

Moderating Role of Management Accounting Systems on Group Diversity and Outcome Relationship

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Prior research in management accounting asserts that management accounting systems (hereafter MAS) provide information that improves the quality of managerial decisions in organizations. However, this assertion has yet to be fully investigated empirically in groups where the potential for group conflict is high due to the presence of faultlines. Faultlines are potential dividing lines along key attributes of group members and are major sources of group conflict. This paper reports the result of an experiment that examines how MAS information characteristic of scope affects group processes and outcomes in heterogeneous groups where group members have incentive to form conflicting subgroups. The results support the overall hypothesis that management accounting systems information characteristic of scope has significant effect on mitigating the negative effects of faultline-induced conflict on group satisfaction and perceptions of decision quality. This study contributes to the growing search in the accounting literature for improved understanding of the causal relationships between MAS and other organizational variables. Further, this study contributes to the diversity faultline theories by incorporating the role of MAS information scope in the faultline, process, and outcomes theoretical model.

Field of Research: Accounting, Business Administration, and Management

Introduction

Prior research in management accounting asserts that management accounting systems (MAS) provide information that improves the quality of managerial decisions in organizations (Cheng et al., 2003; Chong and Eggleton, 2003; Sprinkle, 2003). Several management accounting studies have investigated this assertion at the individual level using a contingency approach (e.g. Chenhall and Morris, 1986; Chong and Eggleton, 2003). However, there is little empirical evidence to support this argument as it relates to decision-making in groups (Sprinkle, 2003). It is important to study this assertion at the group level because decision-making at the individual level differs from decision-making at the group level (Sprinkle, 2003).

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The key difference between individual decision and group decision is that groups are sometimes characterized by conflict. Notably, the psychology and organizational behavior literatures suggest that conflict in organizational groups can lead to losses in group processes and outcomes (De Dreu and Weingart, 2003; Jehn 1995; Lau and Murnighan, 2005; van Knippenberg et al., 2004). On the other hand, management accounting research asserts that MAS information characteristic of scope could be used to achieve judgment consensus in group decision-making (Sprinkle, 2003). However, researchers have not adequately investigated these assertions in groups where the potential for group conflict is high, such as when groups are compositionally diverse. Compositionally diverse refers to the degree to which there are objective or subjective differences between people within the group (van Knippenberg and Schippers 2007). Only a relatively few studies in accounting have examined the effect of MAS on conflict in decision-making groups. Hence, a contribution of this study is to examine the validity of this argument in decision-making groups that are prone to conflict.

Prior studies have used the faultline theory to explain the negative effects of conflict (e.g. Lau and Murnighan, 1998). Lau and Murnighan 1998 argue that faultlines emerge when different dimensions of diversity align to create conflicting subgroups that can disrupt group processes resulting in poor outcomes. Following this argument, other studies have documented that faultlines create between-subgroup conflicts, dissatisfaction among group members, and low quality decisions in compositionally diverse groups (Lau and Murnighan, 2005; Li and Hambrick, 2005; Homan et al., 2007). Consequently, researchers are redirecting their effort to finding ways of mitigating the negative effects of faultlines in organizational groups (e.g. Homan et. al., 2007; Gratton et al., 2007). Furthermore, the literature calls for research that pays more theoretical and empirical attention to information in decision-making processes presumed to underlie the effects of diversity on group performance (van Knippenberg and Schippers, 2007). This study contributes to this effort by considering how the MAS information structure (e.g. as in scope of MAS information) could be used to mitigate the negative effects of faultlines in decision-making groups. The primary research question addressed by this study is whether MAS information reduces conflict in decision making groups.

To investigate the research question, this study develops and tests a theoretical framework that considers how MAS information that varies in scope interacts with faultline in heterogeneous decision making groups. This research framework is based on the argument that MAS will interact with faultline such that when compared with narrow scope MAS (NSM), broad scope MAS (BSM) will introduce greater structure in the group processes that will mitigate the negative effects of faultline. The thesis of the proposed framework relies on the contingency theory of management accounting, which argues that different MAS information will have different effects on organizational decision making due to differences in their information characteristics of scope (Chenhall and Morris, 1986; Chong, 1998; Naranjo Gil and Hartmann, 2007; Reid and Smith, 2000; Waterhouse and Tiessen, 1978).

