Do non-financial performance and accrual-based cost information affect public sector budgeting?

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Abstract

Purpose – This study aims to provide evidence of how budget officers use non-financial and accrual-based cost information in the budgeting process and how the usage of this information is influenced by financial constraints.
Design/methodology/approach – A randomized survey-based field experiment investigating budget officers in 546 Japanese local governments (LGs) was conducted. This allowed us to identify the budget officers' decision-making in the public sector budgeting process by creating and analyzing primary data with regression models.
Findings – We found that budget officers suppress budget amounts based on non-financial information of good performances. Under fiscal constraints, officers further reduce budget amounts using information on high accrual-based costs and poor non-financial performance.
Originality/value – Our survey-based field experiment allowed us to obtain primary data from officers making budget decisions. To the best of our knowledge, this study provides the first evidence that non-financial good and poor performance information and accrual-based cost information affect budget officers' decision-making under financial constrain.

Keywords Japan, Local government, Non-financial performance information, Accrual-based cost, Budgetary information, Survey-based field experiment
Paper type Research paper

Introduction

As a part of the New Public Management movement, a private management technique, Organization for Economic Co-operation and Development (OECD) countries strengthened their public service efficiency, effectiveness and accountability (Gray and Jenkins, 1993; OECD, 1993; Hood, 1995). Many public sector organizations initiated outcome-based evaluations of programs and projects using non-financial performance information for budgeting (Brignall and Modell, 2000; Lapsley and Wright, 2004; Ter Bogt *et al.*, 2015). In

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addition, they introduced accrual-based accounting for public organizations to improve the efficiency and transparency of administrative services (OECD, 2002; Pina *et al.*, 2009).

Public sector organizations can use non-financial and financial information, including accrual-based cost information, to assess a department's performance in delivering goods or services (Liguori *et al.*, 2012; Mauro *et al.*, 2017). However, the usefulness of such information in budgetary decision-making is controversial. Prior studies provide mixed evidence on whether financial and non-financial information influence budgetary decision-making (Cuganesan *et al.*, 2014; Gilmour and Lewis, 2006; Reck, 2001; Zaltsman, 2009). Furthermore, the relationship between public budgeting and financial constraints is a key research theme (Jimenez, 2014).

We investigate whether non-financial and accrual-based cost information is employed in the budgeting process as well as the role of financial constraints in their relationship. Our research questions are as follows. (1) How do budget officers use non-financial and accrual-based cost information in the budgeting process? (2) How is budget officers' use of non-financial and accrual-based cost information influenced by financial constraints?

We focused on technical and economic decisions by budget officers who aim to improve service outcomes by proposing program budget amounts (Thurmaier, 1992, 1995; Melkers and Willoughby, 1998; Reck, 2001; Zaltsman, 2009; Martí, 2013). Budget officers assess programs on behalf of the chief executive and council to improve program effectiveness, assess program information in the budgeting process, make decisions about resource changes, and report to elected officials, managers and staff (Liguori *et al.*, 2012; Melkers and Willoughby, 2001, 2005).

Regarding budgetary decision-making, Johnsen (2012) shows that governments can improve social welfare by increasing resources (including budgets) for poor-performing projects. Previous studies find that a project that has achieved its purpose (good performance) can have its budget amount suppressed (e.g. Ammons and Rivenbark, 2008). However, when budget officers lack non-financial information, they might not actively deny budget requests.

We investigated how financial constraints affect budget officers' use of non-financial and accrual-based cost information. Jimenez (2014) finds evidence that fiscal shortfalls play a mediating role between non-financial information and budgetary cuts. In addition, Budding (2004) argues that accounting information becomes significant during the budgeting process under uncertain situations. Non-financial information with accrual-based cost information may resort on such information become more plausible in medium- and long-term perspectives amid severe financial constraints. Furthermore, Johnsen (2012) explains that, theoretically, under financial constraints, budget officers pay more attention to poor-performing projects than to well-performing ones. Thus, we expect that under financial constraints, non-financial poor performance information with high accrual-based cost information further suppresses budgets.

We conducted a field-based survey experiment employed by some previous studies (Druckman *et al.*, 2011; Sniderman, 2011). Japanese LGs are suitable for observing the effect of non-financial and accrual-based cost information on budgetary decision-making for three reasons. First, most budget officers can use each type of information since most Japanese LGs introduced performance management systems in the 2000s and adopted uniform accrual-based accounting standards in 2014 (Kobayashi *et al.*, 2016). Second, Japanese LG budget officers help manage and monitor public spending and fiscal consolidation under uniform fiscal rules (CLAIR, 2016). Moreover, they increase the awareness of cost and outputs/outcomes to ensure financial sustainability under central government pressure (MIC, 2018). Finally, we can measure the degree of financial constraints under uniform fiscal rules to test the impact of financial constraints on information use.

We set up three main groups to test our hypotheses and another group for additional testing. The first is a baseline group that gets information about current and requested budget amounts for each program but receives neither non-financial information nor accrual-based cost information. The second group is provided with non-financial information, including both well- and poor-performing projects, in addition to the first group's information. For the third group,

accrual-based cost information for each project is added to the second group's information. The group for additional testing receives accrual-based cost information for each project and the first group's information. During January–February 2017, we sent out four types of questionnaires after selecting four random groups for each of the seven typologies of all 1,741 Japanese municipalities. We found that budget officers suppress budget amounts based on non-financial information of good performances. Under financial constraints, officers further reduce budget amounts using information on high accrual-based costs and poor non-financial performance.

This study contributes to public sector accounting and management accounting research by extending a budget officers' decision-making model. Our study also presents implications for how to use non-financial indicators and accrual accounting. The results will provide better information on how financial constraints affect budgeters' information use to relevant future studies. To the best of our knowledge, this study provides the first evidence that non-financial good and poor performance information and accrual-based cost information affect budget officers' decision-making under financial constraints.

Budgeting process and hypotheses development

Budgeting process in the public sector

Figure 1 illustrates the budget formulation process considered in this study. Budget officers scrutinize and sometimes adjust budget amounts after consulting with the mayor and other politicians. Subsequently, they assign unofficial budget amounts (hereafter, "budget amounts") to applicants and send a budget proposal to the mayor. The mayor finalizes the proposal, and the local assembly formally approves the budget amounts. Since budget amounts largely depend on budget officers' decisions, we focused on this decision-making.

