

**Budget Requests and Agency Decision Making under Uncertainty:
A Theoretical Analysis of Risk-Bearing Behavior in Administrative Organizations***

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Abstract

Research on administrative organizations has given scant attention to systematic analysis of bureaucratic decision-making under conditions of uncertainty. Investigating the nature of risk-bearing behavior displayed by administrative agencies allows for greater understanding of how these organizations arrive at such decisions. On a broader level, this line of inquiry has implications for understanding the value administrative agencies place on organizational maintenance in the face of uncertainty. In this study, the theoretical relationship between an agency's budgetary decision-making and the amount of uncertainty (volatility) that it experiences is set forth. This endeavor has theoretical roots in the seminal work on portfolio choice under uncertainty by examining the risk-bearing nature of bureaucratic decisions, while holding utility fixed. A plausible range of theoretical conditions that reflect agency budgetary risk-averse, risk-neutrality, and risk-seeking behavior are derived from this deductive analysis, taking into account the differential context in which uncertainty transpires under divided and unified party government. The implications of these theoretical results for understanding administrative behavior and organizational slack are subsequently discussed.

1. Introduction

Administrative agencies are central to the implementation of public policies. Analyzing how agency decisions are made is vital for understanding policymaking. Organizational theorists maintain that agency decision-making occurs under circumstances of incomplete information and uncertainty (e.g., March and Simon 1958; Simon 1955, 1976; Stinchcombe 1990). Administrative agencies are either treated as being adaptive or boundedly rational organizational units that make decisions based largely on extrapolating from the past as a means to overcome cognitive and information processing limitations (e.g., Davis, Dempster, and Wildavsky 1966; Lindblom 1959; Padgett 1980; Simon 1955; 1976; Wildavsky 1964). This portrait of agency decision-making reveals that these organizations must make decisions in the face of ambiguity (March and Olsen 1976).

Unfortunately, only a very small body of research exists that directly considers agency response in an uncertain world (Carpenter 2000; Bendor and Moe 1985; Bendor, Taylor, and Van Gaalen 1985, 1987) or risk-bearing propensities (Bozeman and Kingsley 1998; Moon 1999). Instead, past studies investigating decision-making behavior and processes in public bureaucratic organizations has, for the most part, been largely centered on the tension between “politics” versus “administration” in terms of democratic governance in the administrative state (Wilson 1887). Political scientists have thus placed their energies in determining whether or not bureaucratic agencies are subject to political control from democratic institutions (e.g., Calvert, McCubbins, and Weingast 1989; Carpenter 1996; Eisner and Meier 1990; Hammond and Knott 1996; Krause 1996, 1999; McNollGast 1987, 1989; Moe 1982, 1985; Weingast and Moran 1983; Wood and Waterman 1994). While these studies have contributed a vast wealth of knowledge to the study of bureaucratic politics, they provide precious little insight into how administrative agencies make decisions in the face of uncertainty from an organizational standpoint.

As a result, we know relatively little concerning the extent to which bureaucratic institutions are willing to preserve themselves in the face of an uncertain environment. This is because we do not know

how agencies will explicitly behave in response to uncertainty. Analyzing the risk-bearing behavior of administrative agencies provides us with insight into the relative importance these entities place on organizational maintenance. Therefore, investigating the nature of risk-bearing behavior displayed by administrative agencies in an explicit, systematic fashion is an essential enterprise if we wish to better understand how such decisions made by bureaucratic actors typically occur under incomplete and imperfect information.

In this study, a simple theoretical analysis of agency budget request decision-making is advanced as a means to understand how bureaucratic agencies can respond to uncertainty. The purpose here is not to create a broad model of the political or policy process, but rather to concentrate on the relationship between agency choice and uncertainty in order to get theoretical leverage on the various ways in which a bureaucratic agency makes decisions in response to an uncertain environment. Theoretical conditions that allow for the full potential range of agency decision-making under uncertainty that encompasses budgetary risk-aversion, budgetary risk-neutrality, and budgetary risk-seeking behavior are derived from this comparative-static analysis based on the funding request that it submits to political principals. Moreover, a qualitative distinction is made between unified and divided party government so as to reflect the different political regimes that agencies encounter, and hence, underlie the shifting decision rules that transpire in budgetary decision-making (Wildavsky 1988). The theoretical results are capable of providing basic insight into the relative willingness administrative agencies place on organizational maintenance (e.g., Crozier 1964; Cyert and March 1963; Downs 1967; Niskanen 1971, 1975; Rourke 1984), all else being equal.

2. Bureaucratic Agencies, Uncertainty, and Strategic Behavior

Many scholars assert that bureaucratic organizations operate in an environment of uncertainty (e.g., March and Simon 1958; Simon 1955, Simon 1976; Stinchcombe 1990; Wilson 1989). *Within the*

*context of this study, uncertainty refers to the degree of volatility (variance) that the agency experiences in relation to essential items that are beyond their complete control.*¹ The source of uncertainty confronted by the agency might pertain to a lack of assurance concerning the budgetary appropriation outcomes that are determined by political institutions, task demands placed on the agency, or other aspects germane to the administrative organization. This perspective is consonant with bureaucratic agencies trying to cope with making decisions in a world where there is ambiguity and complexity regarding policy mission and direction (Downs 1967; Gormley 1989; March and Olsen 1976; Wilson 1989). This means that bureaucratic organizations exhibit a dual tension between protection from uncertainty, while at the same time being cognizant of the demands being placed on them from political institutions that possess constitutional authority over them. Bureaucratic agencies, operating under conditions of uncertainty, must address a critical, fundamental question: How do these organizations arrive at decisions in an imperfectly and incompletely informed environment? One plausible way to answer this salient question is by determining the risk-bearing nature of agency behavior based on their budgetary (funding) requests.² Addressing this question requires the analytical derivation of theoretical propositions as to what constitutes risk-averse, risk-neutral, and risk-seeking budgetary behavior displayed by the agency. The purpose of this essay is to tackle this problem.

An exploration into the risk-bearing behavior of administrative agencies is critical for acquiring a better theoretical understanding of how agencies operate as strategic organizational entities in a political setting. Inquiry into this topic has direct implications for the manner in which administrative

1 This view departs from much of the research on models of incomplete information where uncertainty is deemed a discrete probabilistic choice. Rather, this definition is consistent with standard theoretical research on portfolio choice under uncertainty involving the “risk–return” relationship confronting holders of wealth–related assets (e.g., Tobin 1958; Hirshleifer and Riley 1992).

2 Although bureaucratic organizations engage in what could be termed as “internal” budgeting with respect to various programs within the agency before they seek to make requests externally for funds, the focus here is on the agency request since the unit of analysis is at the (macro) organizational level.

agencies value organizational preservation in an uncertain environment. Analytical derivation of the explicit theoretical conditions of risk-bearing behavior by which administrative agencies formulate budget requests can indicate, for instance, that an (organizationally) risk-averse agency will favor protecting the organization in response to a rise in uncertainty by asking for additional funding, *ceteris paribus*. Such behavior reflects an agency's strong desire to obtain greater flexibility to be responsive in these circumstances. These theoretical conditions can also shed light in situations where agency budgetary decisions are unresponsive to variations in uncertainty (budgetary risk-neutrality) that imply indifference between obtaining greater versus lesser organizational maintenance under such circumstances; and also if agencies seek relatively less funding in those instances when uncertainty rises (budgetary risk-seeking) that indicate an agency is less concerned with organizational maintenance, and possibly more concerned with trying to do "more with less" as a means of enhancing their reputation with elected officials. Although one should expect that agencies will typically behave in a risk-averse or risk-neutral fashion given past research on bureaucratic organizations, the possibility of risk-seeking agency budgetary decision-making is not precluded. Cathy Johnson (1992), for instance, chronicles several instances where administrative agencies will seek relatively lower increases in budgetary resources in response to policy environment conditions. Therefore, one cannot preclude the possibility that administrative agencies may request a relatively lower budgetary increase as uncertainty rises, and hence, behave in a manner consistent with budgetary risk-seeking.

