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Budgeting Research: Three Theoretical Perspectives and Criteria for Selective Integration

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Abstract: Budgeting is one of the most extensively researched topics in management accounting and has been studied from the theoretical perspectives of economics, psychology, and sociology. Thus, budgeting offers opportunities for research that chooses between competing theories from these perspectives or combines theories from different perspectives if they are compatible, to create more complete and valid explanations of the causes and effects of budgeting practices. In the first part of the paper we analyze budgeting research in the three theoretical perspectives, focusing on important similarities and differences across perspectives with respect to the primary research question, levels of analysis, assumptions about rationality and equilibrium, budgeting and nonbudgeting variables, and causal-model forms. In the last part of this paper we identify four interrelated criteria for selective integrative research and provide an example of using these criteria for research on participative budgeting.

INTRODUCTION

Virtually every aspect of management accounting is implicated in budgeting.¹ Budgeting is related to cost accounting, responsibility accounting, performance measurement, and compensation. Budgeting is used for many purposes, including planning and coordinating an organization's activities, allocating resources, motivating

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¹ We use the term "budgeting" to refer to a broad range of topics. Some research focuses on the budget as a set of numbers: for example, the amount of resources allocated to an organizational subunit and the performance target. Other research focuses on the processes of developing and using budgets: for example, the negotiation that is involved in setting budgets and modifying them after they are set. In the remainder of this paper, we use "budgeting" to refer to both the set of numbers and the process of arriving at those numbers, "budget" to refer to the set of numbers only, and "budgeting process" to refer to the process only.

employees, and expressing conformity with social norms. Not surprisingly, budgeting is one of the most extensively researched topics in management accounting (Luft and Shields 2003). It has been investigated from multiple social-science theoretical perspectives, generating diverse streams of research that have developed in partial isolation from each other. Although any social science can, in principle, provide a basis for investigating budgeting, most of the existing accounting research on budgeting is informed by economics, psychology, and sociology; we therefore focus on these three theoretical perspectives.

Research on budgeting in all three theoretical perspectives has grown from common roots and addresses a common set of problems. Research in the three perspectives has tended to grow apart, however, as budgeting researchers are influenced more by nonbudgeting research in their own theoretical perspective than by budgeting research in other theoretical perspectives. Each perspective makes different choices about which budgeting-related issues to examine intensively. To make the chosen issues tractable, each perspective also, at least temporarily, "simplifies away" other potentially important issues, using maintained assumptions to eliminate, hold constant, or substitute simpler versions of issues that are not the primary focus of attention. One reason for integrating the budgeting research in all three social-science perspectives is that, taken together, they provide a more complete understanding of budgeting than is available from the literature in any one theoretical perspective alone.

Another reason for an integrative strategy is that research within a theoretical perspective often advances by modifying its assumptions and addressing issues that were previously simplified away. Researchers are likely to find that their own theoretical perspective offers only limited assistance in specifying alternative assumptions and predicting their effects. Other perspectives, which have chosen different assumptions and therefore have more experience with these alternatives, can provide assistance. For example, psychology and sociology can be helpful to economics-based researchers who want to relax the characteristic economics assumptions of unbounded rationality and stable, exogenously given preferences for wealth and leisure only. Similarly, psychology-based researchers may want to relax the common simplification of taking the behavior of superiors in a budget setting as exogenously given in order to examine the reactions of subordinates to budgeting. Economic theory can help by suggesting ways of structuring and solving the problem of mutual influences between superiors and subordinates in budgeting. However, researchers trained in one theoretical perspective often find it difficult to take full advantage of the assistance offered by research in other perspectives, because research in each perspective uses different names for the same (or similar) variables, uses the same names for different variables, makes different simplifying assumptions (not always explicitly identified), and has a different primary focus of attention (also not always explicitly identified).

The first objective of this paper is to offer a guide to economics-, psychology-, and sociology-based scholarly research on budgeting that shares important common ground and can be integrated relatively readily. The intent is to make such research in each theoretical perspective better known and more accessible to those whose training is mostly in other perspectives. The second objective of this paper is to identify criteria for designing and evaluating research that selectively integrates across these theoretical perspectives and to provide an example of applying these criteria to budgeting research.

These objectives limit the scope of this paper in important ways. First, we have excluded some important budgeting research because it does not easily lend itself to the kind of integration that is the focus of this paper. For example, the extensive political-science research on governmental budgeting is not included because many of its important research questions (e.g., causes of budget deficits, role of political parties in budgeting) differ from

the questions addressed in the accounting literature. Also, some streams of sociology-based research are not included because of epistemological differences (e.g., differences about what constitutes “reality” or persuasive evidence) that pose significant challenges to integration with the largely positivist research described in this paper.² A second scope limitation is that the integration this paper aims at is selective, making valid use of a specific theory, concept, or result developed in one theoretical perspective to research a specific set of cause-and-effect relations in a different perspective. The paper does not aim at a general theoretical unification or the creation of “one big model” of budgeting.

Budgeting Research: Historical Development

The growth and contributions of the existing budgeting literature can be presented in two ways. One form of presentation is historical, showing how research questions in each theoretical perspective grew out of interactions among practice concerns, budgeting research in other perspectives, and developments in basic economics, psychology, and sociology theories. The other form of presentation is analytical, separately describing the research questions, assumptions, and results characteristic of each theoretical perspective. Although the latter presentation mode, which we use in the following sections of this paper, is convenient for orderly exposition, it can give the impression that the three theoretical perspectives are more isolated and incompatible with each other than they actually are. Therefore, the remainder of this introduction summarizes the common historical background of the three perspectives on budgeting and describes their key similarities and differences.

All three literatures analyzed in this paper grew out of a common set of practitioner concerns about budgeting, which received classic expression in a field study commissioned by the Controllership Foundation (Argyris 1952, 1953).³ These concerns continue to be reiterated in current practitioner literature (see Hansen et al. [2003] for examples). The source of these practitioner concerns is that, although budgeting has potential benefits—it can increase efficiency through planning and coordination and can support both control and learning through the comparison of actual results to plans—budgeting also has large costs beyond the easily measured, out-of-pocket costs of operating the budgeting system. It can create rigidity, limit cooperation and creative response, overemphasize short-term cost control and top-down authority, encourage gaming, and demotivate employees (Hansen et al. 2003).

The initial scholarly response to these observations was a stream of social-psychology-based research, which searched for (but did not always find) systematic evidence of the costs of budgeting described anecdotally in the practitioner literature. Recognizing the complexity of individuals’ responses to their social environments, the psychology-based research investigated the effects of budgeting on a variety of potentially conflicting mental states and behaviors, primarily motivation, stress, satisfaction, commitment, relations with peers and superiors, and individual managerial performance. This research also examined the association of these effects with specific budgeting practices such as the level of difficulty of budget targets, the supervisor’s budget-related performance-evaluation style, and the extent to which employees’ compensation depends on meeting budget targets. In particular, this research investigated the effects of participative budgeting, the remedy Argyris (1952, 1953) proposed to eliminate or reduce the costs of budgeting he observed.⁴

² For introductions to this sociology-based research, see Covaleski et al. (1996) and Baxter and Chua (2003).

³ Now the Financial Executives Institute.

⁴ The emphasis on employee empowerment in some of the practitioner literature analyzed in Hansen et al. (2003) can be seen as a contemporary analog to the emphasis on employee participation in the earlier literature.

Like the psychology-based literature, the sociology-based budgeting literature was influenced by Argyris' (1952, 1953) description of the costs of budgeting. Early sociology-based studies linked this description of budgeting with the emerging literature on organizational theory, which was synthesized by March and Simon (1958) and associated with a second study of practice commissioned by the Controllershship Foundation at about the same time, examining the controllership function in organizations (Simon et al. 1954).⁵ This organizational-theory literature focused on the difficulties of decision making and coordination in large, complex organizations engaged in diverse activities in uncertain environments over many periods. In this setting, identifying optimal organizational practices seemed beyond the capabilities of boundedly rational individuals. In consequence, an important role of organizational structures and routines such as budgeting was to simplify organizational decision making. Although sociology-based research did not expect organizational practices to be always optimal, a stream of studies based on the contingency theory of organizations argued that organizations would tend to adopt practices (such as budgeting) that improved performance, and that these practices would vary systematically depending on organizational variables such as size, environmental uncertainty, and technology (Chenhall 2003).

As sociology-based budgeting research evolved, it increasingly emphasized that individuals within an organization have conflicting interests, and organizational structure and routine can establish power relations. Some sociology-based research argued that budgeting could reduce resistance to the exercise of power by concealing it in apparently neutral routine or technical procedures such as budget formulas. Budgeting could also be identified with a social norm of rational organizational behavior, thus conferring legitimacy on decisions reached through the budgeting process. However, the breakdown of routines, structures, or shared representations through changes in budgeting (or the initial development of such routines in new organizations or subunits) could generate conflict (sometimes prolonged) that hindered the working of an organization's decision-making process.⁶ Thus, the sociology-based budgeting literature sometimes represented practices like participative budgeting and budget-based performance evaluation and compensation as ways of simplifying organizational decision making for boundedly rational individuals, and sometimes represented them as part of the construction, functioning, and occasional breakdown of power relations in and around organizations.

Argyris' study (1952, 1953) and the early psychology-based research it stimulated also played a role in early economics-based studies, as researchers began to use the emerging economics of information to analyze accounting practice, including budgeting. Citing Argyris (1952) and social-psychology-based studies such as Hopwood (1972), which documented costs of budget-based evaluation of employees, Demski and Feltham (1978) asked: What are the offsetting benefits of this practice that might account for its prevalence? How can the cost-benefit trade-off be analyzed to determine whether the combination of costs and benefits provided by one budgeting practice (such as budget-based performance evaluation and reward) is better for both employer and employee than the trade-off provided by an alternative practice? Economics-based research (e.g., Baiman and Evans 1983; Penno 1984; Kanodia 1993) also took up the theme of participative budgeting from the practice- and psychology-based literatures, and subsequent economics-based research has explored

⁵ Hopper et al. (1987) note the importance of the Argyris (1952, 1953) and Simon et al. (1954) studies for the early development of organizational and behavioral management accounting research in Britain.

⁶ For examples of this stream of budgeting research, see Covaleski and Dirsmith (1988a, 1998b) and Czarniawska (1997).

the optimal cost-benefit trade-offs associated with other budgeting practices (e.g., variance investigation policies, hurdle rates for capital budgeting).

The economics-based research thus often addressed the same budgeting practices as the psychology-based and sociology-based research, but shifted the focus of primary and intensive research attention. In the psychology-based research, what was “under the microscope,” showing its full complexity, was the nature of individual employee reactions to budgeting practices, while many features of the organization in which these practices operate appeared only sketchily in the background. In the economics-based research, the preferences and beliefs of individuals were much simplified, and what was “under the microscope” was the nature of the optimal trade-offs in employment agreements between owners and employees with conflicting preferences and different information, and how these trade-offs affect organizational performance. In the sociology-based literature, what was “under the microscope” was the role of budgeting in these organizational processes and their outcomes (e.g., organizational performance). Representations of individual preferences and beliefs are relatively underdeveloped in the sociology-based research, just as representations of organizational structure and process in large complex organizations are relatively underdeveloped in the economics- and psychology-based literatures.

The research questions formulated by the budgeting literature in the last several decades are likely to remain important questions for future research: How do budgeting practices affect employee motivation and performance, as well as organizational performance? What role should budget targets play in evaluating and rewarding employees’ performance? What are the costs and benefits of different levels of budget-target difficulty and different methods of setting these targets? How does budgeting help or hinder in planning and coordinating activities in complex organizations, and what is its role in generating or resolving organizational conflict? How do the answers to all these questions change with changes in non-budgeting variables such as environmental uncertainty, technology, and organizational strategy and structure?

Three Theoretical Perspectives: A Summary Matrix

The matrix in Table 1 provides a structure for our analysis of the budgeting literature. The rows identify important characteristics of budgeting research that will be described in more detail in the remainder of the paper. The three columns of the matrix represent the three theoretical perspectives: economics, psychology, and sociology. It is important to note that the existing scholarly literature on budgeting has drawn on only limited portions of the social sciences on which it depends. The psychology-based literature on budgeting relies more on social psychology than on cognitive psychology. The economics-based literature on budgeting relies on principal-agent models, but not on other potentially relevant economic theory such as models of adaptive behavior in games or complementarities in organizational design. The sociology-based research on budgeting is mostly based on contingency and institutional theories rather than population-ecology or critical theories. Thus, the entries in the columns of Table 1 are not descriptions of economics, psychology, sociology as a whole, but only of the scholarly literature on budgeting that is most prevalent in each perspective.

The first row in the matrix presents the (broadly defined) primary research question about budgeting on which each perspective focuses. The second row presents the level of analysis at which most research in each perspective is conducted. The level of a variable is defined *at the level at which the variation of interest occurs* (Rousseau 1985; Klein et

TABLE 1
Comparison of Budgeting Research across Three Social Science Theoretical Perspectives

	Economics	Psychology	Sociology
Primary Research Question	What is the economic value of budgeting practices for owners and employees?	What are the effects of budgeting practices on individuals' mental states, behavior, and individual performance?	How does budgeting influence decision-making and bargaining processes among a plurality of interests pertaining to planning and control of social and organizational resources?
Level of Analysis	The agency (employer and employee), as a simplified representation of an organization or subunit.	Individual. The focus is on a subordinate, frequently in the context of a superior-subordinate dyad.	Organization and subunit.
Rationality Assumptions	Perfect rationality: costless calculation and consistent preferences.	Boundedly rational, satisficing.	<ol style="list-style-type: none"> 1. Contingency theory: boundedly rational and satisficing. 2. Institutional theory: bounded rationality and satisficing (volition and choice are important).
Equilibrium Assumptions	Nash equilibrium.	Single-person cognitive consistency.	<ol style="list-style-type: none"> 1. Contingency theory: fit between contingencies and organizational characteristics. 2. Institutional theory: tension and disequilibrium are due to conflicting interests of employees.

