Budget-Related Behavior: Resolving A Portion Of The Performance Puzzle In The Management Accounting System

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Abstract

An integral component of the management accounting system in large organizations is the budgeting system. Multiple budget-related behaviors (BRBs) characterize what managers do in overseeing the work task environment of various departmental units to achieve performance goals. However, just as a four-wheel drive vehicle comes as a complete system, not all of its operating components are activated simultaneously under all conditions. In the BRB/performance linkage, uncertainties in the work task environment critically determine which BRBs must be emphasized or de-emphasized for optimal performance. This paper uses a structural equation approach to model this uncertainty contingency and ferret-out the appropriate set of significant BRBs. This identification, in turn, helps to resolve part of the performance puzzle.

Introduction

A n important component of the accounting information system (AIS) is the management accounting system (MAS) which makes information available to managers, assisting them in decisions such as planning, organizing, controlling and coordinating activities within their jurisdiction. An integral part of these activities involves the budgeting process. While it is assumed that managers will make full use of all budgetary information did not pay much attention to the output from the

supplied by the MAS, in reality, this outcome may not materialize. Mintzberg [1972] and Preston [1986], for instance, found that managers accounting information system. What factors, then, influence the use or non-use of budgetary accounting data by managers?

Initial research into this question focused on budget-related behavior (BRB), first identified by Decoster and Fertakis (1968) and, subsequently, used and modified by Swierenga and Moncur (1974), Bruns and Waterhouse (1975), Merchant (1981,1984) and Williams et al. (1990). Examples include the handling of

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budget variances, managers' ability to meet the budget, incorporating their suggestions in the new budget, and the flexibility of the budget in dealing with incentives. According to Briers and Hirst (1990), the relationship between the use of information provided by the AIS, or MAS, and expected outcomes from managers who use or do not use the information is an important area of behavioral accounting research.

The central issue for an organization is to emphasize or de-emphasize particular BRBs to enhance departmental goals. One extreme is to design systems that are situation-specific and concentrate on individual managers, thus providing the exact information required. Unfortunately, this is not cost-effective from a practical perspective. However, understanding a common set of BRBs across contingent work environments in the budgeting process can be an effective means to better performance. Misunderstanding this relationship though may lead to suboptimal resource allocation and decision making and, thus, lower performance.

This paper examines a set of BRBs under several uncertainty contexts facing work units in large organizations and the corresponding effect on departmental performance. Contingency theory overarches the essential approach of this research. It permits an assessment of different organizational factors that influence the relationship between the budgeting process and performance. In particular, task uncertainty (Perrow 1967; 1970) and departmental interdependence (Thompson 1967; 1973) are two significant contextual factors within large organizations that affect this relationship. This means that BRBs vary in the degree to which they are used to achieve performance, depending on whether the presence of the contextual factors is strong or weak. Moreover, incorrect emphasis on the BRBs in a given context could lead to suboptimal performance. Thus, a proper "fit" is crucial.

In order to deal with the complexity inherent in

large organizations, this paper adopts a systems definition of fit and deals with issues of equifinality in the presence of several contextual contingencies, a situation which is characteristic of organizational life (Hopwood, 1983). The systems approach provides a theory for guiding this empirical investigation and, yet, simultaneously provides a deeper understanding of the complexity of the issues involved in the process of MAS design. Managers stand to benefit from the results since the annual budgeting process is ubiquitous in large organizations and it is performance focused.

Background

Contingency Theory

Underlying the contingency concept is the fit between AIS design and organizational context (Van de Ven and Drazin, 1985) to yield optimum organization performance. Various types of fit have been adopted in previous accounting research. These include the selection approach, interaction approach and systems approach. The selection approach assumes that fit is prerequisite for survival but does not explicitly model performance (Khandwalla, 1972; Bruns and Waterhouse, 1975; Merchant, 1981, 1984; and Macintosh and Daft, 1987).

An interaction approach to fit assumes that context and AIS structure interact to affect performance. However, this model of fit explicitly tries to model performance that the selection model assumed implicitly (Brownell, 1981, 1983; Kim, 1988; Abernethy and Stoelwinder, 1991). These studies examined particular forms of this interaction and its relationship to performance.

To avoid a reductionist approach (Van de Ven and Drazin, 1985), the systems approach considers multiple organizational contexts, AIS structural alternatives and performance outcomes simultaneously. Recognizing that many equally effective solutions may emerge from a complex

setting is known as equifinality. Williams et.al. (1990) attempt to address these system issues, particularly with respect to BRBs, arising from inherent organizational complexity.

Budgeting and Performance

The budgeting process is intended to promote behavior which is consistent with organizational goals (Flamholtz, 1983). However, empirical research has produced opposite findings. For example, Milani (1975) theorized that participation would increase job satisfaction, which, in turn, should improve performance. However, the empirical results were inconsistent. Kenis (1979) attempted to identify factors that influenced managers' participation in budget preparation and influenced the goals of their areas of responsibility. He found an inverse relationship between participation and performance.