Budget officers are concerned with financial outcomes, which may affect their reputation (Jones *et al.*, 1985; Reck, 2001). Wildavsky (1964) suggests the presence of incrementalism: The future budget tends to increase from the previous year's budget. Non-financial and financial information assists budget officers in their decision-making regarding adjustments in spending (Wildavsky, 1986). Government decision-making involves non-financial and financial information that allows budget officers to explain budget amounts to mayors, persuasively communicate assessment results to departments and reallocate program resources (Melkers and Willoughby, 2005).

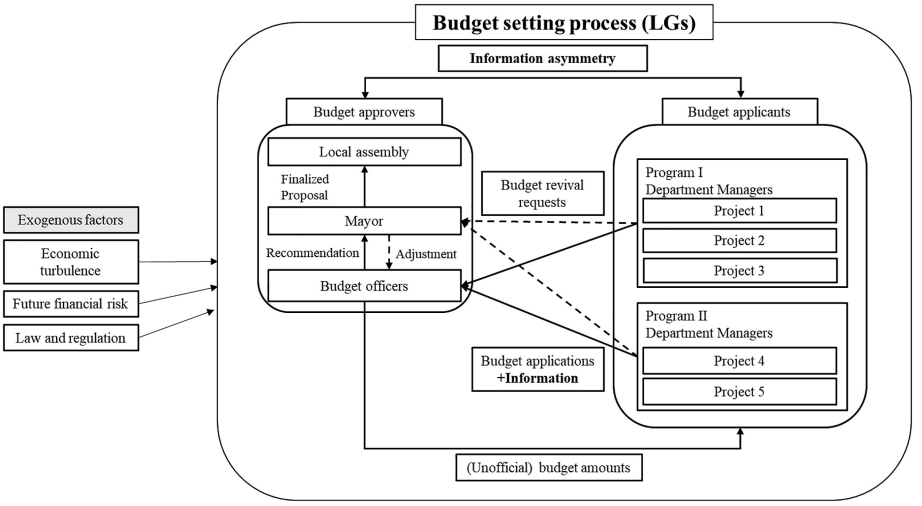

Figure 1.
Budget setting process used in this study

In the budgeting process, budget officers receive a program budget proposal from applicants such as department managers. Non-financial and accrual-based cost information form part of this proposal (Liguori *et al.*, 2012). Non-financial information about services pertains to outputs and initial, intermediate or long-term outcomes (Gianakis and McCue, 1999; Melker and Willoughby, 2005). This information may represent the quantity of services provided or ratios indicating quality requirements (e.g. Melkers and Willoughby, 2001; OECD, 2007). Meanwhile, accrual-based cost information implies the use of analytical accounting and other types of evaluating or costing techniques for each program's budget; it provides input or service cost information (Liguori *et al.*, 2012; Marti, 2013).

Hypotheses development

Non-financial performance and budgeting. We first ascertained whether non-financial program performance information affects budget officers' decision-making. Budget officers often describe the performance of public service projects in non-financial terms (Jones *et al.*, 1985; Collins *et al.*, 1991; Jones and Puglisi, 1997; Montesinos and Vela, 2000). In public sector organizations, profit is not a goal, and financial information, including budgetary information, does not necessarily measure outcomes, providing only a narrow interpretation of performance (Ma and Mathews, 1993; Montesinos *et al.*, 1995; Monsen and Nasi, 1999). In contrast, many studies find that public administrators are interested in non-financial performance information because public sector organizations have a multifaceted performance spectrum that cannot be captured by a single financial "bottom-line" measure (Boyne, 2002). Non-financial performance information can capture public interest through the provision of services (Carnegie and Wolnizer, 1995; Lee, 2008).

We focused only on budget officers who propose budgetary appropriations to politicians and mayors (Schedler, 2007; Liguori *et al.*, 2012; Thurmaier, 1992, 1995). Budget officers make decisions for increasing program effectiveness using non-financial information (Melkers and Willoughby, 2001, 2005). Melkers and Willoughby (2001, 2005) find that budget officers use non-financial performance budgeting for decision-making. Ammons and Rivenbark (2008) show that non-financial good performance tends to lead to negative budget changes. While these authors compare non-financial good and poor performance, it is also necessary to investigate the non-financial information is actively employed in budgeting decision-making.

Johnsen (2012) shows that governments can improve social welfare by increasing poor-performing projects' budgets more than those of well-performing ones. If budget officers use non-financial information to assess projects, they may suppress budget amounts for those with high performance because it will not produce a large improvement in marginal welfare. By contrast, in the absence of sufficient information, it is difficult to assess projects, which may lead officers to approve budget increases as requested by applicants (Wildavsky, 1986). Thus, we proposed the following hypothesis:

H1. The availability of non-financial good performance information affects budget officers' decision-making on suppressing budget amounts.

Financial constraints and non-financial performance with accrual-based cost information. Prior studies investigate the conditions and drivers under which non-financial and financial information are used, because not all municipalities use both these types (Mauro *et al.*, 2017). It may be controversial if non-financial poor performance information alone prompts budget cuts (Hou *et al.*, 2011; Williamson and Snow, 2014). Jimenez (2014), however, finds that budget shortfalls due to financial deterioration interact with performance information to reduce slack by reducing information asymmetry, resulting in budget cuts.

If the public sector's economic conditions are critical, financial constraints should accelerate budget officers' perceived financial deterioration risk when they can use non-financial performance information with accrual-based cost information. Budding (2004) shows that managers' accountability responses and their responses to external uncertainty are largely

determined by the extent to which they use accounting information. Budding *et al.* (2021) further find that more non-financial performance indicators are incorporated in public sector financial statements if the sector has fewer financial resources. We assume that accounting for external uncertainty requires the contribution of budget officers, especially when reporting local government deficits. In such cases, in addition to non-financial performance information, it would be desirable to focus on accrual-based costs from a medium- to long-term perspective.