(continued on next page)

Budgeting Variables	<p>Characteristics of budgeting and compensation practices, including budget-based contracts, participative budgeting, capital budgeting, and variance investigation.</p> <ol style="list-style-type: none"> 1. Labor market: employees' skill and preferences; 2. Information structure: public and private information, state uncertainty; 3. Outcomes: individual welfare, organizational performance, budget slack. 	Participative budgeting, budget difficulty, budget emphasis in performance evaluation, budget-based compensation.	<ol style="list-style-type: none"> 1. Contingency theory: participative budgeting, budget-based performance evaluation, budget importance, using operating budgets for management control. 2. Institutional theory: budgeting process.
Nonbudgeting Variables	<ol style="list-style-type: none"> 1. Mental states: attitudes, motivation, satisfaction, stress; 2. Context: task uncertainty; 3. Behavior: gaming; 4. Performance: individual managerial. 		<ol style="list-style-type: none"> 1. Contingency theory: organizational size, structuring of activities, decentralization, technology automation, subunit interdependence, diversification strategy. 2. Institutional theory: symbolic value of accounting, resource negotiating and bargaining, concealing and mobilizing power, environmental change, organizational change.
Causal-Model Form	<ol style="list-style-type: none"> 1. Analytical models: bidirectional nonlinear interaction. 2. Empirical models: unidirectional linear additive. 	<p>Stage 1: unidirectional direct linear additive. Stage 2: unidirectional direct linear interaction. Stage 3: unidirectional indirect linear additive.</p>	<ol style="list-style-type: none"> 1. Contingency theory: unidirectional direct linear additive or interaction. 2. Institutional theory: uni- or bidirectional direct or indirect linear additive or interaction.



al. 1994; Kozlowski and Klein 2000).⁷ For example, participative budgeting is an individual-level variable when a study examines effects on individual mental states or behavior of the individuals' beliefs about how much they participate in budgeting, and the researcher is interested in variation across individuals per se, as opposed to when individuals serve as proxies for subunits or organizations. Participative budgeting is an organizational-level variable when a study examines cross-organizational differences in participative budgeting, and the researcher's goal is to relate this variation in budgeting to variations in technology, structure, or performance across organizations.

The third and fourth rows present assumptions about rationality and equilibrium that differ across perspectives and create important differences in the way in which budgeting is represented and analyzed in each perspective. The fifth and sixth rows present the budgeting practices most commonly studied in each perspective and the nonbudgeting variables most often linked to budgeting in each perspective. The last row presents causal-model forms that are characteristic of the research in each perspective (e.g., unidirectional versus bidirectional,⁸ direct versus indirect, linear versus curvilinear, additive versus interactive; see Luft and Shields [2003] for definitions of causal-model forms).⁹

The following three sections use the structure in Table 1 to describe and analyze the research on budgeting in the economics, psychology, and sociology perspectives respectively. Criteria and examples for valid integrative research are discussed in the final section.

ECONOMIC PERSPECTIVE ON BUDGETING

Primary Research Question

Economics-based budgeting research views budgeting as a component of the organization's management accounting system.¹⁰ Budgets play important roles in coordinating activities and providing appropriate incentives within organizations. Economics-based research focuses on equilibrium budgeting arrangements that maximize the combined interests of organization owners and managers. This research investigates the use of budgeting practices (e.g., budget performance measures, budget targets [standards], budget-based compensation, participative budgeting) as an equilibrium response to labor market characteristics such as the skills and preferences of potential employees, information characteristics such

⁷ This use of the term "levels" differs from two others that occasionally appear in the literature. First, levels of analysis are not identical to hierarchical levels. A CEO is not a higher level of analysis than a shop-floor worker: both are individuals. Second, the level of analysis of a variable is not necessarily the level where it appears to belong because it is internal to or controllable at that level. For example, environmental uncertainty, even if it is external to and uncontrollable by organizations, can be an organizational-level variable in studies that focus on cross-organizational differences in this uncertainty, or an individual-level variable in studies that focus on differences across individuals in their beliefs about the uncertainty of the environment.

⁸ In unidirectional models, causal influence runs from independent to dependent variables, but not in the opposite direction. In bidirectional models, two variables or sets of variables mutually influence each other. In cyclical recursive bidirectional models, there is an identifiable time interval between the change in one variable and the resulting change in another variable. In contrast, in reciprocal nonrecursive models, the changes in the two variables occur simultaneously or at time intervals too short for the causal influences in each direction to be distinguished empirically (Berry 1984).

⁹ The matrix rows represent cross-perspective similarities and differences relevant to the specific integration opportunities and challenges described in this paper (see the final section of the paper for examples). For an example of a broader characterization of differences across multiple theoretical perspectives (including a wider range of sociological theories and accounting issues other than budgeting), see Hopper et al. (1987).

¹⁰ As indicated in the introduction, we consider the allocation of resources to organizational units and the evaluation of those units based on some comparison of actual versus budgeted results to be the essential features of budgeting. Economics-based research on organizational incentives and compensation does not always use the term "budgeting" to describe these situations and practices. We concentrate primarily on research labeled as "budgeting," but we also incorporate other research that addresses the essential features of budgeting even if it does not use that term.

as uncertainty with respect to factors such as cost and demand (state uncertainty) and differences in information between owners and managers (information asymmetry). This research also analyzes how equilibrium choices of budgeting practices produce outcomes such as individual welfare, organization performance, and budget slack.

The primary research question underlying economics-based budgeting research is: what is the economic value of budgeting practices for owners and employees? Economics-based research attempts to answer this question as the outcome of organizations choosing budgeting practices that maximize their objectives, given the specific circumstances that they face. Of course, this approach implies that budgeting's benefits exceed its costs; otherwise, organizations would be better off without budgeting.

Economics-based research views budgets as playing *decision facilitating* and *decision influencing* roles within the organization (Demski and Feltham 1976).¹¹ Budgets *facilitate* decisions by enhancing coordination across subunits as the planned activities of one subunit influence the plans of other subunits. Budgets also facilitate decisions when employees with superior information about local conditions such as market demand or production costs supply that information so that owners can improve decisions. Employees often communicate such information via participative budgeting. The employees' communications concerning anticipated demand or production potential inform subsequent decisions about levels and mixes of organizational inputs and outputs. Owners must carefully consider how to use such communications because this use will determine how costly it is to induce employees to communicate fully and honestly, as we illustrate later. Budgets *influence* decisions because of their role in managerial performance evaluation and compensation. That is, budgets influence managers' and other employees' personal trade-offs between labor and leisure, as well as their allocation of total effort across different tasks. For example, the potential to earn a bonus for achieving budget targets will influence employees' total effort and the distribution of their effort across specific activities such as cost control, sales, or quality improvement.

Level of Analysis

The economic approach to budgeting focuses on "the agency"; i.e., the owner-employee dyad, as the level of analysis.¹² Here "the agency" can serve as a simplified representation of either an organization as a whole (owners and employees) or a subunit of the organization (superior and subordinate).

Assumptions

Owners and employees are assumed to be perfectly rational individuals who make decisions that maximize consistent preferences and for whom calculations are typically costless and perfect. Conventional assumptions about preferences are that individuals prefer more wealth to less, more leisure to less, and that they are either risk-averse or risk-neutral.¹³ Individuals know others' preferences and they anticipate that others will act to maximize those preferences. Choosing what actions to take or what budget communications to send

¹¹ Economics-based budgeting research focuses primarily on for-profit organizations. Nevertheless, budgeting's decision-facilitating and decision-influencing roles operate in both for-profit and not-for-profit organizations. Hence, we use the broader term "organizations" to refer to both types of entities.

¹² We later discuss how some economics-based theoretical research extends the level of analysis to more complex organizational structures; e.g., Melumad et al. (1992) allow the principal to contract with responsibility center managers who, in turn, contract with other agents.

¹³ The economic approach can potentially incorporate richer preferences; e.g., one individual's utility could depend not only on her own wealth, but also on the wealth of other individuals. Nevertheless, the great majority of economics-based research assumes that individuals are purely self-interested.

can be complex problems in environments with large sets of possible actions, communications, uncertain states, and related decisions by other individuals. Despite these complexities, the economic approach typically assumes that individuals can solve such problems perfectly and costlessly.¹⁴

Next, we describe how the economic perspective on budgeting identifies equilibrium outcomes that balance the interests of the owner and employee. Although an organization is unlikely to be in equilibrium at any given time, economics-based research nevertheless focuses on equilibrium as the natural position toward which an organization will move as a result of strategic interaction between the owner and employee. In this strategic interaction, the owner moves first by selecting the organization's information system, incentive system, and budgeting practices. Employees move next by deciding whether to work for the organization, and if so, choosing a mix of effort levels across tasks. In equilibrium, the owner selects the profit-maximizing information, incentive, and budgeting systems, given all conditions facing the organization, and anticipates how the employee would react to all possible information, incentive, and budgeting choices. In turn, the employee selects actions and reports that maximize his or her own expected utility in light of the information, incentive, and budgeting systems that he or she faces. The result is a Nash equilibrium in which both parties (owner and employee) choose the best responses to the other party's strategy.

Budgeting and Nonbudgeting Variables

This section begins with a brief overview of the recent development of the literature on the economic approach to budgeting. After that overview, we discuss the budgeting and nonbudgeting variables addressed in this literature, organized according to the research methods employed—analytical models, econometric analysis of archival data, and laboratory experiments.

Current economic models of budgeting evolved from the development in economics of the role of information in organizations beginning in the 1960s (Feltham 1972; Demski and Feltham 1976; Demski 1980). Researchers began with single-person models in which budgeting could provide decision-facilitating information for that individual. Feltham (1968) first emphasized that under uncertainty an individual's demand for information depends on the relation between the decision to be made and the potential information available. This was the first recognition that the demand for information (or processes such as budgeting) was endogenous rather than exogenous. This means that the value of information should be derived from the decision context rather than being simply assumed.

The next extensions recognized separate roles for different individuals. For example, the decision maker and the information evaluator could be different individuals (Demski and Feltham 1976) or individuals with common goals could operate in teams who shared information (Marschak and Radner 1972). The final step in this evolution came with the development of agency theory in which individuals have different preferences and information. By proper design of incentive and budgeting arrangements, an owner can induce an employee, who would otherwise devote all available time to activities the employee prefers, to devote time to activities that benefit the owner and to communicate to the owner what the employee knows about local conditions.

¹⁴ Although analytical economic models assume that individuals' information processing is costless, the firm may incur a cost to acquire information (e.g., Demski and Feltham 1978). Similarly, some economics-based research on budgeting and incentives assumes that there are costs associated with transmitting detailed information from local managers to headquarters within an organization.

The economic theory of agency (Ross 1973) forms the foundation for analytical budgeting models by evaluating how state uncertainty and information asymmetry affect the use of information-based practices such as budgeting in incentive contracts between owners and employees. Baiman's (1982, 1990) literature reviews on agency theory and managerial accounting, as well as Lambert's (2001) review of contracting theory and accounting, provide comprehensive and insightful analyses of the broad conceptual foundations and technical modeling issues that arise when researchers apply agency theory to a range of managerial accounting issues, including budgeting.¹⁵

Agency theory provided an important conceptual advance for the study of budgeting by offering a well-defined structure in which the value of such practices (including their decision-influencing value) could be established in a rigorous, internally consistent manner. But perhaps even more important than the internal rigor of the analysis was agency theory's shift from a single-person (owner or employee) paradigm to a multi-person paradigm (owner-employee dyad). Agency theory showed how practices such as budget targets and communication of employees' private information in incentive contracts could create value by improving the resolution of the owner-employee conflict resulting from differences in preferences and information. Agency theory did so by integrating elements of budgeting into the compensation system that simultaneously determined the welfare of the owner and employee. We next examine the role of budgeting in such analytical models.

Analytical Models

Building on these developments in economics, Demski and Feltham (1978) (hereafter DF) first introduced analytical (formal mathematical) agency models of budgeting. DF demonstrate how budgeting (in the limited sense of the use of "budget-based contracts," as defined in the next subsection) can create value when markets are "incomplete." In complete markets, all information is public, enabling owners to construct contracts with employees based on the level of effort that the employees would supply as well as on the employee's skill (in economics terminology, the employee's "type"). As a result, owners could design optimal incentives without introducing budget-based compensation practices. However, firms typically operate in incomplete markets, where employees' efforts and skills are private information known only by the employees. In such environments, DF demonstrate the value of budgeting. They do so by showing that compared to the welfare of the owner and employee without budgeting, introducing budgeting-based compensation yields a Pareto improvement. This means that with budgeting the owner is better off and the employee's welfare either stays the same or improves relative to their welfare levels without budgeting.

¹⁵ Budgeting and incentive research in accounting relies heavily on results from economics, including optimal risk-sharing, the value of monitoring, and the Revelation Principle. Optimal risk-sharing means that a risk-neutral principal should impose the minimum risk on risk-averse agents, as long as incentive arrangements are adequate to motivate the desired effort and communication of private information. Holmstrom (1979) establishes that when a monitoring signal, such as an accounting report, is at least marginally informative about the agent's action, the signal has economic value. Therefore, contracts incorporating the signal can provide better incentive versus risk-sharing trade-offs than any contract that excludes the signal. The Revelation Principle (Myerson 1979) greatly simplifies modeling communication within firms, including budget-related communication. Myerson's insight in the Revelation Principle is that for any budgeting arrangement in which the manager has incentive to report falsely (e.g., to create budget slack) the owner could have induced the manager to report honestly by promising the slack as a reward. Therefore, the researcher loses no generality by building a model with honest reporting as long as the model requires that owner to give the manager the necessary incentive to report honestly. Focusing only on models with honest reporting greatly simplifies modeling budgeting problems. Using these results, researchers in accounting can consider an economic environment, analyze whether budgeting creates value in that environment, and if so, then address how budgeting should be used.

The ability of agency theory to relate budgeting to the welfare of both owners and employees has two important implications. First, alternative budgeting practices can potentially increase or decrease the welfare of the owner and the employee, or increase the welfare of one while decreasing the welfare of the other. For example, increasing budget-based incentive compensation could improve the employee's welfare while making the owner worse (better) off by decreasing (increasing) organization profit. This first implication means that a complete analysis of alternative budgeting practices should reflect their effect on the welfare of both parties. For example, showing that budgeting practice A improved the employee's welfare relative to budgeting practice B, while ignoring the effects on the owner, would be an incomplete basis for judging the relative desirability of the two practices.