The outcome of this study will contribute to the growing search in the accounting literature for improved understanding of the causal relationships between MAS and other variables in the structure of organizations (e.g. Chenhall, 2003; Naranjo-Gil and Hartmann, 2007; Rowe et al., 2008; Towry, 2003). Specifically, this study contributes to theory by considering the role of MAS in decision-making processes and outcomes in groups that develop conflicting subgroups as a result of the effect of faultlines. In addition, this study responds to management accounting research that calls for more research using a contingency approach that is concerned with the effect of MAS on other organizational factors (Chenhall and Morris, 1986). Furthermore, this study extends group decision and diversity theory by incorporating the role of organizational information structure in the form of MAS in the group faultline and outcomes relationship model.

On a practical level, the result of this study will benefit organizations implementing new MAS (such as the value based management, activity based costing, and the balanced score card approaches) in its various forms, in understanding when a new MAS will or will not provide significant incremental benefits. It will also provide empirical evidence on the extent to which organizations can extend the new MAS approaches to decision making at the unit level to align performance measurement across different levels of management. The remainder of this paper is organized as follows. The following section provides a theoretical background and motivation for the hypotheses. The next section provides a description of the methodology, followed by a discussion of the results. The final section gives a summary and conclusion.

Theory and Hypotheses

This section develops the main hypotheses of this study, which relates to the conceptual relationships between MAS, faultlines, and group outcomes. The hypotheses are based on the research framework and theoretical model. Notably, this study relies on MAS research, group diversity research, and faultline theories, to develop and explore a research model that extends our understanding of how characteristics of MAS could mitigate the negative effects of diversity.

Management accounting literature asserts that the purpose of MAS is to provide information, in order to facilitate decision-making consistent with an organization's strategic goals (Anthony and Govindarajan, 2001; Cheng et al., 2003; Chong and Eggleton, 2003). Sprinkle (2003) suggests that management accounting information is supposed to facilitate the quality of managerial decisions, and consensus in decision-making groups. Prior research, using a contingency approach, provide evidence that show how MAS facilitate managerial decision-making (e.g. Chenhall, 2003; Chenhall and Morris, 1986; Chong and Eggleton, 2003; Mia and Chenhall, 1994; Naranjo Gil and Hartmann, 2007). However, as Sprinkle (2003, 306) pointed out:

“..... research in managerial accounting has not fully explored the multiperson and multiperiod nature characterizing many managerial accounting settings.

several interesting issues regarding the decision-facilitating use of managerial accounting information in these settings warrant exploration.”

The above position indicates that decision-making at the group level differs significantly from decision-making at the individual level. One of the differences identified in the literature is the likelihood of conflict in groups. Research in psychology and management indicate that conflict in decision making groups may have negative effects on group processes and decision quality (Jehn, 1997). Thus, it is important to examine the assertion that MAS improves decision quality in group (multiperson) settings (Sprinkle, 2003). Before exploring how MAS can facilitate group decision-making, it is important to discuss the dynamics of group level decision-making that make it unique and different from individual level decision-making.

Decision-making groups in organizations are fundamental tools in the organizational structure necessary for achieving strategic objectives (Cohen and Bailey, 1997; van Knippenberg et al., 2004). At the same time, organizational groups are becoming more diverse because of changes in the compositional diversity of organizations (Lau and Murnighan, 2005; Towry, 2003; van Knippenberg et al., 2004). Furthermore, the literature suggests that diverse groups may be more advantageous for decision-making tasks (Harrison et al., 2002; Jackson et al., 2003; Lau and Murnighan, 2005; Naranjo-Gil and Hartmann, 2007; Van Knippenberg et al., 2004; William and O’Reilly, 1998). Thus, diversity in decision-making groups should help in problem solving and decision making through collaborative work that involves the exchange of knowledge and ideas across the diverse groups of individuals. Unfortunately, reviews of prior psychology and management studies show that, contrary to this expectation, diversity can also have negative effects on group processes and outcomes through conflicts (Ancona and Caldwell, 1992; Jehn, 1997; Lau and Murnighan 1998; 2005; Thatcher et al., 2003; van Knippenberg and Schippers, 2007; Williams and O’Reilly, 1998).

