Article

Resource Stability and Federal Agency Performance

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Abstract

Resources are essential for organizations to cope with challenges and to achieve their desirable outcomes. Although much scholarly attention has been paid to the type or level of resources allocated or used to enhance organizational effectiveness, relatively little effort has been made to analyze whether and how resource changes influence organizational performance. Considering today's unstable fiscal climate, this study focuses on how government agencies respond to their budget fluctuations—both gains and cuts—and their distinctive impact on agency performance. Using data from the Performance and Accountability Reports from FY 2004 through FY 2014, we analyze the effect of budgetary resource changes on organizational performance in 52 U.S. federal agencies. Findings show that agency effectiveness is significantly influenced by budget changes. In particular, we find an asymmetric relationship between budgetary resource changes and organizational performance. It appears that budget cuts are not associated with changes in agency performance, whereas budgetary resource gains are associated with dampened agency effectiveness. Ultimately, this study provides insights into public organizations' resilience and calls for considering change management perspectives when exploring resource–performance linkages.

Keywords

organizational performance, U.S. federal government, resource stability, budgetary resources

Over the last several decades, enhancing the performance of government agencies has been one of the public sector's central concerns. Accordingly, much scholarly attention has been given to the antecedents of organizational performance such as leadership (Fernandez et al., 2010), public service motivation (Alonso & Lewis, 2001), and management (O'Toole & Meier, 2003). Scholars have also specified how managerial skills—including proactive management (Goerdel, 2006) or innovative management (Walker et al., 2010)—contribute to improving organizational performance. Studies also show that when career managers/executives or other appointees administer a federal program, its performance appears to be higher than the program run by political appointees from the campaign or party (Gallo & Lewis, 2012; Lewis, 2007). As such, "people" appear to be the most significant element that determines government effectiveness (Osborne & Gaebler, 1992; Pfeffer, 1994).

However, relatively little attention has been paid to financial resources as a major source for explaining organizational effectiveness. Budgets are one explicitly important component that constitutes organizational environment, which would influence its performance and policy implementation (Meier & O'Toole, 2009; Wildavsky, 1986). For U.S. federal agencies, the administration's annual budget proposal for each fiscal year emerges as a big concern. It not only signifies the administration's policy priorities but also affects the agency's performance for upcoming fiscal year. If Congress passes all appropriations bills based on the president's suggestions and Congressional priorities, some federal agencies are confronted with their proposed budget cuts, whereas other agencies get a boost in funding for achieving their goals. In previous literature, some dissents can be heard on the effect of financial resources on agency performance in the United States. It has been argued that an increase of the absolute budget size for federal programs rather deteriorates their respective performance (Jung, 2013). However, spending authority from offsetting collections turns out to be positively associated with organizational performance in the federal government (Lee & Whitford, 2013). This scholarly discrepancy may come from several factors such as the different shares of federal budgets examined in each study or time frames that authors focused on.

Given this, we use a total amount of budgetary resources of 52 U.S. federal agencies to understand the effect of financial resources on organizational performance. In general, government agencies harness the total budgetary resources, which consist of unobligated balances from the prior year's budget authority, appropriations, and the spending authority

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from offsetting collections in a current year. Furthermore, we focus on resource changes that each organization experiences. In particular, we consider two types of budget changes that an organization may experience at the same time, and how they would influence agency effectiveness. As public organizations are increasingly confronted with unpredictable resource fluctuations, scholars have focused on organizations' response to their endogenous constraints or exogenous turbulence over time (e.g., Boyne & Meier, 2009; Levine, 1984, 1985; Meier & O'Toole, 2009; O'Toole & Meier, 2010).

Two scenarios are possible after resource changes are made. One is the case when organizations have substantive gains in their resources. In this case, the resources can be used to either fill up the shortages or become a leftover. Spare resources have been discussed in the management literature since Barnard (1938) introduced the term "slack" in his explanation on sustaining organizational membership. Although opponents argue that excessive resources diminish incentives to innovate and generate inefficiency, the salient feature threading through the discussions on the slack resources is that they serve as a buffer for an organization to absorb the turbulence and to adapt to both internal and external pressures (Bourgeois, 1981; Cyert & March, 1963; Pfeffer & Salancik, 1978). There have been scholarly efforts to explain public organizations' response to their internal spare resources (e.g., Busch & Gustafsson, 2002; Hendrick, 2006; Marlowe, 2011; Moulick & Taylor, 2017; O'Toole & Meier, 2010). Another case of the resource change is when organizations confront with resource cuts compared with the previous year. Since Levine (1978) discussed the decline of public organizations with their lower levels of resource consumption, considerable evidence has been amassed on cutback management (e.g., Meier & O'Toole, 2009; Schmidt et al., 2017).

Taken together, this study asks as follows: do the changes of budgetary resource influence agency performance?; if so, would government agencies respond to resource changes in a different way, which distinctively influences organizational performance? This study seeks to answer these questions by analyzing Performance Accountability Reports (PARs) of 52 U.S. federal agencies from FY 2004 through FY 2014.[1] While the Program Assessment Rating Tool (PART) evaluates the effectiveness of federal programs, the PAR focuses on each agency's outcome. Given that some federal programs cross agency jurisdictions or government levels, we decide to use the PARs for explaining federal agency performance.