H1 describes the impact of non-financial performance information on budgeting, but in some EU countries and Japan, LGs have implemented accrual accounting in addition to traditional cash-based budgetary systems (Kobayashi *et al.*, 2016; Pina *et al.*, 2009). Pina *et al.* (2009) indicate that only a few countries emphasize the usefulness of accrual information for internal purposes. In our dual system setting, budget amounts are primarily determined as cash-based expenditures. Accrual-based accounting information is, thus, a complement to, rather than a substitute for, cash-based information. We next conjectured how adding accrual-based cost information affects budget officers' decisions in LGs' budgeting processes.

Kober *et al.* (2010) and Bergmann (2012) demonstrate that accrual-based cost information is perceived as relatively more useful than cash-based information for decision-making. Internal users particularly appreciate accrual-based cost information to identify departmental costs of goods/services and, although accrual-based costs alone might not be sufficient for measuring efficiency or effectiveness (Kober *et al.*, 2010), they could support budget officers' decision-making by providing more accurate service effort information. Particularly, a higher ratio of accrual-based cost to expenditures might lead prudent budget officers to reduce future budget amounts.

By smoothing one-time investment amounts, accrual-based cost is less volatile and usually higher than cash-based expenditures, except in fiscal years where there is a large amount of capital investment (Van der Hoek, 2005). We thus focused on the general case where the accrual-based cost for each project is higher than or equal to its cash-based expenditure, assuming previous year high capital investment. Performance evaluations enable budget officers to analyze program efficiency and effectiveness (Melkers and Willoughby, 2001). They are supposed to assess each program, mainly using cash-based budgetary cost and non-financial performance information, complemented by accrual-based cost information. This situation may be not universal but is justifiable in dual system countries (Pina *et al.*, 2009; Kobayashi *et al.*, 2016). In some countries, the combination of accrual-based accounting and cash-based budgeting is considered a permanent solution. Several studies show that this is a common pattern in most countries that have introduced accrual-based accounting (OECD, 2002).

Although accrual information is complementary, it can provide additional information regarding long-term matching between service efforts and outputs/outcomes. The OECD (1993) indicates that adopting accrual accounting with a cash-based budgeting system can improve budgetary decision-making. Diamond (2006) states that "the depreciation amount can also provide an indication of the future expenditure required to replace the existing assets at the end of their useful lives and so maintain current activity levels" (p. 9). Thus, if they receive early warning of future financial deterioration, budget officers may use non-financial performance information with accrual-based cost information. This intertemporal cost allocation, which matches a project's performance, can provide useful information, allowing budget officers to prepare for future financial difficulties. Therefore, we proposed the following hypothesis:

H2. Under financial constraints, budget officers further suppress budget amounts in case of non-financial poor performance and high accrual-based costs.

Methods

We tested the hypotheses by conducting a survey-based field experiment for budget officers in LGs. An experimental approach has the advantage of creating a research setting and data,

providing evidence of the actions of individuals or small groups, and revealing the specific internal processes of management accounting (Sprinkle, 2003; Sprinkle and Williamson, 2007; Luft, 2016). In a practical setting, program budget data used in LGs' budgeting processes are normally not available because most LGs do not disclose these details (Ittner and Larcker, 2001). However, a survey-based field experiment allows us to observe how LG budget officers use accrual-based costs and performance measures for each program when they negotiate with budget applicants during the budget process. This is a novel approach in the field because it allows us to obtain primary data from the decision-makers.

We conducted an experiment based on questionnaires where the respondents were actual decision-makers. This approach is useful for obtaining primary data from those making decisions about budget amounts.

Setting

The questionnaire was distributed to Japanese municipal budget officers due to the possibility of controlling for legal and institutional factors as well as financial resources and socio-environmental conditions. Japanese LGs also have some institutional characteristics that might affect budget officers' decisions. For instance, Japanese LG budget officers have similar, even uniform, institutional environments, based on the norm that residents in every municipality should receive the same public services. Although central laws determine LGs' basic functions, prefecture and municipality levels, LGs lead most of the local administration (Kimura, 2016).

Japanese budget officers have incentives to create budget proposals focusing on financial viability and stability because financial deterioration leads to reductions in their salary. If a financial failure occurs in an LG, intervention by the Ministry of Internal Affairs and Communications (MIC) will lead to a loss of authority and fiscal austerity, resulting in salary cuts. For instance, in Yubari City, an actual bankruptcy case, employee benefits were significantly curtailed by MIC intervention.

Furthermore, budget officers and other civil servants are required by law to perform their duties in the public interest. The Constitution of Japan states that "all public officials are servants of the whole community and not of any group thereof (Article 15)." Most Japanese LGs have a personnel system where performance is evaluated based on achieving the duties described in the abovementioned laws. In fact, the MIC provides Japanese LGs with a template for personnel evaluations of civil servants. Most LGs apply this template, which includes items about responding to citizens' needs and maintaining financial stability. Therefore, budget officers have incentives to ensure effective budgeting.

Japanese LGs introduced accrual accounting and performance evaluation systems as public reform in the late 1990s. First, the MIC promoted performance evaluations based on non-financial performance information in most LGs, and every municipality discussed using non-financial performance information at some point. By 2017, 1,099 (61.4%) LGs had already introduced non-financial performance measures such as process, output and outcome measures. Of those, 959 (87.3%) used the measures to evaluate each program; more importantly, 838 (76.3%) of them referred to such measures in the budgeting process. Consequently, while not all municipalities use non-financial performance information in their budgeting process, knowledge of its use is common.

Second, some Japanese LGs have voluntarily disclosed accrual-based financial reporting in addition to cash-based budget information since the 2000s. Importantly, Kobayashi *et al.* (2016) find that the overwhelming majority of finance officials answered positively when asked about the usefulness of accrual-based accounting information in relation to efficiency and effectiveness [1]. In addition, in 2015, the MIC notified that all LGs, given the limited resources, should introduce accrual-based accounting and strengthen financial management through budgeting and performance evaluations. Japanese LGs have adopted a uniform and mandatory accrual-based accounting system since 2017, although they still mainly use the

cash-based budgeting required by the Local Finance Act. The purpose of this standardization was to strengthen internal control, including budgeting and performance evaluations, for each municipality (MIC, 2017). Prior to that, budget officers had emphasized single-year financial goals. However, since accrual accounting was adopted, budget officers have been required to consider asset values, future investment and repair and replacement costs using a longer-term perspective, including depreciation.