Prior research uses the alignment theory to explain the inconsistency in result noted above. The alignment theory argues that members of diverse groups could form conflicting subgroups based on the alignment of group members attributes (De Dreu and Weingart, 2003; Jehn and Chatman, 2000; Lau and Murnighan 1998, 2005). Lau and Murnighan (1998) explain this phenomenon in terms of faultline. The present study will adopt the alignment theory as proposed by Lau and Murnighan (1998).

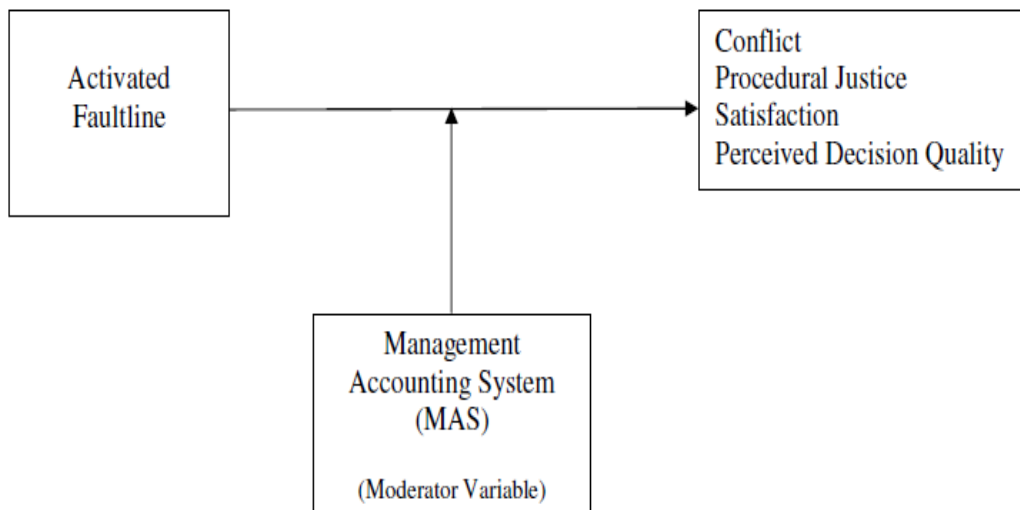
Faultlines occur when group members align along two or more task relevant attributes creating the potential for a group to split into homogeneous sub-groups (Lau and Murnighan, 1998; Thatcher et al., 2003). Lau and Murnighan (1998) argue that faultlines can form around combinations of attributes, including demographic, functional affiliation, ideology, skills, personality, and values. Harrison et al. (2002) extend the faultline theory to show that salient psychological and non-demographic diversity attributes have effects identical to demographic differences.

Figure 1 – Theoretical Models

Panel A: Basic Faultline Model



Panel B: Faultline Model with MAS Moderator



Note: An activated faultline is one in which either the task or context triggers groups to splinter along a faultline into distinct subgroups. Without a trigger, the faultline has no effect on satisfaction or perceived decision quality. The management accounting system is hypothesized to alter the effect of the faultline on satisfaction and perceived decision.

As indicated in figure 1, once a faultline becomes active, the dynamics of decision-making in a group changes, leading to changes in group processes and group outcomes (Lau and Murnighan, 2005; Thatcher et al., 2003). Panel A of Figure 1 presents a basic model representing existing faultline theory. This model assumes that group heterogeneity together with a trigger produce an active faultline that increases the likelihood of between-subgroup conflict, procedural problems, dissatisfaction, and perceptions of poor decision quality related to the overall group.

In summary, conflict affects group processes and outcomes by accentuating subgroup boundaries, and increasing biases (Lau and Murnighan, 2005). Consistent with prior literature, the preceding discussion suggests that conflicts between subgroups created by faultlines explain the negative relationships between diversity and individual affective outcomes such as satisfaction with the group, and group consensus (De Dreu and Weingart, 2003; Jehn and Chatman, 2000; Lau and Murnighan 1998, 2005).

