of group incentive schemes, which reward individuals on the basis of group outcomes, has grown rapidly over the last 50 years (Blinder, 1990). This raises a question regarding

whether organizations should employ group piece-rate contracts (based on, e.g., revenue or profit) or budget-based contracts. While piece-rate schemes reward all positive levels of group output, they theoretically lead to high levels of free-riding. Moreover, given the sharing mechanism and the "public good" nature of group output, free-riding frequently is a dominant strategy. Budget-based contracts, on the other hand, only reward output after some target is achieved; such contracts are characterized by multiple Nash equilibria, some of which include positive levels of individual production and group output (e.g., Holmström, 1982).³⁰

Experimental research in managerial accounting (Fisher et al., 2003) finds that, as suggested by theory, group budget-based contracts outperform group piece-rate contracts. Budget-based contracts lead to higher group effort (less free-riding), higher group performance (Pareto-superior outcomes), and less decay in long-run performance. Such research speaks not only to how group compensation schemes might be crafted to enhance productivity but also to the important role that managerial accounting, specifically the use of a budget and the budget level, plays in such schemes. This research could readily be extended to examine how other important issues in managerial accounting affect the efficacy of budget-based contracts, including the partitioning of group decision rights and the information flow among group members.

Third, experimental research in managerial accounting tends to focus rather heavily on budget-based compensation schemes. As previously discussed, there are numerous unresolved issues regarding the

²⁸In this regard, management accounting researchers might borrow from organizational behavior researchers who have examined work behaviors that are beyond the prescribed roles of a job and traditional measures of job performance. Such behaviors have been labeled organizational citizenship behavior (e.g., Organ, 1988), prosocial organizational behavior (Brief & Motowidlo, 1986), extra-role behavior (Van Dyne & Cummings, 1990), and organizational spontaneity (George & Brief, 1992).

²⁹Notable exceptions are Drake et al. (1999), Rankin (2004), Rankin & Sayre (2000), Rowe (2004), Scott & Tiessen (1999), Towry (2003), and Young et al. (1993).

³⁰Under budget-based contracts, only group output that meets or exceeds the target is rewarded. If group output is below the target, workers receive a relatively low [penalty] wage. This type of forcing contract can yield multiple Nash equilibria. Simply put, the discontinuity that exists under budget-based contracts can change the marginal benefit to working. For example, assume that other members of a group are working and that the marginal worker, by exerting effort, is able to ensure that the group target will be met and that pay will be high. If the marginal worker does not exert effort, however, the group target will not be met and pay will be low. Given the discontinuity in pay, the incremental benefit from working can strictly exceed the incremental cost, and working is therefore sustainable as a Nash equilibrium (mutual best reply). Such motivations do not theoretically exist under group piece-rate schemes because these schemes typically are continuous and linear—the marginal benefit of an extra "unit" of effort is constant, thereby giving rise to the classic public good problem where free-riding is a dominant strategy.

efficacy of such schemes.³¹ That said, there are numerous ways of linking pay to performance and rewards can vary as to their type, timing, and magnitude (see, e.g., Bonner & Sprinkle, 2002; Bonner et al., 2000).

For example, tournaments (e.g., promotions) frequently are observed in practice (Baker et al., 1988; Bull et al., 1987; Prendergast, 1999), yet few experimental studies have examined the efficacy of tournament-based compensation schemes vis-à-vis other compensation schemes. Additionally, research that does examine tournament pay schemes typically only considers how they affect the firm's moral hazard problem, often reporting that tournaments lead to lower (average) levels of individual effort and performance than alternative pay schemes (Bonner et al., 2000). It is possible, though, that tournaments work quite well when the firm's adverse selection problem is considered and that, compared to other compensation schemes, tournaments attract the highest skilled (most productive) individuals and are best able to sort individuals on the basis of their ability (Prendergast, 1999). This underscores the importance of considering the impact alternative performance-evaluation and reward systems might have on *both* moral hazard and adverse selection problems. This also underscores the importance of considering whether rewards will be based on absolute or relative performance and, if the latter, whether the basis for comparison is some known standard or the (a priori unknown) performance of others.

Finally, in studying principal-agent relationships extant experimental research in managerial accounting tends to focus on only one side of the control problem. Research tends to examine issues relating to employee moral hazard and neglect those relating to employer moral hazard. As Demski (1997, p. 579) articulates "two-sided (or double moral hazard) concerns, in which important control considerations arise on both sides of a relationship, are commonplace."³² This raises a question regarding whether and how managerial accounting information and practices play a role in helping employees protect themselves against the opportunistic actions of owners.

³¹In addition to the aforementioned issues, it also is unclear whether budget targets should be exogenously set or, as frequently occurs in gainsharing plans, generated endogenously by the historical output of workers. More generally, the presence of a budget target leads to questions regarding how budget levels, and their concomitant difficulty, are determined.

³²See, e.g., Cooper & Ross (1985) and Demski & Sappington (1991, 1993).