In addition, this topic is worthy of scholarly attention since only a handful of studies exist that attempt to deal with the nature of risk-bearing behavior exhibited by administrative agencies. This phenomenon has been treated by students of bureaucratic decision-making as a simplifying *a priori* exogenous assumption (Bendor and Moe 1985; Bendor, Taylor, and Van Gaalen 1985, 1987), or derived in a manner where the agency's range of responses to this uncertainty is restricted only to the risk-neutral case (Carpenter 2000). While the risk-taking assumption is allowed to vary under different scenarios in

these studies, it fails to account for the full range of endogenous agency responses that fully capture agency decision-making under uncertainty.

Recent survey-based studies of managerial behavior in the public sector focusing on the determinants of risk-taking behavior in bureaucratic organizations in an exploratory fashion do not set forth an explicit theory of risk-bearing behavior (Bozeman and Kingsley 1998; Moon 1999). These empirical studies examine the risk-taking behavior of public managers in public organizations by assessing the managerial propensity for such behavior predicated on such items as red-tape, trust among agency personnel, hierarchical complexity, centralization, and influence by elected officials. Neither study examines risk-bearing behavior in relation to uncertainty, nor is capable of distinguishing between different risk-bearing behavioral conditions displayed by administrative agencies. As a result, formal based theoretical conditions of risk-aversion, risk-neutrality, and risk-loving behavior exhibited by administrative agencies cannot be established. In addition, the use of a survey instrument to assess risk-taking behavior by public organizations is based not on objective choices made by the agency, but instead purely reflects subjective perceptions. Therefore, one cannot adequately assess the generalizable nature of risk-taking behavior displayed by administrative agencies in existing research.³ To properly capture the theoretical nature of risk-bearing behavior of bureaucratic agencies, one must focus on the relationship between a specific type of agency behavior and the uncertainty that it experiences as an administrative organization, while holding agency utility fixed.

How do bureaucratic organizations handle uncertainty? First, administrative agencies might employ bureaucratic rules and procedures (e.g., standard operating procedures) to their advantage so that they are better equipped to deal with uncertainty (Crozier 1964; Cyert and March 1963; Downs 1967:

³ The nature of the survey question used in each study, while providing a sound general measure of risk propensity, is also rather vague – i.e., “Most employees (Top management) in this organization are not afraid to take risks.”

59– 60; Wilson 1989).⁴ Second, an agency’s task domain might be restricted in order to cope with uncertainty. Still another way for administrative agencies to deal with this uncertainty is to request additional funding that it otherwise would not have pursued in order to obtain slack resources for organizational mission purposes (Cyert and March 1963; Downs 1967). An investigation of agency budgetary decision-making is an intuitively appealing way to investigate uncertainty on two levels. On a practical level, agency funding requests serve as a fruitful approach since budgets are vital to the performance of administrative agencies (e.g., Carpenter 1996; Meier 1993; Wilson 1989), and are also a fundamental component in capturing the inherent tensions that exist between political and bureaucratic institutions (e.g., Banks 1989; Bendor and Moe 1985, 1986; Miller and Moe 1983; Niskanen 1971, 1975). On a conceptual level, administrative institutions possess control over the budget requests that are submitted by them to OMB or Congress, and thus such decisions serve as a choice variable for the agency. Next, agency budget requests are discussed as a strategic instrument that is designed to help bureaucratic organizations hedge against uncertainty.

Agency Budget Requests As a Buffering Mechanism

Agency budget requests are used to set forth the policy, programmatic, and administrative plans that the agency wishes to pursue in a given year. Lance LeLoup (1984: 81-83) notes that agency goal expectations as an organizational unit are revealed most directly in budget estimates. It is commonly accepted that public budgeting contains a strategic component (Bendor and Moe 1985, 1986; Meyers 1994; Miller and Moe 1983; Niskanen 1971, 1975). However, a lack of consensus exists pertaining to the nature of this strategic component. The behavioral continuum ranges from complete agency opportunism (Niskanen 1971, 1975) to notable concerns regarding retribution and lost credibility from

⁴ Alternatively, administrative rules and procedures can also be used by elected officials in order to externally control bureaucratic behavior (e.g., Bawn 1995; Calvert, McCubbins, and Weingast 1989; McNollGast 1987, 1989).

political overseers (Bendor, Taylor, and Van Gaalen 1985).⁵ Providing explicit, theoretical conditions for different forms of budgetary risk-bearing behavior displayed by administrative agencies can enable us to discern where these organizations fall along this dimension.

Although agencies may request more budgetary resources than they actually need to perform activities – i.e., organizational slack (Cyert and March 1963), the extensive layers and filters of the budgeting process are designed to monitor agency behavior, and thus strongly dissuade outlandish budgetary requests that do not accurately reflect agency preferences (Padgett 1980, 1981). For instance, formal models of agency budgeting reveal that through auditing (or threat thereof) agencies will possess a strong incentive not to pad budgets in a conspicuous manner (e.g., Banks 1989; Banks and Weingast 1992; Bendor, Taylor, and Van Gaalen 1985, 1987). Bureaucratic agencies' ability to fool politicians into giving them excessive amounts of funding without much substantiation to back up usage is highly improbable (Foreman 1988). Fenno (1966: 340) notes that members of Congress do not like being deceived by agencies during the budgetary process, and that deception is easily discovered (Wilson 1989: 252).⁶ Moreover, administrators who take such risks are susceptible to political intervention, thus jeopardizing the loss of future political support (Kettl 1992: 106). Given that agencies need to make a sincere attempt to form a credible reputation in the political arena (Bendor, Taylor, and Van Gaalen 1985; Gormley 1989; Kaufman 1981; Wilson 1989), it is not surprising that agencies find it in their best interests to be forthright about their activities.⁷ This perspective suggests that administrative agencies

⁵ An excellent summary of disparate findings on the issue of whether bureaucratic agencies are budget maximizers can be found in Blais and Dion (1991a).

⁶ In very rare episodic cases politicians may wish to be fooled by agencies in order to grant them more funding (e.g., U.S. Drug Enforcement agency appropriations in the 1980's). However, such behavior on behalf of democratic institutions is rather atypical.

⁷ There has been empirical survey state-level evidence by Duncombe and Kinney (1987) that supports this latter view that agency (budget) officials place great importance on maintaining good relations with political principals.

seek increased budgets for the purposes of adequately fulfilling their policy mission⁸ (Wilson 1989). This view greatly differs from a classic public choice view of agencies as monopolists who can successfully manipulate political superiors with respect to budgetary funding (Buchanan and Wagner 1977; Niskanen 1971, 1975; Tullock 1965). Much of the scholarship on the topic of bureaus and budgets over the past two decades rejects the organizational wealth maximization viewpoint advanced by classic public choice theories.

Instead, this study views budgetary resources sought by a bureaucratic organization as a potential hedge against the uncertainty that they experience. In other words, administrative agencies view budget requests as an instrument to help buffer the organization against uncertainty, thus serving as a viable means to acquire organizational slack. Anthony Downs (1967: 138-139) echoes this point when he states that organizational slack has three positive benefits for the agency that directly pertain to coping with uncertainty. First, agencies can adjust to unexpected changes (increases) in workload without having to seek additional appropriations. Second, additional resources can reduce internal agency tensions by dampening resource battles for programs and subunits within the agency during more uncertain periods. Organizational slack also affords the agency an opportunity to undertake marginal, yet useful nonprogrammed activities that would be likely targets for deleting when operations are cut (e.g., long-range planning, basic research, etc...). Downs' perspective implies that an agency budget strategy that seeks organizational slack as a cushion to absorb uncertainty is a rational response for obtaining bureaucratic flexibility.