A second important implication of the economic perspective's focus on the agency is that budgeting is treated as a component of the incentive-contracting system that governs the employment relation. DF describe how budgeting practices operate within the incentive contracts that owners design to influence the reports and decisions of employees. Both the analytical agency and the organizational architecture literatures (Brickley et al. 1997) emphasize the importance of the owner simultaneously choosing various features of the budgeting and compensation systems so that these choices properly complement each other.

We next describe the budgeting and nonbudgeting variables that have been addressed by analytical research. Models of four budgeting practices are selected on the basis of representing the most important analytical budgeting research: budget-based contracts, participative budgeting, capital budgeting, and variance investigation. These examples also illustrate the simultaneous consideration of both owner and employee welfare, as well as the integration of the budgeting and compensation systems.

Budget-based contracts. The primary budgeting variable that DF address is whether the employee's incentive contract is budget-based; i.e., whether it contains a budget target with one payment rule for outcomes above the target and another for outcomes below the target. The nonbudgeting variables addressed by DF are characteristics of the labor force such as the employee's skill and risk preferences and characteristics of the information possessed by the owner and employee such as state uncertainty and information asymmetry (the employee's possession of information the owner does not have).

DF analyze when budget-based contracts can provide better incentives than alternative contracts. More specifically, they establish conditions under which budget-based contracts that pay the employee a fixed incentive for achieving production at or above a budget target are Pareto superior to linear incentive contracts that pay the employee a fixed amount per unit produced without a budget target. The budget-based contract plays a decision-influencing role by providing the employee an incentive to exert effort at a lower cost than any linear incentive contract. The cost is lower because the budget-based contract's fixed payment for achieving the budget target means that as long as the risk-averse employee meets the target, she bears no risk because her incentive payment is fixed. In contrast, because the total production depends in part on the exogenous state outcome, a linear incentive contract imposes additional risk on the risk-averse employee, and the owner must ultimately compensate the employee for bearing this additional risk.

DF's results relate the budgeting variable of budget-based targets to the nonbudgeting variables of employee risk preferences and information. They establish that two necessary conditions for budget-based contracts to outperform linear contracts are that the employee be risk-averse and that the employee's productive effort be unobservable to the owner.

DF's analytical results offer an explanation for why we observe budget-based targets in some circumstances but not in others. For example, when the owner can observe the

employee's effort level, the owner has no need for budget-based targets because he can discipline the employee by threatening to fire him if he fails to exert enough effort. Likewise, if the employee's effort is private information but the employee is risk-neutral, the owner will do better to let the employee bear the risk by leasing the operations to the employee. Based on this type of reasoning, analytical models predict that organizations are more likely to use budget-based contracts as the employee's effort becomes more difficult to control by direct observation and as the employee becomes more risk-averse.

Participative budgeting. A second important budgeting practice examined by analytical research is participative budgeting. In this context, several models relate the budgeting variables of participative budgeting and the employee's incentive contract to local conditions including the actual cost of production or the actual level of demand, the employee's private information about the cost and demand, and the employee's risk preferences. In these models, participative budgeting means that the employee communicates private information about local conditions to the owner and these reports influence the organization's production plans and the employee's compensation. The owner has the choice as to whether to base the employee's compensation, in part, on the employee's communication about local conditions. In making this decision, the owner knows that the employee has superior information about local conditions, but the employee also has the ability and incentive to manipulate his report to create budgetary slack.

Baiman and Evans (1983) and Penno (1984) demonstrate how participative budgeting can create a Pareto improvement by allowing employees to communicate their private information to the owner. Incentive payments to the employee then depend on the relation between the employee's specific communication and the resulting production and organization profit. The value of budgeting is that contracts incorporating the budget communication from the employee are Pareto superior to all contracts without budgeting communication; i.e., to all contracts without participative budgeting.

The analytical results offer an explanation for why participative budgeting is observed in some circumstances but not in others. For example, when the employee possesses no private information, participative budgeting has no value. Likewise, if the employee possesses private information but is risk neutral with sufficient resources to fund production, then the owner will do better to let the employee bear the risk by leasing the operations to the employee. Based on this type of reasoning, analytical models predict that participative budgeting becomes more likely as the employee becomes more risk-averse, possesses more private information, and has less personal wealth.

Capital budgeting. The capital-budgeting context is similar to participative budgeting in that the employee's budgetary reports communicate his private information. However, here the budgeting variables are the level of the budget target (hurdle rate for project approval) and the form of the budget-based contract, while the nonbudgeting variables include the employee's private information, risk preferences, wealth level, and alternative labor market opportunities. Antle and Fellingham (1995) (hereafter AF)¹⁶ show how the employee's private information leads the organization to set the hurdle rate for capital budgeting projects above the cost of capital. AF show that when the employee has superior information about local conditions (production costs), the organization maximizes expected profit by setting the hurdle rate above its cost of capital, thus forgoing profitable projects that yield returns between its cost of capital and the hurdle rate. The rationale for doing so

¹⁶ See also Antle and Eppen (1985) and Antle and Fellingham (1997). The latter paper reviews the capital budgeting literature, emphasizing differences between the analytical approach and behavioral approaches to information asymmetry and budgetary slack.

is that the higher hurdle rate saves the organization more by limiting the employee's ability to obtain excess resources (budgetary slack) than the organization loses in forgone profits. The empirical implications are that organizations will set their hurdle rates for project approval above their costs of capital and that organizations will not invest in all apparently profitable projects.

The analytical results on capital budgeting explain why owners permit employees to build budgetary slack and why organizations set their hurdle rates for project approval above their cost of capital. The owner permits budgetary slack because eliminating all slack is too expensive; it would require producing only when the minimum cost was realized. The owner will do better to let the employee build in some slack because the owner is simultaneously also accumulating profit. Based on this type of reasoning, analytical capital budgeting models predict that budgetary slack and the gap between the hurdle rate and the cost of capital will increase as the employee's private information increases.

Variance investigation. In this final budgeting context, the budgeting variables are whether and when the owner investigates budget variances and how the results of the investigation are incorporated into the employee's incentive contract. The nonbudgeting variables include the information structure, specifically the statistical relation between the firm's outcome and the results of the variance investigation, as well as the employee's risk preferences. Baiman and Demski (1980) describe an organization's optimal policy for investigating budget variances. They demonstrate that given certain assumptions about the signals that are available to evaluate the employee's performance and the employee's preferences, the optimal variance investigation policy depends on how risk-averse the employee is. Specifically, for more risk-averse employees, the owner maximizes organization profit by investigating unfavorable variances and then penalizing the employee if the outcome of the variance investigation indicates that the employee has shirked. For less risk-averse employees, the owner maximizes organization profit by investigating favorable variances and then rewarding the employee if the outcome of the variance investigation indicates that the employee has exerted the proper level of effort.

Baiman and Demski's (1980) analytical results offer an explanation for why organizations investigate some variances but do not investigate others. The explanation is that the organization should match its investigation process to the type of employees it has. Specifically, the model predicts that as an organization's employees become more risk-averse, the organization will shift from investigating favorable variances to investigating unfavorable variances. Likewise, the organization will shift from using bonuses to reward positive investigation results to using penalties to discipline employees when the investigation reveals negative results.

Organizational structure. The preceding analytical models treat an organization's organizational structure as exogenously given, and hence as one dimension of the organization's environment. However, more recent analytical research in accounting has allowed components of the organizational structure to be endogenous (e.g., Melumad et al. 1992; Baiman et al. 1995; Arya et al. 1996; Hemmer 1998).¹⁷ Although this research has not focused on budgeting per se, the simultaneous examination of compensation and organizational structures has important implications for budgeting. For example, Melumad et al. (1992) analyze when an owner employing two managers would designate one manager to be responsible for a cost center with authority to contract with the second manager rather than employing a "flatter" organizational structure with both managers responsible directly

¹⁷ Much of this work is inspired by related work in economics (e.g., Milgrom and Roberts 1992, 1995).

to the owner. They show analytically that even when communication is costless, a cost-center arrangement with budget-based contracts can do as well as any arrangement in which the owner contracts directly with both employees. Further, when communication is costly, the owner is strictly better off with the cost-center arrangement. These results illustrate how certain features of organizational design can be treated as endogenous within the economic perspective on budgeting.

Similarly, Arya et al. (1996) analyze alternative organizational reporting structures to deal with multiple managers. They illustrate how the single-manager, single-project capital-budgeting model in Antle and Fellingham (1995) can be extended to richer settings. In particular, they show how relative ranking of projects can help an owner to obtain information from multiple managers at the minimum cost.

Developing Empirical Implications from Analytical Budgeting Models

The preceding discussion of analytical budgeting models has emphasized the conceptual appeal of the models' joint owner-employee focus as well as their integration of compensation and budgeting practices. Both of these features operate to make more variables endogenous, which is conceptually attractive but costly. The cost is that simultaneously analyzing owners' and employees' welfare, as well as compensation and budgeting practices, requires more complex models. In turn, more complex models reduce a researcher's ability to derive precise, unambiguous, empirically testable implications from the models. As models become more complex with additional endogenous variables, the effect of a change in any one variable depends on how that variable relates to the increasing number of other variables in the model. Because the variables in economic models are typically not assumed to be related in a unidirectional linear additive fashion, the model is more likely to predict that the effect of interest is ambiguous because it depends on other variables or relationships. We next discuss some examples of economics-based empirical budgeting research, starting with archival studies and then laboratory experiments.

Archival research. Relatively few studies have tested economics-based budgeting hypotheses using archival data. This section discusses some obstacles that may account for the relatively limited research in this area, and describes three of the studies that have been conducted. Several factors combine to limit the empirical testing of the analytical budgeting models described in the previous section.

First, because disclosures mandated by the SEC and FASB typically do not include many of the variables in budgeting models (e.g., employees' skills, preferences, and knowledge, local production functions, etc.), data availability is the most fundamental limitation. The relatively large number of studies of CEO compensation using mandated disclosures for the top five executives of publicly traded corporations suggests that researchers would conduct many more archival studies of budgeting in for-profit organizations if corresponding empirical archival budgeting data were available.¹⁸

Second, certain features of the results from analytical budgeting models complicate the task of a researcher attempting to conduct empirical tests based on those results. Some analytical results (e.g., the DF results cited earlier about when budget-based contracts will dominate linear contracts) are not well suited to testing with archival data. The problem is that although DF rank these two types of contracts, they cannot rule out some other contract

¹⁸ Archival data about budgeting in government organizations is more readily available. Using these data to test predictions based on agency models is problematic, however, because the roles and incentives of individuals in government organizations may not closely match those in the for-profit organizations represented in most agency models (e.g., owners who provide capital and have a residual claim on output).

form dominating both budget-based and linear contracts. Hence, the DF results fail to provide an unambiguous prediction about the form of contract one should expect to observe in practice. Perhaps even more importantly, many analytical results depend on nonbudgeting variables such as individual risk preferences and the precise private information held by different parties that are almost certainly unavailable in archival settings.¹⁹ Measurement of such variables is more practical in experimental laboratory settings, which we discuss below.

Reflecting these and perhaps other considerations, we are aware of relatively few archival tests of the various economics-based budgeting predictions illustrated earlier. Considering the four analytical budgeting contexts described above, we are unaware of any empirical archival studies based on the models of capital budgeting and variance investigation. Models in both of these contexts do predict the form that budgeting practices (e.g., hurdle rates greater than the cost of capital, variance investigation followed by penalties for more risk-averse employees) should take. However, a serious obstacle to archival testing is that these predictions depend on precise specifications of what owners and employees know about certain variables, as well as individuals' risk preferences, and as noted above, such knowledge and preferences are very difficult to measure in archival settings.

For the remaining two contexts of budget-based contracts and participative budgeting, we have identified three studies that draw on the underlying economic intuition from the related models, although they do not test the specific predictions generated by the models. First, for the comparison of budget-based contracts to linear contracts, DF's analytical model demonstrates the role of budgeting in the key trade-offs between incentives and risk sharing that underlie incentive contracting in organizations. To motivate risk-averse employees to exert effort, owners use incentive contracts that impose risk on the employees. However, because the employees must be compensated for bearing this risk, owners choose the minimum amount of risk sufficient to produce the desired incentives.

Murphy (2001) and Indjejikian and Nanda (2002) are two archival studies that focus on budgeting practices. Both studies motivate hypotheses in terms of the trade-off between incentives and risk sharing. These studies document the role of performance targets (typically budget targets) in CEO and managerial compensation. Murphy (2001) finds that for his sample of large U.S. corporations, budget-based measures are the most common targets in annual bonus plans. Consistent with results from analytical models, Murphy (2001) finds that organizations are less likely to use internal targets as performance targets when these targets contain more random variation (i.e., when the internal targets are "noisier") and thereby impose more risk on risk-averse managers relative to external targets. Conversely, he finds no support for the prediction that organizations with greater investment opportunities will rely more on external targets because they face more serious dysfunctional consequences from managerial manipulation of internal targets.

Indjejikian and Nanda (2002) provide empirical evidence for their sample of managers at the CEO through plant-manager level showing that target bonuses tend to be smaller when performance measures are noisier, but larger when organizations have greater growth opportunities and executives exercise greater discretion. Because these bonuses are often based on a comparison of actual performance to budget, the size of the target bonus is an indicator of the amount of compensation that depends on the actual-versus-budget comparison. These results support the analytical prediction about limiting the risk imposed on

¹⁹ Lambert (2001, 18) describes the sensitivity of agency theory results to specific individual parameters as "both a blessing and a curse." The blessing is the flexibility to explain various contract forms, while the curse is the difficulty of empirically measuring many of the parameters.

risk-averse managers (but only for non-CEOs), as well as the notion that target bonuses are positively associated with organizations' growth opportunities.