For example, many organizations frequently augment objective performance evaluation with subjective performance evaluation. Theoretically, such evaluations can increase employee and employer welfare by incorporating non-contractible (unverifiable) information about employees' actions in performance evaluations (see, e.g., Baiman & Rajan, 1995; Baker et al., 1994). However, subjective performance evaluation can be prone to numerous evaluator biases, and owners may renege on the implicitly agreed upon manner in which subjective measures will be used in the evaluation process (Prendergast, 1999). This raises a question, largely unexplored in managerial accounting, regarding the relative roles of objective and subjective measures in evaluating performance and, more generally, employer moral hazard.³³ Indeed, managerial accounting practices may be non-trivially shaped by employees' concerns over owners' opportunistic use of non-contractible information.

In summary, a number of issues connected with the use of managerial accounting information for performance-evaluation and reward purposes merit further inquiry. We suggest that experimental research begin to examine some of the complexities that exist in real-world organizations regarding work tasks, organizational structure, compensation schemes, and two-sided opportunistic behavior. Additionally, research might examine the motivational effects related to the mere act of collecting evaluation data (as well as the type of data collected). The experimental approach is particularly amenable for examining the questions raised since it allows for a systematic analysis of *ceteris paribus* changes in the discrete aspects of tasks, the organization's environment, and performance-evaluation and reward systems. By isolating the effects of these changes, researchers can best assess whether the features identified in theory materialize in the actual actions of individuals.

3. Decision-Facilitating Role of Managerial Accounting Information

The decision-facilitating role of managerial accounting information refers to the provision of information to reduce pre-decision uncertainty (Demski & Feltham, 1976). This role for managerial accounting information can be viewed as the use of information to reduce *ex ante* uncertainty discussed in Tiessen & Waterhouse (1983), the belief revision use of

³³Fisher et al. (2005) is at least one exception. This study found that firm output and employees' compensation are greater when the employer does not have discretion over total employee compensation, but does have discretion over the allocation of total compensation.

managerial accounting information discussed in Baiman (1982), and is analogous to the problem-solving use discussed in Simon et al. (1954). The use of managerial accounting information for decision-facilitating purposes is intended to improve employees' knowledge, thereby enhancing their ability to make organizationally desirable judgments and decisions and better-informed action choices. For example, firms supply managers with product cost data to help ensure appropriate pricing and product-emphasis decisions. Firms also provide managers with standard cost variances so that they can determine the sources of deviations from planned performance and take corrective action.

In its decision-facilitating role, then, managerial accounting information serves as an important input for numerous economic judgments and decisions. Such judgments and decisions subsume both the past (performance evaluation) and the future (e.g., planning). They concern the acquisition, use, and disposition of both inputs and outputs to achieve organizational goals. They also involve a retrospective examination of prior choices and decisions and, as such, involve evaluating, appraising, and assessing performance, with the ultimate goal of improving future performance.³⁴

3.1. Summary of Prior Research

Consistent with the aforementioned objectives, prior experimental research reporting on the decision-facilitating role for managerial accounting information has focused on the general issue of determining what information should be supplied to a particular decision maker in a particular decision context. Such a focus is consistent with the general purposes of judgment and decision-making research in accounting and cognitive psychology, which are to (1) examine how and how well individuals (or groups) perform judgment and decision tasks, and (2) examine the determinants of judgment and decision-making

performance, with the aim of identifying factors that may enable individuals to make better judgments and decisions (Bonner, 1999, 2001; Hogarth, 1991). Below, we briefly survey the findings of prior experimental research in these two areas.

3.1.1. Quality of Judgment and Decision-Making in Managerial Accounting

Despite the perfect rationality assumption governing most models of economic behavior, much prior experimental research in managerial accounting indicates that individuals' decisions are less than optimal. Two streams of research report on the quality of judgment and decision-making in managerial accounting settings.

First, experimental research in managerial accounting has examined how well individuals make information system choice decisions. This research views the managerial accountant as an "information evaluator" and a producer or supplier of information for decision-making (Demski, 1972; Feltham, 1972). In general, this body of research shows that individuals' choices deviate from normative models and that individuals do not, in general, choose economically optimal information systems (see, e.g., Hilton & Swieringa, 1981, 1982; Krishnan et al., 2002; Ko & Mock, 1988; Schepanski & Uecker, 1983; Uecker 1978, 1980, 1982; Waller, 1995). The second stream of research focuses on the use of managerial accounting information for judgments and decisions. Again, this research tends to indicate that decision makers do not, in a Bayesian or decision-theoretic sense, make optimal decisions.³⁵ For example, research has shown that individual judgments often are affected by normatively irrelevant outcomes (e.g., Brown & Solomon, 1987, 1993; Fisher & Selling, 1993; Frederickson et al., 1999; Lipe, 1993).