Next, a simple comparative-static analysis of agency budgetary decision making under uncertainty is set forth in order to arrive at theoretical conditions for such risk-bearing behavior. The purpose here is to examine how an agency's budgetary request will vary in relation to the policy

⁸ There are other perspectives on this issue. For instance, Blais and Dion (1991b: 357) surmise that an agency's desire for resource expansion can reflect a combination of mission-oriented "values" (Campbell and Naulls 1991; Lynn 1991), yet also exhibit political dispositions (Blake 1991).

environment uncertainty (volatility) for a given fixed level of utility.

3. A Positive Analysis of Agency Budgetary Decision-Making under Uncertainty

Background

Administrative agencies make budgetary decisions (requests) in an uncertain environment. The manner in which agencies respond to this uncertainty is captured through the nature of their risk-bearing behavior. Three possible types of budgetary risk-bearing behaviors can be exhibited by an administrative agency under conditions of uncertainty: risk-aversion, risk-neutrality, and risk-loving. *Each type is defined in terms of the agency's well-being – i.e., organizational maintenance.* Specifically, the degree of risk-bearing behavior is defined in terms of an agency's willingness to request additional funding this year from what it received last year in actual appropriations (termed *budgetary residual*) to handle the uncertainty confronting the bureaucratic organization. This study's central focus does not lie with the final budgetary outcome (i.e. appropriation), but instead rests with the decision-making behavior of administrative agencies reflected in their budget requests. This is a valid approach for analyzing bureaucratic decision-making under conditions of uncertainty.

Uncertainty can be viewed as one form of ambiguity confronting the bureaucratic organization that is germane to operations (Downs 1967; March and Simon 1976; Stinchcombe 1990). Greater uncertainty translates into a more ambiguous decision-making situation for the agency. This means that agency decision-making will be made more difficult when they face greater volatility – i.e., more ambiguity in their political environment as well as from the environmental demands placed upon them.⁹

⁹ The terms *ambiguity*, *uncertainty*, and *volatility* are each used interchangeably throughout this study. This is not uncommon for research on risk-bearing propensities in financial economics. According to *The Random House College Dictionary* (1984 revised edition), *ambiguity* is defined as doubtfulness or uncertainty in meaning or intention; *uncertainty* is defined as unpredictability, indeterminacy, and doubt; while *volatility* refers to sharp fluctuations. Each of these terms connote the degree of incertitude confronting administrative agencies when they make decisions under incomplete and imperfect information that is commonly accepted by students of public organizations.

For the purposes of this inquiry, uncertainty does not refer to probabilities associated with discrete decision outcomes, but instead is treated as a continuous phenomenon that reflects the degree of variance or volatility that the agency experiences for a given phenomenon beyond its complete control.

Suppose administrative agencies handle uncertainty according to an adaptive process – i.e., the agency considers uncertainty in a retrospective manner – consistent with theories of bounded rationality and incrementalism. Thus, agencies current responses to uncertainty will be based on recently observable volatility (ambiguity) in its environment. One type of uncertainty confronting the administrative organization, for example, is the volatility of the agency’s actual budget appropriations over the preceding i years. A rise (drop) in the volatility associated with appropriations uncertainty makes it more (less) challenging for the agency to gauge what actual funding that they can expect to receive in a given year, holding all else constant. Hence, the agency’s policy planning and desire to fulfill their programmatic mission more (less) difficult. For instance, an agency receiving a five percent (5%) rise in funding from the previous year’s appropriation level for each of the last three years will lead one to surmise that the appropriations’ outcomes for this agency as being completely stable and predictable over this time horizon, all else being equal. On the other hand, a three percent (3%), seven percent (7%), and ten percent (10%) annual growth in an agency’s appropriations over the same three-year interval reflects greater volatility/variability where the environment is much less stable and predictable, *ceteris paribus*.¹⁰ Thus, uncertainty experienced by the agency, captured via appropriations volatility, is higher in the latter illustration relative to the former. Greater volatility in agency appropriations represents a higher level of uncertainty confronting bureaucratic organizations since they are less certain about their funding levels for the current period. This is a reasonable assertion given that

¹⁰ A skeptic might contend that these budgetary allotments are part and parcel of purposive behavior, and thus do not reflect uncertainty. While these variations might very well be purposive, they are so only on behalf of political institutions. The actual budgetary appropriation is a function of chief executive–legislative bargaining, thus beyond the bureaucratic agencies’ scope of decision–making control.

incrementalism implies stable, routinized patterns of agency behavior which reflects little, if any, uncertainty (Lindblom 1959; Wildavsky 1964; Davis, Dempster, and Wildavsky 1966). In theory, a limiting view of incremental budgeting suggests that the volatility in the rate of change for agency appropriations should be at zero since this is indicative of a constant growth funding rule.

Bureaucratic agencies might wish to respond to uncertainty by incorporating this information into the budget requests that they submit to elected officials. Although there are other potential factors that influence agency budget requests, such as the ideological preferences of political institutions, agency clientele support, but to name a few, the central purpose of this study is to isolate the effect of uncertainty on agency budget requests, *ceteris paribus*.¹¹ Examining the individual-level programs contained within a given agency's jurisdiction is not of interest here. This is not to diminish the importance of studying individual programs. Rather, the unit of analysis of this study is the agency because of the focus is on the aggregate organization. Agency budget requests serve as a means by which bureaucratic behavior can be analyzed, not an end in and of itself as would be the case in traditional studies of public budgeting. Since these budget requests reflect agency choice, this instrument will be capable of providing us with insights into bureaucratic decision making under uncertainty.

Agency Budgetary Behavior under Divided and Unified Party Government

Budgetary strategies and objectives are conditional upon climate and conditions in the policy environment (Wildavsky 1988). This suggests that the use of different decision rules or calculus as a means to deal with uncertainty is central to facilitate our understanding of agency budgetary behavior. Alternatively stated, bureaucratic agencies are not inclined to arrive at budgetary decisions in an identical manner when the context of the uncertainty that they confront is fundamentally altered. The dichotomy between divided and unified party government serves as an important qualitative distinction by which

¹¹ Concurrent empirical research testing this theoretical relationship controls for other exogenous factors that might affect the budgetary residual sought by the agency.

agency budget requests are formulated.