In the participative-budgeting context, Shields and Young (1993) depart from the prior literature's focus on the consequences of participative budgeting to identify the factors that determine when organizations will employ participative budgeting. They then draw on the analytical models' prediction that managers' possession of superior information is a necessary condition for participative budgeting to be valuable. Rather than controlling for all factors in the analytical model, they rely on capturing the essential economic intuition for the economic benefits of participative budgeting. They test this and other predictions using archival data and find support for the prediction relating managers' superior information to organizations' decisions to use participative budgeting.

Experimental research. Laboratory experiments permit researchers to control environmental factors and thereby investigate the response of individuals to environmental conditions that are difficult to measure in archival settings. With respect to the four budgeting contexts for which we earlier described analytical economic models, experiments have addressed budget-based contracts, participative budgeting, and capital budgeting, but not variance investigation.

With respect to budget-based contracts, Bonner et al. (2000) review results of 85 laboratory studies in managerial accounting and other literatures using various tasks and incentive schemes, and conclude that budget-based schemes are the most likely to produce positive incentive effects.²⁰ At a very general level, this result is consistent with DF's finding that budget-based contracts dominate linear contracts. However, the result must be interpreted carefully because DF's result holds only under specified conditions including unobserved employee effort and employee risk-aversion, whereas the studies reviewed by Bonner et al. (2000) typically do not reproduce these conditions. Further, DF's comparison is from the agency perspective incorporating the welfare of the owner and employee, whereas "performance" (e.g., total units produced in a production task) is only a proxy for the welfare effects.

Participative budgeting and capital budgeting share the feature that the employee's private information plays a central role, and a variety of experiments have addressed different implications of this private information. Studies have focused the most attention on how alternative budgeting and contractual arrangements affect the truthfulness of the employee's communication. Various contract forms have been studied including truth-inducing schemes and slack-inducing schemes in a single-agent environment, as well as the Groves mechanism with multiple agents. Experimental results have generally confirmed the predicted truth-inducing properties of budgeting practices identified by analytical models as inducing honest communication.

In contrast, experimental results have deviated more significantly from the predictions of economic models when the contracts give employees the incentive to misrepresent their private information. In particular, various experiments explore the extent to which individuals create the maximum potential budgetary slack through their budgetary report as the analytical models predict. Experimental results consistently find that individuals create significantly less budgetary slack than the models predict (e.g., Chow et al. 1988; Chow et al. 1994; Waller 1988). Among the explanations offered for these results are that individuals' preferences include not only wealth and leisure, but also equity or honesty, etc. (Stevens

²⁰ Their terminology for budget-based schemes is "quota schemes," but the criteria (Bonner et al. 2000, 26) correspond to our budget-based category.

2002). In turn, Rankin et al. (2003) examine how such reporting behavior may influence the superior's design of the budgeting contract. These significant deviations between assumed and actual communication behavior cast doubt about the optimality of budgeting arrangements designed around the assumption of wealth and leisure as the only important arguments in the utility function (Evans et al. 2001).

Causal-Model Form

The analytical budgeting models described earlier imply that the relations among budgeting variables and nonbudgeting variables reflect equilibrium conditions. Given the environments facing organizations, owners design compensation and budgeting systems to maximize organization profits subject to various constraints. The constraints include ensuring that compensation and budgeting systems provide the employee with at least as much welfare as he would enjoy working elsewhere and that the employee has incentive to take productive actions and issue communications as the owner wishes. The analytical models are typically solved as nonlinear programming problems in which various combinations of constraints may be binding in equilibrium depending on the conditions facing the organization. This implies that the equilibrium values of budgeting variables will be complex nonlinear functions of the nonbudgeting variables as well as the other budgeting variables. Even in a simple model of one owner and one employee in which the employee has only a few possible private information signals and a few possible effort level choices, the number of variables (incentive payments and budgeting practices) in the solution grows exponentially with the number of effort levels and signals. Likewise, the solution must simultaneously satisfy a series of nonlinear relations that may hold as equalities or inequalities, making it very difficult to find simple, explicit solutions in any but the most limited environments.

Part of the resulting complexity stems from researchers' desire to capture relations among such factors as the organization's structure and budgeting practices. If certain organizational features are allowed to be endogenous rather than taking them as exogenously fixed, then this has the attractive feature of recognizing interactions between variables that researchers believe to be important. At the same time, the cost of doing so is that the equilibrium solutions involve solving a system of equations to obtain results that are more complex and difficult to interpret.

In contrast to the complex nonlinear analytical solution forms that are very sensitive to individual risk preferences and beliefs about uncertain variables, the corresponding empirical tests typically assume unidirectional linear additive model forms. This simplicity reflects at least two considerations. First, as illustrated in the preceding series of specific applications, the precise empirical implications of the analytical models are usually too specific for empirical testing. For example, consider the relatively precise prediction that participative budgeting is valuable when the employee has private information and is risk-averse. However, what researchers really want to compare empirically is situations with more private information versus those with less private information (as opposed to the extremes of some private information versus no private information). Therefore, researchers extrapolate from the extremes in the model to the qualitative relation between situations with more versus less private information, relying on the general economic intuition for the effect. However, this means that researchers can only make a simple directional prediction.

The second consideration is that researchers' ability to measure many of the variables such as risk preferences and private information is relatively limited. As a result, empirical research relies primarily on less precise, qualitative predictions concerning the relations

among variables that can be measured as opposed to more precise predictions about variables that cannot be measured.

Summary

Perhaps the most distinctive feature of the economic perspective on budgeting is the simultaneous reconciliation of the interests of owners and employees. Researchers have employed theoretical, archival empirical, and laboratory experiment studies to examine why budgeting practices are used, the form these practices take, and how they affect reporting behavior (budgetary slack) and individual welfare. From an economic perspective, owners respond to incomplete markets by using budget practices within incentive systems to better inform decisions and to better align the incentives of decision makers with the owners' interests (a decision-influencing use of information). Analytical research shows how budget practices such as participative budgeting can be rationalized by its decision-facilitating contributions, while the investigation of budget variances creates value by enhancing the efficiency of incentives. Analytical research also demonstrates how capital-budgeting practices may limit investments to discourage the creation of budgetary slack, and empirical research establishes that organizations choose budget targets in response to the relative level of noise in alternative targets. Finally, laboratory experiments confirm that individuals do respond to economic incentives, but that other considerations such as honesty or fairness appear to significantly influence budgeting communications, thereby reducing the level of budgetary slack.

Opportunities for integrating the economic perspective with other theoretical perspectives can potentially take many forms. For example, the economics perspective might consider how to incorporate psychology's richer representation of how budgeting affects individuals. Second, economics could also recognize sociological considerations such as organizational processes and constraints regarding whether superiors or subordinates initiate budget negotiations, the maximum length of negotiations, the impasse resolution process, etc.

PSYCHOLOGY PERSPECTIVE ON BUDGETING

Primary Research Question

The psychology-based budgeting research can be characterized by the distinguishing feature of psychology relative to the other social sciences, which is its focus on how individuals' mental states are both influenced by stimuli and influence their behavior (e.g., communicating, effort, gaming) and performance. The psychology-based budgeting research has focused almost exclusively on answering the following question: What are the effects of budgeting practices on individuals' mental states, behavior, and performance? In contrast, little research investigates the causes of differences in budgeting practices, for example, whether differences in the extent of participative budgeting (or some other budgeting variable like budget-based compensation) are caused by differences in individuals' mental states, behavior, or performance. In attempting to answer the question about the effects of budgeting practices, psychology-based research has had a three-stage historical development in which each stage sought to answer this question by using a different causal-model form.

The initial research looked for unidirectional direct linear additive effects of budgeting practices on individuals' mental states, behavior, and performance. When the evidence accumulated did not provide consistent results (i.e., evidence not consistent with theoretical predictions, inconsistent evidence across studies), research moved on to the second-stage question: Are the effects of budgeting practices on individuals' mental states, behavior, and

performance conditional on other budgeting variables and/or nonbudgeting variables like uncertainty (i.e., are the effects of budgeting better explained or predicted by unidirectional direct linear interaction models)? Overall, the results of these studies did not provide a consistent answer to this question because of theory-empirics inconsistency and inter-study empirical inconsistency. In response to these inconsistent answers to the second-stage question of whether the effects of budgeting practices are direct linear interactive, the research has recently begun to move on to the third stage in which the question is reframed as: How do mental states mediate the effects of budgeting practices on individual behavior and performance? This third-stage question asks whether the effects of budgeting practices on behavior and performance are unidirectional linear additive indirect via mental states (an intervening-variable causal-model form).

The three stages of research addressing the basic question about the effects of budgeting practices can also be characterized as follows. The first two stages focused on different causal-model forms for the independent variables (i.e., additive versus interactive). In contrast, the third stage of research is focused on relations among the dependent variables in the models used in the first two stages—individuals' mental states, behavior, and performance (e.g., budgeting practice → mental state → behavior → performance).

Level of Analysis

Almost all the extant psychology-based budgeting research is at the individual level of analysis,²¹ because of its focus on how the effects of budgeting vary across individuals. Two caveats should be kept in mind, however. First, the focus is typically on a subordinate's budgeting-related mental state, behavior, and performance in the context of a superior-subordinate dyad (for example, as they work together to develop a budget for the subordinate). Although the dyadic relation provides the budgeting context, this research usually does not investigate the causes or the effects of a superior's mental state, behavior, or performance, instead focusing only on the subordinate. Second, only a few studies focus on budgeting at the subunit level with multiple subordinates (e.g., Daroca 1984).

Assumptions

Two assumptions are made in the psychology-based budgeting research. One is the assumption that behavior is boundedly rational and satisficing. The other is that individuals seek or desire a state of internal (single-person) equilibrium that is called *mental consistency*, but they are often in a state of disequilibrium due in part to their bounded rationality and satisficing.

Concerning rationality, psychology-based research assumes that individuals are boundedly rational and satisficing.²² Complex and ill-structured problems like those related to developing and implementing budgets can exceed individuals' limited cognitive processing capacity. For example, when making judgments and decisions about budgets (e.g., searching for information, identifying alternatives, assessing the costs, benefits, and probabilities associated with each alternative), the information-gathering and mental costs of searching and processing information will often exceed individuals' mental capacity to consider all information about all alternatives and select the best one. As a result of being boundedly rational and satisficing, individuals frequently will not consider all alternatives and all possible

²¹ See Chenhall (1986) for an exception.

²² For analysis and evidence on bounded rationality, satisficing, and unstable preferences, see Conlisk (1996), Rabin (1998), and Shafir and LeBoeuf (2002).

information about each alternative and instead will frequently select the first alternative identified that provides benefits above some aspiration or satisficing level. The alternative selected does not necessarily represent the optimal trade-off between the costs and benefits of searching and processing information; it is simply a satisfactory trade-off. That is, the alternative selected does not necessarily maximize an individual's expected utility. Moreover, levels of aspiration tend to adjust to circumstances. In order to avoid mental tension between what individuals believe is achievable and what they prefer (i.e., to avoid cognitive inconsistency), they may adjust their preferences to feel better about whatever outcomes they believe are achievable.

The notion of cognitive consistency of an individual's mental state is an important assumption in psychology and is the basis for the psychological concept of equilibrium. Cognitive consistency means individuals' mental states (e.g., attitudes, beliefs, preferences) fit together harmoniously and do not conflict. When mental states are not harmonious or are in conflict (e.g., cognitive dissonance), then individuals are assumed to experience an unpleasant psychological state of tension, which causes stress, which then motivates individuals to reduce stress by changing a mental state(s) to create cognitive consistency. "The inconsistent relation among cognitions is referred to [in various psychology theories] as cognitive imbalance ... asymmetry ... incongruence ... and dissonance" (Shaw and Costanzo 1970, 188; see also Deutsch and Krauss 1965).

Psychology-based budgeting research relies explicitly on cognitive consistency. For example, Brownell (1982c, 14) states that "the fundamental thrust of consistency theory is that individuals strive for a balanced or equilibrium cognitive structure, with unbalanced or disequilibrium situations construed as cognitive conflict." Stress is a frequently used dependent variable in the psychology-based budgeting research because it is a direct consequence of being in disequilibrium and it leads to dysfunctional behavior (e.g., gaming, reduced effort). The psychology-based research on budgeting implicitly assumes that disequilibrium occurs frequently, because this research primarily investigates the negative psychological effects of budgeting; in equilibrium, there would be no effects due to cognitive inconsistency such as stress.

Budgeting and Nonbudgeting Variables

The most frequently used budgeting variables in the psychology-based budgeting research are participative budgeting, budget difficulty, budget-based performance evaluation,²³ and budget-based compensation.²⁴ The most frequently used nonbudgeting variables are: (1) mental states—attitudes, motivation, satisfaction, and stress; (2) organizational context—task uncertainty; (3) behavior—gaming (e.g., data manipulation, inaccurate communication); and (4) performance—individual managerial. Typical studies examine the effects of various combinations of participative budgeting, budget-based performance evaluation, and task uncertainty on stress and/or performance.²⁵ As discussed below, these independent and dependent variables are the core set of variables that have driven the nature of, and changes in, psychology-based budgeting research.

²³ This variable is often called budget-constrained performance evaluation style, budget emphasis in performance evaluation, or Reliance on Accounting Performance Measures (RAPM) (Hartmann 2000).

²⁴ Budget-based compensation means that an individual's compensation is influenced by, for example, the difference between actual and budgeted performance.

²⁵ See Shields and Shields (1998) for a review of the research on participative budgeting and Hartmann (2000) for a review of the research on budget-based performance evaluation.

Causal-Model Form

To examine the effects of budgeting variables, the psychology-based budgeting research has employed three causal-model forms, each for a different historical stage of this research. The remainder of this section describes the casual-model form used in each stage to investigate the effects of budgeting and why each form was used. All three causal-model forms are unidirectional linear with budgeting practices as independent variables, but they differ on whether they are additive- or interactive-effects models and direct- or indirect-effects models.