Collectively, the experimental research in managerial accounting is largely consistent with other experimental research in accounting and auditing, which documents that individual judgments and decisions are not always of the highest quality (Bonner, 1999, 2001). Individuals do not appear to be good intuitive statisticians and suboptimal decisions frequently can be traced to the use of simplifying heuristics, judgment biases, and systematic errors (Shields, 1988; Waller, 1995). Consequently, it is important to understand the determinants of decision quality and how managerial accounting practices might improve judgment and decision performance. We turn our attention to these issues next.

³⁴Demski (1997) stresses that the performance evaluation of an activity (e.g., department or product) is qualitatively different from managerial performance evaluation. Specifically, he notes (p. 537), "activity evaluation is a question of whether the organization's interests are best served by the activity, while managerial evaluation is a question of whether the manager's inputs, broadly interpreted, have been in the organization's interests." Thus, managerial performance evaluation not only is conducted to determine whether a manager should be "kept or dropped" but also is, due to contracting frictions, conducted to ensure organizationally desirable behaviors. This can change the data collected and reported or threatened to be collected and reported.

³⁵Although in some instances (e.g., some variance investigation decisions) research reports that individuals make remarkably good judgments and decisions (see, e.g., Brown, 1981, 1983; Lewis et al., 1983; Shields, 1988).

3.1.2. Factors Influencing Judgment and Decision Performance in Managerial Accounting

Numerous studies examine how well decision makers use managerial accounting information. Further, numerous individual, task, and environmental variables have been found to affect judgment and decision-making performance in managerial accounting settings. For a comprehensive mapping of relations between the dependent and independent variables studied in this area, the interested reader should consult Luft & Shields (2003). Other useful reviews of this literature can be found in Ko & Mock (1988), Shields (1988), and Waller (1995). Below, we briefly discuss prior research that has examined whether variations in managerial accounting practices and procedures affect judgment and decision quality.

Experimental research indicates that managerial accounting practices and procedures can have a significant effect on the quality of individuals' judgments and decisions. For example, receiving budget and variance feedback appears to enhance learning and improve decision performance (e.g., Ghosh, 1997; Mock, 1973). Additionally, feedback frequency has been found to affect managerial decision performance, with more frequent feedback often improving decision quality, but sometimes biasing judgments (see, e.g., Frederickson et al., 1999; Mock, 1969). The amount of information provided to decision makers also influences judgments, with studies reporting an inverted-U relation between the amount of information and judgment accuracy (see, e.g., Iselin, 1988; Shields, 1980, 1983). Finally, recent research shows that other basic properties of managerial accounting information can affect judgment performance, such as the manner in which it is organized, whether it contains financial or non-financial measures of performance, and whether a performance measure is common or unique to an organizational subunit (e.g., Lipe & Salterio, 2000, 2002; Schiff & Hoffman, 1996).³⁶

Experimental research in managerial accounting also has extensively studied how various product costing systems affect decision performance. Much of this research examines how absorption costing systems, compared to variable costing systems, affect pricing decisions. This research tends to indicate that individuals prefer absorption cost systems to variable cost systems in making pricing decisions, although

such systems generally lead to larger price biases and distortions (e.g., Ashton, 1976; Barnes & Webb, 1986; Hilton et al., 1988; Turner & Hilton, 1989). Recent research in this area, though, suggests that these biases are mitigated in a competitive market setting (Waller et al., 1999). Experimental research has focused on other attributes of an organization's product cost system such as its accuracy, reporting that more accurate product cost information frequently leads to more accurate judgments and more profitable decisions. However, such benefits have been shown to depend on the market structure, the behavior of competitors, the type of feedback, and individual knowledge structures (Briers et al., 1999; Callahan & Gabriel, 1998; Dearman & Shields, 2001; Gupta & King, 1997).

Finally, the use of managerial accounting information for decision-influencing purposes might affect an individual's propensity to use managerial accounting information for decision-facilitating purposes, thereby playing a key role in determining the judgment and decision performance of individuals within an organization. For example, the structure of the compensation contract (performance-contingent or fixed wage) could affect how and how well a manager uses product cost information in making pricing decisions. Such research speaks to the interdependent nature of the decision-influencing and decision-facilitating roles of managerial accounting information and, thus, their interactive effects. Given the organization of this paper, we defer our discussion of these issues to Section 4.

In summary, managerial accounting information and practices have been found to have significant effects on the judgment and decision performance of individuals. Both the provision of information for decision-facilitating purposes and the characteristics of that information have been found to improve individuals' knowledge and ability to make better judgments and decisions. Prior research also has documented, though, that the efficacy of managerial accounting information and practices in improving judgment and decision performance can be moderated by a number of individual, task, and environmental factors (see, e.g., Luft & Shields, 2003).