There is general agreement in the literature that budget participation may have a positive impact on a manager's performance and there has been a concerted effort to identify the variables explaining this relationship. Brownell (1981) examined internal versus external locus of control and, in his 1982 study, identified four variables (i.e., cultural, organizational, interpersonal, and individual) consistently emerging in other non-accounting research that may impact participation and performance. Brownell (1982) suggested that no statement should be made about this relationship simply because the research findings lack consistency. One aspect of budgeting that has been studied extensively in an interaction context is participation. Brownell and Dunk (1991) examined several dimensions of task uncertainty interacting with participative budgeting to enhance performance. Dunk (1993) examined the interaction effect of job-related tension and participative budgeting on performance and used the same model (Dunk, 1995) to examine information asymmetry in place of job-related tension. Other studies employing this ap

proach to analyze participative budgeting are featured in Shields and Shields (1998).

Leadership styles and authoritarianism were examined by Brownell (1983) and Chenhall and Morris (1986), respectively. These results indicated that certain styles of these attributes have an effect on the participation/performance relationship. Other studies by Brownell (1985) and Govindarajan (1986) examined the effect of environmental uncertainty on participation and performance. Each study concluded that participation has an impact on performance only when uncertainty is high. Choo and Tan (1997) used a structural equation model to evaluate the impact of disagreement in budgetary performance evaluation style on the subordinate's job-related tension, job satisfaction and performance. No direct relationship was found between evaluation style and performance; instead an inverse effect was found for the two moderating variables.

Budgeting is an integral part of the formal framework of controls in the MAS. It should promote behavior emphasizing the accomplishment of plans that is participative in nature and operates via formal communication patterns (Bruns and Waterhouse, 1975; Merchant, 1981). In fact, the involvement of managers in the budget process overarches much of the research on budgeting (Kren, 1992).

The close linkage between the AIS and MAS, and the budgeting system featuring planning, measuring activities and controlling variances provides an opportunity to analyze managerial actions and interactions emanating from decisions in the budget process. The preponderance of previous research in this area has tended to isolate one BRB and examine its effects on performance in multiple settings, also considered individually. By contrast, this paper examines a set of BRBs in multiple contextual settings simultaneously in terms of the outcome effect on performance.

Method*Hypotheses*

As the literature reveals, uncertainty is a critical contextual variable moderating the relationship between BRBs and performance. One important uncertainty variable is task uncertainty. This is a measure of internal sub-unit demands. Perrow (1967) identified two dimensions of this variable. One is task variability, defined as a function of the frequency of unexpected or novel events in the sub-unit task environment, while the other is task analyzability which concerns how individuals respond to problems that arise. These two dimensions can be combined to form an overall variable called task uncertainty. Collectively, Perrow's work leads to the following hypotheses involving BRBs and performance:

H1a: Under task analyzability conditions, BRBs are important in attaining higher performance.

H1b: High task analyzability versus low task analyzability conditions is associated with different sub-sets of BRB variables.

H2a: Under task variability conditions, BRBs are important in attaining higher performance.

H2b: High task variability versus low task variability conditions is associated with different sub-sets of BRB variables.

H3a: Under task uncertainty conditions, BRBs are important in attaining higher performance.

H3b: High task uncertainty versus low task uncertainty conditions is associated with different sub-sets of BRB variables.

A second major uncertainty dimension deals with task interdependence, which is a measure of external sub-unit demands. Thompson (1967) defined three types of task interde-

pendence reflecting the extent to which departments depend on each other, exchange information and share resources in an effort to accomplish objectives (Van de Van et al., 1974). In aggregate, task interdependence can be partitioned into a high context and a low context, each placing different set of demands on the BRB/performance relationship. Thus, a fourth set of hypotheses can be expressed as follows:

H4a: Under conditions of task interdependence, BRBs are important in attaining higher performance.

H4b: High task interdependence versus low task interdependence conditions is associated with different sub-sets of BRB variables.

In interpreting the above hypotheses it is important to differentiate and underscore three caveats. First, the expression "different" BRB variables means that each one in the set is not equally important in the relationship with performance. Secondly, the important variables under each of the four contingencies are not necessarily identical. Finally, in all cases the central concept of "fit" must not be overlooked, meaning that any deviation from the important variables in each contextual situation implies lower performance.

Sample

Companies from the Canadian public utilities industry were used in this study because they tend to be large decentralized organizations with a large span of operating units. In addition, they manifest formal budgeting systems and use departmental evaluation as part of their AIS design. After initial contact with chief financial officers, six public utilities agreed to participate. There were three criteria for sub-unit selection. First, sub-unit heads had active responsibility in negotiating for budget resources. Secondly, the sub-unit size was between 20 and 80 full-time employees. Thirdly, managers of sub-units needed at least one year of experience dealing

with their company budgets.

An initial distribution of 297 questionnaires was administered to employees in these companies with a follow-up by letter approximately one month later. A final sample of 263 responsesⁱ yielded a response rate of 88%. Respondents averaged 16.3 years in their respective organizations and had occupied their current positions for an average of 3.8 years.

