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Uncertainty, and Budget Rigidity on Financial Performance**

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**Combined Effects of Subjective Performance Evaluation,
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on Financial Performance**

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Abstract

This study examines the combined effects of subjective performance evaluation, environmental uncertainty, and budget rigidity on financial performance. Specifically, this study assumes that the beneficial role of subjective performance evaluation in highly uncertain environment will decrease because high budget rigidity causes dysfunctional behavior in achieving targets. Using survey and archival data for 252 firms, the results support the hypothesis that subjective performance evaluation enhances financial performance as environmental uncertainty increases and budget

rigidity decreases. In addition, supplementary analysis indicates such positive performance effects of subjective performance evaluation become more prominent when performance measure diversity is low. These findings suggest that the effectiveness of subjective performance evaluation is determined by congruence not only with environmental uncertainty, but also with budget rigidity. Furthermore, this study empirically indicates that under certain situations, it is rational for there to be a substitutional relationship between subjective performance evaluation and performance measure diversity for performance improvement.

Keywords

Subjective performance evaluation, Environmental uncertainty, Budget rigidity, Performance measure diversity, Financial performance, Questionnaire survey

1 Introduction

Managerial performance evaluation is a central means to achieve goal congruence between firms and managers. In order to align their interests, which are not always consistent, it is necessary to set performance targets that contribute to achieving organizational objectives and provide incentives for direct effort to achieve goals. Formal performance evaluation provides such incentives through setting performance targets, weighting them, and rewarding their achievement (Merchant & Van der Stede, 2012).

However, there are some limitations for performance evaluation based on formal rules. For example, risks exist that cause distorted incentives. Quantitatively evaluating important behavior, such as knowledge creation or cooperation, is not always easy. Nevertheless, evaluation based only on specific performance measures might provide managers with distorted incentives to commit to measured targets while ignoring other relevant behavior (Holmstrom & Milgrom, 1991). In addition, there is

the risk of unexpected poor performance by managers. Uncontrollable factors, such as economic crisis or organizational interdependencies, influence the achievement of performance targets. In this situation, performance evaluation based solely on the achievement of targets enhances risk-bearing problems (Holmstrom, 1979). Because of these limitations, performance evaluation based on formal rules might lower a manager's motivation or enhance unintended dysfunctional behavior that impedes the achievement of organizational objectives.

Subjective performance evaluation has been considered as an effective way to overcome these limitations. Subjectivity is used to evaluate managerial performance based not on formal rules but on subjective perception or judgement of evaluators. Previous research provides three types of usage of subjectivity in performance evaluation: incorporating qualitative non-financial measures, using subjectivity in ex post weighting of performance measures, and allowing ex post discretionary adjustments based on factors other than specified performance measures (Bol, 2008; Gibbs, Merchant, Van der Stede, & Vargus, 2004; Hoppe & Moers, 2011).

Some studies deal with the performance effects of subjective performance evaluation. Specifically, they show that subjective performance evaluation promotes value-enhancing behavior, such as knowledge creation or cooperation and enhances motivation through reducing risk-bearing problems (Bol & Smith, 2011; Cheng & Coyte, 2014; Gibbs et al., 2004; Hoppe & Moers, 2011). Furthermore, some studies examine the combined effects of subjective performance evaluation and contextual factors, such as environmental uncertainty, business unit strategy, and trust on organizational performance (Gibbs et al., 2004; Govindarajan, 1984; Govindarajan & Gupta, 1985).

It can be assumed that not only these contextual factors but also higher pressure of financial targets substantially influences the performance effects of subjective performance evaluation. Evaluation standards or criteria are not clear for managers (evaluatees) when their performance is subjectively evaluated because such evaluation accompanies the evaluator's own preferences or interpretations (Bol, 2008; Luft, Shields, & Thomas, 2016; Merchant, 1989; Ross, 1995). In this situation, heightening pressure of specific financial targets leads to managers' perceptions that achievement of targets is critical (Marginson & Ogden, 2005). Managers who perceive the importance of achieving financial targets might take dysfunctional behavior, such as manipulation of performance measures, like pulling profits from future periods, into the current period to achieve targets (Merchant, 1990). Furthermore, the risks of deriving this dysfunctional behavior are enhanced when the external environment becomes more uncertain because the causal relationship between managerial behavior

and results becomes unclear (Govindarajan, 1984; Merchant, 1990). Subjective performance evaluation is suitable for eliminating this dysfunctional behavior through ex post adjustment in performance evaluation (Bol, 2008); however, its beneficial effects might be offset by higher pressure of financial targets. Hence, it can be assumed that performance effects vary by combination of subjective performance evaluation, environmental uncertainty, and the pressure of financial targets, but there is scarce empirical evidence about their interaction effects.