3.2. Directions for Future Research

Compared to experimental research examining the decision-influencing role of managerial accounting information, fewer studies in the last decade have focused particularly on the decision-facilitating role of managerial accounting information. To spur work in the area, Waller (1995) suggested that researchers adopt a "behavioral-economics" approach, whereby

³⁶In addition to affecting the quality of judgments, Kadous et al. (2005) found that the mere presence of managerial accounting information can enhance the persuasiveness of an argument or proposal.

concepts from economics and psychology are integrated and the validity of the assumptions underlying neo-classical economic theory (e.g., perfect rationality) is empirically tested. We agree with Waller (1995), and also suggest numerous additional avenues for further inquiry regarding studying the decision-facilitating role of managerial accounting information in controlled laboratory settings. We focus our attention on two areas: (1) performance evaluation, and (2) multi-person, multi-period, and expertise issues.

3.2.1. Performance Evaluation

Organizations routinely evaluate the performance of individuals, activities, and subunits. While such evaluations clearly have a decision-influencing purpose, they also serve to facilitate numerous economic judgments and decisions. For example, evaluations of performance frequently are used to allocate resources within the organization, decide on corrective actions, set future performance goals, develop or refine strategies, and identify training and development needs. Moreover, accurate performance evaluation is of critical importance in organizations, and both financial and non-financial data from the firm's managerial accounting system serve as a key input in forming these evaluations (Foster & Young, 1997; Ittner & Larcker, 2001).

Within managerial accounting, analytic (agency) research typically focuses on the *ex ante* choice or development of performance measures to motivate employees rather than the *ex post* use of those measures by evaluators (e.g., Feltham & Xie, 1994; Hemmer, 1996). Much of this research is guided by the informativeness principle (Holmström, 1979), which posits that performance measures are valuable if they [statistically] reduce the error with which an employee's actions are estimated. A maintained assumption is that performance measures are either mechanistically used in the evaluation process or that evaluators are perfectly rational and optimally use performance measures. This need not be the case, though, as performance evaluation frequently is subjective and can be prone to much bias and random error (Bommer et al., 1995). Thus, performance measurement and performance evaluation may be a two-stage process (i.e., not perfectly correlated).

This issue is particularly important given the trend toward organizations implementing new and expanded performance measurement systems in an attempt to overcome perceived limitations associated with traditional accounting-based performance measures. Among these trends are the use of

economic-value-added methods and measures as well as the use of non-financial performance measures and the balanced scorecard. Such methods and measures are posited to improve managerial and firm performance evaluation as well as decision-making within the firm by providing decision makers with a better set of financial metrics as well as forward-looking non-financial metrics (Ittner & Larcker, 1998).

Despite these claims and increased usage by firms, archival-empirical evidence indicates limited and mixed support regarding the efficacy of these new performance measurement procedures and measures in explaining stock returns and stock prices (Ittner & Larcker, 1998, 2001). Additionally, archival-empirical evidence is limited and mixed regarding the ability of such methods and measures to improve decision-making and operating performance (Ittner & Larcker, 1998, 2001). This raises questions about how and how well individuals use these new measures in decision-making and in evaluating the performance of managers and divisions.

With an expanded set of financial and non-financial performance measures, it is important to understand how evaluators weight and integrate the various performance measures to form an overall evaluation of performance, particularly given the use of subjective performance evaluation rather than a formulaic or objective approach (see, e.g., Ittner & Larcker, 1998, pp. 227–228). In such situations, evaluators must combine performance measures defined in different dimensions (e.g., money, time, customer satisfaction ratings) to form an overall assessment of performance. It is unclear how this process actually works and what factors influence the weights placed on various financial and non-financial measures. Research in managerial accounting and psychology shows that the performance-evaluation process is complex and that numerous economic, psychological, and social attributes influence performance appraisals (Ilgen et al., 1993; Krishnan et al., 2005). Additional experimental research in managerial accounting could continue to use this process approach and provide evidence regarding the manner in which new performance measures affect the acquisition, encoding, storage, and processing strategies of evaluators.

There also are issues related to information overload and bounded rationality. The number of performance measures may be inversely related to an evaluator's ability to form accurate assessments of performance (see, e.g., Shields, 1983; Schick et al., 1990). The optimal amount of performance data that should be supplied to evaluators is unclear, and may be related to the combinations and types of financial and non-financial measures employed. Additionally,

larger numbers of performance measures raise concerns regarding a dilution effect (e.g., Nisbett et al., 1981), or whether cues of lesser diagnosticity dilute cues of higher diagnosticity. Such an effect may be the unfortunate by-product of individuals allocating their attention and efforts to, and thus attempting to integrate, a multi-faceted set of performance measures.

Finally, Ittner & Larcker (1998, p. 215) report that certain economic value methods and measures may simply be too complex for individuals to understand, thereby limiting their usefulness as decision-making and performance-evaluation tools. Additional complexities also might arise when economic value measures are used for more than one purpose in an organization (e.g., capital budgeting, goal setting), as the use of information for multiple purposes can affect how information is stored, retrieved, and subsequently processed (see, e.g., Williams et al., 1986). This raises questions regarding whether the use of economic value measures as well as non-financial performance measures for multiple purposes in the organization results in less accurate performance evaluation.