Measures

A two-step approach was utilized to measure the BRB variables. First, a confirmatory measurement model was used to consider the relationships between the observed variables and their underlying constructs. Secondly, a confirmatory structural model that specifies the relationships between the constructs was used. Anderson and Gerbing (1988) advocate this approach because it offers the advantage of using a measurement model to assess construct discriminant and convergent validity. The structural model then may be considered a confirmatory assessment of the construct relationships as suggested from the theory being tested.

Constructs developed for this study were tested for discriminant validity (i.e., an indication of the extent to which a particular construct is different from other constructs), convergent validity (i.e., the degree of agreement among the items measuring the construct) and internal consistency (i.e., similar to Cronbach's alpha).

(i) BRB Variables

BRBs were measured using the questionnaire developed by Decoster and Fertakis (1968) and, subsequently, used and modified by Swierenga and Moncur (1974), Bruns and Waterhouse (1975), Merchant (1981,1984) and Williams et al. (1990, 1995). Department managers were asked to rate how often 44 budget-related activitiesⁱⁱ occur on a scale from one (to a very little extent) to five (to a very great extent).

Budgeting was defined as a planning and control exercise for the fiscal period dealing with the allocation and use of resources.

In the first stage, a confirmatory factor analysis (CFA) was used to develop the BRBs since a detailed and identified initial model was available (Bollen, 1989). The initial model chosen for this study was the system of ten BRBs identified by Williams et al. (1990). The BRB dimensions identified in their model conform closely to those of previous studies. Beginning with the initial ten variables, six BRBs were derived for this study. Since the lowest operating level in the organizations was the focus, two modifications were made to the set of BRB variables before the CFA was applied. The "budget reaction" variable was not included because managers who stop activities or charge activities to other accounts due to budget constraints are not exhibiting valid behaviors found in a formal control system. Also, the "interaction with subordinates" variable was not included because it is considered to be of diminished importance at lower levels of the organization (Williams and Liu, 1995). Interviews with contacts in the sampled organizations agreed with these adjustments. Other modifications were suggested by the CFA and supported theoretically as wellⁱⁱⁱ. Table 1 shows the factor loadings from the CFA, the average square loadings, and the Fornell and Larcker reliability measure. All six BRBs are unidimensional and attain acceptable levels of reliability for further analysis.

(ii) Task Uncertainty Variables

Task uncertainty was measured using the instrument developed by Withey et al. (1983). This instrument has been used extensively and distinguishes between work unit types along the two dimensions of task analyzability and task variability. Managers were asked to assess the analyzability and predictability of task complexity on a scale ranging from one (to a very little extent) to five (to a very great extent). The two sub-scales are combined into one measure of task

Table 1
Confirmatory Factor Analysis
and Reliabilities of Measured BRB Variables

Variables	Items	Factor Loadings	Average Squared Multiple Loadings	Fornell and Larcker Reliability
Variance Explanation (BRB1): -prepare reports comparing actual to budget -submit explanation in writing about causes of large variances -trace causes of budget variances to groups or individuals	B19 B27 B29	.62 .71 .58	.40	.77
Budget Evaluation (BRB2): -reminded of the importance of meeting the budget -evaluated on my ability to meet the budget	B12 B13	.68 .93	.66	.85
Budget Influence (BRB3): -new budgets include changes I have suggested -budget is not finalized until I am satisfied	B9 B10	.76 .67	.50	.78
Budget Involvement (BRB4): -express opinions on budget matters -offer suggestions for the improvement of budget systems	B37 B38	.92 .67	.64	.86
Interact with Superiors (BRB5): -work with my superior in preparing the budget -go to my superior for advice on how to achieve my budget	B4 B18	.69 .75	.51	.78
Flexibility (BRB6): -budget enables me to be more flexible -budget enables me to be more innovative	B41 B42	.92 .82	.75	.92

uncertainty if their reliability is high (Withey et al., 1983) and they correlate highly (Brownell and Dunk, 1991).

Table 2 depicts the confirmatory factor analysis results for these two dimensions^{iv}. The factor loadings, average square loadings, and the Fornell and Larcker reliabilities also are shown. Collectively, these statistics indicate the unidimensionality of the separate dimensions as well as the combined construct, which supports previous research. A significant correlation (see Table 3) between the two dimensions (.627, $p < .001$) together with high internal reliability provided reasonable assurance that Perrow's (1967) routine/non-routine diagonal is closely approximated by adding the two dimensions. Hence, the respective items for each dimension were added together and then averaged to provide separate task variability and task analyzability variables. Finally, both were summed together and averaged to provide an overall measure of task uncertainty.

Task analyzability, task variability and task uncertainty (an aggregate of the previous two) were used for the structural equation analysis. This was done in order to evaluate the issues raised by Brownell and Dunk (1991) and Williams and Liu (1995) whom concentrated on the nature of the separate and combined task uncertainty constructs. In order to ascertain the significant BRBs under low uncertainty and high uncertainty conditions, a median split was performed on each of the three uncertainty variables to create high and low sub-samples.