At the heart of the divided versus unified government distinction is the notion that institutional stability of the external environment is critical on the margins with respect to the relationship between uncertainty and agency utility. Classic research on budgetary behavior and decision-making claims that policy coherence manifested through institutional stability translates into more stable expectations, and thus facilitates more informed agency decision-making in an uncertain environment (Davis, Dempster, and Wildavsky 1966). Relatedly, Epstein and O'Halloran (1999: 78) contend that under a divided government era, bureaucrats will possess less policy flexibility, insofar that they experience greater difficulty in being able to shape coherent public policies compared to eras of unified government.¹² Thus, greater policy coherence and more stable policy expectations occurs in the political environment during periods of unified government compared to divided government, all else being equal. This is because the political signals that agencies receive are less noisy (ambiguous) than what occurs under unified government. Therefore, it is not unreasonable to posit that administrative agencies will find uncertainty as having a less deleterious effect on their utility under unified government relative to divided government for a given type of risk-bearing behavior. Specifically, this distinction structurally manifests itself through the rate of change in marginal utility pertaining to variations involving uncertainty. This is because the nature of policy coherence displayed by the external political environment, and hence; more stable policy expectations formed by the agency, will affect how uncertainty is viewed by administrative

12. The view taken here runs counter in two ways from what a traditional power accrual story would predict since a coalition of politicians under divided government an agency will experience greater discretion (e.g., Bryner 1987; Dahl and Lindblom 1953; Hammond and Knott 1996). First, administrative agencies are not presumed to care so much about playing political principals off of one another to accrue power as an ends as these accounts typically infer. Rather, the extent to which they wish to protect the agency from political and policy uncertainty is what is critical with respect to this decision-making context. This is especially important given that the purpose of this study is to analyze the risk-bearing behavior of administrative agencies. Second, divided government results in greater uncertainty (variance) than unified government since conflict among political principals rises during such eras. Thus, the agency receives stronger mixed messages concerning the direction of policy administration during the former periods than the latter, even if the average policy is of a more moderate ideological nature.

agencies on the margins when exhibiting either risk-averse or risk-seeking behavior.¹³ An agency is assumed to receive less (greater) gains (declines) in marginal utility from uncertainty under divided government compared to unified government for budgetary risk-seeking (risk-averse) behavior, all else being equal. Thus for both a given type of risk-bearing behavior and change in the amount of uncertainty that the agency confronts, variations in uncertainty will possess a relatively less potent negative marginal impact on agency utility during times of unified government compared to an era of divided government. Next, the comparative–static analysis is performed.

Theoretical Framework

How do administrative agencies construct budget requests under conditions of uncertainty?

In order to properly address this question, some assumptions concerning the agency's utility associated with both the sought after budgetary residual (BR) and the uncertainty (σ) that it confronts must be made. The agency's budgetary residual is defined simply as: $BR = F_{Rt} - F_{At-1}$, where BR is simply the first-difference between the agency's budget request in the current year (F_{Rt}) and what it actually received in legislative appropriations from the previous year (F_{At-1}).¹⁴ It is assumed that the agency seeks a level of funding that is greater than what they received from the previous year – i.e., $BR > 0$.¹⁵ To reiterate, the

13 Since risk-neutral behavior is unresponsive to variations in uncertainty by definition because it neither contributes nor detracts from agency utility (e.g., see Hirshleifer and Riley 1992; Tobin 1958), the divided–unified government dichotomy is irrelevant in this particular case.

14 This formulation is consistent with the linear decision budgetary rule that is commonplace in budgetary models: $F_{Rt} = F_{At-1} + \xi_t$ (Davis, Dempster, and Wildavsky 1966; Padgett 1980: 355). By rearranging terms and converting into percentage terms (i.e., converting into logs and then multiplying by 100) one obtains the expression noted above where ξ_t is equivalent to BR_t . Thus, the budgetary residual sought by the agency can be alternatively thought of as being a budgetary request return. An analysis of incrementalism and its critics are beyond the scope of this essay. Rather, the focus here is on assessing the risk-bearing budgetary behavior of bureaucratic organizations by assessing the impact of uncertainty on agency behavior based on a plausible behavioral model grounded in the adaptive nature of administrative behavior.

15 This simplifying assumption is for purposes of mathematical tractability since a negative root might exist otherwise when using a power functional form that is adopted here. However, an actual budget appropriation reduction from one year to the next is not precluded since the current year budgetary appropriation is not germane for this assumption to hold. Relaxing this assumption would not alter the theoretical predictions produced by the general solution appearing in the Appendix.

purpose here is not to construct a full-blown model of the budgetary process since we are not interested in explaining budgetary outcomes concerned with agency utility maximization, but rather to focus on how agency's determine their budget requests in response to uncertainty for a given fixed level of utility. Other factors that may affect this decision are part of the *ceteris paribus* condition since the aim is to isolate this basic theoretical relationship that is important for understanding the risk proclivities of administrative agencies. The approach undertaken here is consistent with standard research on portfolio theory under uncertainty commonly employed in the study of financial economics (e.g., Tobin 1958; Hirshleifer and Riley 1992).

For purposes of simplicity, assume that an agency's utility function consists of two variables and can be expressed in the following manner:

$$U(BR, \sigma) = f(BR) + g(\sigma) \quad (1)$$

where agency utility is an additive function of the budgetary residual (BR) and the uncertainty (σ) it encounters. The purpose here is not to maximize the agency's utility, but rather to treat it as being fixed in order determine the risk-bearing nature underlying budgetary decision-making by administrative agencies. An agency is assumed to always accrue positive marginal utility from BR since it is safe to presume that these organizations will prefer more money as opposed to less, *all else being equal*¹⁶, because what the agency does not ask for in terms of budgetary resources, it will not likely acquire from political principals.¹⁷ This is assumed to be true irrespective of the type of budgetary risk-bearing behavior displayed by the agency. The rate of change in the positive marginal utility associated with the

¹⁶ The positive marginal utility assertion does not mean to imply that agencies will pad budgets in a conspicuous manner since there are other factors that will constrain them to do so such as political preferences, macro-level budgetary constraints induced by macroeconomic performance, and agency enforcement workloads, but to name a few examples. The present theoretical analysis treats these items as being fixed in order to have a tractable problem that can be analytically solved. These factors can be readily controlled for in an empirical investigation.

¹⁷ Although it is possible for politicians to appropriate a higher level of funding than requested by the agency, it is rather uncommon.

agency budgetary residual (BR), however, will depend upon the nature of agency's budgetary risk-bearing behavior. With this said, the agency cannot seek an infinite (unconstrained) level of resource expansion because of the implicit budgetary constraint that is formally imposed on the agency by holding utility fixed when analyzing the relationship between the agency budgetary residual and uncertainty.

Risk-Averse Agency Budgetary Behavior

Given (1), a *risk-averse* agency's utility function (U) can be further simplified by redefining it as a power function of the following form¹⁸:

$$U = c + BR^\alpha - \sigma^\beta \quad (2)$$

where $\alpha > 1$, $\beta > 1$ (Divided Government)

$\alpha > 1$, $0 < \beta < 1$ (Unified Government)

c is a positive constant, and agency utility is assumed to be increasing at a successively higher rate α with respect to the budgetary residual (BR) that the agency wishes to obtain, and declining at the rate β with respect to uncertainty (σ). Risk-averse agency budgetary behavior means that a bureaucratic organization will obtain successively greater utility increases for trying to obtain larger amounts of additional funding, but disutility from increased uncertainty. If agencies confront less coherent policy signals from political institutions, and thus exhibit less stable policy expectations under divided government vis-a-vis unified government, variations involving uncertainty will thus contain a greater than proportional negative effect on agency utility under periods of divided government, while they possess a smaller than proportional negative impact on agency utility during times of unified government. Taking the first and second-order partial derivatives of agency utility with respect to BR yields:

¹⁸ The power function is employed since its interpretation is intuitively straightforward and can be better linked to empirically testable propositions. When this distributional form is relaxed for a general one, the comparative-static results hold (please see Appendix).

$$\frac{\partial U}{\partial BR} = \alpha BR^{\alpha-1} > 0; \quad \frac{\partial^2 U}{\partial BR^2} = (\alpha^2 - \alpha) BR^{\alpha-2} > 0. \quad (3)$$