In summary, given that firms are relying more heavily on both financial and non-financial performance measures, it seems vital to understand how and how well individuals use these performance measures in evaluating individual and division performance and, more generally, in making organizationally desirable decisions. While recent experimental research in managerial accounting addresses some of these issues (e.g., Lipe & Salterio, 2000, 2002; Luft & Shields, 2001), more research is needed. Such research would provide valuable insights regarding the appropriate design of performance measurement and evaluation systems and the role that managerial accounting information plays in these systems. Further, as discussed in Bonner (1999) and Libby & Luft (1993) experiments are particularly valuable for sorting out the determinants of decision performance (e.g., amount and type of information) and measuring the processes through which they affect performance (e.g., information search and integration). In turn, understanding these determinants and processes is critical for improving judgment and decision performance (Bonner, 1999).

3.2.2. Multi-Person, Multi-Period, and Expertise Issues

Notwithstanding the recent innovations in performance measurement and other areas of managerial accounting practice, several fundamental aspects of the firm's decision environment merit further inquiry. For example, research in managerial accounting has

not fully explored the multi-person and multi-period nature characterizing many managerial accounting settings. As discussed below, several interesting issues regarding the decision-facilitating use of managerial accounting information in these settings warrant exploration.

Regarding the multi-person aspect of many decision problems, firms clearly need to address the organizational structure question. That is, firms must decide how to best organize employees for purposes of production (e.g., should production be team-based or individual-based). As previously discussed, the decision-influencing use of managerial accounting information may help guide this organizational design choice. Conditioned on using workgroups and teams, there are a number of judgment and decision-making issues that also need to be addressed.

For example, group settings frequently are characterized by conflict among members, which can arise from differences in individual beliefs regarding how scarce resources are to be allocated among group members, differences in opinions and judgments, or differences in beliefs regarding the appropriate course of action (Brehmer, 1986; Hocker & Wilmot, 1995). In an attempt to resolve these interpersonal conflicts, organizations and groups often-times employ both formal and informal negotiations (Bazerman et al., 2000; Lewicki et al., 1999; Walton & McKersie, 1965). Managerial accounting information might facilitate the negotiation process, enabling group members to better co-ordinate, achieve judgment consensus, and ultimately reach agreement on the issue at hand (see, e.g., Craft, 1981). For example, organizations might provide information about the abilities and resources of the negotiating parties (e.g., payoffs). It is unclear, however, whether such (or other) information facilitates or hinders the negotiation process (see, e.g., Elias, 1990; Haka et al., 2000; Kachelmeier & Towry, 2002; Luft & Libby, 1997).³⁷

³⁷For example, Kachelmeier & Towry (2002) report, in a negotiated transfer price setting, that the disclosure of relative profit information can increase fairness-based frictions and change negotiation outcomes (possibly impede negotiation agreement). Research in experimental economics also shows that bargaining outcomes can be affected by the amount of information available to each party, even when this information does not change the theoretical Nash solution. For example, in binary lottery games, Roth & Malouf (1979) and Roth & Murnighan (1982) find that the provision of relative payoff information tends to lead to outcomes resulting in a more equitable (equal) split of the monetary payoffs. Here, relative payoff information may actually facilitate negotiation agreement by reducing the

Additional issues relate to how information should be distributed among group members to maximize group decision-making effectiveness. For instance, if a group is responsible for making a pricing decision, should all members be provided with the same information set, or should some members of the group receive cost (supply) data while other members receive demand data? Research in psychology examining these information sharing and pooling issues is inconclusive about the manner in which information should be distributed (see, e.g., Cruz et al., 1997; Winqvist & Larson, 1998). More generally, research consistently shows that group decision-making processes differ from individual decision-making processes (Castellan, 1993; Hare et al., 1994). Thus, it is important for researchers in managerial accounting to examine the information needs of groups and, consequently, the information likely to result in the highest quality group judgments and decisions in the most efficient (timely) manner. To date, though, few studies have examined how variations in managerial accounting practices affect group or negotiated decision processes and outcomes and more research in this area is needed (see, e.g., Luft et al., 1998).

Managerial decisions also are multi-period in nature, and an objective of managerial accounting systems is to promote learning. In particular, Atkinson et al. (1997b, p. 4) note, "Management accounting information is one of the primary means by which operators/workers, middle managers, and executives receive feedback on their performance, enabling them to learn from the past and improve for the future." Yet, we know very little about the managerial accounting practices most likely to facilitate individual and organizational (multi-person) learning (Shields, 1997). Oftentimes, studies do not employ multiple decision periods and, in the instances where they do, researchers rarely report on the learning dynamics. However, experimental research could provide useful insights regarding how certain properties of managerial accounting information (e.g., accuracy, level of aggregation, financial vs. non-financial, qualitative vs. quantitative, internal vs. external, formal vs. informal, timeliness) combine with individual, task, and

environmental characteristics to affect the process and rate of learning. Additionally, such research could report on how these properties affect continuous improvement as well as the propensity to innovate (re-engineer).