(iii) Task Interdependence Variable

Task interdependence was measured using the Van de Ven and Delbecq (1974) instrument, which was used subsequently by Macintosh and Daft (1987), and Williams et al. (1990). The instrument uses diagrams to illustrate pooled, sequential and reciprocal workflow relative to other work units. Managers were asked to indicate the extent to which the dia-

grams explain the movement of work between their own and other departments on a scale from one (to a very little extent) to five (to a very great extent).

In this study, the three dimensions of task interdependence were used as a measure of the external demands placed upon the sub-unit. A factor analysis of the three indicated both unidimensionality and reliability given the average square loading of .56 and the Fornell and Larcker reliability of .85. In considering the BRB activities, a procedure similar to Williams et al. (1990) was used to split the sample into two groups featuring high and low characteristics of interdependence. First, cases clearly dominant in both the pooled and reciprocal categories were considered low or high, respectively. This procedure yielded 123 reciprocal (high) and 71 pooled (low) responses. The remainder of the sample was assessed to determine if the responses exhibited relatively more or less uncertainty, resulting in two sub-samples of 153 high and 103 low responses for testing purposes.

(iv) Departmental Performance Variable

To rate performance, managers were asked to compare their departments' performance with other departments using a measure developed by Van de Ven and Ferry (1980) as part of their Organizational Assessment Instrument. The measure includes seven dimensions of performance on a scale from one (far below average) to five (far above average). The seven performance dimensions were subjected to a factor analysis that revealed one factor. The average squared loading for this variable was .40, with a Fornell and Larcker Reliability of .45^v. As a result, the seven items were summed together and averaged to form an overall measure of departmental performance.

Second Stage Statistical Design

The second stage of the two-step approach involved an assessment of the structural

Table 2

**Confirmatory Factor Analysis
and Reliabilities of Measured Task Uncertainty Variables**

Variables.	Items	Factor Loading	Average Squared Loading	Fornell and Larcker Reliabilites
Task variability: -tasks remain the same from day to day -work is routine -sub-unit members perform repetitive activities	T1 T3 T7	.72 .83 .76	.58	.88
Task Analyzability: -clear known way to do work in sub-unit -understandable sequence of steps to do work -employees rely on established procedures	T2 T4 T8	.76 .74 .73	.54	.86
Task Uncertainty	n/a	n/a	.55	.91

equation model. Testing involved examining the six BRB variables simultaneously in terms of their effect on performance. An indication of the improvement in performance resulting from the presence of the BRBs is indicated by a change in the R^2 of the model including the BRBs versus the model without them.

LISREL 8 (Joreskog and Sorbom, 1993) was used to perform the analysis, with the general model shown in Figure 1. It assesses whether the factor structures are the same across the high and low sub-samples pertaining to uncertainty and whether the BRBs are responsive to the uncertainties faced by the sub-unit in enhancing performance. Each BRB was measured using the individual items rather than the traditional method of averaging them to create an overall measure of the variable. This reduces measurement error substantially. Two analyses were conducted using this model. The first was a constrained analysis whereby the parameter matrices of the high/low groups were constrained to be equal. This is similar to using a combined sample. The second was an unconstrained analysis that does not force the parameter matrices of the high/low groups to be equal. A chi-square difference test determines the equality of the two

groups (Bollen, 1989).

The simultaneous response of the BRBs to each dimension of uncertainty can be measured by the path coefficients leading to performance. Using structural equation analysis in this manner allows the critical notion of equifinality to be considered, meaning that several feasible and equally effective BRB designs lead to the same level of performance (Van de Ven and Drazin, 1985).

Results

The descriptive statistics for the variables used in this study are presented in Table 3. All measured variables appear to span the theoretical range of their respective scales with no obvious anomalies. Table 4 shows the inter-correlations between the measured variables while Table 5 shows the structural model specification results.

The major test of H1a, H2a, H3a and H4a, which posits a relationship between the set of BRBs and performance for each of four different uncertainty states is accomplished by examining the probability of a linear fit from the --

Figure 1
General Structural Equation Model

Table 3

Descriptive Statistics

Variables	Theoretical Range	Actual Range	Mean	Standard Deviation
Variance Explanation	1-5	1-5	3.17	.95
Budget Evaluation	1-5	1-5	3.69	1.04
Budget Influence	1-5	1-5	3.27	3.27
Budget Involvement	1-5	1-5	3.73	.85
Interact with Superiors	1-5	1-5	2.21	.93
Flexibility	1-5	1-5	2.57	.99
Performance	1-5	2.4-5	3.61	.49
Task Uncertainty	1-5	1-5	n/a	n/a

Table 4
Correlation Matrix of Operational Measures
and Average Variance Extracted

	BRB1	BRB2	BRB3	BRB4	BRB5	BRB6	Performance	Task Analyzability	Task Variability	Task Uncertainty	Interdependence
BRB1	.63										
BRB2	.49***	.81									
BRB3	.16*	.13	.71								
BRB4	.43***	.33***	.15*	.80							
BRB5	.03	-.05	-.11	-.04	.71						
BRB6	.21	.14	.32	.29***	.24**	.86					
Performance	-.11	-.06	.00	.04	.03	.10	.67				
Task Analyzability	-.25**	-.26***	-.04	-.04	-.01	-.10	.05	.73			
Task Variability	-.17*	-.15*	-.11	-.03	-.09	-.10	.13	.62***	.76		
Task Uncertainty	-.23**	-.22**	-.09	-.04	-.06	-.11	.10	.88***	.91***	.74	
Interdependence	.03	-.09	-.12	.04	.16*	.15*	.09	-.14	-.16*	-.17*	.74

* p<.05

** p<.01

*** p<.001

structural model as well as R^2 , indicating the strength of the relationship. Table 5 shows that the probabilities are .98 and above for the uncertainty variables while R^2 ranges from 130 for task variability to .213 for task uncertainty. Therefore, there is support for all four hypotheses.