Amid various efforts to define and measure the agency performance, scholars have provided various ways of assessing organizational effectiveness (see Selden & Sowa, 2004). Considering organizational performance as a condition where the organization maximizes its outputs but minimizes inputs, Rainey and Steinbauer (1999) portray that performance is reflected in how well and to what extent the agency achieves the planned missions. Following these conceptual dimensions, many scholars have assessed the organizational performance as the degree to which an organization achieves its goals (e.g., Lee & Whitford, 2013; Moon & Christensen, 2020; Pfeffer, 1982; Rainey, 2003). This study also takes a goal approach in measuring agency performance. When an organization establishes a strategic framework for achieving its mission, PARs report how many goals (or targets) are achieved using specific indicators of performance for each agency. Drawn from each agency's annual PAR, we examine the level of goal achievement of each federal agency. In addition, while we expect that budgetary changes influence agency performance, there is a possibility of the reverse causality. The Office of Management and Budget (OMB) had used performance information in allocating budgetary resources. To address these concerns, we use an instrumental variable (IV) strategy to rule out the endogeneity issue.

This study is expected to make several contributions. Although considerable advances have been made in incorporating agency performance into federal budgetary process through the lens of performance-based budgeting, relatively little attention has been paid to the impact of budgetary resources on agency performance. This study contributes to extending the literature on the linkage between resources and performance in the context of the U.S. federal government. In particular, much of the relevant research on government performance has used the budget as a measure for organizational size and, in most cases, has relied upon an absolute size (e.g., Boyne, 2003; Jung, 2013). However, we are suggesting that the change of resources is also important when explaining the effectiveness of the government agencies. In recent years, several scholars point to the importance of budgetary changes in public educational and policy context (Flink, 2019; Robinson et al., 2007). We respond to the growing focus on the resource changes by placing our argument in the context of U.S. federal agencies. Furthermore, we consider both the gains and cuts of budgetary resources that federal agencies experience and their influence on organizational goal achievement. Given today's fiscal uncertainties, public agencies are challenged to cope with their unprecedented financial conditions. Examining how the agencies exhibit a distinct pattern when they are confronted with budget fluctuations will provide important implications on how government organizations translate their internal resources into desirable outcomes.

Theories of Resource–Performance Linkage

Resources are closely associated with organizational survival, management, and effectiveness. Resource dependence theory (RDT) proposes that organizations should be capable of coping with environmental contingencies to manage their resources and reduce uncertainties (Pfeffer & Salancik, 1978). Given that organizations acquire resources and need

to maintain them, resource-based view (RBV) further argues that having more resources improves organizational performance (Bryson et al., 2007; Wernerfelt, 1984). For organizations, reliance on distinctive resources provides them with a competitive advantage and, thus, contributes to improving their performance. As such, much previous scholarship on the resource–performance linkage has primarily focused on the levels of resources. Both the RBV and the RDT have focused on how the organization or its outcome would respond to its absolute amount of internal or external resources. Nevertheless, it is too simple to assume that more resources would always lead to public service improvement (Boyne, 2003).

With respect to budgetary resources, public organizations are increasingly confronted with fiscal uncertainties. We find several studies that focused on changes of fiscal resource in their predicting organizational performance. In his analysis of 48 U.S. states' government spending, Sharkansky (1967) examines whether there is a significant correlation between the changes in government expenditure practices and public service performance. Out of 135 possible relationships, he finds 28 significant correlations between changes in spending and services. In a public educational and policy context, scholars have paid attention to the relationship between changes of budgetary resources and performance outcomes. Robinson et al. (2007) focus on the budgetary changes observed over 1,000 education organizations to test the dynamics of Punctuated Equilibrium Theory (PET). Building upon the PET, Flink's (2019) study further shows how organizational performance gaps are related to the probability of annual percentage changes in instruction spending per student.

If public organizations attribute their effectiveness to the ability to adapt to shifts or discontinuities of their budgetary resources, how they translate these internal resources to organizational outcomes is important. With different focuses and examples, many scholars have explained how public organizations or bureaucrats deal with slack resources (Busch & Gustafsson, 2002; Hendrick, 2006; Marlowe, 2005; O'Toole & Meier, 2010) or respond to their cutback-related changes (Levine, 1978; Meier & O'Toole, 2009; Schmidt et al., 2017). Consistent with these research streams, we can surmise that federal budget change is an important variable to predict the upcoming agency performance. Although we are not offering a specific direction at this time,[2] the first hypothesis is offered as follows:

> **Hypothesis 1:** There is a significant relationship between budgetary resource changes from the prior year and the organizational effectiveness in the current fiscal year.

Given the presumption that changes of resource availability influence agency performance, we then expand our inquiry into how public organizations deal with these resource changes. One avenue for specifying this influence is to examine how federal agencies respond to annual budget cuts or gains and how these fiscal concerns affect organizational performance, respectively.

How do federal agencies respond to budget cuts? Scholars have examined how public organizations deal with their fiscal constraints (Levine, 1984, 1985). First, public organizations are likely to cope with fiscal shocks by altering the composition of their internal resources or seeking out less expensive assets. In their study of 1,000 public schools over an 8-year period, Meier and O'Toole (2009) find that organizations are likely to fill a portion of their budget deficits by lowering personnel salaries. Through this, public organizations can absorb the fiscal constraints internally without experiencing performance decline. Second, public organizations tend to cope with their fiscal constraints by utilizing slack resources. It has been suggested that budget shock activates slack in managerial resources, which buffers the negative budgetary impact on organizational performance (O'Toole & Meier, 2010). In their study of 1,000 public schools over 17 years, Moulick and Taylor (2017) report that unobserved fund balances successfully dissipate the impact of budget shocks on student performance. Consistent with previous literature, it is expected that when there is a challenge concerning financial conditions, public organizations are likely to render various measures such as redeploying resources or using their slack to relax budgetary constraints without big losses. Through these defensive strategies against funding shocks, public organizations can minimize the impact of budget cuts on their effectiveness.