Budgetary *risk-averse* agencies, holding all else constant, will exhibit an increasing rate of positive marginal utility with respect to seeking greater budgetary funding – i.e., $U'(BR) > 0$; $U''(BR) > 0$. This, in turn, is suggestive of risk-averse bureaucratic organizations' placing a high premium on organizational maintenance. Taking the first and second partial derivatives for agency utility (U) with respect to uncertainty (σ) results in:

$$\frac{\partial U}{\partial \sigma} = -\beta \sigma^{\beta-1} < 0;$$

and

$$\frac{\partial^2 U}{\partial \sigma^2} = (-\beta^2 + \beta) \sigma^{\beta-2} < 0 \quad (\text{Divided Government}) \quad (4)$$

$$\frac{\partial^2 U}{\partial \sigma^2} = (-\beta^2 + \beta) \sigma^{\beta-2} > 0 \quad (\text{Unified Government})$$

where a risk-averse agency operating under divided (unified) government experiences successively larger (smaller) declines in marginal utility attributable to increases in uncertainty – i.e., $U'(\sigma) < 0$; $U''(\sigma) < 0$ (divided government), and $U''(\sigma) > 0$ (unified government). In other words, a risk-averse agency operating under a divided government has a stronger disdain for uncertainty relative to periods of unified government because both policy coherence and expectations stability are comparatively weakened under the former configuration of institutional politics. This is because divided government eras result in administrative agencies having less stable expectations concerning the policy environment due to increased conflict among political overseers (Davis, Dempster, and Wildavsky 1966; Epstein and O'Halloran 1999: 78) that produces a noisier political signal compared to unified government. In both cases, however, the first-order conditions reveal that an agency that is risk-averse is one that receives disutility from uncertainty. The key issue then becomes what can be formally deduced from these utility-based relationships? Will agencies seek greater or less funding in response to increasing

uncertainty? If so, at what rate do agencies seek to obtain greater or less funding? How does the distinction between divided and unified government affect such agency decision-making? In order to analytically capture the relationship between agency budgetary decision-making and uncertainty, agency utility must be held constant at a fixed positive value, \bar{U} so that $U = \bar{U}$ and solve for the budgetary residual (BR) in (2):

$$BR = (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}}. \quad (5)$$

$$\text{where } 0 < c < \bar{U},$$

thus \bar{U} serves as the supremum for c by definition since $BR > 0$ by assumption. Next, the direction of this relationship (i.e., first-order conditions) can be determined by taking the first derivative of (6) with respect to σ :

$$\begin{aligned} \frac{dBR}{d\sigma} &= \frac{1}{\alpha} (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} \cdot \beta \sigma^{\beta-1} > 0 \\ &= \frac{\beta}{\alpha} \sigma^{\beta-1} (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} > 0. \end{aligned} \quad (6)$$

Therefore, a risk-averse agency will request greater budgetary funding in response to an increase in uncertainty, *ceteris paribus*. Substantively, this implies that budgetary risk-averse agencies place a rather strong premium on organizational maintenance via their attempts to obtain additional funding, holding all else constant. Taking the second-derivative of this function provides us with information on the rate at which this positive relationship varies as uncertainty changes. This budgetary residual-uncertainty relationship may vary between divided and unified party government since uncertainty in the former state will have a greater detrimental effect on agency utility than it does in the latter state for reasons discussed earlier. The rate at which the positive relationship between the budgetary residual sought by the agency and uncertainty varies during periods of divided party government, and is given by the following:

$$\frac{d^2 BR}{d\sigma^2} = \frac{(\beta^2 - \beta)}{\alpha} \cdot \sigma^{\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} + \left(\frac{\beta^2}{\alpha^2} - \frac{\beta^2}{\alpha}\right) \cdot \sigma^{2\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-2} \stackrel{>}{=} 0 \quad (7)$$

where:

$$\frac{d^2 BR}{d\sigma^2} > 0: \text{ if } \frac{\beta}{\alpha} > 1, \quad \sigma < \left[\left(\frac{\frac{\beta}{\alpha} - 1}{\beta - \frac{\beta}{\alpha}} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}} \quad (8a)$$

$$\frac{d^2 BR}{d\sigma^2} = 0: \text{ if } \frac{\beta}{\alpha} = 1, \quad \sigma = \left[\left(\frac{\frac{\beta}{\alpha} - 1}{\beta - \frac{\beta}{\alpha}} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}} \quad (8b)$$

$$\frac{d^2 BR}{d\sigma^2} < 0: \text{ if } 0 < \frac{\beta}{\alpha} < 1, \quad \sigma > \left[\left(\frac{\frac{\beta}{\alpha} - 1}{\beta - \frac{\beta}{\alpha}} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}}. \quad (8c)$$

The rate at which the agency is willing to seek additional funding in response to uncertainty under divided government, where uncertainty has a successively larger negative impact on agency utility, is conditional on the ratio of the rate at which agency utility increases with respect to both the budgetary residual sought by the agency (BR) and declines in relation to uncertainty (σ) – i.e., $\frac{\beta}{\alpha}$. There are three possible scenarios in this instance. If the rate at which agency utility declines with increases in uncertainty exceeds the rate at which agency utility rises with increased budgetary funding being sought by the agency – i.e., $\frac{\beta}{\alpha} > 1$, then an agency will prefer proportionally greater budgetary resources in response to changes involving uncertainty – i.e., $\frac{d^2 BR}{d\sigma^2} > 0$. If the rate at which the budgetary residual contributes to agency utility in a manner that is identical to that which uncertainty detracts from it – i.e., $\frac{\beta}{\alpha} = 1$, then increases in uncertainty will have a proportional effect on the amount of funding that the agency wishes to obtain – i.e., $\frac{d^2 BR}{d\sigma^2} = 0$. In the special case where the impact on agency utility attributable to the budgetary residual that the agency is trying to obtain exceeds that of

uncertainty's impact on agency utility – i.e., $0 < \frac{\beta}{\alpha} < 1$, the rate at which marginal changes in budget requests vary in response to movements in uncertainty will be less than proportional – i.e., $\frac{d^2 BR}{d\sigma^2} < 0$. Thus the more pronounced the negative effect of uncertainty on agency utility relative to that of the budgetary residual's positive effect on agency utility, a budgetary risk-averse agency will possess greater the impetus for acquiring successively higher level of resources in order to hedge against rising uncertainty, ceteris paribus.

The second-order derivative for periods of unified government unequivocally indicates that marginal increases in the budgetary residual requested by the agency successively declines as uncertainty rises. This is expressed as:

$$\frac{d^2 D}{d\sigma^2} = \frac{(\beta^2 - \beta)}{\alpha} \cdot \sigma^{\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} + \left(\frac{\beta^2}{\alpha^2} - \frac{\beta^2}{\alpha}\right) \cdot \sigma^{2\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-2} < 0 \quad (9)$$

where the less pervasive effect of uncertainty on agency decision-making under unified government translates into a successively weaker desire to obtain budgetary resources as a means to cope with uncertainty, all else being equal. This result makes intuitive sense when one considers that periods of unified government are marked by greater policy coherence and stability for administrative agencies compared to times of divided government as noted earlier in this essay.