The tests reported in Table 5 represent the unconstrained version of the structural model analysis. However, the major test of H1b, H2b, H3b and H4a requires two runs of the structural model with one being constrained and the other unconstrained. This test is accomplished by examining the Chi-square difference statistic that tests for a difference between the high and low sub-samples in terms of the relationship between the set of BRBs and performance. Simultaneously, the unconstrained structural model identifies significant paths between the individual BRBs and increased performance.

Table 6 shows that X^2 is significant at $p < .01$ for task analyzability and task uncertainty, thus providing strong support for hypotheses H1b and H3b. The X^2 for task variability is significant at $p < .08$ which provides weak support for hypothesis H2b. For task interdependence, X^2 is not significant ($p < .19$) and, therefore, there is no difference between the high

and low sub-samples and hypothesis H4b must be rejected.

Discussion

At a systems level, the findings provide strong support for the linkage of a set of BRBs to enhanced departmental performance at the work unit level of analysis under different constructs of uncertainty. Table 5 clearly indicated that the presence of the BRBs substantially increased the explanation of higher performance since R^2 was only .021 when they were absent from the model. Moreover, the structural model employed in this study demonstrates that it is appropriate to use more than a single variate to capture the characteristics of real world behavior reflecting an organization's budgeting process. Also, the structural model is able to control for all the interaction effects among the variables simultaneously. A less specified model of only one or two variables, which has been the preferred mode in these types of studies, may account for the many discrepancies in the findings reported in the accounting literature.

The findings also indicated that uncertainty in the task environment confronting work unit managers is crucial to the design of the bud-

Table 5
Structural Model Specification Results

	MAS Not Considered	Task Analyzability	Task Variability	Task Uncertainty	Interde- pendence
X^2	99	368	341	401	284
Degrees of Freedom	97	311	307	311	265
Probability	.42	.01	.08	.00	.19
RMSEA	.008	.04	.03	.04	.018
Probability	.99	.99	.99	.98	.99
G.F.I.	.95	.96	.97	.97	.90
N.F.I.	.93	.91	.92	.92	.87
Coefficient of Determination (R^2)	2.0%	19.5%	13.0%	21.3%	13.0%

Table 6
Significant Paths To Performance*

	Task Analyzability	Task Variability	Task Uncertainty	Inter dependence
Variance Analysis	-	-	-2.723	-
Budget Evaluation	-.361	-	1.555	-
Budget Influence	.197	-	.578	.146
Budget Involvement	-	-	-	-
Interaction With Superiors	-	-	1.146	-
Flexibility	-	-	-	-
Chi-square Difference for sub-samples	$X^2_{(98,48)}$, Different	$X^2_{(80,52)}$, Different	$X^2_{(67,48)}$, Different	$X^2_{(33,48)}$, Not Different

* - Significant paths are with reference to "HI" subsample.

getting system. Two unexpected outcomes represent some puzzlement. Hypothesis H4b predicted a difference between high and low task interdependence but this did not occur. It may be that for this dimension of uncertainty more refined measures of performance are required to differentiate the high and low uncertainty effects, as found in Williams et al. (1990). Nonetheless, Table 6 shows that the linkage between higher budget influence and higher performance is critical under high task interdependence and this is consistent with Williams et al. (1990).

The second unexpected surprise involved the decomposition of the routine-nonroutine task uncertainty dimension described by Perrow (1967) and supported by the outcomes for hypotheses H1a, H2a and H3a in this study. A significant portion of the research in accounting that has examined the linkage between specific BRB characteristics, such as participation and budget

influence, and performance, argues for the separation of Perrow's continuum into task analyzability and task variability to enhance the explanatory power of this performance linkage. The findings in Table 6 support this research effort since R^2 is higher for task analyzability (.195) as compared to task variability (.130). In particular, these results support Brownell and Dunk (1991) who claim that task analyzability assumes the more dominant role in enhancing the linkage between budget participation and budget emphasis, and performance. But the puzzle is that aggregating Perrow's (1967) two underlying dimensions yielded an R^2 of .213 in Table 6, which is higher than either of the dimensions of task analyzability (.195) or task variability (.130).