On the other hand, we can think of the opposite case. If federal agencies face budget gains compared with the previous year, how do agencies respond to their resource gains? Depending on their annual fiscal conditions, organizations are likely to deal with their increased resource availability in two ways: agencies use their increased resources for filling up their shortages or accumulate them as slack in preparation for uncertain and even risky environments. Considering these two possibilities, this study looks further into two competing theoretical streams that have explained the linkage between organizational resources and performance: (a) the behavioral theory of firms based on organizational theory (Cyert & March, 1963; March, 1994; Pfeffer & Salancik, 1978; Thompson, 1967) and (b) the resource constraint literature based on agency theory (Baker & Nelson, 2005). Because these two theoretical arguments are somewhat incompatible in predicting how increase of resources influences agency performance, it is difficult to develop a hypothesis that supports only one side. Therefore, we decide to separately discuss the two theoretical backgrounds, respectively, and then test two competing hypotheses simultaneously.

The behavioral theory of firms and organizational theory treat organizations as human-like organisms that pursue survival as their ultimate goal. It has been argued that resources

allow organizations to ensure their survival by helping their adaptation to internal challenges and response to unpredictable environmental jolts. Resources serve as a source of competitive advantage, especially for organizational survival, growth, and effectiveness. Such assumption is adopted by the RBV, demonstrating that the more resources agencies have, the higher the growth and performance they will achieve (e.g., Barney, 1991; Bryson et al., 2007; Wernerfelt, 1984). Although there have been concerns about its theoretical tenets (Priem & Butler, 2001) or empirical implications (Arend & Lévesque, 2010; Newbert, 2007), the RBV has remained a cornerstone of many studies centered on organizational resources and their influence on performance. Based on the RBV, Lee and Whitford (2013) show that U.S. federal agencies have higher performance scores when they have a greater percentage of spending authority from offsetting collections.

In line with the behavioral theory of firms, organizational theory considers resources as a tool for achieving organizational goals. If resource gains are sufficiently large enough to make up for shortages and further constitute the slack, this excess resource performs various functions.

Early organizational theorists show that slack provides agencies with unexploited and propitious opportunities to increase their outputs, and also plays a crucial role as an inducement to draw organizational participants (e.g., Barnard, 1938). Even we assume the case when the budget gains do not constitute the spare resources, but are used to fill up the shortages, resources themselves act as an inducement for an organization to make proactive choices or even take risks to achieve its goals. Organizational studies have shown that sufficient resources can become a facilitator of strategic behavior (Thompson, 1967) and organizational innovations (Bourgeois, 1981; Hambrick & Snow, 1977; Moses, 1992). Moreover, organizations use resources as a buffer to adapt successfully to internal constraints and external pressures. Scholars have demonstrated that spare resources relax fiscal stress (Hendrick, 2006; Marlowe, 2005), absorb environmental turbulence (Cyert & March, 1963), and overcome errors (Wildavsky, 1988). When it comes to organizational performance, sufficient resources are considered as an essential condition for achieving high levels of organizational performance (Kettl & Fesler, 2005) and for implementing successful public policy (Mazmanian & Sabatier, 1989). In keeping with these arguments, we expect that federal agencies experiencing budget gains in previous year are likely to utilize their increased resource availability to lessen their uncertainties and improve their organizational outcomes. This line of logic leads to our asymmetric effect hypothesis as follows:

> **Hypothesis 2a:** Agencies which experience budget gains in the prior year will have a higher performance in the current year, but budget cuts will not influence the current performance.

Although an increase of resource availability can facilitate the flexibilities of an organization and enhance agency performance, some literature contends that organizations with fewer resources are more likely to achieve higher performance (Baker & Nelson, 2005; Starr & MacMillan, 1990). The rationale for this argument is that a resource-constrained environment elicits behavioral changes in bureaucrats, which results in allocative efficiency. It is consistent with the assumption of the RDT that resource scarcity influences the organizational pattern. If bricolage allows organizations to leverage or stretch their available resources to improve their capabilities, organizations can achieve their goals with fewer resources. Consistent with these perspectives, scholars have suggested that declines in government resource availability rather enhance the creative or innovative behavior of public bureaucrats. In their analysis of 500 U.S. cities, Singla et al. (2018) report that financial resource constraints rather boost entrepreneurial activities of local governments.

As such, available resources may lead bureaucrats to take fewer risks and avoid innovation. These arguments are largely grounded in agency theory, which regards the organization as the contract between principals and agents. A rationale for agency theory comes from the principal-agency problem that agents are likely to misrepresent their readily available resources to principal—they accumulate resources to pursue their own self-interests (Jensen & Meckling, 1976). Given the assumption that all actors are narrowly self-interested, government bureaucrats are presumed to maintain the status quo and to pursue their own enrichment with the resources at hand (Jensen, 1986). The same applies when resource gains become organizational slack. It has been argued that surplus resources are negatively associated with risk taking (Bromiley, 1991; Wiseman & Bromiley, 1996) and decrease effectiveness (Nouri & Parker, 1996). Also, excess resources lead managers to invest in dubious areas, which hurts organizational goal achievement and results in organization inefficiency (Jensen, 1986).