Stage One: Additive Model

The first budgeting studies sought to answer the question: Do budgeting practices have direct linear additive effects on mental states, individual behavior, and individual performance? This question arose in response to increasing awareness that successful budgeting practices depend on how they are related to psychology variables in organizations (e.g., cognitive consistency, stress) and not only on their technical correctness (e.g., mathematical correctness of calculations; adherence to policies concerning the timing, form, aggregation, and documentation of budgets; and the numerical consistency of budgets across organizational subunits in achieving organizational goals). Until the early 1950s the accounting literature and practice had largely treated budgeting as a technical phenomenon only. Practitioners increasingly noticed, however, that organizations with good technical budgeting sometimes had undesirable social-psychological events related to budgeting (e.g., interpersonal conflict). In response, the Controllershship Foundation sponsored a study by Argyris (1952, 1953) to increase understanding of budgeting's psychological effects.

Participative budgeting. Argyris' (1952, 1953) (hereafter Argyris) exploratory field study, based on the human relations perspective from organizational social psychology, sought to identify the nature and effects of these undesirable social-psychological events. He identifies several ways in which pressure to achieve budgets creates cognitive inconsistency in employees' minds (e.g., "I want to achieve my budget and be a good organization citizen but I can't achieve my budget if I were to follow organization policies."). This cognitive inconsistency results in stress, interpersonal conflict, and distrust, which in turn cause dysfunctional behavior (e.g., gaming, reduced effort, poor communications).

Argyris' principal recommendation for reducing these dysfunctional effects of budgeting is to use participative budgeting (i.e., a superior lets a subordinate be involved with and have influence on the setting of the subordinate's budget) and to avoid pseudo-participative budgeting (i.e., a superior lets a subordinate be involved with but have no influence on setting the subordinate's budget). Using concepts from the human-relations perspective, Argyris argues that participative budgeting would reduce or eliminate the conditions (e.g., budgets that employees believe are not achievable, too much pressure to achieve budgets) that lead to poor mental states (low motivation to achieve the budget) and dysfunctional behavior.

Argyris provided qualitative evidence that budgeting can adversely affect employees' mental states and behavior. This evidence highlighted how the success of budgeting for motivating employees and for planning depended on how budgeting influenced employees' mental states and behavior. Two subsequent studies, motivated in part by Argyris' findings, had an important influence on the development of psychology-theory-based investigations of budgeting. First, Stedry (1960) experimentally tested the effects of budget difficulty and individuals' motivation (level of aspiration) on their performance. He found that performance is a complex interactive effect of budget difficulty and motivation to achieve the budget target. Specifically, individual performance is conditional on whether a budget target is

imposed, and if it is imposed, how difficult the target is to achieve; individual performance is also conditional on whether the individual sets his or her own level of aspiration, and if so, whether it is set before or after learning whether or not a budget target will be imposed. If a target is imposed, then individual performance also depends on whether the individual sets his or her level of aspiration before or after learning what the target is.

In a second influential study, Hofstede (1967) used interviews and surveys to investigate relations among many budgeting and nonbudgeting variables. His primary focus, however, was the effects of participative budgeting and budget difficulty. Using level of aspiration theory, Hofstede predicted and found that budget difficulty had a nonlinear effect on motivation to achieve the budget: maximal motivation occurred when budget difficulty was moderate (neither very easy nor very difficult). In contrast, Hofstede found that budget difficulty had no effect on job satisfaction. He also hypothesized and found that participative budgeting had a positive effect on motivation to achieve the budget.

Stedry (1960) and Hofstede (1967) had an important impact on the research strategies of ensuing psychology-based budgeting studies. In reaction to the scope and complexity of these two studies (e.g., number of variables, causal-model form), most subsequent studies used simpler and more focused research designs. For example, like much of the research in organizational and social psychology, most subsequent budgeting studies used a small set of variables and examined simple causal-model forms, almost always hypothesizing and testing for unidirectional direct linear additive effects of budgeting on individuals' mental states, behavior, and performance. However, many of these budgeting studies had results contrary to prediction and inconsistent across studies, with some studies finding positive, negative, and no significant effects (Hopwood 1976; Kenis 1979; Shields and Shields 1998).

Budget-based performance evaluation. Up to this point the budgeting research was primarily focused on the motivating and planning use of budgeting via participative budgeting. Hopwood (1972) extended the psychology-based study of budgeting by investigating whether the extent and style in which managers use budgets to evaluate their subordinates' performance influences subordinates' mental state, behavior, and performance.²⁶ He developed and tested three styles of evaluating performance: (1) budget constrained, in which budgets play a key role in evaluating performance and are used in a rigid manner such that failure to achieve budget targets results in poor evaluations regardless of the reasons for failure; (2) profit conscious, in which budgets provide targets for indicating whether performance is good or bad, but they are used in a more flexible manner and viewed as just one indicator of a longer-term concern with profits (i.e., spending over the current budget can be viewed favorably if it results in higher expected future profits); and (3) nonaccounting, in which budgets are of secondary importance and performance is primarily evaluated by reference to nonaccounting information. Hopwood (1972) argues that accounting and budget information for evaluating performance frequently provides incomplete, imprecise, or biased information about managers' actions and performance. When accounting and budget measures are used to evaluate performance, subordinates are likely to experience role conflict (a form of cognitive inconsistency) because of uncertainty concerning how their actions affect these measures. This sets off a causal chain starting with stress, poor

²⁶ Motivating and evaluating may seem similar to some readers, but the psychology literature assumes that motivating can be achieved by stimuli other than financial rewards assigned during a performance evaluation (e.g., by influencing individuals' attitude, morale, or intrinsic interest in the task). Evaluating is not necessarily limited to assigning financial rewards based on performance (e.g., in many organizations performance evaluations are related to human resource management and include rating and ranking employees in terms of their value to the organization).

mental states (e.g., attitude about and dissatisfaction with budgeting, motivation), dysfunctional behavior (e.g., gaming) and, finally, poor performance.

Hopwood (1972) hypothesized and found that a budget-constrained performance-evaluation style, compared to the profit-conscious and nonaccounting performance-evaluation styles, causes subordinates to experience stress, have poor relations with superiors (e.g., lack of respect and trust) and peers, and manipulate accounting data. He also presented evidence that the budget-constrained style was associated with lower budget-related performance. Otley (1978) sought to replicate Hopwood, but failed to do so, instead finding, for example, that a budget-constrained style did not result in stress and was related to higher budget-related performance.

Hopwood (1972), Otley (1978), and other studies investigated whether budget-based performance evaluation had direct linear additive effects on individuals' mental states (attitudes toward budgeting, motivation, satisfaction with budgeting, stress), gaming behavior, and managerial performance. Many of these studies, however, like the studies of participative budgeting, found results contrary to their predictions and inconsistent with other studies: some studies found positive effects, some found negative effects, and some found no effects (Hartmann 2000; Shields and Shields 1998). To reconcile these inconsistent results for participative budgeting and for budget-based performance evaluation, psychology-based budgeting research began to modify the form of the question about the effects of budgeting.

Stage Two: Interaction Model

The mixed results of studies trying to answer whether budgeting had direct linear additive effects gave rise to the following modification of the original question: Are the effects of budgeting on mental states, individual behavior, and individual performance direct linear interactive with other budgeting and/or nonbudgeting variables (e.g., uncertainty)? This question was suggested by Hopwood (1976) and Otley (1978) and elaborated on by Brownell (1982a). Since the studies related to the additive-effects question did not find that participative budgeting universally improves mental states, behavior, and individual performance, Hopwood (1976) suggested that researchers should not expect the effects of budgeting variables like participative budgeting to be independent of other variables; instead, those effects should be expected to be conditional on other variables (e.g., task uncertainty). Otley (1978) suggested that the difference in results between his study and Hopwood (1972) could likely be attributed to differences in their studies' organizational contexts (profit versus cost responsibility, interdependence, difficulty of operating environment, uncertainty). That is, Hopwood (1976) and Otley (1978) proposed that the causal-model form be changed from additive to interaction. Brownell (1982a) identified several potential interaction variables (environment, organization, task, personal) and urged researchers to investigate which other variables "moderate" the effects of budgeting variables.

In response, many studies investigated various direct linear independent- and/or moderator-variable ordinal and disordinal²⁷ interaction models to try to identify which other budget and/or nonbudget variables could explain the inconsistent effects of budgeting variables detected in the studies answering the additive-effects question. The most frequently used variables in these studies testing interaction models are participative budgeting, budget-based performance evaluation, and task uncertainty as the independent and/or moderator

²⁷ An ordinal interaction occurs when the strength but not the sign of the relation between an independent and dependent variable depends on the level of another independent or moderator variable. In contrast, a disordinal interaction occurs when the sign (and usually the strength) of the relation between the independent and dependent variables depend on the level of another independent or moderator variable.

variables and satisfaction, stress, and individual performance as dependent variables (Shields and Shields 1998; Hartman 2000; Luft and Shields 2003). Overall, these studies did not provide consistent theory-based evidence that, for example, the effects of participative budgeting or budget-based performance evaluation on mental states, behavior, and performance are predictably conditional on other variables such as task uncertainty. In response, subsequent studies began proposing and testing more complex interactions by including other budgeting variables and/or nonbudgeting variables. A key example from the literature provides an illustration.

Brownell (1982b) predicted and found that managerial performance is a disordinal interaction function of participative budgeting and budget-based performance evaluation: managerial performance is at a high level when participative budgeting and budget-based performance evaluation are both at high levels or both at low levels. When either budgeting variable is at a high level and the other at a low level, then managerial performance is at a low level. Hirst (1983) found that stress (considered a predictor of or proxy for poor performance) is associated with a high level of budget-based performance evaluation only when task uncertainty is also high; when task uncertainty is low, stress is associated with a low level of budget-based performance evaluation (a linear disordinal interaction). Hirst's (1983) results promoted further research for two reasons. First, they suggest that Brownell's (1982b) results might depend on the level of task uncertainty. Second, they are inconsistent with Hirst's prediction of a convex relation between budget-based performance evaluation and stress independent of task uncertainty. In an attempt to resolve potential inconsistencies between these results, Brownell and Hirst (1986) predicted that the disordinal relation found in Brownell (1982b) would hold only for low task uncertainty, and that for high task uncertainty stress would be negatively related and performance would be positively related to participative budgeting, independent of the level of budget-based performance evaluation. Their results are consistent with their predictions for stress but not for performance.

These three studies illustrate the difficulty of conducting research on how the effects of a budgeting variable can be conditional on other budgeting and/or nonbudgeting variables. The number of budgeting and nonbudgeting variables that might plausibly interact is large, and therefore the number of potential significant interactions of various forms is very large. The underlying psychology theory does not seem sufficiently well developed to generate consistently supported predictions about which of these potential interactions have significant effects on specific individuals' mental states, behaviors, or performance. It is possible that important higher-order (e.g., four- or five-way) interactions are significant, but they would be difficult to predict, test, and interpret. In consequence, interest in seeking answers to the interaction-effects question has decreased. Studies like Brownell and Hirst (1986) that found inconsistent results for various dependent variables are problematic, in part due to lack of consideration of relations among these dependent variables. Many of these studies had multiple dependent variables, which were treated as being unrelated to each other, when the psychology literature indicates that they are related. The research in the stage-three studies has begun to consider how various dependent variables—mental state, behavior, and performance—are related and this has changed the causal-model form.

Stage Three: Intervening-Variable Model

As research pursuing the interaction question has decreased, research driven by a third question has increased and is emerging as a new focus of psychology-based budgeting research. This question is: How do mental states mediate the effect of budgeting on individual behavior and performance? This question arises from the inconsistent answers to the first (additive-effects) and the second (interaction-effects) questions. Studies of direct linear

interaction effects did not provide definitive explanations of the unexpected and inconsistent results of the studies that test for direct linear additive effects of budgeting variables on mental states, behavior, and performance. The intervening-variable-effect question employs a different strategy to attempt to explain the effects of budgeting variables. While previous research investigated budgeting effects on mental states separately from its effects on behavior and performance, this third question has identified mental states as mediators through which budgeting affects behavior and performance.

The research strategy associated with this new approach is to understand how budgeting influences mental states, which in turn influence behavior and performance. This research strategy assumes that budgeting's effects are not direct on behavior and performance (additive-effects question) or conditional on the budgeting context (interaction-effects question). Instead, the research strategy is to identify which mental states can explain, for example, why budgeting's effect on behavior or performance is positive in some circumstances but negative in others. If research can identify which combinations of budgeting practice-mental state links are associated with positive behavior or performance, then research can better consider how to design budgeting practices to have positive effects on behavior and performance.

Research seeking answers to the intervening-variable-effects question uses an intervening-variable model (or a sequence of direct-effect models), which is consistent with the basic assumption in psychology-based budgeting research that budgeting influences mental states, which in turn influence individual behavior and performance. We next describe examples of recent studies using an intervening-variable model. Shields et al. (2000) provide evidence that the performance effects of participative budgeting, budget difficulty, and budget-based compensation on individual performance are mediated by stress. In particular, they find that participative budgeting and budget-based incentives reduce stress and budget difficulty increases stress, and that stress has a negative effect on performance. Nouri and Parker (1998) show that the participative budgeting-job performance link is mediated by budget adequacy (the subordinate's belief that budgeted resources are adequate to accomplish the budget goal) and organizational commitment: participative budgeting increases budget adequacy and organizational commitment, budget adequacy increases organizational commitment, and budget adequacy and organizational commitment increase job performance. Finally, two studies provide additional evidence on mental states mediating the participative budgeting-performance relation:²⁸ Chong and Chong (2002) show that participative budgeting influences budget goal commitment, which in turn influences the acquisition of job-relevant information which then influences performance; and Wentzel (2002) provides evidence that participative budgeting influences fairness perceptions, which in turn influence goal commitment, which then influences performance.

Summary

The psychology-based budgeting research has focused almost exclusively on answering the question: What are the effects of budgeting practices on individuals' mental states, behavior, and performance? The causal-model forms used to answer this question have evolved through three stages of research. The first stage asked whether the effects of budgeting (primarily participative budgeting and budget-based performance evaluation) on mental states, individual behavior, and individual performance are direct linear additive. Not finding a consistent answer to the first question, the second question asked by the research

²⁸ Both studies find that although the direct participative budgeting-performance relation is not statistically significant, each bivariate link in their intervening-variable model is statistically significant.

is whether the effects of budgeting variables are direct linear interactive with other budgeting variables and/or nonbudgeting variables. Finally, not finding that interaction models provide consistent results that reconcile the research to date, in the third stage the research is moving on to answer the question of how various mental states (e.g., commitment, stress, fairness perceptions) intervene between budgeting and individual behavior and performance, thus testing for indirect linear additive effects of budgeting.