Finally, Japanese LG budget officers face substantial pressure due to the financial deterioration caused by a rapidly aging and declining population. In 2014, the Japanese central government enforced the Act on Overcoming Population Decline and Vitalizing the Local Economy in Japan, which highlighted the financial deterioration caused by considerable population decline and declared that LGs create mandatory vision and strategy plans for the next 30 years based on individual risks. Consequently, the total social welfare expenditures of LGs reached JPY 7.2 trillion in 2016 compared to JPY 4.4 trillion in 2006. Therefore, most LG budget officers in Japan understand the financial deterioration and need to tighten expenditures (CLAIR, 2016).

Questionnaire

We incorporated an experiment for Japanese LG budget officers within the questionnaires, specifically, an unpaid, single-shot experiment facilitating one-time decision-making without interaction with other decision-makers to eliminate the enduring effects of previous experience as a pre-treatment (Gaines *et al.*, 2007). As initial preparation, we discussed the LG budget-setting process and accounting with budget officers from Yokohama City, Fukuoka City, and Kumamoto City, and the LG accounting section in MIC from August 2016 to January 2017. We added to and modified the content based on LG budget officers' feedback.

On February 6, 2017, we sent questionnaires to budget officers in all 1,741 Japanese municipalities as of February 1, 2017; 23 districts in Tokyo, 20 designated cities, 48 core cities, 723 ordinary cities, 744 towns and 183 villages. We eliminated 47 prefectures because they do not provide the same public services as other municipalities but have broader responsibilities [2]. We used a professional survey firm to conduct the delivery and collection work. By February 24, 2017, we had received responses from 703 LGs (response rate: 40.4%) [3].

After receiving budget applications, an LG budget officer was asked to use information to make unofficial decisions about the fiscal year budget amounts for a social welfare program (see Appendix 1 for a sample questionnaire). In Japan, which has the world's most aged population, social welfare programs are in high demand and account for one of the most difficult budgets to control as they are constantly increasing (OECD, 2019). Although the social welfare program is divided into multiple projects, we assumed the budget is set on a program basis and that budgets can be allocated to some projects. The budget applications included common basic information from applicants related to budgeting and operations, such as current fiscal year budget information for social welfare programs and the next fiscal year's requested budget amounts. The current year's budget for the welfare program was JPY 49 million, divided into four projects: community support committee (JPY 8 million), caregiver training (JPY 8 million), regional welfare support center (JPY 15 million) and consignment of elderly service welfare support (JPY 18 million) [4].

We assumed that the budget officer receives higher budget requests for the next fiscal year, up to JPY 60 million, split among a community support committee project for JPY 10 million, caregiver training project for JPY 10 million, regional welfare support center project for JPY 18 million and consignment of the service welfare support project for elderly for JPY 22 million. The change in budget amounts between the current year's budgets and next year's requests may be significant (around 22.5%), but we set them according to the aging of Japan's population, where welfare expenses have increased by 10%–15% or more, meaning the budget application amount could be greater.

We also added four different types of information by dividing the entire sample into almost equal sized four groups using stratified random sampling. Group 1 is a baseline group that was provided with only basic budgetary cost information. Group 2 is a group provided with non-financial performance information, including of good and poor performance, and basic budgetary information. Group 3 is a group provided with both accrual-based cost and non-financial performance information in addition to basic budgetary information. Group 4 is a control group used for a robustness check to clarify the impact of accrual-based cost information alone on budget amounts.

Conceptual model

To test the effect of non-financial performance information (H1), we compared budget officers' decisions between Groups 1 and 2. Group 2 was provided with non-financial performance information with extreme values for the three current year projects; the citizen satisfaction levels are 98%, 30% and 30% for the caregiver training project, regional welfare support center, and consignment of the service welfare support project for elderly respectively [5]. There were various types of non-financial performance information, such as efficiency, customer satisfaction, service appropriateness, future activities, activities and outputs (Lee, 2008; Liguori *et al.*, 2012; Pina and Torres, 1996; Ter Bogt and Van Helden, 2000; Willoughby, 2004). After considering a variety of possible measures for non-financial performance information, we employed the degree of citizen satisfaction because LG budget officers have a common interpretation of this measure. Liguori *et al.* (2012) find that information about customer satisfaction and service appropriateness is the non-financial performance information most used by both managers and politicians. We set extremely high (98%) and low (30%) [6] satisfaction rates to test the effect of good and poor performance information [7].

To test H1, we estimated the ordinary least squares (OLS) regression model in Equation (1) using the survey results for Groups 1 and 2 and archival data to control for the external factors related to incremental budgeting:

$$difBS = \alpha_0 + \alpha_1 NFP + \alpha_2 Balance + \alpha_3 Debt\ ratio + +\alpha_4 Variance + \alpha_5 Elderly\ Ratio + \sum_{k=1}^{5} \alpha_{5+k} LG\_Type_k + \varepsilon_t. \quad (1)$$

We set *difBS* as the dependent variable, representing the change between the appraisal of the budget for the next fiscal year and that for the current year, deflated by the current year budget amount. The independent variable of interest is *NFP*, which equals 1 when the questionnaire is for Group 2 and 0 otherwise. If α_1 is negative and significant, H1 is supported.

We used the net financial balance ratio (Balance) as a proxy for financial constraint. Balance represents the ratio of the net balance to the standard financial scale. The term "net financial balance" denotes the balance between revenue and expenditure during a fiscal year, calculated by deducting the funds to be carried forward to the next fiscal year as a reserve for continuing expenditure, and the expenses given budgetary approval to be brought forward from the gross balance (CLAIR, 2008). If the ratio of LGs indicates a loss, the MIC designates them fiscally unsound. Budget officers need to decide whether to increase the revenue or decrease the expenditure if this ratio is small. However, the Local Autonomy Act and Local Financial Act set uniform residential tax rates, with LGs themselves having very little discretion. Therefore, when Balance is small, LGs face financial constraints [8].

We also added control variables related to financial characteristics that might influence budgetary decisions. We used *Debt ratio* and *Variance* in 2017 as financial factors. *Debt ratio* is the ratio of debt repayment amounts to total revenue. *Variance* measures governmental

performance by subtracting each municipality's actual expenditure for 2015 from its total revenues in 2016 divided by the actual expenditure for 2015. According to Robinson (2016), Johansson and Siverbo (2014) and Lee and Plummer (2007), debt payments and past performance may influence decisions on budget amounts [9].