More generally, there is a need for research in managerial accounting that employs the "expertise" paradigm (Libby, 1995; Libby & Luft, 1993). This paradigm has been heavily used in audit judgment settings to explore the relations among ability, experience, knowledge, environmental factors, and judgment performance across a wide variety of audit tasks and settings. Given the expanded role managerial accountants (and managerial accounting information) play in organizations, this framework seems particularly useful for studying judgment and decision-making issues in managerial accounting (Birnborg & Hieman-Hoffman, 1993). For example, the Institute of Management Accountants (1999) noted that managerial accountants are now becoming more actively involved in firm decision-making, frequently serving as internal consultants and business analysts, performing long-term strategic planning, process improvement, and financial and economic analysis. These tasks, as well as numerous other tasks performed by managerial accountants, are economically important to the firm, computationally and cognitively demanding, and unstructured.

In general, though, we know little about how knowledge, ability, and experience affect how and how well managerial accountants perform their various duties.³⁸ We also know little about how knowledge, ability, and experience affect how and how well managers and others within the firm use management accounting information.³⁹ Research directed toward filling these voids could provide insights on some substantive practical issues in managerial accounting regarding how, for example, the role of skill, experience, training, education, and environmental and task attributes relate to the development of expertise in managerial accounting and/or the efficacy with which management accounting information is used. To achieve these insights researchers need to systematically investigate, in a variety of decision settings, how managerial accountants' and others' experience, knowledge, and abilities combine with the firm's environment and internal information system to determine judgment performance.

(footnote continued)

multiplicity of equilibria, directing bargainers' attention to outcomes that are symmetric and focal. One difference between most transfer pricing settings and binary lottery games is the presence of an outside option (the disagreement outcome in binary lottery games is \$0), although it is unclear whether this alone affects the value of providing relative payoff information.

³⁸For some recent work on this issue see Hunton et al. (2000) and Stone et al. (2000).

³⁹For some recent work in this area, see Dearman & Shields (2001), Kadous & Sedor (2004), and Vera-Muñoz (1998).

In summary, there are a number of salient institutional features connected with the provision of managerial accounting information for decision-facilitating purposes that have been somewhat neglected, but merit further research. We suggest that experimental research in managerial accounting further explore the multi-person, multi-period, and expertise issues prevalent in numerous decision settings. Such issues are difficult to address in natural settings because the determinants of decision performance are likely to be confounded. Additionally, the dependent variable, individual or small-group decisions, and important independent variables, such as knowledge, are likely difficult to obtain or measure reliably. In this regard, the experimentalist has a clear comparative advantage by being able to isolate the key cause and effect relations.

Future research also might examine the effect that recent trends and innovations in information technology have on judgment and decision-making (see, e.g., Mauldin & Ruchala, 1999). For example, the use of sophisticated information technology can affect the manner in which cost data are classified (direct vs. indirect), the frequency and timing of feedback, and the verifiability (credibility) of information. Thus, information technology can alter the amount, type, and quality of information available to decision makers and has the potential to significantly influence judgment and decision performance.

4. Interdependence of Decision-Influencing and Decision-Facilitating Roles of Managerial Accounting Information

The decision-influencing and decision-facilitating roles of managerial accounting information are not necessarily disjoint. A single information system, managerial accounting practice, or piece of information can be used for both decision-influencing purposes and decision-facilitating purposes. Consider, for example, a manager who makes a production quantity decision in each of several periods and has diffuse priors about product demand. In this setting, realized profit information has a belief revision use and a contracting use. First, the realized profit signal allows the manager to update beliefs regarding the expected profit of future output decisions (i.e., learn about demand). Second, the realized profit signal is useful for incentive-contracting purposes because it provides information about the manager's output (action) choice. Notice, though, that the manager's propensity to use the realized profit information to achieve high performance on the task is likely to be affected by the manner in which the realized profit information is used for contracting purposes.

Analogously, standard costs are used to facilitate several decisions within the firm such as pricing and bidding, production, resource allocation, and causal diagnosis (e.g., variance investigation). Standard costs also are employed as benchmarks for performance evaluation, and firms frequently attempt to motivate employees to control costs by linking rewards to standard attainment. Thus, variance information from a firm's standard costing system may be decision-facilitating with regard to a manager's variance investigation decision, but decision-influencing with regard to the employee responsible for meeting the standard.

These examples illustrate the interdependent nature of the decision-influencing and decision-facilitating uses of managerial accounting information. Data may relate to both uses simultaneously and, as illustrated above, information that is decision-influencing for one party may be decision-facilitating for another party. More generally, questions regarding decision-making and motivation frequently are not orthogonal. Despite such interdependencies, prior experimental research tends to examine the decision-influencing and decision-facilitating uses of managerial accounting information separately (Waller, 1995). Only a few studies provide evidence regarding the interaction of managerial accounting's decision-influencing and decision-facilitating effects.