Against this background, the aim of this study is to investigate the combined effects of subjective performance evaluation, environmental uncertainty, and the pressure of financial targets on financial performance. Specifically, this study focuses on budgetary targets as the representative position in financial targets and considers the effects of budget rigidity as a notion that reflects the pressure of financial targets. The results from survey and archival data for 252 samples of large Japanese firms show evidence consistent with expectations. That is, subjective performance evaluation enhances financial performance (both return on assets, ROA, and sales growth rate) as environmental uncertainty increases and rigidity of budgetary targets decreases. Furthermore, supplementary analysis indicates that positive performance effects of subjective performance evaluation appear more prominently when performance measure diversity is low.

This study makes several contributions to the related literature. First, this study finds specific conditions in which subjective performance evaluation enhances organizational performance. Previous research on subjective performance evaluation empirically indicates that contextual factors, such as environmental uncertainty, business unit strategy, and trust, determine the effectiveness of subjective performance evaluation on organizational performance (Gibbs et al., 2004; Govindarajan, 1984; Govindarajan & Gupta, 1985). The current study reveals that not only these contextual factors but also the rigidity of budgetary targets determines the effectiveness of subjective performance evaluation. In addition, supplementary analysis indicates that the performance effects of subjective performance evaluation under specific conditions become prominent when performance measure diversity is low.

Second, this study finds effects of subjective performance evaluation on financial performance. One subject of the performance evaluation literature is whether outstanding performance evaluation theoretically enhances financial performance (Franco-Santos, Lucianetti, & Bourne, 2012; Ittner, Larcker, & Randall, 2003). The results of this study contribute to these streams of literature by clarifying the effects of financial performance in certain situations.

Finally, the results of this study suggest the importance of empirically distinguishing between two notions: performance evaluation style and budget rigidity. Research on reliance on accounting performance measures (RAPM) uses two terms, performance evaluation styles (objective, subjective, and both) and budget rigidity, without clear distinction. Some research determines the cause of the inconsistency of empirical results or theory–practice gaps on undisposed notions (Hansen, Otley, & Van der Stede, 2003; Libby & Lindsay, 2010; Otley & Fakiolas, 2000). Given these problems, the empirical results of this study, which clearly distinguish between two overlapping notions, show that financial performance effects vary depending on the combination of subjective performance evaluation and budget rigidity, even in the same situation.

The remainder of this paper is structured as follows. Section 2 reviews related prior literature on subjective performance evaluation and budget rigidity, and develops the hypothesis of the study. Section 3 explains the data collection and variable measurement. Section 4 presents the results of analysis. Finally, section 5 shows the contributions, limitations, and directions for future research.

2 Literature review and hypothesis development

This section reviews the previous literature on two key concepts: subjective performance evaluation and budget rigidity. Specifically, the literature review mainly focuses on the relationship between each concept and environmental uncertainty. Finally, a hypothesis is developed regarding the effects of the contingency relationship between environmental uncertainty, subjective performance evaluation, and budget rigidity on financial performance.

2.1 Environmental uncertainty and subjective performance evaluation

Some studies focus on managers' controllability and environmental uncertainty as contextual factors that influence subjectivity in performance evaluation (Bol & Smith, 2011; Gibbs et al., 2004; Hoppe & Moers, 2011; Woods, 2012). These studies assume that subjectivity in performance evaluation is used in order to enhance adaptive behavior in highly uncertain environments or to reduce the risks of managers performing poorly owing to uncontrollable factors. Gibbs et al. (2004) assume the following two relationships. The first is that the more uncontrollable factors influence quantitative performance measures, the more subjectivity in performance evaluation

increases. The second assumption is that the more the external environment becomes unpredictable or competitive, the more subjectivity in performance evaluation increases. Likewise, Bol and Smith (2011) and Woods (2012) empirically find that the evaluation outcomes of managers are subjectively adjusted upward when they perform poorly owing to uncontrollable factors. Furthermore, Hoppe and Moers (2011) focus on subjective weighting of performance measures and presume a relationship with environmental uncertainty as follows. They assume that the ex ante weighting of performance measures increases the risks of enhancing non-adaptive behavior to changes in the environment when it is difficult to clarify optimal behavior that would contribute to firms' value ex ante, although managers have to adapt flexibly to changes in the environment. Subsequently, the authors empirically confirm that the more environmental unpredictability increases, the more is subjectivity in the weighting of performance measures used to enhance adaptive behavior.