Finally, we computed the *Elderly Ratio* for the population above 65 years of age divided by the total population in 2015 as a demographic characteristic [10]. LGs with a high elderly ratio perceive financial deterioration due to the increases in health and social welfare expenditures (i.e. Dang *et al.*, 2002; Lee and Edwards, 2002). Therefore, the elderly ratio indicates the sensitivity of LG budgeting to financial deterioration. Moreover, to control for LG types, we added dummy variables for the specific districts in Tokyo, designated cities, core cities, ordinary cities and towns.

Next, we investigated fiscal constraints' effects on the relationship between poor performance information and budget officers' decisions. We added complementary high accrual-based cost information, including depreciation and retirement benefit costs. Group 3 was given previous year's accrual-based cost information, totaling approximately JPY 57 million. The breakdown is JPY 8 million for the community support committee project, JPY 8 million for the caregiver training project, JPY 18 million for the regional welfare support center project and JPY 23 million for the consignment of the service welfare support project [11]. In other words, the projects with good performance information have the same accrual cost and cash information without additional data. However, high accrual cost information is set to the projects with poor performance information because our setting assumes that some assets have been depreciated and no capital investment was made for these projects in a previous fiscal year. If budget officers use the non-financial information of poor performance combined with high accrual-based costs under financial constraints, they should deem the social welfare program ineffective; thus, they are expected to reduce next year's budget in favor of other social welfare programs.

To test H2, we estimated the OLS regression model in Equation (2) using the survey results for Groups 2 and 3 combined with archival data to control for the external factors related to incremental budgeting:

$$difBS = \alpha_0 + \alpha_1 NFP * AC + \alpha_2 Balance + \alpha_3 Debt\ ratio + +\alpha_4 Variance + \alpha_5 Elderly\ Ratio + \sum_{k=1}^{5} \alpha_{5+k} LG\_Type_k + \varepsilon_t. \quad (2)$$

The independent variable of interest is *NFP* * *AC* and equals 1 when the questionnaire is for Group 3 (including information for Group 1 and accrual-based cost and non-financial performance information) and 0 otherwise. We used *Balance* to indicate fiscal constraints. We divided the sample into two subsamples (high- or low-fiscal-balance LGs) by setting the median of *Balance* as a threshold [12]. If a local government's *Balance* is high, it has sufficient financial resources to formulate budget appropriations. However, if it is low, the local government's financial resources might face budget pressure. We expected α_1 to be negative and significant in low-fiscal-balance LGs. The definitions of the other variables are the same as in Equation (1).

Additionally, the respondents evaluated the items using a 5-point Likert scale in terms of whether they used each information type for decision-making. Specifically, we set a scale for the current budget amount, next year's requested budget amount, accrual-based cost (Group 3 only) and performance measures (Groups 2 and 3 only). Together with the budget amounts, we confirmed the degree of information usage for budgetary, accrual-based cost and non-financial performance information. If the assumptions of both H1 and H2 are well established, the degree of use should increase when non-financial performance information and accrual-based cost information are added to the budget applications.

Results

Basic statistics

Table 1 shows the breakdown of the survey response rates. Panels A and B indicate the response rates for each local government type and each group, respectively. The response rates for most local government types exceed 20%. Tokyo's metropolitan wards have the lowest response rates, but this does not affect the validity of the estimation results due to their different characteristics. The response ratios are 27.8% for Group 1, 29.0% for Group 2 and 23.0% for Group 3 (26.9% for Group 4 as a control group). The differences between them are not large enough to skew the results.

Table 2, Panel A reports the basic statistics. LG budget officers allocated an average (median) of JPY 51.475 (49) million for the next year's budget. Unsurprisingly, current budget information was the most frequently used information, while accrual-based cost information was not used as much as the performance measures to assess budget amounts [13]. Panel B shows information usage by group. In Group 3, utilization of accrual-based cost information was higher than in Group 4 (control group), and utilization of the performance measures was higher than in Group 2, implying that, if we provide both accrual-based cost information and performance measures, budget officers will increase their usage of each information type [14].

Tests for H1

Table 3 shows the OLS results for H1. Not directly related to the hypotheses, the result using Group 1 and Group 2 shows that the constant is positive (0.075) and significant at the 1% significance level. This indicates that, in this setting, officers decide to increase the average budget by 7.5%. We showed that the Group 2 budget amounts are lower than those in Group 1 and that the coefficient (−0.025) is significant at the 5% level. This result supports H1, as budget officers suppress 2.5% of budget amounts primarily using good performance

Panel A

	Target		Response			Response rate
	#	%	# (Received)	# (Valid)	% (Valid)	%
Special city	20	1.2	11	5	0.9	25.0
Central city	48	2.8	18	16	2.9	33.3
Ordinary city	723	41.5	370	292	53.5	40.4
Town	744	42.7	237	188	34.4	25.3
Village	183	10.5	55	42	7.7	23.0
Tokyo metropolitan	23	1.3	12	3	0.6	13.0
Total	1,741	100	703	546	100.00	31.4

Panel B

	Group 1		*Group 2*		*Group 3*		*Group 4*	
	Valid response (#)	Response rate (%)	Valid response (#)	Response rate (%)	Valid response (#)	Response rate (%)	Valid response (#)	Response rate (%)
Special city	0	0.00	2	40.00	2	40.00	1	20.00
Central city	6	50.00	3	25.00	2	16.70	5	41.70
Ordinary city	67	37.10	68	37.60	80	44.30	77	42.60
Town	47	25.30	52	28.00	36	19.40	53	28.50
Village	9	19.70	12	26.20	8	17.50	13	28.40
Tokyo metropolitan	2	34.80	1	17.40	0	0.00	0	0.00
Total	131	27.80	138	29.00	128	23.00	149	26.90