In order to ensure that my approach provides results that are consistent with existing studies, I first propose the following hypothesis:

H1: Compared to groups with inactive faultlines, group members with active faultlines will experience:

- a. more conflict***
- b. lower levels of procedural justice***
- c. less satisfaction***
- d. lower perceived decision quality***

Hitherto, accounting studies using a contingency approach have suggested that the scope of MAS information is a significant characteristic of MAS that can facilitate decision making in groups (Bouwens and Abernethy, 2000; Sprinkle, 2003). These studies argue that broad scope MAS can enhance decision-making by providing more information that achieves reduction in ex-ante uncertainty, belief revision, and helps with problem solving (Sprinkle, 2003). Broad scope MAS can be a more effective tool in providing information that is useful in predicting the possible consequences of alternative actions and in structuring the description of those consequences. This argument implies that broad scope MAS can provide information that adds structure to the decision task, and can make it easy for groups to reach a consensus. On the other hand MAS researchers argue that narrow scope MAS or the traditional MAS is based on “single” financial measures that may be too late, too aggregated and too one dimensional to be useful because they are narrow in focus, historical in nature and incomplete (Ittner and Larcker, 1998; Ittner et al 2003). Thus the use of broad scope MAS, is supposed to provide organizations with an alternative information structure that overcomes the deficiencies associated with the traditional MAS.

Following this argument, and consistent with prior studies that adopt a contingency approach to the study of MAS (e.g. Bouwens and Abernethy 2000; Chenhall 2003; Reid and Smith 2000; Sprinkle 2003), H2 proposes the potential moderating role of MAS in the context of decision-making in groups. Panel B of Figure 1 graphically introduces the notion that MAS will moderate the differences predicted in H1 for group decision making processes and outcome.

H2: The management accounting system (MAS) will interact with faultline condition such that groups using a BSM report when compared to groups using a NSM report will perceive smaller differences between faultline conditions for:

- a. conflict**
- b. levels of procedural justice**
- c. satisfaction**
- d. decision quality**

Methodology and Research Design

The experiment consists of a 2 X 2 between-group factorial design with groups of four participants each nested within the treatment conditions. The experiment exposed participants to a group decision-making context in which faultlines are either active or inactive and the scope of the management accounting system information is either broad scope (BSM) or narrow scope (NSM) as described earlier.

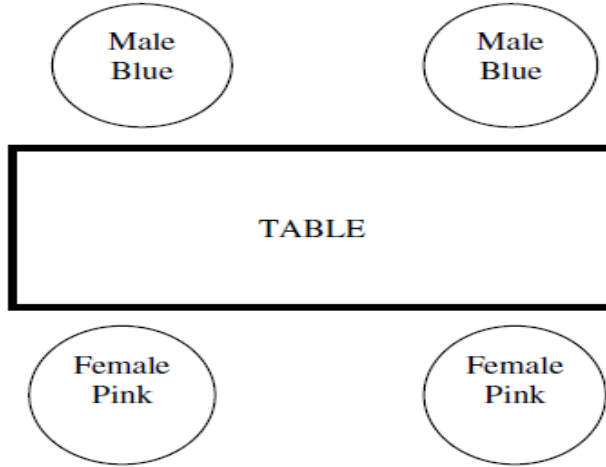
All groups, regardless of treatment condition, are heterogeneous and have potential for faultlines. In the active faultline condition, the colleges represented by the participants (Blue and Pink) are differentially affected by the project selection task. By co-manipulating gender and physical seating arrangement along with the university college affiliation, the faultline manipulation is stronger (see Panel A of Figure 2). Research shows that arranging group member attributes in this way results in high within-subgroup similarity and high between-subgroup differences, thus creating strong faultline potential (Homan et al., 2007; Towry, 2003; van Knippenberg et al., 2004). The faultline manipulation is consistent with Towry's (2003) manipulation of team-identity and self-categorization using colors.

Participants in the inactive-faultline group are assigned to university units not identified in the budgeting problem i.e. Red and Green. In addition, the inactive-faultline groups have mixed gender within a college arranged in a crossed pattern with one male and one female of different units seated together (see Panel B of Figure 2). This provides a control group for testing the interactive effect of MAS on group conflict.