Alongside the development of the abovementioned studies, a few studies examine the combined effects of environmental uncertainty and subjective performance evaluation on organizational performance. Govindarajan's (1984) study based on contingency theory finds that superior organizations that perceive higher environmental uncertainty use subjectivity in performance evaluation more.

2.2 Environmental uncertainty and budget rigidity

This subsection reviews the related literature on budget pressure. At first, some studies focus on tightness (slack) of budgetary targets¹. Merchant and Manzoni (1989) use field investigations to reveal the rationality of setting highly achievable budgetary targets that contain slack in highly uncertain environments. In highly uncertain environments, it is difficult to motivate managers to achieve very difficult targets because uncontrollable factors hamper their achievement. In addition, greater emphasis on achieving budgetary targets enhances the risks of deriving dysfunctional behavior, such as manipulation of performance measures or restriction of discretionary expenditures. While very difficult budgetary targets in highly uncertain environments cause such serious problems, highly achievable targets met through substantial effort motivate managers by lowering the effects of uncontrollable factors and by clarifying

¹ Dunk and Nouri (1998, p.73) define budgetary slack as "the intentional underestimation of revenues and productive capabilities and/or overestimation of costs and resource."

the causal relationship between managers' behavior and their results. Furthermore, highly achievable targets that contain slack enhance adaptive behavior to external environments that change on a short-term basis and increase discretionary expenditures through enhancing operational flexibility². Merchant and Manzoni (1989) reveal the effectiveness of setting budgetary targets that contain slack to enable adaption to changes in the environment or achievement of multiple performance measures, such as customer responsiveness (Davila & Wouters, 2005; Todd & Ramanathan, 1994).

The abovementioned studies reveal the effectiveness of budgetary slack for organizational processes, but there has not been sufficient accumulation of empirical evidence about their performance effects. Furthermore, some studies show an inverted-U relationship between budgetary slack and organizational performance (Nohria & Gulati, 1996). Hence, it is difficult to explore optimal levels of budgetary slack (tightness) that contribute to superior performance.

This study focuses on the rigidity of budgetary targets that influence the formation of budgetary slack. According to Sponem and Lambert (2016), budget rigidity has two distinct design characteristics: budget revision (possibility of changing the initially set budget) and budget re-forecast (existence of a forecast during the year)³. The more the rigidity of budgetary targets increases, the more the budget

² In addition, Merchant and Manzoni (1989) find that business units set very difficult budgetary targets when their priorities are to obtain short-term profits. In this situation, managers make decisions to restrict discretionary expenditure that would hamper future performance in order to achieve short-term budgetary targets.

³ However, it cannot be said that there is consensus about the definition of budget rigidity. For example, RAPM research defines budget rigidity regarding the extent to which managers are evaluated based on the achievement of budgetary targets (Govindarajan, 1984; Hopwood, 1972). Specifically, these studies assume that budget rigidity is high when managers are evaluated based on budgetary targets only. On the contrary, budget rigidity is low when managers are evaluated based on a combination of achievement of budgetary targets and other information. Hence, these studies assume budget rigidity and performance evaluation as a similar concept. On the other hand, recent studies reveal practices that combine budget rigidity and performance evaluation. For example, Libby and Lindsay (2010) find that about half of respondent firms emphasize the achievement of budgetary targets, but just 15 percent of respondents evaluate achievement only. Moreover, the authors find that subjective performance evaluation is spread to some degree. In response to Libby and Lindsay's

revision or budget re-forecast decreases. If budget rigidity is high, the possibility of containing slack by subordinates decreases because superiors intervene and control the slack-creation behavior of subordinates (Dunk, 1993; Merchant, 1985; Van der Stede, 2000).