Similarly, organizational economists have considered spare resources as a reflection of managerial self-interest, incompetence, or a waste of organizational adaptations (Williamson, 1963). Such perspectives are further buttressed within public choice traditions. For example, Niskanen (1971) assumes that budget-maximizing bureaucrats are likely to increase bureau slack, which leads to allocative inefficiency.

From these perspectives, we can presume that budget gains for public organizations are not a sufficient but necessary condition for improving agency performance. Organizations with greater budgetary resources are more likely to achieve their goals and enhance their outcomes only when these financial resources are effectively managed. The same applies to the case when resource gains do not constitute the organizational slack. Under the assumption of principal–agent relationships, it is difficult to believe that resources are always effectively managed and redeployed to improve

organizational effectiveness. In his analysis of U.S. federal programs, Jung (2013) tests the association between budget size of the programs and their respective performance. Although his study uses budgets as a measure for organizational size, his findings reveal that financial resources have a direct and negative influence on agency effectiveness. Based on existing research, this study develops an alternative asymmetric effect hypothesis:

> **Hypothesis 2b:** Agencies which experience budget gains in the prior year will have a lower performance in the current year, but budget cuts will not influence the current performance.

Model Specification

We analyze 52 federal agencies from FY 2004 to FY 2014 to evaluate the proposed hypotheses. To explore the association between budgetary resource changes and agency performance, the regression equation to test H1 can be expressed as follows:

$$Y_{it} = \alpha + \beta V_{it} + \delta X_{it} + \mu_i + \upsilon_t + \varepsilon_{it}, \quad (1)$$

where Y_{it} denotes the organization i's performance (or agency effectiveness) at year t, V_{it} refers to a budget growth rate from fiscal year $t-1$ to t in federal agency i, X_{it} is a vector of the other explanatory variables, α is the constant, β and δ are coefficients of variables, μ_i means an agency-specific fixed effect, υ_t is a time-specific fixed effect, and ε_{it} is an error term.

To test an asymmetric effect hypothesis, we explore whether and how budget gains and cuts in the previous year result in agency effectiveness in a current year, respectively. To this end, our second empirical model specification is as follows:

$$Y_{it} = \alpha + \beta V_{it} \mathrm{I} + \gamma V_{it} (1 - \mathrm{I}) + \delta X_{it} + \mu_i + \upsilon_t + \varepsilon_{it}, \quad (2)$$

where I is an index function (it is 1 if $V_{it} > 0$, and otherwise 0), and others are similar to those in Equation 1. If there is an asymmetric effect between the positive and negative changes of budgets, the coefficients, β and δ will be different. To test the asymmetry more easily, this study rearranges the Equation 2 and derives the following:

$$Y_{it} = \alpha + (\beta - \gamma) V_{it} I + \gamma V_{it} + \delta X_{it} + \mu_i + \upsilon_t + \varepsilon_{it}. \quad (3)$$

To provide a clearer interpretation on our argument, this study follows the logic from previous literature that tests the asymmetric effect (e.g., Anderson et al., 2016; Azeez et al., 2017). We test whether the coefficient $(\beta - \gamma)$ of a budget growth rate from fiscal year $t-1$ to t in federal agency $V_{it}I$ is statistically significant. By checking the statistical significance of the estimated coefficient on the variable $V_{it}I$, we test the null hypothesis that $\beta - \gamma = 0$ and take the alternative H_1 that $\beta - \gamma \neq 0$.

As a final step, IV estimation is employed to control for potential reverse causality between budgetary resources and performance. We consider a variety of instrumental variables such as agency ideology, presidential approval ratings, or annual debts of federal government, but all these variables have either no correlation with the budget allocations or statistically influence agency performance. Therefore, we use the lagged budget growth rate as an instrument, which is statistically significantly correlated with budget growth rate, but does not have a direct effect on agency performance in a current year.

In this study, our dependent variable is organizational performance which is represented by an agency's goal achievement based on the goal approach. As stated, our measurement of organizational performance is drawn from the PAR's archival information. In accordance with the requirements of OMB Circular A-136, federal agencies show their commitment to accomplishing their targeted goals for each fiscal year by publishing the PAR and submitting it to the President, Congress, and members of the public. This report is posted on each agency's official website and can be downloaded. Basically, the PAR has three sections—management's discussion/analysis, performance section, and financial section. The performance section presents detailed information on each agency's performance results by strategic goal in each fiscal year. For instance, the PAR reports whether the actual performance results meet the goals (targets) of performance indicators. The number of met or exceeded indicators over the number of total annual performance indicators set by each agency shows the achievement of organizational goals. There are four categories for assessing an agency's performance in PARs. Annual performance indicators are graded as "exceeded" when the actual result of performance surpassed the initial targets of performance indicators. If the agency's initial goal is achieved, performance is graded as "met." When the agency's performance fails to meet the initial target, the goal is "unmet." When the assessment is not conducted or the data are not available, agencies report these cases as "not assessed." In this study, the number of met or exceeded annual performance indicators is divided by the number of total annual performance indicators to assess the level of goal achievement. Because each agency annually sets different number of goals as their performance indicators, we measure the agency effectiveness by calculating the proportion of achieved goals among the planned goals. Moreover, we also perform a logit transformation on the rate of the goal achievement. Because the goal achievement is a proportion that is bounded by 0 and 1, the logit transformation enables this proportion rate to break the 0/1 boundaries and become any value including minus.