Finally, the richness of the unconstrained structural model is reflected in the significant paths that are generated in the

BRB/performance linkage. For example, research on the appropriate match between budget emphasis (low/high) and budget participation (high/low) has been ongoing for over a decade. Brownell (1982) claimed that high budget emphasis needs to be matched with high participation, but not low participation, to increase performance. Brownell and Hirst (1986) concluded that the match did not matter. Then Dunk (1989) found that high (low) participation and low (high) budget emphasis must prevail for higher performance. The findings in Table 6 support Dunk's (1989) conclusion but only under task analyzability conditions. The path coefficients show that for high uncertainty (i.e., low task analyzability) budget evaluation needs to be deemphasized (i.e., low) while simultaneously emphasizing budget influence because of the negative sign for the former (-.361) and the positive sign for the latter (.197). However, just the opposite emphases are required for low uncertainty (i.e., high task analyzability). These findings suggest that BRBs need to be managed as a "system" under different contextual uncertainties facing an organization's work unit.

Furthermore, the results in Table 6 point to an important research and practical trade-off for managers. It appears that Withey et al.'s (1983) scale for aggregating Perrow's (1967) two sub-dimensions of uncertainty into a routine/non-routine measure of task uncertainty yields more significant paths under the structural model. Four out of six BRB variables influence performance differently under high and low task uncertainty. This measure of task uncertainty captures more information on how the budgeting system functions to enhance performance than the decomposition measures of task analyzability and task variability shown in Table 6. The R^2 of .213 supports this view. Thus, a broader domain of task uncertainty give managers more path-specific knowledge in designing their budgeting systems and, yet, allows them to focus on the critical BRB variables overarching more narrow domains of task uncertainty related to the work unit.

Summary and Limitations

The purpose of the research reported here was to use a structural analysis that simultaneously captures the uncertainty dimensions that multiple budgeting behaviors operating as a system must contend with at the work unit level of large organizations to improve performance goals. The findings support the notion that patterns of budgeting behaviors describe the budgeting system, with some emphasized more and some less under different conditions of uncertainty facing the work unit. There is strong evidence for suggesting that an emphasis on critical budgeting variables can benefit performance goals; however, misplacing this emphasis can lead to sub-optimal performance.

Some caution is warranted because the sample data pertained to service work units in public utilities as opposed to the more customary manufacturing settings. Despite the sampling procedures, the results from this study confirm major findings in the literature and, concomitantly, underscore the importance of the choice attached to measuring uncertainty in complex work task environments. Then, too, other budgeting variables might be added to the analysis. Finally, performance is a multi-faceted construct and using a single overall dimension may not have captured the range of performance goals confronting departmental units in large complex public utilities.

Suggestions for Future Research

The structural equation model used in this study offers researchers a powerful approach for analyzing multiple systems characteristics simultaneously, reducing measurement error, and refining the linkages between multiple systems variables and performance outcomes. Repeated studies using common frameworks for contextual and systems characteristics may lead to the identification of "contingency gestalts" that are of immense benefit to managers seeking departmental performance goals. This approach

may possibly eradicate the endless confusion occupying the literature that has arisen from simple bi-variate model results, noisy data and a reluctance to deal with the full range of systems attributes that depict MAS design in the real world.

Most notably, perhaps, is that organizations need the capacity to adapt information systems, such as the budgeting system, to different uncertainties for optimal performance. This ability, and corresponding directives, need to come from upper management levels where research of the type reported in this study is even more urgently required to fulfill performance goals in an increasingly competitive environment. □

Endnotes

¹ Two tests were undertaken to determine if non-response bias was problematic. The total sample was split into two sub-groups based upon the median response rate. A correlation analysis was performed on all the variables within each group. There was no significant difference between the two groups, thus suggesting that non-response bias was minimal. With an expected response rate of 85.3%, a Chi-square test ($X^2=.995$; d.f.=5) of no difference in the proportions of questionnaires returned from all sampled organizations was significant ($p<.05$) confirming the first test of minimal response bias.

² A list of the 44 budgeting activities is found in the Appendix.

³ Although the X^2 is significant ($p=.002$), other indicators suggest a good fit of the data to the model with the GFI=.95, AGFI=.91, RNI=.97 and RMSEA=.05 ($p=.67$). Such findings are common in large sample sizes (Brown and Cudeck, 1993; Marsh, 1994). In addition to not including the "budget reaction" variable and the "interaction with subordinates" variable, other modifications were made to the model. The "budget analysis" and "budget feedback" variables also were excluded because they did not

attain characteristics that would justify their inclusion in the analysis. The remaining six BRB variables met the CFA and other criteria, indicating strength in their statistical characteristics (see Table 1).

⁴ The two dimensions from previous research were used as the initial model and subjected to a CFA. Two items were dropped, one from each dimension, resulting in a specification substantially conforming to the initial model. X^2 is not significant ($p=.20$). Other indicators substantiate a good fit of the data to the model, with the GFI=.99, AGFI=.96, RNI=.99, and RMSEA=.04 ($p=.58$).