A key challenge in integrating the psychology-based budgeting research with the economics- and sociology-based budgeting research is the level of analysis. Most psychology-based research examines only individual subordinates' beliefs about, for example, budget difficulty and participative budgeting. More might be learned about budgeting through attention to the dyadic and organizational context of budgeting. For example, how does budgeting affect superiors' mental states, behavior, and performance and superior-subordinate interactions, or why does an organization use the budgeting practices it uses? Economics- and sociology-based budgeting research, which studies organization and subunits levels, can be informative on these issues, but care needs to be taken in bridging across these levels and correctly specifying the relations between individual- and organization-level variables.

SOCIOLOGY PERSPECTIVE ON BUDGETING

Primary Research Question

The sociology perspective on budgeting broadly refers to various sociological and organizational research traditions that have concerned themselves with budgeting issues within and across organizations. Wildavsky (1975, xii, xiii) succinctly captured the implications of this broader research perspective of budgeting when he states:

The reasons for studying budgeting ... are many. It exists. The people in it care about what they do. Their actions are important to many others. Budgeting systems achieve many purposes beyond control, that they are at once forms and sources of power ... The bonds between budgeting and "politicking" are intimate. Realistic budgets are an expression of practical politics.

This rich characterization of budgeting implies multiple purposes and uses of budgeting to be considered from the sociology perspective. The bond between budgeting and politics suggests that budgeting serves not only to facilitate decision making to identify optimal solutions in the planning and control of resources, but also to facilitate organizational political processes embedded in the competing values and plurality of interests inherent in complex organizational life. In short, the sociology perspective on budgeting explicitly addresses the tension in aligning individuals' goals and behaviors with organizational goals and objectives, as well as the role of individuals in shaping organizational goals and objectives, through the budgeting process.

The sociology-based budgeting research has addressed the following primary research question: How does budgeting influence decision making and bargaining processes among a plurality of interests pertaining to the planning and control of social and organizational resources? Two major research streams within the sociology perspective are included in this paper: contingency theory of organizations and institutional theory.²⁹

Both research streams have their intellectual roots in March and Simon's (1958) decision-making model of organizations that stresses the importance of the formal organizational structure and processes, and rules and routines such as budgeting that serve to

²⁹ See Introduction and footnote 2 on other sociology-based budgeting research.

bring order and minimize uncertainty for boundedly rational employees. Employees' bounded rationality and satisficing often results in their making decisions that are not aligned with organizational goals. An important assumption of contingency theory is that these employees are not strategic in intentionally violating organization policies and goals. In contrast, political models of organizations such as institutional theory assume that these boundedly rational employees are likely to engage in strategic (self-interested) behavior. Institutional theory also assumes that this strategic behavior often takes the form of attaching meaning to the budgeting process beyond the formal role of coordination and control that it has been given in the contingency theory approach. For example, such strategic behavior could include defending budgeting because it conforms to social norms of rationality or (in the case of participative budgeting) democracy. The distinction between contingency-theory and institutional-theory research on budgeting will be developed more fully later in this section.

Level of Analysis

The level of analysis for the sociology perspective is organizational: the role of budgeting in inter-organizational relationships (with other organizations in the broader social environment) and intra-organizational relationships (between subunits within the organization). Contingency theory and institutional theory share common ground in focusing on the organizational level, but they make different assumptions and use different variables and causal-model forms. In the remainder of the sociology section, therefore, separate analyses are presented for each theory.

Assumptions

Contingency theory

Rationality. Contingency theory, following March and Simon (1958), assumes that individuals are boundedly rational and satisficing. In consequence, it is difficult to align their behavior with organizational goals. (If they were perfectly rational, then this alignment could be achieved through incentives expressed in the organizational budget.) Designers of organizational structure and processes can make mistakes, and employee behavior in response to organizational structure and process choices can be erratic and unpredictable. Contingency theory de-emphasizes individual volition and strategic behavior (Donaldson 2001); failure of individuals to act in the organization's interest is expected to be unintentional, due to decision errors rather than to conflicts of interest between organization and individual.

Equilibrium. The contingency-theory concept of equilibrium is "fit." In order to operate effectively, organizations are expected to fit their structure and process to three groups of contingencies—environment characteristics, organizational size, and technology. "Fit" occurs when a combination of organizational and contingent characteristics produces higher organizational performance than alternative combinations. Contingency theory assumes that, although organizations must have good "fit" in order to survive, and competitive pressures will therefore move them toward equilibrium, disequilibrium occurs often because of individual bounded rationality and satisficing. Organizational disequilibrium can exist for long periods (e.g., ten years) as employees slowly learn from feedback and trial-and-error to bring their decisions into alignment with organization goals (Donaldson 2001).

Institutional Theory

Rationality. Institutional theory also assumes bounded rationality and satisficing, but in contrast to contingency theory it assumes that individual volition and choice are important and often in conflict with organizational goals.

Equilibrium. Institutional theory assumes ongoing tension and disequilibrium in organizations as a result of the potentially conflicting vested interests that individuals import into organizational life. Furthermore, since organizations differ in their propensities to conform to external environmental pressures, the degree to which organizations are able to comply with external social demands (or in the case of subunits, comply with broader organizational demands) through budgeting processes may serve as an important source of variation in their ability to achieve equilibrium (Oliver 1991).

Budgeting and Nonbudgeting Variables

Contingency Theory

Budgeting research based on contingency theory focuses on participative budgeting, budget-based performance evaluation, budget importance, and the use of operating budgets for management control. The nonbudgeting variables are from all three groups of contingencies and include organizational size, decentralization, technology automation, task interdependence, structuring of activities, and diversification strategy.

Research on the relations among these variables is grounded in contingency theory's explicit concern for issues of organizational coordination and control (Woodward 1965; Thompson 1967; Perrow 1967; Lawrence and Lorsch 1969). The two basic themes of early contingency-theory research outside the accounting domain are: (1) a given means of control can only be understood through reference to other control approaches used in an organization; and (2) tight control systems should be used in centralized organizations presumably faced with stable, simple environments, and loose control systems should be used in decentralized organizations, presumably faced with dynamic, complex environments. Consistent with this theoretical tradition, the contingency-theory models of budgeting argue that there are no universally effective budgeting practices. The choice of effective budgeting practices will depend on the environmental and technological circumstances surrounding a specific organization.

Institutional Theory

Institutional-theory-based research tends to focus on the budgeting process as a whole (which can be considered the budgeting variable of interest): the interrelated analyses, interpretations, and negotiations that constitute budgeting. Nonbudgeting variables include the symbolic value of accounting, resource pressure and resource allocation problems, concealment of political (i.e., power and resource allocation) issues, and environmental and organizational change.³⁰

A variety of political models of organizations, including institutional theory, have developed from the basic organizational-theory work by March and Simon (1958). Such political-process models of organizations include Cyert and March (1963) and other organizational research that has brought the politics of budgeting to the foreground (March and Olsen 1976; Pfeffer 1981; Pfeffer and Salancik 1978). This literature focuses on how rules and routines (such as budgeting) support power relationships by providing: (1) the power to set premises and define the norms and standards that shape and channel behavior; and

³⁰ See Covaleski et al. (1996) for more extensive development of the contributions of organizational political models to management accounting research.

(2) the power to delimit appropriate models of bureaucratic structure and policy that go unquestioned for years. March and Olsen (1983) argue that an important part of this political process is the development of meanings (symbols) or values.

More specifically, institutional theory argues that an organization's survival requires it to conform to social norms of acceptable behavior as much as to achieve levels of production efficiency (Meyer and Rowan 1977; Meyer 1986; Carruthers and Espeland 1991; Carruthers 1995). Thus, many aspects of an organization's formal structure, policies, and procedures such as budgeting serve to demonstrate a conformity with institutional rules and social norms, thereby legitimizing it, to assist in gaining society's continued support. Here it is argued that budgeting is used to influence negotiating and bargaining around resource procurement and deployment, rather than to apply bureaucratically neutral decision rules to optimize organizational functioning as depicted in contingency theory. As Czarniawska (1997) suggests, institutional theory depicts budgeting as having a critical role in the expression of symbolic preference in a bargaining process rather than a formal structural control mechanism in a decision-making process, as a means of conversation rather than a means of control, and as an expression of values rather than an instrument for action.

Causal-Model Forms

Contingency Theory

Contingency-theory research identifies three kinds of fit between organizations and their contingencies. The two types of fit that have been used in budgeting research—selection and interaction—imply different causal-model forms (Donaldson 2001).³¹ The first two kinds of fit have been used in budgeting research and imply different causal-model forms. Selection fit is the congruence between an organization and its contingencies. Tests of selection fit use unidirectional direct linear additive models, with contingency variables such as organization size and technology as the independent variables. For example, Bruns and Waterhouse (1975) show that structuring of activities leads to more participative budgeting. Merchant (1981) provides evidence that organizational size and diversification strategy are associated with managers' beliefs that budgeting is more important, and decentralization, diversification, and organizational size are associated with more use of participative budgeting. Macintosh and Daft (1987) show that subunit interdependence results in more use of operating budgets for management control.

Interaction fit is the organizational performance difference between organizations with higher and lower levels of selection fit. Tests of interaction fit use unidirectional direct linear interaction models, usually with organizational (or subunit) performance as the dependent variable. For example, Merchant (1981) finds that the effects of participative budgeting and budget importance on organizational performance are moderated by organizational size, and Merchant (1984) reports that participative budgeting and organizational size interactively affect organizational performance.

Institutional Theory

Studies employing an institutional theory perspective have investigated the causes of budgeting using a unidirectional direct linear interaction model. The effects of budgeting have also been investigated but with different causal-model forms: unidirectional and bidirectional cyclical, linear direct and indirect additive and interaction.

³¹ See Chenhall (2003) for a more extensive analysis of recent research in the contingency-theory tradition. Systems fit has not been used in budgeting research. See Donaldson (2001) for an analysis of systems fit.

The complexity of causal relations implied by institutional-theory approaches is illustrated in a study by Covaleski and Dirsmith (1988a, 1988b), who adopt an institutional perspective to examine the manner in which social norms of acceptable budgetary practices are articulated, enforced, and modified during a period of organizational decline. They note that, consistent with the general theme of the institutional perspective, an organization's survival requires it to conform to social norms of acceptable behavior. They trace and examine a university budget category through its development, transformation, and eventual decline. Covaleski and Dirsmith (1988a, 1988b) describe the process of how a university challenged and rejected a traditional budgeting format and protocol between state agencies and the state for allocating state funding (i.e., the institutionalized budgetary framework) when this framework became inconsistent with the university's goals and interests. Consistent with this institutional perspective of budgeting, Covaleski and Dirsmith (1988a, 1988b) find that the self-interest of the plurality of organizational decision makers (the university, different parties within the university system, the various state agencies, and the legislators) is foremost in the minds of the various parties involved in the budgeting process. They conclude that the common and legitimate language of budgeting is an important vehicle through which societal expectations are enforced and reproduced.

Summary

The sociology perspective on budgeting emerged in the mid-1970s inspired by, and sharing with, the organizational decision-making model's (and, more specifically, contingency theory models of organizations') concern for examining the manner in which organizational structure and processes such as budgeting serve in the control of boundedly rational and satisficing employees within organizations. The predominant deterrent to the achievement of such organizational goals is that these relatively nonvolitional, yet malleable, employees are limited in their capabilities (i.e., boundedly rational) to achieve organizational outcomes. The articulation of how organizational structure and processes serve to influence these employees should enhance our understanding of how budgeting influences organizational decision making pertaining to the planning and control of resources.

However, from an organizational theory perspective, these employees are capable of volitional strategic behavior, including efforts to attach meanings to these various organizational tools such as budgeting to advance their own agendas. As such, they might attempt to define the meaning attached to the budgeting process beyond the formal role of coordination and control that it has been given in the contingency theory approach. More political organizational models (and, more specifically, institutional theory models of organizations) have directed attention to the importance of symbolic aspects of organizations and their environments, reflecting a growing awareness that besides being technical systems, organizations also exist in a broader social environment that defines their social reality. Thus, institutional theory provides a model to more explicitly address the volitional role of the plurality of interests pertaining to the planning, control, and bargaining processes such as budgeting around social and organizational resources.

A major contribution of the sociology perspective to budgeting research is its level of analysis: the role of budgeting in inter-organizational relationships as well as in relationships between subunits within the organization. Although the different views within the sociology perspective characterize organizational relationships in different manners (e.g., the relatively nonvolitional, malleable employees in organizational decision models such as contingency theory versus the more volitional behavior in organizational political models such as institutional theory), these models remain somewhat limited in that they are primarily based

upon assumptions about, rather than a detailed investigation of, individual behavior. More might be learned from systematic study of the behavior of individuals such as offered by economics- and psychology-based budgeting research. The more theoretically informed analysis of individual behavior presented in budgeting research from economics and psychology perspectives provides an opportunity to combine such insight with the more macro models in sociology-based budgeting research to potentially capture the richness of the budgeting phenomenon.

SELECTIVE INTEGRATION IN BUDGETING RESEARCH: CRITERIA AND EXAMPLE

Research on budgeting from the three theoretical perspectives provides a variety of explanations of the causes and effects of a common set of budgeting practices (e.g., participative budgeting, the use of budgets in performance evaluation and compensation). To the extent that these are competing and mutually exclusive explanations³²—if, for example, psychology-based and economics-based explanations of the same practice cannot both be valid—then integrative research is needed to decide which explanation (if either) is valid. If the different perspectives provide compatible explanations, then integrative research is needed to determine if and how they can be combined into more complete explanations.