Perhaps the first study of this ilk was Magee & Dickhaut (1978) who found that individuals' use of cost variance information in their investigation decisions differed depending on the compensation plan. Other research in this area tends to be much more recent. For example, Sprinkle (2000) found that compared to flat-wage contracts, performance-based contracts are more likely to promote the most effective use of feedback information and enhance the rate of learning (improvements in performance). In a similar vein, research demonstrates that providing employees a modest financial incentive or making them more accountable for their decisions increased information cue usage, thereby mitigating information overload and increasing task performance (Libby et al., 2004; Tuttle & Burton, 1999). Finally, Drake et al. (1999) found that the benefit of providing detailed activity-based costing information was inextricably linked to the firm's incentive compensation system. Compared to a volume-based costing system, activity-based costing information led to increased profits when experimental participants worked under a group incentive (profit-sharing). When experimental participants worked under a tournament-based incentive, the opposite occurred—primarily because participants used the activity-based costing information to improve

their own performance rather than co-ordinate and improve group (firm) performance (see also Ravenscroft & Haka, 1996).

Further, research suggests that expanding employee decision-making can have opposing effects on the efficacy of incentive systems. On the one hand, Williamson (2005) found that expanding employee decision-making can enhance the ability of incentive systems based on a non-contractible performance measure to motivate the most effective use of employees' private information. On the other hand, Bloomfield & Luft (2005) found that assigning employees the responsibility for making cost management decisions impeded their ability to effectively use market feedback information when making pricing decisions with biased product cost information.

Collectively, this research provides valuable insights regarding the complementary nature of managerial accounting practices, and suggests that compensation contracts must be appropriately structured to ensure that the information provided for decision-facilitating purposes is fully utilized to enhance firm value. Research in this area could examine whether certain social motives, values, or the mere act of evaluating performance have similar complementary effects. Additional research in this area also might explore a prediction of agency theory that it is not always economically optimal to provide individuals with private decision-facilitating information because they may use it to shirk (see, e.g., Baiman & Sivaramakrishnan, 1991).

Researchers might also further explore the simultaneous use of a particular managerial accounting procedure for decision-influencing and decision-facilitating purposes. For instance, budgets are one of the most widely used tools for planning (e.g., allocating resources) and controlling (e.g., evaluating performance) operations, and organizations frequently use the same budget for both purposes (Horngren et al., 2003; Umaphy, 1987). This use of budgets for both decision-influencing and decision-facilitating purposes can create tension in the budget desired by an employee. Specifically, the use of budgets for performance-evaluation purposes provides employees with an incentive to create budgetary slack. Thus, if a manager in charge of production is evaluated based on a comparison of actual production to budgeted production, the manager has an incentive to understate production capability during budget negotiations. In contrast, when budgets also are used to allocate resources at the planning stage, employees have an incentive to eliminate slack. Managers who propose budgets with excessive slack may

appear inefficient and therefore may receive fewer resources needed for production than other managers who submit budgets with less slack. Thus, planning and control incentives can have opposite implications for employees.⁴⁰

Recent experimental research in managerial accounting examines whether the use of an individual's budget proposal to determine the allocation of scarce resources mitigates individuals' tendencies to include slack in the budget to achieve a better *ex post* performance evaluation (Fisher et al., 2002). This research finds that the use of budgets for planning and control purposes can endogenously provide countervailing incentives that reduce (eliminate) employees' misrepresentations of their private information and lead to correspondingly higher budgets with less slack, and higher performance. Such research is important because it provides insights regarding why companies rarely use "truth-inducing" compensation schemes (e.g., Weitzman, 1976) and instead evaluate managers' actual performance relative to a budget (Umaphy, 1987). Additionally, these findings demonstrate that the efficacy of managerial accounting practices such as budgeting is perhaps best understood when the two roles of managerial accounting information are considered concurrently. So, rather than being an opportunity for inserting slack, participative budgeting may indeed lead to the truthful revelation of private information, improved information sharing, and higher performance. Capital rationing inefficiencies arising from concerns related to slack creation possibly are mitigated when a single budget forms the basis for resource allocation and performance evaluation.

Finally, it is important to recognize that there oftentimes are tradeoffs between using managerial accounting systems for decision-making and motivation. Invariably, a managerial accounting system cannot be designed to perform both uses as well as a system that need only perform one use (Baiman, 1982). This suggests the need for researchers to adopt a more holistic view regarding studying, for example, the effect of alternative costing systems on individual or group behavior. Moreover, comparing the efficacy of variable costing systems and absorption costing

⁴⁰In certain situations, planning and control incentives appear to reinforce each other. For example, a manager of a cost center may pad the budget in an attempt to garner more resources. Further, by padding the budget, it likely will be easier for the manager to ensure that actual expenditures do not exceed budgeted expenditures. However, by padding the budget, it also is possible that the manager will appear to be inefficient and, as a result, receive fewer resources.

systems in facilitating pricing decisions may only shed light on one piece of the puzzle. To better understand the value of a particular costing system, it also is important to understand its ability to solve motivational problems within the firm.