Table 1. Breakdown of survey response rates

Table 2.
Basic statistics

Panel A: Basic statistics

	Mean	sd	Min	Q1	Med	Q3	max
Assessed budget amount	51,475	407.488	29,800	49,000	49,000	55,000	60,000
dif_BS	0.051	0.083	−0.392	0.000	0.000	0.122	0.224
UsingRequestBudget (Likert)	4.237	1.072	1.000	4.000	5.000	5.000	5.000
UsingCurrentBudget (Likert)	4.582	0.765	1.000	4.000	5.000	5.000	5.000
UsingServiceCost (Likert)	3.485	1.304	1.000	3.000	4.000	5.000	5.000
UsingPerformance (Likert)	4.041	1.134	1.000	4.000	4.000	5.000	5.000
Balance (%)	6.173	4.924	0.000	3.500	5.500	7.600	53.200
Debt ratio (%)	8.827	3.869	0.000	6.400	9.000	11.300	21.300
Variance	0.065	0.097	−0.207	0.013	0.058	0.112	0.433
Elderly Ratio	0.302	0.089	0.095	0.254	0.294	0.340	0.998

Panel B: Information usage for each group

	Group 1	*Group 2*	*Group 3*	*Group 4*	Total
dif_BS	0.061	0.039	0.025	0.072	0.051
UsingRequestBudget (Likert)	4.338	4.145	4.172	4.291	4.239
UsingCurrentBudget (Likert)	4.618	4.623	4.563	4.527	4.586
UsingAccrual (Likert)			3.711	3.275	3.507
UsingPerformance (Likert)		3.942	4.148		4.047

Note(s): $N = 546$. The table shows the mean, standard deviation (s.d.), minimum (min), quartile (Q1, median, Q3) and maximum (max) values. Panel A presents the descriptive statistics of the survey data and Panel B reports information usage for each group. See Appendix 2 for variable definitions

	Expected sign	Group 1 vs Group 2 (H1)
Constant		0.075***
		(2.776)
NFP	(−)	−0.025**
		(−2.566)
Balance	(+)	0.001
		(0.420)
Debt ratio	(−)	−0.001
		(−0.537)
Variance	(+)	−0.014
		(−0.261)
Elderly ratio	(+)	0.073
		(1.607)
LG type		Control
N		264
Adj. R^2		0.058

Note(s): ** and *** indicate statistical significance at the 5% and 1% levels, respectively
This table shows the *t*-statistics for the OLS regression between parentheses. See Appendix 2 for variable definitions

Table 3.
OLS results for H1

non-financial information (*NFP*) [15]. Figure 2 illustrates the difference in the mean *difBS* between Groups 1 and 2.

Tests for H2

Since the fiscal pressure on budget officers caused by scarce fiscal resources also affects the relationship between poor performance and high accrual-based cost information and budget officers' decisions, we divided the sample into high and low-fiscal-balance LGs based on the median fiscal balance. We estimated the OLS regressions in Equation (2) for each group and present the results in Table 4.

Columns 1 and 2 in Table 4 present the results of Equation (2) using Group (*NFP*) and Group 3 (*NFP*AC*) for the two subsamples. For the low-fiscal-balance LGs, the coefficient α_1 on *NFP*AC* is negative and significant at the 5% level. Additionally, the coefficients of

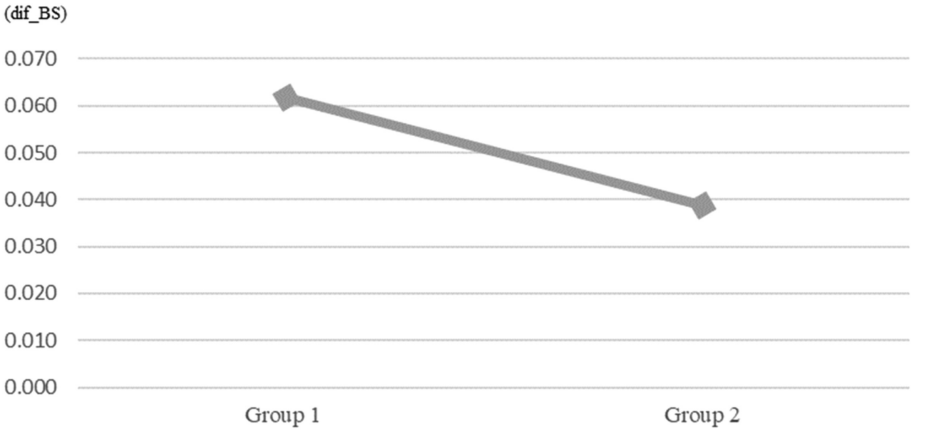

Figure 2.
Difference in the mean *dif_BS* between Groups 1 and 2

	Group 2 vs Group 3 (H2)	
	High Balance	*Low Balance*
Constant	0.056 (1.363)	0.047 (0.621)
*NFP*AC*	0.013 (0.936)	−0.027** (−1.998)
Balance	−0.002 (−0.979)	0.011** (2.243)
Debt ratio	0.002 (1.134)	0.002 (1.047)
Variance	−0.001 (−0.016)	0.068 (0.838)
Elderly Ratio	0.065 (1.224)	−0.192 (−1.386)
LG type	Control	Control
N	134	128
adj. R^2	0.063	0.079

Note(s): $NFP*AC_{high} > NFP*AC_{low}$, $\chi^2 = 5.03$**
** indicate statistical significance at the 5% level. The t-statistics of the OLS regressions are shown in parentheses. χ^2 indicates the chi-squared test to measure the difference in the *NFP*AC* coefficients between the *high* and *low balance* subsamples. See Appendix 2 for variable definitions

Table 4.
OLS results for H2

*NFP*AC* in the two subsamples are statistically different ($\chi^2 = 5.02, p < 0.05$), suggesting that fiscal constraints strengthen the effect of high accrual-based cost information on non-financial poor performance information and budget officers' decision-making. These results support H2 for LGs under fiscal constraints.

Sensitivity test and robustness checks

We conducted several analyses to complement the results. First, we performed a sensitivity analysis for determining the influence of providing only additional accrual-based cost information. Accrual-based cost information might affect cash-based budgetary decisions. However, previous studies (e.g. Kobayashi *et al.*, 2016) suggest that accrual-based cost information alone is rarely used for public sector organizations' budgeting. Therefore, we expected that budget officers would not change their decisions when they had only accrual-based cost information. We compared Group 1 and Group 4 based on a similar regression model to Equation (1) by replacing *NFP* with *AC*. Column 1 in Table 5 shows that the coefficient of accrual-based cost information (*AC*) is not significant ($p > 0.1$).