Compatible explanations can be combined in a variety of ways. For example, in some instances, research in different perspectives may identify multiple independent causes of a particular budgeting practice; combining these causes into a single model should increase the model's explanatory power. In other instances, research in different perspectives may provide evidence on budgeting practices in different settings (e.g., executive versus lower levels of an organizational hierarchy, government and nonprofit versus for-profit organizations), and the same practice can have different causes and/or effects in these different settings. In this case, integrative research can add value by explaining *why* the change in setting alters the causes and/or effects of the particular budgeting practice. In still other instances, research in one perspective may, for convenience, treat a particular budgeting practice as exogenously given and examine its effects, while research in another perspective examines the causes of this practice (thus treating it as endogenous) without gathering direct evidence of its effects. In such instances, integrative research that links cause-and-effect explanations can be valuable: for example, a better understanding of the causes of a practice's adoption can sometimes help explain its unexpected effects, and identifying an unexpected effect of the practice can suggest a previously unknown cause for adopting (or not adopting) the practice.

This concluding section identifies four important interrelated criteria to employ in designing and evaluating research that integrates selected cause-and-effect explanations from different theoretical perspectives. These criteria can help researchers to determine whether explanations are competing or compatible and how to combine compatible explanations. In the description of these criteria we use participative budgeting as an example, for two reasons. First, it has been studied in all three perspectives and thus provides numerous opportunities for comparing research on the same practice from different perspectives. Second, participative budgeting research has addressed fundamental questions about how resources are allocated and how information is communicated in budgeting. These questions are still of urgent interest to practitioners, although they are now often described in terms of “top down” budgets versus “empowerment” and “devolution,” rather than “participative

³² “Competing” is used hereafter to mean competing and mutually exclusive.

budgeting” (Hansen et al. 2003). Of course, we are not implying that participative budgeting should be the dominant topic of future budgeting research. The example can easily be extended to other budgeting practices.

These integrative-research criteria can also be relevant when budgeting (or other management accounting) research draws on previously unused theory in economics, psychology, and sociology, as well as when it integrates explanations from multiple theoretical perspectives. As we noted in the “Introduction,” budgeting research has tended to rely on agency theory from economics, social-psychology theory from psychology, and contingency and institutional theories from sociology. Budgeting research has made comparatively little use of other theories such as the economics of complementarities, adaptive learning in games, cognitive psychology, population ecology, or critical sociology. If researchers use such theories to challenge or extend existing budgeting research, then the criteria below will also be relevant.

Four Interrelated Criteria

When researchers compare studies from different theoretical perspectives in order to decide between competing explanations or to combine compatible explanations, the following four interrelated criteria should be addressed.

(1) Are variable names and meanings consistent across theoretical perspectives?

For example, if participative budgeting does not have the same meaning across different theoretical perspectives, then different explanations of participative budgeting are not competing, and thus no attempt should be made to test them against each other. Moreover, they cannot be combined into a more powerful integrated explanation of participative budgeting because they do not explain the same practice. Conversely, explanations of participative budgeting that appear different may merely be using different names for the same conceptual variable. For example, information asymmetry is an important cause of participative budgeting in the economics-based literature, while organization size and diversification are important causes of participative budgeting in the sociology-based literature. These are not necessarily competing explanations, however, if size and diversification are proxies for information asymmetry.³³

(2) Are the explanations of causal process underlying models from different theoretical perspectives consistent with each other?

The explicit model that guides evidence collection in a particular study may consist of only a few variables (e.g., participative budgeting leads to improved organizational performance by reducing *ex ante* information asymmetry). But underlying the model is an explanation of causal process, specifying in greater detail who does what, how, why, where, and when, in order to create the relations in the model (i.e., how does *X* influence *Y*?). Causal-process explanations underlying similar-looking models from different theoretical perspectives can be inconsistent with each other. For example, the economics-based research assumes that subordinates communicate valuable private information only when they are rewarded more for doing so, while psychology-based research sometimes assumes that subordinates communicate valuable private information because they respond to the trust

³³ Whether they are competing explanations or not depends on the detailed causal-process explanation for participative budgeting. The economics-based explanation requires information asymmetry in which the employee possesses information that the owner does not have. If sociology-based explanations argue that information asymmetry is *not* necessary for participative budgeting to have value, then the explanations are not compatible.

implied by the superior's request for their input into the budget. In such cases, before models from different perspectives can be combined, a researcher must resolve the inconsistencies in their underlying causal-process explanations. For example, in the context described above, a researcher might introduce a more general model in which individuals' preferences include both wealth and trust.

(3) *Is research from different theoretical perspectives at the same level of analysis?*

Research on participative budgeting has been subject to the same ambiguities about level of analysis as research in participative decision making in other fields. For example:

Is worker participation an individual-level phenomenon, describing the influence an individual exerts in unit decisions? Or is worker participation at the unit level, describing a set of formal structures and work practices (for example, quality circles) characteristic of units, not individuals? (Kozlowski and Klein 2000, 27)

If explanations are not at the same level, then they may differ without being competing: reasons why different individuals participate more or less within the same organization are not necessarily the same as the reasons why budgeting is more or less participative across organizations.³⁴

(4) *What constraints on causal-model forms are implied by the theoretical perspectives used in integrative research?*

Different theoretical perspectives place different constraints on the empirical causal-model forms used to investigate budgeting, and research that draws on multiple perspectives must attend to these constraints. For example, economic agency theory assumes that budgeting and compensation practices are chosen simultaneously, while sociology contingency theory assumes that organizational practices like budgeting and compensation adjust to each other gradually over time (Donaldson 2001). Simultaneous choice and gradual mutual adjustment imply different bidirectional causal-model forms (reciprocal nonrecursive and cyclical recursive, respectively; see Luft and Shields 2003). Thus, an empirical study of gradual mutual adjustment could not be motivated solely by agency theory. Different theoretical perspectives can also put other specific constraints on the linearity, additivity, directness, and directionality of causal-model forms (see below for examples).

These four criteria are not independent of each other. Specifying the exact definition of the variables under investigation has important implications for causal-process explanations, levels of analysis, and causal-model forms; and valid integrative research must satisfy all four criteria. Next, we develop a multi-perspective description of participative budgeting research, showing how the four criteria are related to each other and how they can be used to generate new research questions and insights.

Example of Applying the Criteria

This example is developed in two parts. The first part focuses on the effects (mostly performance effects) of participative budgeting as described by research in the three theoretical perspectives. Cross-perspective differences in proposed effects are related to cross-perspective differences in the meaning of participative budgeting (criterion 1) and the causal-process explanations of its effects (criterion 2). We suggest that resolving these

³⁴ For expositional convenience, "organizational level" is used in this section to include both subunits and organizations.

differences, either by choosing between competing explanations or combining compatible explanations, will often require examining specific details of budgeting practice that have received little attention in research thus far.

The second part of the example focuses on the causes of participative budgeting, i.e., why budgeting is more participative in some organizations than others. Cross-perspective differences in the nature or extent of these explanations are often related to cross-perspective differences in level of analysis (criterion 3) and causal-model form (criterion 4). To conclude, we discuss causal-model form issues that arise in integrating cause-and-effect explanations across the three research perspectives.

What is participative budgeting and by what causal processes does it affect performance?

Hopwood (1976, 74) observed, “Unfortunately, the arguments in favor of participation are so varied and so vague that one might justifiably question what useful purposes such a concept is capable of serving ... it appears that participation might mean almost anything to anyone.” Although the arguments have become less vague in the last 30 years, they have probably become more varied.

In economic models (e.g., Baiman and Evans 1983), a subordinate participates in budgeting if he or she provides private information that a superior uses to formulate the budget. Participative budgeting is expected to improve organizational performance by making it possible for the superior to allocate resources more efficiently. This explanation suggests that participative budgeting will improve organizational performance more when organizational performance is more dependent on making the “right” resource allocation decisions (e.g., when there are more competing uses for organizational resources and/or larger differences in the returns from these competing uses), and when making the “right” decisions is more dependent on information the subordinate has and the superior (*ex ante*) does not.

In contrast, in the psychology-based research, subordinates participate if they believe they are involved in the budgeting process and have influence over it (Milani 1975). Such involvement and influence can occur even if subordinates do not have private information. Participation in this sense can improve performance by providing a forum for the superior to communicate information to subordinates that they can use to coordinate their efforts with others or choose actions with higher returns (Kren 1992; Locke et al. 1997). Participation can also improve performance by establishing trust and procedural justice, which can stimulate employee effort in addition to the effort that can be monitored and enforced through incentive contracts (Organ 1988; Podsakoff et al. 2000). Both of these causal-process explanations suggest different predictions about participative budgeting than the economics-based causal-process explanation. For example, they suggest that participative budgeting can have value even when subordinates are not better informed than superiors. Also, because the psychology-based explanations depend on the performance effects of employees’ action choices or effort that may be too costly to monitor, they suggest that participative budgeting will lead to larger improvements in organizational performance when subordinates have more freedom of action and their individual actions have more influence on organizational performance.

An early study that influenced the sociology-based budgeting research defines participation differently, as group discussion that “provides the opportunity for enough interaction that a cohesive group [of subordinates] can emerge” and the cohesiveness reinforces adherence to a common goal (Becker and Green 1962, 397). Participative budgeting in Becker and Green’s sense of group interaction among subordinates is logically impossible in a

single-agent model, and its full effects are not included even in multi-agent economic models (e.g., Kanodia 1993), in which the agents typically communicate with the principal but not with each other.

Participative budgeting as group interaction can have either positive or negative organizational-performance effects, which Becker and Green (1962) suggest, but do not develop in detail. "Group cohesion" can work through incentive and preference-formation processes: subordinates can infer that their peers will sanction them for not meeting a goal that the rest of the group accepts or meeting a goal that the rest of the group rejects; or subordinates can be initially uncertain about their own preferences and reduce this uncertainty through social interaction with others.

Sociology-based research also raises the possibility that the social interaction involved in participative budgeting affects organizational performance by facilitating the formulation and sharing of simplified, stable representations of organizational decision problems. In a world of boundedly rational individuals with unstable preferences, the role of participative budgeting can be more one of enabling individuals to coordinate on a satisfactory or stable outcome, rather than driving an organization to the most efficient outcome. This view of the role of participative budgeting is consistent with the institutional theory orientation within sociology-based research, which argues that an organization's ability to acquire resources depends on its conformity to norms of socially acceptable behavior—in this case, satisfactory or stable outcomes—as much as on its achievement of optimal levels of production efficiency (Meyer and Rowan 1977; Covaleski and Dirsmith 1988a, 1998b; Oliver 1991; Czarniawska 1997).

If the definition of participative budgeting as social interaction is linked with the psychology-based concept of individual equilibrium, then it raises the possibility that participative budgeting could create disequilibrium within individuals and reduce performance. For example, social pressure could support a preference for one budget target (Young 1985) while purely individual interests support a preference for a different target. In contrast to the economic assumption "that a person is given one preference ordering which is supposed to reflect his interests, represent his welfare, summarize his idea of what should be done, and describe his actual choices and behavior" (Sen 1990, 37), social psychology and sociology assume that individuals may experience internal conflicts between multiple preference orderings, and that this internal conflict can reduce the quality and timeliness of organizational decision making (March and Simon 1958).

Integrative research can help to sort out this multiplicity of definitions and causal-process explanations of participative budgeting. Some of the causal-process explanations suggested above may prove invalid; some processes may have stronger performance effects than others (with one effect counteracting another if they have opposite signs); and both the existence and effects of these participation processes may depend on context. An important requirement of such integrative research will be attention to the specific details of budgeting practice.³⁵ Participation in budgeting, in the broad sense of involvement and influence, might consist of reporting by the subordinate to the superior, bilateral negotiation, social interaction among groups of subordinates, or delegation of some decisions to the subordinate (e.g., more extensive rights to transfer funds between line items during the budget period, more extensive rights to adjust total budget amounts if unexpected events occur, or fewer constraints on subordinates' initial budget proposals through organizational

³⁵ Sociology-based studies that do not lend themselves readily to the selective integration described here often provide valuable accounts of the specific detail of budgeting practice (e.g., Berry et al. 1985; Boland and Pondy 1986; Preston et al. 1992).

policy and budgeting formulas) (Hopwood 1976; Umapathy 1987). These choices of the specific details of budgeting can have different effects on the economic efficiency, psychological satisfaction, social acceptability, or power-distribution effects of budgeting.³⁶ Existing empirical research on participative budgeting has extensively examined subordinates' beliefs that they participate, but has done much less to identify the specific details of budgeting practice that influence these beliefs, or to examine the differing costs and benefits of alternative specific details.

Study of the specific details of budgeting practice could help to resolve cross-perspective differences in the meanings of participative budgeting and the explanations of its effects, as well as the effects of other budgeting practices. Such research could also inform managers who want to change the level of participative budgeting in their organizations. Managers cannot directly choose their subordinates' beliefs, which are the subject of much of the existing empirical research on participative budgeting, but they can choose the specific details of budgeting practice that influence those beliefs.

What are the causes of participative budgeting?

The three theoretical perspectives differ in the nature and extent of their explanations of why participative budgeting differs across organizations or individuals. Economics-based research assumes that the individuals who make up an organization choose participation only if it has economic value, because they *know* whether it has economic value (i.e., whether it increases the expected welfare of at least some individuals in the organization without reducing the expected welfare of others). The agency-model's rationality assumptions imply that individuals can judge the economic value of participation correctly and implement an optimal (equilibrium) practice promptly, without prolonged trial-and-error adjustment of organizational practices to each other and to the environment, and without prolonged interpersonal conflict arising from different beliefs about what practices are optimal.

Contingency theory, like economics, has an organizational equilibrium concept and assumes that organizations will tend to adopt practices that improve organizational performance in the particular environment in which the organization operates.³⁷ Unlike economics, however, contingency theory assumes that disequilibrium is common: major changes in organizational practice can take years to complete (Donaldson 2001), and during this time, the environment can change again, so that the changed practice is no longer a good fit to the current environment. In this view, the explanation of budgeting practice in an organization depends not only on what practice fits a given environment, but also on how long it takes the organization to adapt to environmental change. The speed of change can depend on factors not included in conventional economic models of budgeting, such as the cognitive difficulty of solving the problems posed by a changed environment or the intrapersonal and interpersonal conflict generated by the change. Organizational participants may construct an understanding of the changed environment and its implications slowly, trying out and negotiating a variety of such understandings over time (Czarniawska 1997).