For example, compared to variable costing systems, absorption (full) costing systems incorporate an opportunity cost of capacity and also better-highlight the costs associated with capacity resources. Thus, absorption costing systems may facilitate cost management decisions and the allocation of scarce resources within the firm (Zimmerman, 2003).⁴¹ On the other hand, absorption costing systems may engender a loss of control because they create incentives for managers to produce for inventory.

Similar tradeoffs exist under activity-based costing systems. Specifically, compared to single-pool systems, multiple-pool (e.g., activity-based) costing systems are posited to provide more accurate cost data and improve decision-making and cost management. However, multiple-pool costing systems may engender a significant loss of control and ability to monitor behavior since managers have considerable discretion in choosing cost drivers. Such a loss of control can occur because managers exercise greater influence over the number of pools formed and what drivers are used, thereby enabling them to manipulate their performance measures.⁴²

In summary, managerial accounting information and procedures are used for both decision-influencing purposes and decision-facilitating purposes. Further, the two roles for managerial accounting information frequently are not independent. In some instances, the two roles complement each other in the sense that the use of information for one purpose (e.g., contracting) enhances the use of information for another purpose (e.g., decision-making). In other instances, there are tradeoffs and managerial accounting procedures that might promote better decision-making but sacrifice some control (or vice-versa). In either situation, though, it is important for researchers to recognize the potential for these interactive effects

because the ultimate value of any particular managerial accounting practice depends on the array of benefits and costs vis-à-vis other procedures. Again, the experimentalist has a comparative advantage in isolating the conditions under which these benefits and costs materialize and in pinpointing the underlying cause-effect relations.

5. Conclusions

In this paper, we discuss the importance of using experimental methods in managerial accounting research. We also provide a framework for understanding and assessing the contributions of experimental research in managerial accounting. We then use this framework to organize and evaluate the existing experimental managerial accounting research. Finally, based on our survey and synthesis of the literature, we identify and discuss a number of important unanswered managerial accounting questions that may best be answered using experimental methods.

At a fundamental level, managerial accounting information serves two critical roles in an organization: decision-influencing and decision-facilitating. In its decision-influencing role, managerial accounting information is used to mitigate organizational control problems associated with moral hazard and adverse selection. In its decision-facilitating role, managerial accounting information is used to resolve *ex ante* uncertainty and improve judgment and decision performance within an organization.

Consequently, managerial accounting practices are employed to motivate employees to exert effort and undertake actions that maximize firm value. Such procedures center around monitoring and evaluating employee actions and performance as well as rewarding employees for generating more profits. Managerial accounting practices also are employed to increase employees' knowledge and, thus, their ability to make organizationally desirable judgments and decisions. Such procedures center around supplying employees with the best information for a particular decision.

Prior experimental research is quite informative regarding the extent to which managerial accounting information and practices both elicit desired actions from employees and improve judgment and decision performance. For example, prior research informs us that budgets and standards are useful in extracting private information from employees and in motivating increased levels of effort and performance. Prior research also informs us that variations in managerial accounting measurement and reporting methods (e.g., type of product costing system, frequency of

⁴¹Variable costing systems, though, may provide more relevant information for other economic decisions such as those related to a short-term special order or outsourcing. There is an ongoing debate regarding whether fixed-cost allocations, as under absorption costing, facilitate planning and pricing decisions (see, e.g., Balakrishnan & Sivaramakrishnan, 2001).

⁴²This is only a partial list of the tradeoffs. For example, Zimmerman (2003) discusses the importance of minimizing "confusion costs" that can arise from using one costing system for internal reporting and another cost system for external reporting.

feedback) can have significant effects on the quality of economic judgments and decisions. Additionally, research consistently documents that there are a number of individual, task, and environmental factors that interact with managerial accounting practices in determining their benefits for motivational and decision-making purposes.

There are, though, a number of unanswered questions in managerial accounting, providing significant opportunities for future research. In particular, there are a number of unresolved issues regarding the most effective and efficient manner in which to motivate, evaluate, and reward both individuals and workgroups (teams). Other fruitful avenues for future research relate to understanding how socially mediated rewards and ethical concerns combine with formal managerial accounting procedures to resolve control problems within an organization. On the decision-facilitating side, it is important for research to examine whether and how recent trends and innovations in performance measurement actually affect the manner in which performance is evaluated and assessed. Additionally, much research is needed regarding how the multi-person, multi-period, and expertise issues that underlie many managerial decisions affect the provision and use of information for belief revision purposes. Finally, managerial accounting procedures and information frequently are used for both decision-influencing purposes and decision-facilitating purposes. In many instances the two uses of managerial accounting information are not independent, and we suggest several possibilities for investigating their interactive effects.

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