Prior studies reveal that a combination of environmental uncertainty and budget rigidity strongly influences managerial behavior (Merchant, 1990; Van der Stede, 2000). Merchant (1990) empirically finds that the positive effects of budgetary target pressure on the manipulation of performance measures become more prominent when environmental uncertainty is high. This is because a highly uncertain environment makes the causal relationship between managerial behavior unclear and managers perceive obscurity about how to achieve budgetary targets. As a result, the risks of dysfunctional behavior to achieve fixed budgetary targets increase. Likewise, Van der Stede (2000) assumes that adoption of differentiation strategies that accompany obscurity between managerial behavior and its results necessitates slack in order to cope with such uncertainty. His empirical results support his assumption that adoption of differentiation strategies leads to creation of slack by lowering budget rigidity and ultimately enhance long-term managerial orientation. Furthermore, Lillis (2002) empirically finds that lowering budget rigidity enhances the possibility of achieving quality or customer responsiveness measures, which are a trade-off for achieving budgetary targets.

2.3 Effects on financial performance of contingency relationship between environmental uncertainty, subjective performance evaluation, and budget rigidity

This subsection postulates the combined effects of environmental uncertainty, subjective performance evaluation, and budget rigidity on financial performance.

In highly uncertain environments, subjective performance evaluation enhances motivation or perceived fairness by lowering the risks of managers performing poorly and by enhancing adaptive behavior to changes in the external environment (Bol, 2011; Bol & Smith, 2011; Hoppe & Moers, 2011). Because of these advantages, subjective performance evaluation is suitable for highly uncertain environments and ultimately contributes to higher organizational performance (Govindarajan, 1984).

While subjective performance evaluation has several advantages in highly uncertain environments, evaluation standards or criteria are unclear for managers

(2010) findings and Sponem and Lambert's (2016) definition, this study assumes budget rigidity as emphasis of or fixation on budgetary targets.

(evaluatees) when their performances are subjectively evaluated (Bol, 2008; Luft et al., 2016; Merchant, 1989; Ross, 1995). Because of this evaluation obscurity, greater emphasis on achieving budgetary targets leads to clarifying managers' perceptions that their responsibility is to achieve budgetary targets (Marginson & Ogden, 2005). Managers come to perceive the importance of achieving budgetary targets, but the causal relationship between managerial behavior and results becomes unclear when environmental uncertainty increases (Govindarajan, 1984). In this situation, the motivational effects of budgetary targets decrease (Merchant & Manzoni, 1989). Furthermore, managers who perceive obscurity about how to achieve budgetary targets might adopt dysfunctional behavior to cope with such uncertainty (Hopwood, 1972; Merchant, 1990; Merchant & Manzoni, 1989). Although previous literature suggests that subjective performance evaluation is effective for restricting such behavior, it can be presumed that the beneficial effects of subjective performance evaluation decrease. Merchant's (1990) results seem to be consistent with this assumption. Specifically, Merchant (1990) finds no mitigating effects of superiors' consideration that contain subjectivity on the manipulation of performance measures caused by high pressure of budgetary targets⁴. Hence, it can be assumed that highly rigid budgetary targets cause serious problems, even in situations in which subjectivity in performance evaluation is high because of the obscurity of evaluation standards or criteria. Furthermore, highly rigid budgetary targets cause serious problems, as subjectivity in performance evaluation increases and the external environment becomes more uncertain.

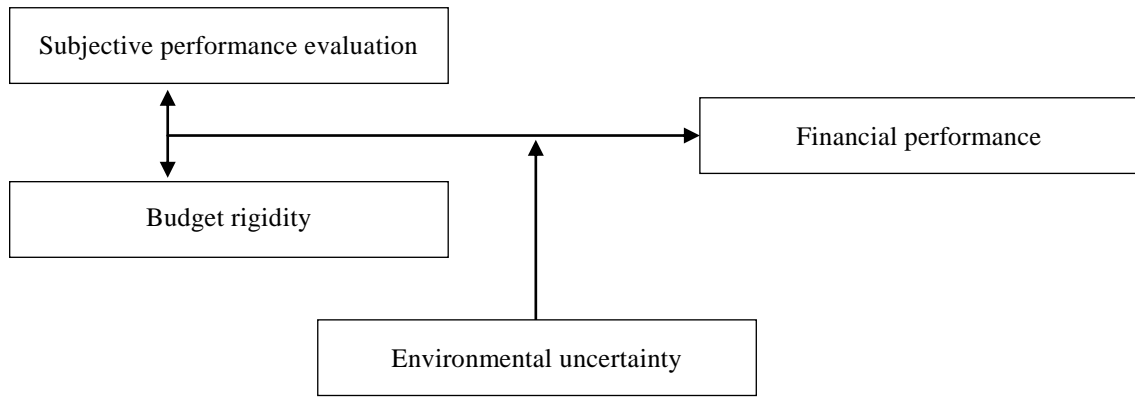
From the aforementioned discussion, it can be assumed that congruence among high subjectivity in performance evaluation, highly uncertain environments, and low budget rigidity is associated with higher financial performance. Thus, the following hypothesis is proposed.