Psychology-based budgeting research does little to address the question of whether optimal budgeting practices are always chosen and if not, why not. The psychology-based research provides evidence that low levels of participative budgeting can result in stress or low individual performance, but it does not provide evidence of whether the participation

³⁶ For example, see Fisher et al. (2000, 2002) on the effects of negotiation rules on budget targets.

³⁷ A "good fit" might mean satisficing rather than optimizing, and might include considerations outside the standard agency model such as conformity to social norms.

levels that induce stress and low performance are chosen mistakenly by boundedly rational individuals or chosen deliberately because the costs of some employees' stress and low performance are offset by other benefits (perhaps because superiors are better informed than subordinates and thus make better decisions if they do not use subordinates' information, or perhaps because of a need for simplicity and uniformity in organization-wide budgeting that is used by many employees and only stresses some), or because it is preferred by more powerful members of the organization in spite of its costs to subordinates.

These different accounts of the causes of variation in participative budgeting highlight important distinctions between the three theoretical perspectives. The economics-based research has a precisely specified model of how individual-level differences (differences in superiors' and subordinates' information and risk preferences) cause organizational-level phenomena (budgeting practices), but it is doubtful that this model provides a consistently accurate description of practice, given its assumptions of near-constant equilibrium at the organizational level driven by perfect rationality at the individual level.

Psychology may provide a more accurate description of individuals, but it has not provided much explanation of how individual-level differences (e.g., superior-subordinate differences) are resolved or combined in organizational-level budgeting practices. Sociology-based research has examined budgeting at the organizational level, but often without providing causal-process explanations at the individual level. Because organizations are composed of individuals, this lack of individual-level theory can limit organizational-level explanations. For example, contingency theory argues that participative budgeting is valuable in an environment of high uncertainty, but contingency theory does not specify the causal process by which boundedly rational individuals determine that they are in a high-uncertainty environment and agree on how to budget in such an environment. Thus contingency theory cannot explain whether or when an organization will succeed in adopting budgeting practices that fit its environment and align individual actions with organizational goals. Furthermore, while institutional theory has a particular concern for the role that budgeting has in organizations reflecting conformity to the demands of their external environments, there is limited insight at the individual level to predict or suggest propensities to use budgeting in this symbolic and political manner.

Research that links individual- and organizational-level explanations without economics' strong assumptions of equilibrium and rationality could add to our understanding of the causes and effects of budgeting practices. The concluding discussion below is organized around questions of causal-model form that need to be resolved in conducting such integrative research.

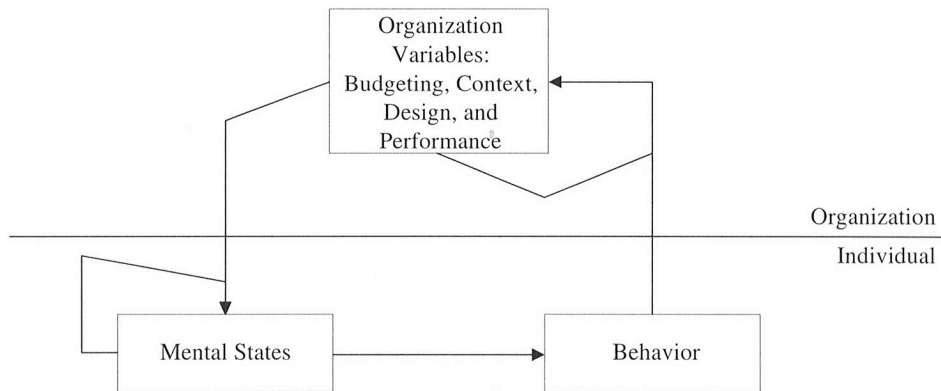
The Shape of Integrative Explanations: Causal-Model Forms

Integrative research on both the causes and the effects and of budgeting practices poses two sets of questions about causal-model forms. First, insofar as explanations from different theoretical perspectives deal with different levels of analysis, researchers cannot choose between or combine them without specifying the relations between levels, i.e., using a valid cross-level model. Second, differing assumptions about rationality and equilibrium put different constraints on the form of valid empirical models even within a single level of analysis.

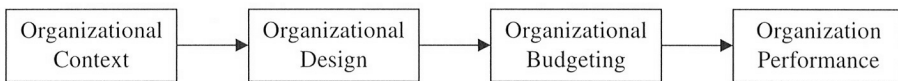
Cross-level models. Figure 1, Panel A shows a simplified generic model, intended as a template for developing more specific models. This model highlights the basic causal relations between organization variables at the organization level and individual mental

FIGURE 1
Causal-Model Forms

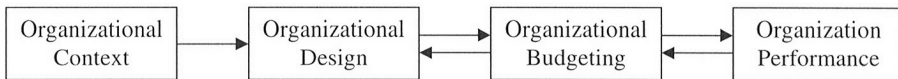
Panel A: Cross-Level Model



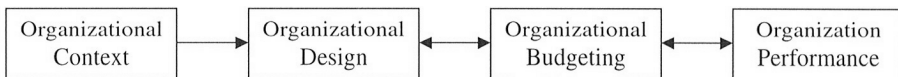
Panel B: Organization-Level Model with Exogenous Variables and Unidirectionality



Panel C: Organization-Level Model with Endogenous Variables and Cyclical Bidirectionality



Panel D: Organization-Level Model with Endogenous Variables and Reciprocal Bidirectionality



states and behavior at the individual level, while suppressing the complexities of causal relations within each level.³⁸

³⁸ Also, for simplicity, subunit levels between individual and organization levels have been omitted.



This generic model has both top-down and bottom-up links. For example, it shows that individual mental states (e.g., beliefs, preferences) influence individual behavior (e.g., effort). The bottom-up link represents how individual-behavior variables affect organization-level variables like the design of a budgeting system, the construction of a specific budget, or redesigning an organization (e.g., decentralization, formalization, structure). A valid cross-level link between individual behavior and organization-level variables must include an interaction at the level of the dependent variable³⁹ (Klein et al. 1994; Luft and Shields 2003). For example, in the development of a budget, individual behavior (e.g., negotiating) interacts with an organization-level variable (e.g., the organization's rules for budget negotiation) to influence the development of the budget.

In the top-down link in Panel A, organization-level variables influence individual mental states. Like the bottom-up link, a valid top-down link must include an interaction at the level of the dependent variable.⁴⁰ Thus, for example, an organization-level budget could influence individual mental states differently because of individual differences in preferences or cognitive ability.

In constructing and using cross-level models, it is important to remember that the organization level is not to be identified with owners or upper-level managers, who are individuals. An organization-level variable represents cross-organization variation in patterns of actions or relations among multiple individuals, such as cross-organization variation in the terms of agreements that resolve conflicts of interest among individuals or cross-organization variation in organizational routines in which individuals play interdependent roles. Similarly, an individual-level variable is one in which there is variation of interest across individuals. Thus, for example, to explain that an organization uses optimistic budget targets because every individual in it is an optimist is not a cross-level explanation: the individual and organizational levels are confounded in this example.

Using individual-level variables to explain an organizational-level budgeting practice therefore means explaining the practice as the consequence of individual differences. The agency-model explanation for the use of budget targets in incentive contracts can be seen as an example of this form of causal model. The incentive contract, which both owner and manager agree to and which determines payoffs for both, is at the organizational level. Organizational-level variation in incentive contracts—i.e., whether they include budget targets—depends on the presence or absence of several sets of individual-level differences: differences between owner and manager in risk preferences, effort preferences, and knowledge of the manager's actions. A cross-level interaction is present because the effect of these individual-level differences on incentive-contract design depends on organizational-level variables such as the uncertainty both owner and manager face. (If uncertainty is virtually nil, then the use of the budget target would have little value even if the owner's and manager's risk preferences differ.)

Agency models can also be seen as including a top-down interaction effect. For example, the effect of a budget-based incentive contract (organizational level) on individual

³⁹ The graphical convention for an interaction is a "Y" shape in which the interacting variables are at the ends of the upper legs and the dependent variable is at the end of the lower leg. Because the organization-level variables in Panel A are combined in a single box for simplicity (in contrast to their separation in the other Panels), the "Y" shape is ill-formed. This model is intended to show an organization-level variable (e.g., negotiation rules) and individual behavior interacting to affect *another* organization-level variable (e.g., a budget, budgeting system, organization design).

⁴⁰ The "Y" form of this interaction is ill-formed because this model has all mental states in the same box. Thus, the model is intended to indicate that, for example, an organization-budget variable interacts with a mental state to influence another mental state.

behavior depends on an interaction between the contract terms and individual mental states such as effort and risk preferences, knowledge, and skills. In this instance, the protection against risk provided by the budget-based contract will have more influence on the mental states and behavior of more risk-averse individuals.

Although the cross-level model form is consistent with explanations based on economic theory, it can also be used with theories that make less stringent assumptions about rationality and the absence of disequilibrium. For example, economics assumes that individual preferences are exogenous, not influenced by organizational design, but psychology and sociology leave open the possibility that organizational-level practices like budgeting can influence preferences (e.g., values, intrinsic motivation).⁴¹ Cross-level models could be used to combine compatible explanations at different levels in the psychology-based and sociology-based research. Choosing between economics-based and sociology/psychology-based explanations raises other important causal-model form issues, however.

A single research study typically does not (and probably should not) attempt to examine a complete cross-level model (including all relevant organizational and individual variables), but focuses only on some portion of it. Sometimes a theoretical model that is fully cross-level is examined empirically only at the organizational level. For example, researchers may provide evidence on whether differences in organization-level uncertainty are associated with differences in organization-level budget-based compensation, without providing evidence on the individual-level variables that explain the organization-level relation; individual-level variables like risk and effort preferences are often more difficult to measure, and researchers assume that they are similar across organizations with different levels of uncertainty.

Single-level models. Sociology- and economics-based research both test organizational-level empirical models, but they make different assumptions about how evidence on performance effects of budgeting practices can be provided. Contingency-theory researchers in sociology are accustomed to showing the value of a budgeting practice for a particular type of organization by providing evidence that organizations of this type perform better if they use the practice than if they do not. The researchers may also show that organizations of a different type, for which the practice should not be valuable, do not improve performance if they use it. Such “interaction fit” (Donaldson 2001) evidence cannot be gathered unless some organizations are in equilibrium (using the practice when it is the best alternative available) and others are not. These interaction models of organizational performance are therefore incompatible with the assumption often made in economics that organizations are usually in equilibrium. A sociology-based researcher who wants to use an economic-theory explanation of the value of a budgeting practice should not use it in an interaction-fit test unless the theory can be modified to be consistent with some organizations’ being out of equilibrium. These alternative assumptions about the prevalence of equilibrium are consistent with alternative theories about what causes organizations to adopt participative budgeting and how rapidly these causes are likely to operate.

Different assumptions about the direction and speed of influences among organizational-level variables raise additional single-level causal-model form issues represented in Panels B–D of Figure 1. These diagrams represent differences in causal direction and speed

⁴¹ Economic theories predict that individuals with different preferences will be attracted to work for organizations with different designs and policies, resulting in an observed association between organizational characteristics and individual preferences. But economic theories typically do not predict that individuals’ preferences will be changed by organizational characteristics.

only, suppressing other potential complexities (e.g., causal relations among multiple organizational-design or budgeting variables, interactions among the variable types shown, or direct paths from organizational context and design to performance). Panel B shows a unidirectional model form. In this model, organizational context (e.g., uncertainty) is taken as exogenous. It influences organizational-design choices like decentralization; budgeting practices are second-order choices that are influenced by, but do not influence, organizational-design choices. Budgeting in turn influences organizational performance.

Unidirectional models like Panel B, while convenient for statistical testing, preclude researchers from simultaneously considering the influences of organizational performance on organizational budgeting practices and influences of organizational budgeting on organizational design. Bidirectional models like those in Panels C and D are required to represent these potential mutual influences. Panels C and D represent causal influences in the same directions but at different speeds. If organizations adapt relatively slowly to their environment, then the process will be as shown in Panel C. A change in the organization's context will result in an initial change in organizational design and then budgeting; if these changes do not have satisfactory performance effects, then they will be modified in a continuing trial-and-error process of mutual adjustment. In contrast, in Figure 1, Panel D, the endogenous elements of organizational design and budgeting are chosen simultaneously, and performance follows as a consequence of these choices (and of various exogenous environmental factors not shown in the model).

The choice between the models in Panels C and D depends on assumptions about rationality and equilibrium. Panel C is consistent with prolonged disequilibrium that occurs because boundedly rational managers are slow to solve complex optimization problems involving multiple organizational design and budgeting variables (or perhaps never solve them correctly). Managers may therefore simplify these problems by changing one variable at a time or by making repeated trial-and-error changes of multiple variables. The model in Panel D is consistent with a simultaneous choice of multiple variables which, because it is made by perfectly rational managers, is the best choice for the existing conditions and will not be changed unless conditions change (i.e., it is an equilibrium choice). Thus, the choice among the organization-level models in Panels B–D depends on researchers' assumptions about the full cross-level model in Panel A. For example, how closely do the mental states in Panel A approach the unbiased judgments and costless calculation required to generate prompt optimal solutions to organizational design and budgeting problems?

These issues of causal-model form choice highlight the potentially complementary nature of budgeting research in the three theoretical perspectives. Economics-based research has focused on the relation between individual and organizational levels, showing how variation in individual-level characteristics like risk preferences drives variation in organizational-level characteristics like budget-based compensation. However, economics-based research has simplified away many characteristics of individuals and organizations that may influence budgeting practice, such as individual preferences other than wealth and leisure, and the existence of organizational complexity that blocks or delays optimization.⁴² Psychology-based research has focused on individual-level characteristics without fully explaining their relation to organizations, and sociology-based research has focused on organizational-level characteristics without fully explaining their relation to individuals.

⁴² Some nonbudgeting economics-based research has modeled situations with "blocked communication," which arise because some messages are too complex to communicate to the relevant individuals and hence are blocked by the prohibitive cost (e.g., Demski and Sappington 1987).

More complete and valid explanations of how budgeting practices come to exist in organizations and how they affect organizational performance and individual welfare can usefully draw on research from all three theoretical perspectives.

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