Risk-Neutral Agency Budgetary Behavior

The *risk-neutral* agency's utility function can also be defined as a power function:

$$U = c + BR^\alpha - \sigma^\beta \quad (10)$$

where $\alpha = 1, \beta = 0$ (Divided and Unified Government)

c is a positive constant, and agency utility is assumed to be increasing at a constant rate α with respect to BR , and does not vary with respect to uncertainty (i.e., $\beta = 0$). Substantively, risk-neutral budgetary behavior by administrative agencies means that it will obtain increases in utility by trying to obtain

additional funding, but neither gain or lose utility from variations in uncertainty. Taking both the first and second-order partial derivatives of agency utility with respect to BR yields:

$$\frac{\partial U}{\partial BR} = \alpha BR^{\alpha-1} > 0; \quad \frac{\partial^2 U}{\partial BR^2} = (\alpha^2 - \alpha) BR^{\alpha-2} = 0. \quad (11)$$

Budgetary *risk-neutral* agencies will exhibit a constant rate of positive marginal utility with respect to the budgetary funding being sought through their request – i.e., $U'(BR) > 0$; $U''(BR) = 0$. Substantively, budgetary-risk neutral agencies are those which are not as concerned with organizational maintenance compared to budgetary risk-averse agencies with respect to the amount of funding that they seek as a hedge against uncertainty. Taking the first and second-order partial derivatives for agency utility with respect to σ results in:

$$\begin{aligned} \frac{\partial U}{\partial \sigma} &= -\beta \sigma^{\beta-1} = 0; \\ &\text{and} \\ \frac{\partial^2 U}{\partial \sigma^2} &= (-\beta^2 + \beta) \sigma^{\beta-2} = 0 \quad (\text{Divided and Unified Government}) \end{aligned} \quad (12)$$

where a risk-neutral agency's utility is completely unresponsive to variations in uncertainty, independent of whether an agency is operating under divided or unified government – i.e., $U'(\sigma), U''(\sigma) = 0$. In order to analyze the relationship between the agency budget residual and uncertainty variables, these terms need rearranging so that the first and second-order derivatives of BR with respect to σ can be obtained:

$$\frac{dBR}{d\sigma} = \frac{1}{\alpha} (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} \cdot -\beta \sigma^{\beta-1} = 0 \quad (13)$$

and

$$\frac{d^2 BR}{d\sigma^2} = \frac{(\beta^2 - \beta)}{\alpha} \cdot \sigma^{\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-1} + \left(\frac{\beta^2}{\alpha^2} - \frac{\beta^2}{\alpha} \right) \cdot \sigma^{2\beta-2} \cdot (\bar{U} - c + \sigma^\beta)^{\frac{1}{\alpha}-2} = 0 \quad (14)$$

Risk-neutral budgetary behavior displayed by the agency indicates that their budget requests will remain

unaffected by fluctuations involving uncertainty. Such a result is suggestive of indifference that the budgetary risk-neutral agency will have concerning maintenance of the organizational apparatus. Why might this indifference occur? One possible explanation might be these types of agencies wish to balance maintaining favorable political relations with organizational maintenance. Thus, a budgetary risk-neutral agency will neither request for additional or less funding in response to rising uncertainty, *ceteris paribus*. Alternatively, budgetary risk-neutrality may also emblematic of a sluggishness or inertia that does not easily afford bureaucratic agencies the opportunity or willingness to request more or less funding in response to changes involving uncertainty.

Risk-Seeking Agency Budgetary Behavior

Based on the power functional form, a risk-seeking agency's utility function will appear as:

$$U = c + BR^\alpha + \sigma^\beta \quad (15)$$

where $0 < \alpha < 1$, $0 < \beta < 1$ (Divided Government)

$0 < \alpha < 1$, $\beta > 1$ (Unified Government)

c is a positive constant, and agency utility is assumed to be increasing at a declining rate α with respect to BR , and rising at the rate β with respect to uncertainty. Risk-seeking budgetary behavior by administrative agencies means that they experience a rise in utility for not only trying to obtain additional funding, but also when they face increasing uncertainty. The rate of change in the marginal effect of uncertainty on agency utility, however, will be conditional on the distinction between divided and unified government discussed earlier. Under unified (divided) government, variations in uncertainty will have a larger (smaller) than proportional positive marginal impact on agency utility. This is because uncertainty will have a more deleterious effect on agency utility during periods of divided government compared to unified government, all else being equal, since institutional policy coherence and stability of agency expectations are lessened in the former era. Once again, taking both the first and second-order partial

derivatives of agency utility with respect to BR in the risk-seeking case yields:

$$\frac{\partial U}{\partial BR} = \alpha BR^{\alpha-1} > 0; \quad \frac{\partial^2 U}{\partial BR^2} = (\alpha^2 - \alpha) BR^{\alpha-2} < 0. \quad (16)$$

Budgetary *risk-seeking* agency behavior will exhibit a decreasing rate of positive marginal utility with respect to seeking greater budgetary funding – i.e., $U'(BR) > 0$, $U''(BR) < 0$, thus indicating that agency behavior will be less concerned with organizational maintenance in the face of rising uncertainty compared to that of both risk-averse and risk-neutral scenarios. Taking the first and second-order partial derivatives for agency utility (U) with respect to uncertainty (σ) produces:

$$\begin{aligned} \frac{\partial U}{\partial \sigma} &= \beta \sigma^{\beta-1} > 0; \\ &\text{and} \\ \frac{\partial^2 U}{\partial \sigma^2} &= (\beta^2 + \beta) \sigma^{\beta-2} < 0 \quad (\text{Divided Government}) \\ \frac{\partial^2 U}{\partial \sigma^2} &= (\beta^2 + \beta) \sigma^{\beta-2} > 0 \quad (\text{Unified Government}) \end{aligned} \quad (17)$$

where risk-seeking agency behavior derives positive utility from uncertainty – i.e., i.e., $U'(\sigma) > 0$. Furthermore, such an agency operating under divided (unified) government experiences successively smaller (larger) rise in marginal utility attributable to increases in uncertainty – i.e., $U''(\sigma) < 0$ (divided government), and $U''(\sigma) > 0$ (unified government). Simply, an agency behaving in a risk-seeking manner during periods of divided government has a stronger dispreference for uncertainty relative to when it is operating under a unified government era for the same reasons noted in the risk-averse case. Thus, holding the nature of risk-bearing behavior fixed, uncertainty will exert a more deleterious impact on agency utility under divided government as compared to unified government. Based on these relationships, the connection between agency budget request behavior reflected in the BR variable in response to uncertainty (σ) is made by solving for BR and setting $U = \bar{U}$ based on (15):

$$BR = (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}} \quad (18)$$

where $0 < c < \bar{U}$,

thus \bar{U} serves as the supremum for c by definition since $BR > 0$ by assumption. Taking the first-order derivative of BR with respect to σ in (18) yields:

$$\begin{aligned} \frac{dBR}{d\sigma} &= \frac{1}{\alpha} (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-1} \cdot -\beta\sigma^{\beta-1} < 0 \\ &= \frac{-\beta}{\alpha} \sigma^{\beta-1} (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-1} < 0. \end{aligned} \quad (19)$$

Therefore, risk-seeking budgetary behavior displayed by administrative agencies translates into a preference for relatively lower funding increase from the previous year's appropriation as uncertainty rises, *ceteris paribus*. This result suggests that agency's exhibiting risk-loving budgetary behavior is less concerned with organizational maintenance since it will request for a smaller increase in funding based on last year's appropriation in response to a rising uncertainty, holding all else constant. The rate at which this inverse relationship between agency budgetary request behavior and uncertainty changes depends upon the nature of the political regime. Taking the second-derivative of (19) provides us with the general result under periods of divided government:

$$\frac{d^2 BR}{d\sigma^2} = \frac{-(\beta^2 - \beta)}{\alpha} \cdot \sigma^{\beta-2} \cdot (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-1} + \left(\frac{\beta^2}{\alpha^2} - \frac{\beta}{\alpha}\right) \cdot \sigma^{2\beta-2} \cdot (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-2} > 0 \quad (20)$$

where marginal decreases in agency budgetary requests will be less than proportional for each unit rise in uncertainty. The less pervasive effect of uncertainty on organizational decision-making during times of divided government case for the risk-seeking agency is suggestive of public bureaucracies' willingness not to cut their budgetary preferences in as bold a manner in response to uncertainty when confronting a situation where policy coherence and stable policy expectations are weakened.