Beginning in 2007, federal agencies can choose to produce either the PAR or alternatively publish both the Agency Financial Report (AFR) and Annual Performance Report

(APR) separately. In the APR, the number of goals (targets) and whether they are achieved or not is indicated, as shown in the PAR. Therefore, we mainly use the PAR and alternately consider the APR. There are multiple ways to measure organizational performance, but we employ an objective measure gathered from archives of information. Based on our goal approach, we believe that each agency's goal achievement rate is more reflective of their performance outcomes, rather than subjective (perceptual) performance measures. In the field of public administration, scholars have consistently used the goal achievement rate drawn from the PAR when they measure the organizational performance in the U.S. federal government (see Lee & Whitford, 2013; Moon & Christensen, 2020).

One key explanatory variable is the budget growth rate of each agency. To measure this variable, we use the financial section of each agency's PARs. In an effort to reflect the annual flow of budgets, changes in financial resources are measured as the difference between the size of total budgetary resources for the fiscal year of t and that of $t - 1$ over those for the year of $t - 1$. Because budget growth partly stems from annual inflation, a GDP deflator is utilized to estimate the real (or net) budget growth rate. We also include absolute size of budgetary resources. By estimating both the *changes* and *levels* of total budgetary resources of each agency, the result is expected to show whether and how the budget growth rate influences organizational performance. These data were drawn from the financial statement of each agency's PARs from FY 2004 through 2014. Like our dependent variable, we also use the AFR if an agency chose to publish the AFR and the APR separately instead of as one consolidated PAR.

There are three specific measures of human resources as explanatory variables: the total number of full-time employees, proportion of professionals, and personnel growth rate (or personnel stability). Empirical evidence shows that both the total full-time employees and the percentage of professionals in each federal agency are significantly related to organizational performance (Lee & Whitford, 2013). Moreover, we also include personnel growth rate based on the study of personnel stability and performance (O'Toole & Meier, 2003). Because stable personnel pattern significantly increases students' performance, we believe that changes in human resources are worth considering in this analysis. In this study, personnel growth rate is divided into two categories using index dummies. We separately examine the case when there is an increased (or a decreased) number of total employees in an agency. All these data are gathered from the Federal Human Resources Database (FedScope).

There are two measures of organizational characteristics: organizational age and agency type. First, organizational age is measured by the number of years the agency has been in existence. We consider this variable because younger organizations are less likely to have sufficient resource management knowledge or capabilities (Thornhill & Amit, 2003). This study covers only eleven fiscal years, so by including the organizational age, we control the possibility that an organization's lack of experience with new tasks would influence organizational effectiveness differently in the short-term. The second measure for organizational characteristics is an agency type. Our sample includes both executive (or cabinet) departments and independent agencies, so agency type is included as a dummy variable. We consider this variable because executive agencies are often large and complex in their operations compared with the independent federal agencies.[3] According to the U.S. Code Title 5, executive departments are coded with 1 whereas independent institutions are coded with 0. In addition to these two variables, a dummy variable is included to distinguish the period between two presidencies: Bush and Obama administration. Online Appendix B displays the summary statistics of all discussed variables.[4]

Considering that our data set has variation within agencies over time and also among the agencies, we perform a fixed-effects model to deal with unobserved heterogeneity. At the same time, time-fixed effects are also included in the regressions to control for year effects on agency effectiveness. Furthermore, a random-effects model is estimated, and the Hausman specification test is performed to evaluate which one is more appropriate. According to Hausman specification tests, we can reject the null hypothesis that cov (xit, ui) = 0 and estimate the model through the fixed-effects model. However, we include the results of both ordinary least squares (OLS) models and the random-effects model in Online Appendices C and D for robustness check.

Results

Table 1 presents the results for our resource change hypothesis (H1) and two sets of asymmetric effects hypothesis (H2a and H2b). Both Columns 1 and 3 present the results when each agency's performance is calculated as a proportion of goal achievement; Columns 2 and 4 report the results when the goal achievement is logit transformed, which expands the range of an outcome variable that is confined between 0 and 1 in the original measure. H1 expected that a budget growth rate will significantly influence the organizational performance, and our results support this expectation. A sequence of robustness checks including the OLS and random-effects model strongly support that budget growth rate is more stable to explain agency effectiveness than total budgetary resources (see Online Appendices C and D). Although we do not specify a direction in H1, findings also imply that there exists a negative relationship between budget growth rate and organizational performance. This suggests that federal agencies with higher budget fluctuations in the prior year are likely to exhibit a lower performance in the current year.

Both Columns 3 and 4 show the estimation results for the asymmetric effect hypotheses. The second row in these two columns indicates a case when each agency witnesses budget

Table 1. Fixed-Effects (Within) Regression Results.