Second, non-financial performance and accrual-based cost information could be used to make budget decisions regardless of financial constraints. To investigate the possibility of no relationship between the financial constraint and budgetary decision-making, we compared Group 2 and Group 3 for Equation (2) without dividing the sample by the financial constraint. Table 5 shows the OLS regression results for Equation (2). Column 2 shows that the coefficient of *NFP*AC* is negative (−0.010) but not significant ($p > 0.1$). This suggests that if financial constraints are not taken into account, we may observe no influence of budget officers' use of non-financial performance and accrual-based cost information.

We also conducted several robustness checks. First, the main results do not change if we eliminate outliers in the upper and lower 1% of the continuous variables. Second, adding dummy variables for mayors' previous experiences, such as serving as a firm employee, firm executive, tax accountant or certified accountant, did not change the results [16].

Discussion

Previous studies show that using non-financial performance and accrual-based cost information for budgetary decision-making is controversial. This study extends budget officer decision-making theory by providing evidence that they suppress budget amounts

Variables	Group 1 vs Group 4 (1)	Group 2 vs Group 3 (2)
Constant	0.110 (3.180)***	0.011 (0.422)
AC	0.010 (1.043)	
*NFP*AC*		−0.010 (−1.007)
Balance	−0.012 (−1.071)	0.001 (0.974)
Debt ratio	0.001 (0.556)	0.001 (0.970)
Variance	−0.022 (−0.451)	0.020 (0.361)
Elderly Ratio	0.063 (0.843)	0.033 (0.671)
LG type	Control	Control
N	286	262
adj. R^2	0.043	0.050

Note(s): $NFP_{high} > NFP_{low}$, $\chi^2 = 0.00$
*** indicate statistical significance at the 1% level. The *t*-statistics of the OLS regressions are shown in parentheses. χ^2 indicates the chi-squared test to measure the difference in the *NFP* coefficients between the *high* and *low balance* subsamples. See Appendix 2 for variable definitions

Table 5.
OLS results for supplementary analyses

using non-financial good performance information at the project level. Although previous studies such as Melkers and Willoughby (1998, 2005) and Liguori *et al.* (2012) only use budget officers' perception of non-financial performance information, we found direct impacts of good performance non-financial information on budget decision-making.

The results indicate a challenge for performance budgeting and the use of non-financial information in budgets. The premise of related debates is "value for money"—allocating more resources to better-performing programs. Prior research investigates whether officers should reduce the budgets for low-performing programs (Hou *et al.*, 2011; Zaltsman, 2009). Budget officers may also consider making new decisions to incentivize departments to report good performance (Reck, 2001). However, from the marginal welfare perspective (Johnsen, 2012), this study suggests that budget officers may make more prudent decisions for programs that achieve higher performance. This implies that, from the budget request side, the harder public officers work, the less they are rewarded. When governments use non-financial information, they may need to take into account good performance in non-budgetary ways.

The results also suggest that officers suppress budget amounts by primarily using non-financial information about good performance regardless of fiscal constraints. However, budget officers in LGs facing difficult fiscal conditions further reduced budget allocations using complementary high accrual-based cost information along with poor non-financial performance information. Accrual-based cost information should be a reasonable reference in the long term when budget officers are deciding the extent of budget reductions for poor-performing programs. In Japan, LGs risk current and future fiscal deterioration due to the low birthrate and aging population, which results in lower tax revenues and higher social welfare costs. Our results suggest that budget officers respond to severe financial constraints, which may influence their usage of accrual-based cost and non-financial information.

Conclusion

Assuming the presence of budgetary cost information, we found that: (1) information about good non-financial performance is related to budgetary decision-making regardless of fiscal constraints; (2) under financial constraints, high accrual-based cost with poor non-financial performance information influences budgetary decisions to control incremental budget amounts. The results suggest both non-financial information and accrual-based cost information are used in budgetary decision-making under financial constraints.

Our experimental results have significant practical implications. Although not all performance aspects are measurable, measuring and reporting non-financial information as much as possible would encourage budget officers to improve public finances based on real-world parameters. Further, local governments facing severe fiscal constraints can suppress incremental budgets by adopting information on both accrual-based costs and non-financial performance for each project. Without this information, budget applicants will not voluntarily disclose good performance information so as to increase budget amounts and responsibilities.

However, our experimental design has limitations that should be addressed in future research. Data limitations may have determined the choice not to address certain aspects of the proposed issue. First, the analysis did not incorporate the incentives and pressures of other budget approvers (i.e. mayors or local assembly members). As such, how other budget approvers reflect efficiency information in budget amounts is a future research agenda. Second, while this study considered cases where performance was extremely high or low, the budget amounts might change depending on the performance measures. Thus, research that quantifies the relationships or structures among budget amounts and efficiency measures is important. Furthermore, we did not investigate efficient budget allocations among programs. Thus, future research should consider budget officers' decisions regarding amounts and allocation issues.

Notes

1. The central government adopted accrual accounting in the 1990s (Yamamoto, 1999) under different laws and systems. Therefore, we focused only on LGs, especially municipality-level ones.
2. Prefectures can provide police, high schools and public investment for prefectural roads across some cities, towns and villages. Meanwhile, municipalities, including cities, towns, and villages, are responsible for providing elementary and junior high school education, municipal roads, agricultural land and regional social welfare programs for older citizens (MIC, 2016, 2017).
3. Via e-mail, budget officers asked, "What accounting standards should we use for accrual costs?"; "Should accrual costs be considered only depreciation costs?"; and "In practice, our LG sets budget limits for each department. Can we assume that there are no limits in this survey?" We answered the questions carefully to ensure we did not provide information beyond that in the questionnaire.
4. Almost all LGs in Japan create budgets aggregated by department. The budget and outcome information for each program is additional to these budgets.
5. As an output for the community support committee project, we set a number of meetings that is much higher than the annual average of all LGs. The national average is 1–2 meetings a month; however, 48 meetings were held weekly.
6. For example, the level of client satisfaction with long-term care services in local governments generally exceeds 70% in large as well as in smaller cities. Therefore, a 30% satisfaction rate can be regarded as significantly low.
7. To set the performance measures, we consulted several LG practitioners. They indicated that although setting common measures is difficult, the satisfaction ratio is easier to determine.
8. According to the MIC, Balance should be roughly 3–5%. If an LG has Balance of more than 5%, it suggests that the LG has adequate financial resources; if it has less than 3%, it is under significant financial constraints. In fact, no LG had a balance below zero in 2017, and many LGs target 5%. The MIC imposes no penalty if the balance is below the benchmark.
9. The two financial factors (*Debt ratio* and *Variance*) may also be partial indicators of financial constraints. However, it is doubtful that *Debt ratio* data for the target period can be used as a proxy for financial constraints because most values are less than 10%. Moreover, *Variance* represents the degree of budget execution rather than financial constraints (Johansson and Siverbo, 2014). Therefore, we used *Balance* to indicate the financial constraints on budgetary decision-making.