Under periods of unified party government, the comparative-statics concerning the rate of

change in the inverse relationship between agency budget requests and uncertainty is ambiguous. Since

$\frac{\beta}{\alpha} > 1$ by definition for risk-seeking agency budgetary behavior under unified government, thus

obtaining¹⁹:

$$\frac{d^2 BR}{d\sigma^2} = \frac{-(\beta^2 - \beta)}{\alpha} \cdot \sigma^{\beta-2} \cdot (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-1} + \left(\frac{\beta^2}{\alpha^2} - \frac{\beta^2}{\alpha}\right) \cdot \sigma^{2\beta-2} \cdot (\bar{U} - c - \sigma^\beta)^{\frac{1}{\alpha}-2} \stackrel{>}{=} 0 \quad (21)$$

where:

$$\frac{d^2 BR}{d\sigma^2} > 0: \text{ if } \sigma > \left[\left(\frac{\beta-1}{\frac{\beta}{\alpha}-1} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}} \quad (21a)$$

$$\frac{d^2 BR}{d\sigma^2} = 0: \text{ if } \sigma = \left[\left(\frac{\beta-1}{\frac{\beta}{\alpha}-1} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}} \quad (21b)$$

$$\frac{d^2 BR}{d\sigma^2} < 0: \text{ if } \sigma < \left[\left(\frac{\beta-1}{\frac{\beta}{\alpha}-1} \right) \cdot (\bar{U} - c) \right]^{\frac{1}{\beta}} . \quad (21c)$$

Unlike the risk-averse case under divided government where conditional relationships are determined by the impact BR and σ each have on agency utility – i.e., $\frac{\beta}{\alpha}$, the rate at which the risk-seeking agency budgetary behavior is trying to obtain additional funding in response to uncertainty under unified government involves a more complicated relationship that is difficult to substantively interpret because both the comparative-static findings differ somewhat and also $\frac{\beta}{\alpha} > 1$ by definition in this latter case.

19 The case where $\frac{d^2 BR}{d\sigma^2} > 0: \text{ if } 0 < \frac{\beta}{\alpha} < 1$ is inconsistent with this theoretical model given that it is assumed under unified government that risk-seeking agency budgetary behavior is such that $0 < \alpha < 1$, and $\beta > 1$.

Specifically, the nature of agency budgetary decision making under uncertainty is conditional on the *absolute* level of uncertainty that the agency experiences (σ) in relation to the relative balance between the rate of positive marginal utility attributable to uncertainty and the ratio of positive marginal utility with respect to both uncertainty and the budgetary residual, multiplied by a fixed level of agency utility raised to a fractional power that lies between zero and unity since $\frac{\beta}{\alpha} > 1$. This latter complex mathematical expression is henceforth, referred to as the *relative positive marginal utility expression* or *RPMUE*. In the case of (21a) when the *level* or *amount* of uncertainty is larger than RPMUE, the agency budget request will decline at a decreasing rate in response to successive increases involving uncertainty, all else being equal. When the level of uncertainty is equivalent to RPMUE as is the case in (21b), the budgetary residual of the agency will decline at a constant (proportional) rate in response to increasing uncertainty, *ceteris paribus*. Finally, when the amount of uncertainty is less than RPMUE as appears in (21c), the agency budgetary residual will decline at an increasing rate in response to rising uncertainty, holding all else constant. In sum, the more pronounced the positive effect of uncertainty on agency utility relative to that of the budgetary residual vis-a-vis the level of uncertainty that the organization experiences, the greater the impetus a budgetary risk-seeking agency has for acquiring successively fewer funding resource gains as a response to increasing uncertainty, *ceteris paribus*. This type of behavior makes logical sense given that agencies are only willing to reduce funding requests in a smaller than proportional manner when uncertainty is high in absolute terms relative to the ratio of the impact of uncertainty to budgetary residual being sought by the agency each with respect to their utility. In the opposite case where the level of uncertainty is low relative to this ratio impact of each variable on agency utility, the agency displaying risk-seeking behavior will be inclined to reduce funding requests in a larger than proportional manner.

4. Conclusion

Although it is commonly known that bureaucratic agencies operate under conditions of uncertainty (e.g., Downs 1967; Gormley 1989; March and Olsen 1976; March and Simon 1958; Simon 1955, 1976; Stinchcombe 1990; Wilson 1989), this fact is overlooked in most existing scholarship of bureaucratic decision-making. In the few instances where this phenomenon has been explicitly considered, it has been assumed a priori in an exogenous fashion (Bendor and Moe 1985; Bendor, Taylor, and Van Gaalen 1985, 1987), or derived in a manner that limits agency response only to the special case of risk-neutral behavior (Carpenter 2000). Recent empirical studies that do attempt to assess risk-bearing behavior fail to provide explicit theoretical conditions that allow one to qualitatively differentiate between various types of risk-bearing behavior that may occur (Bozeman and Kingsley 1998; Moon 1999). As a result, our current understanding and treatment of uncertainty is fuzzy at best and reflects a “black box” where the existence of this phenomenon is implicitly acknowledged, yet the manner in which it affects administrative behavior is largely left undetermined. Understanding how uncertainty affects bureaucratic decision-making necessitates that scholars wrestle with theory underlying agency choice under conditions of uncertainty by analyzing different risk-bearing scenarios.

Administrative agencies can cope with uncertainty in several ways, including, but not limited to, restricting the scope of their policy and task domains, obtaining additional bureaucratic discretion, and perhaps a greater reliance on rules and standard operating procedures. Still one additional way an agency can deal with uncertainty is through the acquisition of budgetary resources as a hedge that provides bureaucratic flexibility via slack resources (Downs 1967: 138–139). The central aim of this study has focused on this latter approach by determining the extent to which an administrative agency is willing to extract additional budgetary resources (organizational slack) in response to the uncertainty that they are experiencing, holding all else constant. This, in turn, provides a direct lens on the extent to which administrative organizations seek fiscal resources with the purposes of creating slack resources for

organizational and policy mission purposes (Cyert and March 1963; Downs 1967; Wilson 1989). In doing so, general theoretical conditions can be derived that enable one to differentiate among risk-averse, risk-neutral, and risk-seeking budgetary behavior displayed by administrative agencies. The analytical results of this study demonstrate that administrative agencies wish to raise the amount of funding it seeks when confronted with a rise in uncertainty under conditions of budgetary risk-aversion, all else being equal. Agency budgetary behavior that reflects risk-seeking behavior entails a desire to lower the amount of funds that they request in response to an increase in uncertainty. In those situations where administrative agencies' budget requests are unresponsive to movements in uncertainty, these organizations display budgetary risk-neutral behavior. As a result, one can infer from these comparative-static theoretical results that organizational slack is most valued by agencies exhibiting budgetary risk-averse behavior and least prized by those that display budgetary risk-seeking behavior.

In addition, the assumption that the rate at which the marginal effect of uncertainty on agency utility being fixed is relaxed to allow for variation between periods of unified and divided party government. This is a critical feature of the theoretical analysis presented in this study given that administrative organizations typically experience both less policy coherence and stable expectations during an era of divided government relative to a period of unified government. These derived conditions generate empirically testable propositions, thus enabling us to determine how the decision-making of administrative agencies respond to uncertainty in a variety of settings. The simple theoretical analysis proposed here can serve as the basis for the construction of future frameworks of analysis that provide answers to questions of a more specific nature such as demonstrating the manner in which some agencies risk-bearing behavior differs from others, and the mechanism, whereby, the nature of risk-bearing behavior is necessarily altered across different political regimes.²⁰

²⁰ A concurrent empirical study involves distinguishing between these two distinct bureaucratic responses to uncertainty (Krause 2002). Thus the theoretical predictions generated from this comparative-static analysis can be subject to hypothesis testing with data.