	Resource changes		Asymmetric effects	
Variables	(1)	(2)	(3)	(4)
Budget growth rate	−0.11**	−0.48**		
	(0.03)	(0.17)		
Total budgetary resources growth rate × I			−0.14***	−0.63**
			(0.04)	(0.20)
Total budgetary resources growth rate × (1 − I)			−0.01	0.08
			(0.07)	(0.43)
Total budgetary resources	−0.01	0.11	−0.02	0.07
	(0.04)	(0.18)	(0.04)	(0.19)
Full-time employees	0.02	0.12	0.02	0.15
	(0.05)	(0.27)	(0.05)	(0.27)
Proportion of professionals	0.47	3.12	0.43	2.91
	(0.31)	(1.74)	(0.31)	(1.74)
Full-time employees' growth rate × I	0.06	0.36	0.09	0.49
	(0.06)	(0.33)	(0.07)	(0.34)
Full-time employees' growth rate × (1 − I)	−0.06	−0.90	−0.06	−0.95
	(0.15)	(0.77)	(0.15)	(0.77)
Organizational age	−0.04	0.07	−0.05	0.03
	(0.08)	(0.49)	(0.08)	(0.49)
Administration	0.04	0.18	0.04	0.17
	(0.03)	(0.17)	(0.03)	(0.17)
Agency FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Constant	0.88	−3.50	1.05	−2.73
	(0.13)	(0.22)	(0.77)	(0.80)
N	333	310	333	310
F value	2.74	1.79	2.60	1.83
R^2 (within)	0.14	0.10	0.14	0.11

Note. I = 1 if rate ≥ 0, otherwise I = 0; Standard errors are in parentheses.
***$p < .001$. **$p < .01$. *$p < .05$.

gains compared with the previous year, whereas the third row shows the case when an agency experiences budget cuts from the previous year. A series of results consistently show that a positive budget growth rate for an agency has a negative and statistically significant impact on agency effectiveness. Also, estimates of Equation 2 are presented as statistically consistent and stable under the OLS (Online Appendix C) and the random-effects model (Online Appendix D). It turns out that the more total budgetary resources the agency has compared with the previous year, the lower its performance becomes, whereas agencies experiencing budget cuts exhibit no significant effect on their performance.

Table 2 presents the estimation result of testing asymmetric effect in Equation 3. As with the previous result table, Column 1 is the result when outcome variable is each federal agency's goal achievement rate, whereas Column 2 presents the result when we perform logit transformation on the outcome variable. Because $\beta - \gamma$ in Equation 3 is statistically significant, we can reject the null hypothesis that $\beta - \gamma = 0$, taking the alternative H_1 that $\beta - \gamma \neq 0$. We find that estimate of $V_{it}I$ is statistically significant at the 0.05 level in Column 1 although the significance level decreases to 0.1 level in Column 2. To put it differently, our empirical evidence confirms that there is an asymmetry in the effects of positive and negative budget changes on agency performance. Online Appendix E illustrates the asymmetric relationship between federal agency performance and budgetary resource changes.

Next, we report the result from the IV analysis. While Table 3 illustrates the second stage results, the full results from the first-stage regression are presented in Online Appendix F. Both Columns 1 and 3 present the results before we perform the logit transformation of dependent variable, whereas Columns 2 and 4 show the result when the outcome variable is logit transformed. Although the statistically significant level becomes lower, the results of the IV analysis are consistent with the results from agency- and time-fixed effects model reported in Table 1. Again, budgetary resource changes appear to play a significant role in predicting upcoming agency performance and specifically, estimation results confirm the asymmetric pattern between budget changes and performance—when federal agencies experience budget gains in the prior year, their goal achievement rather deteriorates in the upcoming year while budget cuts do not influence their performance. Drawn from results in Column 4 in Table 3, we can interpret the findings as follows: when a federal

Table 2. Regression Results for Asymmetry Tests.

Variables	(1)	(2)
Total budgetary resources growth rate × I	−0.25* (0.11)	−1.15^{T} (0.64)
Budget growth rate	0.06 (0.09)	0.23 (0.55)
Total budgetary resources	0.01 (0.00)	0.07 (0.03)
Full-time employees	−0.01 (0.01)	−0.06 (0.04)
Proportion of professionals	0.12** (0.04)	0.53* (0.26)
Full-time employees' growth rate × I	0.12 (0.08)	0.57 (0.44)
Full-time employees' growth rate × (I − I)	0.06 (0.18)	−0.21 (1.04)
Organizational age	0.02 (0.01)	0.14 (0.07)
Agency type	0.04 (0.03)	−0.05 (0.15)
Administration	0.02 (0.04)	0.04 (0.24)
Constant	0.56*** (0.09)	−0.53 (0.49)
Year dummies	Y	Y
N	333	310
R^2	0.13	0.11
Adjusted R^2	0.08	0.05

Note. I = 1 if rate ≥ 0, otherwise I = 0; Standard errors are in parentheses.
***$p < .001$. **$p < .01$. *$p < .05$. $^{T}p < .1$.

Table 3. Instrumental Variable Estimation.