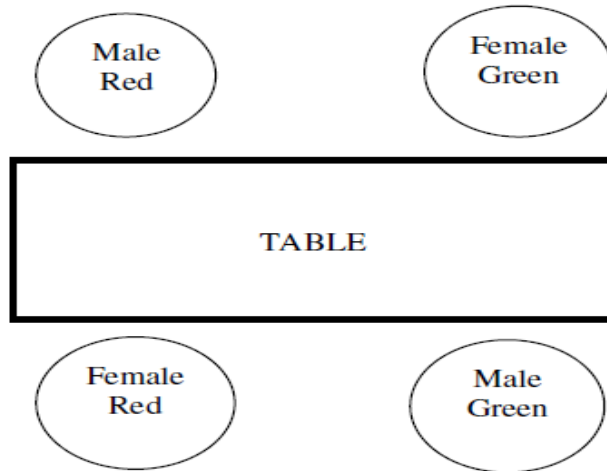
Consistent with Naranjo-Gil and Hartmann (2007), the experimental task manipulates two MAS report formats (BSM versus NSM) that vary in their scope and degree of transparency with respect to the project selection task. While the NSM report provides information that relates only to the cost components of the projects, the BSM report provides information that relates to both cost and revenue components of the projects.

Figure 2 - Faultline Manipulation and Seating Chart

Panel A: Active Faultline Groups



Panel B: Inactive Faultline Groups



All dependent measures for this study are perceptions of individual participants and are elicited using multiple questions adapted from the existing literature where possible (see Appendix II). Individual questions are measured on five-point Likert scales anchored on 1 = completely disagree to 5 = completely agree. The mean response across the multiple questions for each measure constitutes its value for the analysis. To measure conflict, I use a modified version of the multi-item intra-group conflict scale developed by Jehn (1995). The conflict questionnaire includes those items that ask for individual participants' perceptions of the level of disagreement between group members.

The satisfaction measure is taken from Keyton's (1991) global satisfaction indices, and Wall and Nolan's (1986) satisfaction questionnaires. Only those items suited for ad-hoc, one-time groups are included (e.g., "Everyone attends each group meeting" is dropped). In addition, I include a global question, "I am satisfied with the way my group carried out its decision," to assess research participants' overall satisfaction with their group interaction.

Perceived decision quality is measured with a multi-item questionnaire using the following questions: "I am confident that the final decision that my committee came up with is the best decision," "I feel that the quality of my committee's decision would have positive effects on State University," and "Overall, it is my opinion that my committee's final decision is of high quality."

To assess participants' perception regarding procedural justice, the members in each group responded to five questions focusing on the overall fairness of the procedures and the information provided by the MAS. These items are as follows: "The procedures used by the State University Budget Committee allow all sides affected by the decision to be represented," and "The procedures used by the State University Budget Committee in arriving at the decision are fair."

Undergraduate business majors at a large southeastern university, enrolled in a managerial accounting course, participated in the study during a regularly scheduled class period. The students received five course points for participating. Prior to this, the instructors covered budgets, responsibility accounting, and financial statements in class. Overall 98% of the students participated in the experiment. A total of 34 groups with 136 participants (68 female and 68 male) are included in the analysis. The mean age of the participants is 20 years.

The experiment consists of three phases. In phase I, individual participants have 15 minutes to read over the case materials and to rank the projects by selecting one of six possible rank orders with the assumption that only the two highest ranked projects would be funded. This ensures that every participant is familiar with the task before entering the group phase of the study. In phase II, the participants are placed in groups where they interact and come to a group decision about how to rank the projects. This phase lasted a maximum of 45 minutes and all groups reached a decision within this time. In Phase III, the groups disband and participants have 15 minutes to provide individual responses on the conflict, satisfaction and decision quality dependent measures and to complete the post experiment questionnaire (i.e. manipulation checks and demographic information).