Hypothesis: Subjective performance evaluation enhances financial performance as environment uncertainty increases and rigidity of budgetary targets decreases.

Figure 1 shows the proposed conceptual framework of this study.

⁴ Merchant (1990) denotes this result as contrary to the assumptions of Otley (1978), which is a representative study of RAPM research.

Figure 1
Conceptual Framework



3 Method

3.1 Data collection

Large Japanese firms were selected for the sample. This is because an evaluator's subjectivity plays a role in performance evaluation or personnel assessment in Japan. Specifically, personnel assessment in Japan includes not only performance evaluation but also evaluation on personnel capabilities, such as planning ability or ability to get things done. Personnel assessment includes evaluation on managerial attitudes, such as sense of responsibility or aggressiveness. Personnel assessment accompanies subjectivity because evaluation based on capabilities or attitudes is composed of qualitative performance measures (Endo, 1994). In addition, Endo (1994) indicates that subjectivity is a characteristic of managerial performance evaluation, especially regarding decisions about bonus allocation.

Data were collected by questionnaire survey and archival database. The respondents of the mail survey are managers/directors of corporate planning departments⁵. Corporate planning departments are appropriate respondents, as their main functions in large Japanese firms include investigation and exploration of appropriate budgeting and performance evaluation systems.

⁵ The survey instrument was mailed to one company per person based on name and address information from a database of D-VISTION series of Diamond Press. If a manager's name could not be obtained, the questionnaire was sent to the managers/directors of the corporate planning department without names. All respondents were required to fill in their names and departments on a form.

Questionnaires were sent out on November 4, 2014 to 1,822 firms that were listed on the First Section of the Tokyo Stock Exchange. The questionnaire was required to be sent back before November 28, 2014. In an attempt to increase the response rate, a once-off follow-up postcard was sent to those who did not respond by the due date. These processes resulted in 308 responses (a 16.9 percent response rate, including responses after the follow-up postcard). There were 252 final samples for analysis after eliminating sample firms that did not use budgets (2 samples), that did not use budgetary targets for performance evaluation of business unit managers (32 samples), and that contained missing data in questions (22 samples). Appendix A presents the details of survey samples.

Several tests are implemented in order to investigate non-response bias. First, t-tests comparing non-respondents to respondents across organizational size based on sales and number of employees are implemented. The results show no statistically significant differences between respondents and non-respondents for both ($p > 0.10$). Next, differences in organizational size between early and late respondents are examined. As a result, although sales of early respondent firms are larger than sales of later firms ($t = 2.25$, $p = 0.025$), there are no meaningful statistical differences with regard to numbers of employees ($p > 0.10$). Finally, two tests are implemented to investigate the difference in return data for all survey constructs between early and late respondents. First, based on the results of a chi-square test, no significant difference is confirmed in the usages of budgeting and the performance evaluation based on budget targets between early respondents and late respondents ($p > 0.10$). Second, based on the results of the t-test, which investigated the differences of mean-value of 31 survey questions between early respondents and late respondents, early respondents have a higher mean value in two survey items than do late respondents, but no significant differences are found in the averages of the other 29 survey questions ($p > 0.10$)⁶. Overall, the results of these tests support the absence of significant non-response bias that would affect the data for analysis.

⁶ Meaningful statistical differences are found in “evaluate quantitative non-financial targets subjectively on the basis of change of conditions or explanation by manager” ($t = 2.208$, $p = 0.028$) and “evaluate budget targets subjectively on the basis of change of conditions or explanation by manager” ($t = 2.266$, $p = 0.024$). However, the effect sizes of the mean differences (Hedges’ g) are 0.29 and 0.26, respectively. Thus, it can be said that the mean differences of the two items are not serious problems because the effect size is small.