	Resource changes		Asymmetric effects	
Variables	(1)	(2)	(3)	(4)
Budget growth rate	−0.19^{T}	−1.08^{T}		
	(0.11)	(0.58)		
Total budgetary resources growth rate × I			−0.24*	−1.43*
			(0.12)	(0.60)
Total budgetary resources growth rate × (I − I)			−0.05	−0.17
			(0.13)	(0.69)
Total budgetary resources	0.03	0.37	0.01	0.29
	(0.06)	(0.32)	(0.06)	(0.32)
Full-time employees	−0.02	0.02	−0.03	−0.01
	(0.06)	(0.34)	(0.06)	(0.34)
Proportion of professionals	0.63^{T}	3.37	0.52	2.72
	(0.36)	(1.84)	(0.36)	(1.84)
Full-time employees' growth rate × I	0.16	1.07	0.10	0.74
	(0.14)	(0.70)	(0.14)	(0.70)
Full-time employees' growth rate × (I − I)	−0.08	−0.79	−0.03	−0.53
	(0.15)	(0.79)	(0.15)	(0.79)
Organizational age	−0.08	−0.15	−0.10	−0.27
	(0.10)	(0.52)	(0.10)	(0.52)
Administration	0.04	0.19	0.04	0.15
	(0.03)	(0.18)	(0.03)	(0.18)
Con	0.33	−7.59	1.08	−4.00
	(1.29)	(6.97)	(1.34)	(7.07)
Agency FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	307	289	307	289
F value	2.45	1.74	2.57	2.02
R^2 (within)	0.14	0.11	0.15	0.13

Note. I = 1 if rate ≥ 0, otherwise I = 0; Standard errors are in parentheses.
***$p < .001$. **$p < .01$. *$p < .05$. $^{T}p < .1$.

agency experiences 1% increase in the amount of budgets, its organizational goal achievement is likely to decrease a 1.43% points.

Discussion and Conclusion

In this study, we tackle two issues: do the changes of budgetary resource influence agency performance?; if so, would federal agencies respond to resource changes in a different way, which distinctively impacts agency performance? Despite the expansive literature on the relationship between organizational resources and performance, there is little evidence on how changes in resources influence government agencies' performance. When it comes to budgetary resources, relatively little attention has been paid to how budgetary resources influence government agency performance, compared with studies on performance-based budgeting. This study tries to fill these voids by analyzing PARs of 52 U.S. federal agencies from FY 2004 through FY 2014.

Findings suggest that changes in budgetary resources that an agency experienced in the prior year significantly influence its current performance and, further, imply that more changes lead to the deterioration of agency performance. Our results also show that there is an asymmetrical relationship between budgetary resource changes and agency effectiveness—federal agencies with budget gains in the prior year show lower organizational performance in the current year, whereas budget cuts in the previous year do not significantly influence current agency effectiveness. These findings are important because resource changes that an organization experiences have the potential to either enhance or deteriorate its upcoming performance.

Our findings make it clear that organizational resources function differently, depending on whether the organizations are confronted with budget gains or cuts. It turns out that budgetary resource gains result in dampened organizational effectiveness over the short run. This mechanism can be explained in several ways. Spare resources only partly offset the agencies' performance deficits. Agency theorists postulate that there will be conflicts among self-interested bureaucrats over resource controls. This causes problems of resource allocation and losses of operational efficiency. Another possible explanation is that agencies experiencing budget gains are being tasked with new or expanded challenges that tend to weaken their performance in the short-term. Perhaps these agencies require some time to develop effective strategies for mission accomplishment and integrate new personnel and work processes into their normal routines. Such changes thus lead to performance penalties in the short-term but leaven their performance in the long-term.

Organizations with budget cuts, however, would use their existing resources as a buffer to reduce their environmental jolt and pursue organizational stability. Organizational theory argues that maintained resources are deployed in times of unexpected changes (Thompson, 1967). This explains why agency performance is somewhat inelastic when faced with budget cuts. Agencies are likely to have an untapped reserve of will and determination that rises to meet the challenge—at least in the short-term. This explanation is somewhat supported by the result on the proportion of professionals in the organizations. More specifically, agencies with larger proportion of professionals have more capacity to respond to challenges and absorb new missions.

Findings of this study suggest both theoretical and practical implications. Above all, theoretical assumptions and predictions of the RBV need to be expanded. While the RBV is based on the argument that organizations must obtain a greater amount of resources to gain a competitive advantage to enhance their performance, our results demonstrate that more budgets do not always provide organizations with competitive advantages. Such evidence speaks strongly to the necessity for considering change management perspectives in the discussion of resources and performance. Literature on the change management focuses on the process or underlying mechanism that causes an organization to implement changes. In the field of public administration, the change management perspectives, often combined with the discussion of cutback management, have emphasized the managerial challenges of changes within organizations (e.g., Schmidt et al., 2017; Van der Voet & Vermeeren, 2017). In particular, our counter-intuitive findings suggest that not only budget cuts but also budget gains need to be considered as a form of organizational change, which influences the daily operations in the organization.

Our findings also offer some practical implications for public managers. To improve organizational goal achievement, federal bureaucrats need to consider not only the amount of resources but also the changes of them over time. Our results suggest that dramatic changes of annual budgets do not improve organizational performance. We find that budgetary resource gains are associated with dampened agency effectiveness over the short-run, whereas budget cuts are not related to changes in organizational performance over the short-run. Such a distinctive pattern also echoes the current state of public organizations that are confronted with unstable fiscal conditions. Given the assumption that budgetary resources substantially influence policy advocacy and development, there is a growing public demand that federal government reallocate or redirect the fund for its agencies. Despite all these external pressures, budget cuts do not result in performance decline. Perhaps, what matters is the role of public managers who have a special responsibility to use their authority and discretion to stack, allocate, manage, and utilize government resources to relax environmental turbulence.