This study has broader implications for understanding how administrative institutions make decisions within a political environment. The comparative–static results obtained here are suggestive of the possible tension between organizational maintenance versus political responsiveness that agencies undeniably confront in the presence of uncertainty. This tension is consistent with the long–standing observation that administrative agencies do wish to possess discretionary authority, but also possess a strong desire to maintain or enhance their reputation with elected officials (Kaufman 1981; Wilson 1989). The theoretical results presented here reveal that an agency’s allegiance to an organizational mission is comparatively strongest in the case of budgetary risk–averse behavior, followed by budgetary risk–neutrality, with budgetary risk–seeking being the least concerned with resource preservation. Moreover, increases in uncertainty under times of divided government are viewed as having a more detrimental impact on the rate of change in marginal agency utility compared to periods of unified party government since it creates an environment that elicits greater institutional uncertainty with respect to political signals (Davis, Dempster, and Wildavsky 1966), and also less policy coherence with respect to policy matters (Epstein and O’Halloran 1999). The analytical results demonstrate that for a given type of budgetary risk–bearing behavior displayed by an administrative agency, these entities will become at least as much, if not more, marginally protective of their organizational mission in times of divided party government compared to eras of unified party government, all else being equal. These particular set of theoretical results are consistent with the perspective set forth in past descriptive studies which maintains that agencies will seek (comparatively) greater resources as a rational response to obtaining administrative and policy flexibility (Downs 1967), and also in order to make the organizational mission more coherent (Wilson 1989).

The advantage of analyzing uncertainty in directly assessing behavioral relationships can provide us with specific information regarding the nature of risk proclivities exhibited by bureaucratic actors in an incomplete and imperfectly informed decision–making environment. This study has proposed one

such approach with the purpose of understanding how administrative agencies make budgetary decisions under conditions of uncertainty. Future research should develop models and subsequent empirical tests in other areas of decision-making where variations involving uncertainty can color the manner in which bureaucratic organizations make decisions. Our understanding of decision-making processes in administrative agencies will be noticeably enhanced as we begin to explicitly consider the varying nature that uncertainty plays in both our theories and empirical analyses of how these organizations arrive at decisions.

Appendix: General Solution to the Theoretical Conditions of Agency Budgetary Risk–Bearing Behavior

The general solution that demonstrates the comparative–statics hold for the budgetary risk–bearing behavior for the three conditions (risk-aversion, risk-neutrality, and risk seeking), and also taking into account the qualitative distinction between divided and unified government, irrespective of the functional form adopted for purpose of analysis, is straightforward. If we begin with the generic agency utility function involving their budgetary residual (BR) and the uncertainty (σ) that they experience as in (1):

$$U(BR, \sigma) = f(BR) + g(\sigma) \tag{A-1}$$

where agency utility is an additive function of the budgetary residual (BR) and uncertainty (σ). The partial derivatives of (A-1) are such that:

$$f'(BR) = \frac{\partial U}{\partial BR}; g'(\sigma) = \frac{\partial U}{\partial \sigma} . \tag{A-2}$$

In order to solve for $\frac{dBR}{d\sigma}$ and $\frac{d^2 BR}{d\sigma^2}$ respectively, agency utility must be fixed so that $U = \bar{U}$.

Rewriting (A-1) based on fixed utility gives us:

$$\bar{U} = f(BR) + g(\sigma) . \tag{A-3}$$

Setting (A-3) equal to zero and differentiating with respect to σ yields:

$$0 = f'(BR) \frac{dBR}{d\sigma} + g'(\sigma) , \tag{A-4}$$

and solving (A-4) in terms of $\frac{dBR}{d\sigma}$ gives us the following expression for the general first-order condition to this problem:

$$\frac{dBR}{d\sigma} = \frac{-g'(\sigma)}{f'(BR)} . \tag{A-5}$$

Because it is assumed that agency utility has a different (the same) directional relationship with respect to BR and σ separately for the risk-averse (risk-seeking) conditions, by definition $\frac{dBR}{d\sigma} > 0$

$\left(\frac{dBR}{d\sigma} < 0\right)$. In the risk-neutral case, by definition $\frac{dBR}{d\sigma} = 0$ since $g'(\sigma) = 0$ and $f'(BR) \neq 0$ by assumption. Solving for the second-order conditions involves differentiating (A-5) via the quotient rule, and yields the general solution:

$$\frac{d^2 BR}{d\sigma^2} = \frac{-f'(BR) \cdot g''(\sigma) + g'(\sigma) \cdot f''(BR) \cdot \frac{dBR}{d\sigma}}{[f'(BR)]^2}, \quad (\text{A-6a})$$

and substituting the equivalent $\frac{-g'(\sigma)}{f'(BR)}$ for $\frac{dBR}{d\sigma}$ leads to:

$$= \frac{-f'(BR) \cdot g''(\sigma) + g'(\sigma) \cdot f''(BR) \cdot \frac{-g'(\sigma)}{f'(BR)}}{[f'(BR)]^2}. \quad (\text{A-6b})$$

Multiplying both sides by $f'(BR)$ and some combining terms yields the general solution:

$$= \frac{-[f'(BR)]^2 \cdot g''(\sigma) - [g'(\sigma)]^2 \cdot f''(BR)}{[f'(BR)]^3}. \quad (\text{A-6c})$$

The sign of the function associated with the general solution to the second-order conditions will depend upon the sign of $f'(BR)$ as well as for both $f''(BR)$ and $g''(\sigma)$. They are as follows:

Case I. Risk-Averse Agency Budgetary Behavior under Divided Government:

$$\text{If } f'(BR) > 0 \text{ and } f''(BR) > 0, g''(\sigma) < 0, \quad (\text{A-7})$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} > 0 \text{ when } |[f'(BR)]^2 \cdot g''(\sigma)| > |[g'(\sigma)]^2 \cdot f''(BR)|$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} = 0 \text{ when } |[f'(BR)]^2 \cdot g''(\sigma)| = |[g'(\sigma)]^2 \cdot f''(BR)|$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} < 0 \text{ when } |[f'(BR)]^2 \cdot g''(\sigma)| < |[g'(\sigma)]^2 \cdot f''(BR)|;$$

Case II. Risk-Averse Agency Budgetary Behavior under Unified Government:

$$\text{If } f'(BR) > 0 \text{ and } f''(BR) \cdot g''(\sigma) > 0, \text{ Then } \frac{d^2 BR}{d\sigma^2} < 0; \quad (\text{A-8})$$

Case III. Risk-Seeking Agency Budgetary Behavior under Divided Government:

$$\text{If } f'(BR) > 0 \text{ and } f''(BR), g''(\sigma) < 0, \text{ Then } \frac{d^2 BR}{d\sigma^2} > 0; \quad (\text{A-9})$$

Case IV. Risk-Seeking Agency Budgetary Behavior under Unified Government:

$$\text{If } f'(BR) > 0 \text{ and } f''(BR) < 0, g''(\sigma) > 0, \quad (\text{A-10})$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} > 0 \text{ when } | [f'(BR)]^2 \cdot g''(\sigma) | < | [g'(\sigma)]^2 \cdot f''(BR) |$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} = 0 \text{ when } | [f'(BR)]^2 \cdot g''(\sigma) | = | [g'(\sigma)]^2 \cdot f''(BR) |;$$

$$\text{Then } \frac{d^2 BR}{d\sigma^2} < 0 \text{ when } | [f'(BR)]^2 \cdot g''(\sigma) | > | [g'(\sigma)]^2 \cdot f''(BR) |;$$

In the risk-neutral case, the existence or absence of divided party government will not have a bearing on the relationship between BR and σ , thus the following will hold: $f'(BR) \neq 0$; $f''(BR), g''(\sigma) = 0$.

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