⁵ Although these two assessments appear to be low, the variable was used in the structural equation model. When the performance dimensions with low loadings were removed from the performance measurement model, there were no changes in overall model fit assessment or R^2 for the performance equation. ¹ Two tests were undertaken to determine if non-response bias was problematic. The total sample was split into two sub-groups based upon the median response rate. A correlation analysis was performed on all the variables within each group. There was no significant difference between the two groups, thus suggesting that non-response bias was minimal. With an expected response rate of 85.3%, a Chi-square test ($X^2=.995$; d.f.=5) of no difference in the proportions of questionnaires returned from all sampled organizations was significant ($p<.05$) confirming the first test of minimal response bias.

⁶ A list of the 44 budgeting activities is found in the Appendix.

⁷ Although the X^2 is significant ($p=.002$), other indicators suggest a good fit of the data to the model with the GFI=.95, AGFI=.91, RNI=.97 and RMSEA=.05 ($p=.67$). Such findings are common in large sample sizes (Brown and Cudeck, 1993; Marsh, 1994). In addition to not including the "budget reaction" variable and the

"interaction with subordinates" variable, other modifications were made to the model. The "budget analysis" and "budget feedback" variables also were excluded because they did not attain characteristics that would justify their inclusion in the analysis. The remaining six BRB variables met the CFA and other criteria, indicating strength in their statistical characteristics (see Table 1).

⁸ The two dimensions from previous research were used as the initial model and subjected to a CFA. Two items were dropped, one from each dimension, resulting in a specification substantially conforming to the initial model. X^2 is not significant ($p=.20$). Other indicators substantiate a good fit of the data to the model, with the GFI=.99, AGFI=.96, RNI=.99, and RMSEA=.04 ($p=.58$).

⁹ Although these two assessments appear to be low, the variable was used in the structural equation model. When the performance dimensions with low loadings were removed from the performance measurement model, there were no changes in overall model fit assessment or R^2 for the performance equation.

References

1. Abernethy, M.A. and J.U. Stoelwinder, "Budget Use, Task Uncertainty, System Goal Orientation and Sub-Unit Performance: A Test of the Fit Hypothesis in Not-for-Profit Hospitals," *Accounting Organizations, and Society*, Vol.16, No.2, pp. 105-120, 1991.
2. Anderson, J.C. and D.W. Gerbing, "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach," *Psychological Bulletin*, Vol.103, No.3, pp. 411-423, 1988.
3. Bollen, K.A., *Structural Equations with Latent Variables*, John Wiley & Sons, New York, 1989.
4. Briers, M. and M. Hirst, "The Role of Budgetary Information in Performance Evaluation," *Accounting, Organizations and Society*, Volume 15:4, pp. 373-398, 1990.
5. Browne, M.W. and R. Cudeck, *Alternative Ways of Assessing Model Fit.; Testing Structural Equation Models*, K.J. Bollen and J.S. Long editors, Sage Publications, California, pp. 136-162, 1993.
6. Brownell, P., "Participation in Budgeting, Locus of Control and Organizational Effectiveness," *The Accounting Review*, pp. 844-850, 1981.
7. Brownell, P., "Participation in the budgeting process: When it works, and when it doesn't," *Journal of Accounting Literature*, pp. 124-153, 1982.
8. Brownell, P., "Leadership Style, Budgetary Participation and Managerial Behaviour," *Accounting, Organizations and Society*, pp. 307-321, 1983.
9. Brownell, P., "Budgetary Systems and the Control of Functionally Differentiated Organizational Activities," *Journal of Accounting Research*, Autumn, pp. 502-512, 1985.
10. Brownell, P. and A.S. Dunk, "Task Uncertainty and Its Interaction with Budgetary Participation and Budget Emphasis: Some Methodological Issues and Empirical Investigation," *Accounting, Organizations and Society*, pp. 307-321, 1991.
11. Bruns, W.J. and J.H. Waterhouse, "Budgetary Control and Organizational Structure," *Journal of Accounting Research*, Autumn, pp. 177-203, 1975.
12. Burns, T. and G.M. Stalker, *The Management of Innovation*, Tavistock, London, 1961.
13. Chenhall, R.H. and D. Morris, "The Impact of Structure, Environment and Interdependence on the Perceived Usefulness of Management Accounting Systems," *The Accounting Review*, pp. 16-35, 1986.
14. Choo, F. and K.B. Ton, "A Study of the Relations Among Disagreement in Budgetary Performance Evaluation Style, Job-Related Tension, Job Satisfaction and Performance," *Behavioral Research in Accounting*, Volume 9, pp. 199-218, 1997.
15. DeCoster, D. and J.P. Fertakis, "Budget-