Furthermore, in a broad sense, our asymmetric results provide implications for organizational resilience in the public sector. Although some literature looks beyond restorations when it defines the concept, organizational resilience often

refers to an ability to absorb negative shocks without catastrophic failure (Foster, 1993) and to rebound from unexpected disruptions (Sutcliffe & Vogus, 2003). According to Boin and van Eeten (2013), the former type is referred to as *precursor* resilience, whereas the latter one is *recovery* resilience. It has been argued that a flexible form of budgetary resource is itself one important enabler for organizations to deal with unexpected events and develop their resilience (Wildavsky, 1988). However, our results reveal that the presence of budget cut itself does not influence (neither deteriorates nor improves) organizational performance. This implies that government agencies build their own situation-specific resilience internally to be poised to tackle environmental jolts and reduce their impact on performance outcomes. Although investigating its specific mechanism is beyond our analysis, we expect that certain mechanism enables public organizations to accommodate the changes without any loss and maintain their functions under challenging conditions. In this regard, we believe that our findings empirically support the precursor resilience of public organizations.

Another takeaway on our asymmetric findings is that resource gains do not always lead to enhanced organizations' capability to improve their performance. In addition to the role of public managers as stated above, we should focus on each agency's dynamic capability to manage its resources and to sense opportunities and threats. In strategic management literature, organizations' dynamic capabilities refer to their ability to integrate, reconfigure, gain, and release resources (Eisenhardt & Martin, 2000) and to maintain organizational competitiveness by shaping opportunities and reconfiguring both tangible and intangible assets (Teece, 2007). Although the dynamic capability perspectives have been largely grounded on improving organizational effectiveness in the private sector, it is essential for public organizations to develop a mechanism for sensing the external environment and for reconfiguring their internal resources. We believe that such expansion of knowledge gives some practical guidance not only for organizations with poor performance to bounce back in the future but also for agencies with high performance to sustain their competitiveness in the long run.

Despite the richness of our study, we must acknowledge some caveats related to the generalizability of our findings. First, our measurement of organizational performance—the extent of each agency's goal accomplishment—from the PAR inherently changes in nature per agencies. Although the goal achievement rate itself is an objective result drawn from archival information from the PAR, each agency sets the number of targeted goals. If some agencies intentionally target low myopic goals or avoid setting high objectives, it would be difficult to precisely compare organizational performance among agencies. In the field of public administration, organizational performance has been measured in various ways with no single dimension proving paramount (Rainey, 2003; Selden & Sowa, 2004). We believe that using different types of performance measures would be one way to enrich our scholarly discussion on resource fluctuations and their distinctive impact on performance outcomes.

Second, our data cover only a limited number of years, which does not reflect long-term sustainability. That is, we have analyzed only 11 fiscal years, so it is possible that resource changes might be absorbed in the short-term. Considering that our focus is budget fluctuations and how these dynamic changes distinctively influence organizational effectiveness, it is unclear whether our results would still apply to the long run. As the sample size increases, the analysis will provide more valid and comprehensive evidence for the asymmetric impacts of budgetary resource fluctuations on federal agency performance.

A final caveat is related to explanatory variables employed in the analysis. We only consider tangible resources that could influence organizational performance. In practice, however, some resources do not exist in a physical form such as organizational reputation or information technology. It is highly likely that such intangible assets would constitute the competitive advantage of public organizations and influence their performance in a different way.

Overall, this article provides empirical evidence of an asymmetric effect of budgetary resources changes on organizational performance in the U.S. federal government. As a final note, we call for scholars to delve deeper inside the underlying mechanism of public organizations when they cope with resource turbulence and translate their resources into targeted outcomes. One suggestion is to focus more on sub-agency, functional, or activity levels of analysis in exploring resource–performance linkages. Dissecting agency resource measures to their subcomponents would further advance our knowledge. It is also worth considering other contextual variables, such as how the political environment might influence each agency's goal achievement strategies. We believe that continued research on this topic will allow us to better understand how government agencies could enhance their effectiveness with the resources provided and create public value.

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Supplemental Material

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Notes

1. We find that some agencies—such as national security agencies—do not post their Performance Accountability Reports (PARs) in their website. Given the data availability, we focus on 52 U.S. federal agencies (15 executive departments and 37 independent agencies). Online Appendix A in the supporting information shows the list of these 52 agencies.
2. In developing the first hypothesis, we do not set the direction to highlight the importance of considering a change of budget resources in predicting organizational performance. However, we add a specific direction in our later hypotheses.
3. Regarding the potential concern that some executive agencies, such as the Department of Defense, can be separately examined by their sublevels, such as Department of the Army, Department of the Navy, and the Department of the Air Force, we also consider the sublevel analysis. However, strategic goals reported on the PAR are targeted as an overall agency mission, so it is difficult for us to make sense of variation at a subagency level. Thus, we maintain our level of analysis as an individual organization.
4. In addition to the summary statistics, we provide more information on our data and measurement. Online Appendix B-1 lists our variables and their data sources, respectively. We also provide the mean and median of our key variables—organizational performance and budget growth rate—in Online Appendix B-2. On the whole, many agencies have scored their goal achievement mean of more than 0.5, suggesting that they achieved more than half of their targeted goals. Specifically, Federal Communications Commission (FCC) shows the highest goal achievement rate, whereas Federal Mediation and Conciliation Service (FMCS) has the lowest rate on average. Compared with organizational performance, we find a fair amount of variation in budgetary resource changes. On the budget growth rates from FY 2004 to FY2014, federal agencies experienced budget changes ranging between −16.7% and 45.1%.

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