10. Since the latest Population Census, which examines the population of all municipalities in Japan, is that of 2015, we used the results of this census.
11. Since financial results were not compiled at the time the budget was formulated, we assumed that budget officers use accrual-based cost amounts from the previous fiscal year.
12. *Debt ratio* may also represent financial resource scarcity. We performed an additional test with subsamples by setting the median of *Debt ratio* as a threshold and found no difference between the subsamples. Thus, we used *Balance* as a proxy for financial resource scarcity.
13. As a robustness check, we conducted an analysis that limits the use of accrual-based cost and performance to subsamples of local governments who answered 4 or above, and the results are the same.
14. This is part of the manipulation check, which confirms the information that budget officers recognize and how much information was used.
15. Although the result does not allow us to completely determine which good or poor performance information is being used, based on the theory and results of previous studies (e.g. Ammons and Rivenbark (2008), Johnsen (2012)), we can interpret that they primarily use good performance information.
16. As an argument that management characteristics impact accounting behavior, Anessi-Pessina and Sicilia (2019) find that top managers' individual characteristics and traits influence the extent of accounting manipulation. Based on this, incentives differ depending on manager characteristics; thus, a robustness check was used to control for the chief executive's characteristics.

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Appendix 1

Content of the survey experiment

The following budget requests come from government officials from the Welfare and Medical Bureaus. Please create a budget assessment in the amount column.

1-1 Assessed amount

Name of Bureau	Amount of money
The Welfare Bureau	( ) millions of JPY

1-2 The extent of use of information

Type of information	Not used	Neither used or not used			Used
Requested budget amount	1	2	3	4	5
Current budget amount	1	2	3	4	5
Accrual-based full costing	1	2	3	4	5
Performance	1	2	3	4	5

*** This survey was translated from Japanese by the authors.

Group 1 baseline

[Reference material]

Name of welfare program	Requested budget amount (million JPY)	Current budget amount (million JPY)*
Community support committee project	10	8
Caregiver training project	10	8
Regional welfare support project	18	15
Consignment elderly service welfare support project	22	18
Total budget amount	60	49

* All budget amounts for this fiscal year will be expended.

** Accrual-based cost is JPY 57 million.

Group 2: *NFP*

[Reference material]

The name of welfare programs	Requested budget amount (million JPY)	Current budget amount (million JPY)*
Community support committee project	10	8
Caregiver training project	10	8
Regional welfare support project	18	15
Consignment elderly service welfare support project	22	18
Total budget amount	60	49

* All budget amounts for this fiscal year will be expended.

[Other information]

The name of welfare programs	Performance measures within the current year
Community support committee project	48 meetings
Caregiver training project	Satisfaction rate = 98%
Regional welfare support project	Satisfaction rate = 30%
Consignment elderly service welfare support project	Satisfaction rate = 30%

** Depreciation expenses are included in the accrual-based cost.

*** Full cost is JPY 57 million.

Group 3: *NFP*AC*

[Reference material]

Name of welfare program	Requested budget amount (million JPY)	Current budget amount (million JPY)*
Community support committee project	10	8
Caregiver training project	10	8
Regional welfare support project	18	15
Consignment elderly service welfare support project	22	18
Total budget amount	60	49

* All budget amounts for this fiscal year will be expended.

[Other information]

Name of welfare program	Accrual-based cost in the previous year (million JPY)**	Performance measures within the current year
Community support committee project	8	48 meetings
Caregiver training project	8	Satisfaction rate = 98%
Regional welfare support project	18	Satisfaction rate = 30%
Consignment elderly service welfare support project	23	Satisfaction rate = 30%
Total amount	57	

** Depreciation expenses are included in the accrual-based cost.

Group 4: *AC*

[Reference material]

Name of welfare program	Requested budget amount (million JPY)	Current budget amount (million JPY)*
Community support committee project	10	8
Caregiver training project	10	8
Regional welfare support project	18	15
Consignment elderly service welfare support project	22	18
Total budget amount	60	49

* All budget amounts for this fiscal year will be expended.

[Other information]

Name of welfare program	Accrual-based cost in the previous year (million JPY)**
Community support committee project	8
Caregiver training project	8
Regional welfare support project	18
Consignment elderly service welfare support project	23
Total amount	57

** Depreciation expenses are included in the accrual-based cost.

Appendix 2

Table A1.
Variable definitions

Variables	Definitions
dif_BS	Difference between appraisal of the budget amount for the next fiscal year and the current year budget amount, deflated by the current year budget amount
NFP	1 when the questionnaire is for Group 2 and 0 otherwise
*NFP*AC*	1 when the questionnaire is for Group 3 and 0 otherwise
Using Request Budget (Likert)	Extent of the use of requested budget information on a five-point Likert scale
Using Current Budget (Likert)	Extent of the use current budget information on a five-point Likert scale
Using Accrual (Likert)	Extent of the use of accrual-based cost information on a five-point Likert scale
Using Performance (Likert)	Extent of the use of performance information on a five-point Likert scale
Balance	Ratio of the net balance to total revenue
Debt ratio	Ratio of debt repayment amounts to total revenue
Variance	Each municipality's actual expenditure for 2015 is subtracted from its total revenues in 2016, then divided by the actual expenditure for 2015
Elderly Ratio	Population over 65 years of age divided by total population in 2015

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