- Induced Pressure and Its Relationship to Supervisory Behaviour," *Journal of Accounting Research*, Autumn, pp. 237-246, 1968.
16. Dunk, A., "The Effects of Job-related Tension on Managerial Performance," *Accounting, Organizations, and Society*, Volume 18, pp. 575-586, 1993.
17. Dunk, A., "The Differential Effect of Information Asymmetry on the Relation between Budgetary Participation and Departmental Performance," *Advances in Management Accounting*, Volume 4, pp. 147-161, 1995.
18. Flamholtz, E.G., "Accounting, Budgeting and Control Systems in Their Organizational Context: Theoretical and Empirical Perspectives," *Accounting, Organizations, and Society*, Vol.8, No.2/3, pp. 153-169, 1983.
19. Fornell, C. and D. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, Number 18, pp. 39-50, 1981.
20. Govindarajan, V., "Impact of Participation in the Budgetary Process on Managerial Attitudes and Performance: Universalistic and Contingency Perspectives," *Decision Sciences*, Volume 1, pp. 496-516, 1986.
21. Hopwood, A.G., "On Trying to Study Accounting in the Contexts of Which It Operates," *Accounting, Organizations and Society*, Volume 8, No.2/3, pp. 287-305, 1983.
22. Joreskog, K.G. and D. Sorbom, D., *LISREL8: Structural Equation Modelling with the SIMPLIS Command Language*, Scientific Software, Chicago, 1993.
23. Kenis, I., "Effects of Budgetary Goal Characteristics on Managerial Attitudes and Performance," *The Accounting Review*, October, pp. 707-721, 1979.
24. Khandwalla, P.N., "The Effect of Different Types of Competition on the Use of Management Controls," *Journal of Accounting Research*, Summer, pp. 275-285, 1972.
25. Kim, S.K., "Organizational Coordination and Performance in Hospital Accounting Information Systems: An Empirical Investigation," *The Accounting Review*, October, pp. 427-489, 1988.
26. Kren, L., "Budgetary Participation and Managerial Performance: The Impact of Information and Environmental Volatility," *The Accounting Review*, Volume 67, pp. 511-526, 1992.
27. Macintosh, N.B., "A Contextual Model of Information Systems," *Accounting, Organizations and Society*, Volume 6, No 1, pp. 39-53, 1981.
28. Macintosh, N.B. and R.L. Daft, "Management Control Systems and Departmental Interdependence: An Empirical Analysis," *Accounting, Organizations and Society*, Volume 12, No 1, pp. 49-61, 1987.
29. Marsh, H.W., "Confirmatory Factor Analysis Models of Factorial Invariance: A Multifaceted Approach," *Structural Equation Modelling*, Number 1, pp. 5-34, 1994.
30. Merchant, K.A., "The Design of the Corporate Budgeting System: Influences on Managerial Behaviour and Performance," *The Accounting Review*, October, pp. 813-829, 1981.
31. Merchant, K.A., "Influences on Departmental Budgeting: An Empirical Examination of a Contingency Model," *Accounting, Organizations and Society*, pp. 291-307, 1984.
32. Milani, K., "The Relationship of Participation in Budget Setting to Industrial Supervisor Performance and Attitudes: A Field Study," *The Accounting Review*, April, pp. 272-284, 1975.
33. Mintzberg, H., "The Myths of MIS," *California Management Review*, Fall, pp. 92-97, 1972.
34. Perrow, C., "A Framework for the Comparative Analysis of Organizations," *American Sociological Review*, pp. 194-208, 1967.
35. Perrow, C., *Organizational Analysis: A Sociological View*, Brooks/Cole and Tavistock, Belmont, California, 1970.
36. Preston, A., "Interactions and Arrangements in the Process of Informing," *Accounting, Organizations, and Society*, Volume 11,

- Number 6), pp. 521-540, 1989.
37. Shields, J.F. and M.D. Shields, "Antecedents of Participative Budgeting," *Accounting, Organizations, and Society*, Volume 23, pp. 49-76, 1998.
38. Swieringa, R.J. and R.H. Moncur, *Some Effects of Participative Behaviour on Managerial Behaviour*, National Association of Accountants, New York, 1974.
39. Thompson, J.D., *Organizations in Action*, McGraw Hill, New York, 1967.
40. Thompson, J.D., "Technology, Polity, and Societal Development," *Administrative Science Quarterly*, pp. 6-21, 1973.
41. Van de Ven, A.H. and A.L. Delbecq, "A Task Contingency Model of Work- Unit Structure," *Administrative Science Quarterly*, June, pp. 183-197, 1974.
42. Van de Ven, A.H. and R. Drazin, "The Concept of Fit in Contingency Theory," *Research in Organizational Behaviour*, Volume 7, pp. 333-365, 1985.
43. Van de Ven, A.H. and D.L. Ferry, *Measuring and Assessing Organizations*, Wiley, New York, 1980.
44. Weber, M., *The Theory of Social and Economic Organizations*, Edited by T. Parsons, Oxford University Press, New York, 1947.
45. Williams, J.J. and M.H. Liu, "Budget Participation and Satisfaction: The Influence of Managerial Interactions and Task Uncertainty," *Accounting and Business Review*, Volume 2, Number 1, pp. 85-110, 1995.
46. Williams, J.J., J.B. Macintosh, and J.C. Moore, "Budget Related Behaviour in Public Sector Organizations: Some Empirical Evidence," *Accounting, Organizations and Society*, Volume 15, Number 3, pp. 221-246, 1990.
47. Withy, M., R.L. Daft, and W.H. Cooper, "Measures of Perrow's Work Unit Technology: An Empirical Assessment and a New Scale," *Academy of Management Journal*, Volume 26, Number 1, pp. 45-63, 1986.

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