Results and Discussion of Findings

Confirmatory factor analysis (CFA) is used to examine the validity of the questionnaire items used to test the hypotheses using a four-factor model that forced each of the questionnaire items to load only on its intended factor. The fit statistics, root mean square error of approximation (RMSEA) of 0.088, comparative fit index (CFI) of 0.93, standardized root mean square residual (SRMR) of 0.098, and Chi-square (χ^2) of

419.74 ($df = 205$, $p < 0.00$) suggest a good fit and indicates good reliability and discriminant validity between the constructs. Table 1 presents the descriptive statistics, correlations, and reliability coefficients for these constructs.

<u>Variable</u>	<u>Means</u>	<u>SD</u>	<u>α</u>	<u>MAS</u>	<u>FL</u>	<u>DECQLT</u>	<u>CONFLT</u>	<u>SAT</u>
<i>Manipulated Variables</i>								
MAS	0.0	1.00	-	1				
FL	0.06	1.00	-	0.00	1			
<i>Measured Variables</i>								
DECQLT	0.54	0.32	0.90	0.41**	-0.18*	1		
CONFLT	2.69	0.90	0.88	-0.20*	0.33**	-0.23**	1	
SAT	4.13	0.71	0.92	0.37**	-0.38**	0.53**	-0.15	1
PJ	3.97	0.59	0.82	0.24**	0.05	0.25**	-0.10	0.24**

* $p < 0.05$. ** $p < 0.01$.

Note: N = 136. SD = standard deviations; α = coefficient alpha; DECQLT = decision quality measured on [1 – 5] scale; CONFLT = conflict measured on [1-5] scale; SAT = satisfaction measured on [1 – 5] scale; PJ = procedural justice measured on [1 – 5] scale; MAS = management accounting system [-1, 1]; FL = faultline [-1, 1].

To further ascertain the inter-item reliability of the scales for these four factors, the study subjected the individual factors to a test of reliability using coefficient alphas. The results indicate a significant alpha for Satisfaction $\alpha = 0.92$; Decision Quality $\alpha = 0.90$; Procedural Justice $\alpha = 0.82$; and Conflict $\alpha = 0.88$. Thus, the measurement scales exhibit acceptable inter-item reliability.

In this study, the dependent variables were measured at the individual level, but because the participants were embedded in four-person committees, their responses may not be independent within group (Bliese 2000; Bliese and Ployhart 2002; Kashy and Kenny 2000). I compute intra-class correlations (ICC) to assess the proportion of variance in the dependent variables that can be attributed to committee membership. Results suggest that a substantial proportion of the total variance in satisfaction (ICC = 0.25) and perceived decision quality (ICC = 0.31) is explained by group membership. Thus, tests of hypotheses include group as a nested factor within each experimental condition.

H1 predicts that active faultlines lead to more (a) conflict, (b) lower procedural justice, (c) less satisfaction, and (d) lower perceived decision quality. Table 2 shows means (standard deviations) for the measured variables by treatment condition and Table 3

shows an omnibus test of H1 using MANOVA. As shown in Table 3, the effect of faultline is highly significant ($F < 0.0001$) in support of H1.

<u>Variable</u>	<u>Inactive Faultline</u>			<u>Active Faultline</u>		
	<u>NSM</u> <u>n=32</u>	<u>BSM</u> <u>n=32</u>	<u>Mean</u> <u>N=64</u>	<u>NSM</u> <u>N=36</u>	<u>BSM</u> <u>N=36</u>	<u>Mean</u> <u>N=72</u>
Conflict	2.44 (0.91)	2.31 (0.59)	2.38 (0.77)	3.26 (0.59)	2.68 (1.09)	2.97 (0.92)
Procedural Justice	3.72 (0.53)	4.17 (0.52)	3.94 (0.57)	3.94 (0.59)	4.07 (0.62)	4.00 (0.60)
Satisfaction	4.31 (0.64)	4.52 (0.63)	4.41 (0.64)	3.47 (0.50)	4.28 (0.57)	3.87 (0.67)
Decision Quality	4.21 (0.63)	4.58 (0.39)	4.40 (0.55)	3.83 (0.66)	4.51 (0.54)	4.17 (0.69)

Note: NSM = Narrow Scope MAS Information; BSM = Broad Scope MAS Information

<u>Variable</u>	<u>Num</u> <u>df</u>	<u>Den</u> <u>df</u>	<u>F</u>	<u>p > F</u>
MAS	5	98	12.97	< 0.0001
Faultline	5	98	20.08	< 0.0001
Group (MAS * Faultline)	155	490.09	2.83	< 0.0001

Note: MAS = management accounting system

Within the active faultline condition, mean Conflict is higher (2.97) than in the inactive faultline condition (2.38) as predicted. Also as predicted, the means for Satisfaction and Decision Quality (3.87 and 4.17) are lower than in the inactive faultline condition (4.41 and 4.40). Table 4 reports the results of univariate ANOVAs. Consistent with H1, the effect of faultline is significant for Conflict, Satisfaction, and perceived Decision Quality

(all p -values < 0.001). The effect of Faultline on Procedural Justice is not significant ($p = 0.496$).

Table 4
Univariate ANOVAs

Variable	df	Conflict		Procedural Justice		Satisfaction		Decision Quality	
		F	$p > F$	F	$p > F$	F	$p > F$	F	$p > F$
MAS	1	11.40	0.0010	11.10	0.0012	36.24	< 0.0001	41.67	< 0.0001
Faultline	1	29.85	< 0.0001	0.47	0.4964	37.75	< 0.0001	7.56	0.0071
Group (MAS * FL)	31	4.21	< 0.0001	2.51	0.0003	2.69	< 0.0001	2.94	< 0.0001
R-Square		0.627		0.467		0.607		0.579	

Note: MAS = management accounting system; FL = faultline

H2 predicts that the effects observed in relation to H1 will be smaller when the MAS is BSM than when it is NSM. This prediction is supported by the significant interaction ($F = 2.83$, $p < 0.0001$) between MAS and Faultline in the MANOVA as shown in Table 3 and by the significant interactions (all p -values < 0.001) in the univariate ANOVAs shown in Table 4.

Summary and Conclusions

This study proposed and tested the proposition that the management accounting system can play an important role in determining how group members view the outcome of group decision-making when active faultlines are present. Specifically, this study tests whether the scope of MAS information changes the dysfunctional effects of faultlines on the decision-making behaviors of heterogeneous groups. The findings of this study support prior research that show direct negative effects of faultline on group processes and outcomes in heterogeneous groups. I obtain strong evidence that the activation of faultlines in groups creates the same negative dynamics and outcomes previously observed.

The central finding in this study is that MAS can reduce the negative effects of faultlines. When members of an active-faultline group are provided information using a more transparent BSM approach, they transcend the effects of faultline, conflict, and subgroup boundaries. Decision-making groups arrive at decisions that members believe are of higher quality. When the faultline remains inactive, the type of MAS does not matter. In certain contexts, MAS can link benefits to costs and open to view the effects on all entities so that members feel they are treated more fairly, greater satisfaction, and

more support for the group outcome. This result is consistent with a contingency approach that predicts the effects of MAS differ between contexts.

This study contributes to both theory and practice. By introducing MAS (a form of structured information) into the decision-making model of groups, the study expands our understanding of the relationships between MAS and other organizational factors. This study extends the literature on group decision-making, the literature on group conflict, and faultline theory by incorporating the MAS in the discussion of how to mitigate faultline effects in decision-making groups (van Knippenberg et al. 2004). Further, it contributes to the ongoing discussion of the multi-person nature of most management accounting settings and their implication for effective decision-making in different organizational contexts (Sprinkle, 2003).

A number of factors limit the generalizability of this study. First the results of this study are limited to conflict, satisfaction, procedural justice and beliefs about decision quality in small groups. Other group process and outcome variables could provide results that may differ from those observed here. Second, the use of experimental methods has certain well-known limitations which may include assumptions and control conditions that limit the results. Although student subjects are used in this study (because of the difficulties involved in bringing together large numbers of professionals into a group setting), the experiment was carefully designed to use a task that would be somewhat familiar and for which they had meaningful training. It is my believe that individuals in field settings often have clearly defined roles and strong preexisting ideologies that likely exceed those created within the reasonably short span of a laboratory experiment. Hence, it is likely that faultlines effects and the benefits from MAS information are stronger in the field. I hope this approach will be useful to others in investigating these topics.

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