3.2 Variable measurement

3.2.1 Subjective performance evaluation

It is difficult to state that the measurement items of subject performance evaluation (*SPE*) have been established by previous studies. For example, Govindarajan (1984) and Govindarajan and Gupta (1985) measure superiors' evaluation styles with reference to whether performance evaluation and the determination of incentive bonuses rely on formulas or subjective approaches. Respondents were asked to indicate percentages when bonuses were decided partly in a subjective manner and partly in a formula-based manner. Likewise, Gibbs et al. (2004) measure the use of subjectivity in the assignment of awarding bonuses in two ways, including whether any subjective bonus is given and the percentage of total compensation-related subjective bonus earned. Libby and Lindsay (2010) measure the use of budgets in performance evaluation by asking respondents to choose one of five options, namely (1) actual financial performance rigidly compared to budget, (2) budget target adjusted for uncontrollable budget variances, (3) budget target adjusted at year-end using the formula established at the beginning of the year, (4) budget target adjusted subjectively at the end of the year, and (5) both budget target and other subjective factors used.

In this study, *SPE* is measured with the following four items in reference to Libby and Lindsay (2010) and Van der Stede, Chow, and Lin (2006). Specifically, *SPE* is measured for each typology of performance measures. First, subjectivity based on budgetary targets was asked in a form adopted from Libby and Lindsay's (2010) question (4). Second, respondents were asked to rate subjectivity on both objective and subjective non-financial measures. Finally, to represent the features and practices of Japanese management style, an item that reflects the subjective approach and is related to the use of personnel capabilities and attitudes is added. These four items are measured on Likert scales of 1–7, where 1 indicates “not at all” and 7 indicates “absolutely correct.”

Principal component analysis of the four items extracted one factor. The variable is measured using the mean value of four items. The value of Cronbach's alpha for this construct is 0.68, which is deemed an acceptable level (Hair, Anderson, Tatham, & Black, 1998).

3.2.2 Environmental uncertainty

Environmental uncertainty (*EU*) is measured using questionnaire items, following Govindarajan (1984). This is because decision-makers' perceptions of uncertainty in external environments have a significant impact on performance evaluation style and budget rigidity (Govindarajan, 1984).

The questionnaire items of *EU* are measured adopted from previous studies. For example, Widener (2007) measures strategic uncertainties, a similar concept to *EU*, based on the following three dimensions: operation (the five items of diffusion of proprietary knowledge outside the organization, scale effects, scope effects, input costs, and internal production innovation), competition (the three items of product introductions in adjacent industries, market tactics of competitors, and new industry entrants), and technology (the two items of changes in product technology that affect the relative cost/efficiency to user and new technology). Based on the widely used instrument developed by Hoque's (2004) eight items (production and information technologies, customer demand/tastes/preferences, market activities of competitors, industrial relations, suppliers' actions, deregulation and globalization, government regulation and policies, and economic environment), Ekholm and Wallin (2011) add three items that reflect new competitors/competing products, development of raw material markets, and development of labor market. In this study, *EU* is measured using eight items that reflect three dimensions common in prior studies: internal business processes, competition, and technology. These eight items are measured on Likert scales of 1–7, where 1 indicates “very predictable” and 7 indicates “very unpredictable.”

The results of principal component analysis of the eight items indicate two factors. The second factor, which includes items of industrial relations, government regulation, and policies that present high factor loading, is eliminated because these factors are influential factors on others. Hence, the first factor is used as a variable of *EU*. The variable is measured using the mean value of six items that load on factor one. Cronbach's alpha for this construct is 0.82, which is a satisfactory level.

3.2.3 Budget rigidity

In this study, budget rigidity (*BR*) is defined as the emphasis of achievement of budgetary targets based on business-unit level. Many previous studies use an instrument developed by Hopwood (1972) or Otley (1978) to measure *BR*, but it might be better not to use their instruments because they are developed to investigate practices at particular companies or business units (Otley & Fakiolas, 2000). In this

study, *BR* is measured by Van der Stede's (2000) seven items, which are developed for a cross-sectional survey and subsequently, are used by Libby and Lindsay (2010). These seven items are measured on Likert scales of 1–7, where 1 indicates “not at all” and 7 indicates “absolutely correct.” One item is eliminated because of the ceiling effect. From the results of principal component analysis, one factor is abstracted. The variable is measured using the mean value of six items. The value of Cronbach's alpha for this construct is 0.84, which is an adequate level.

3.2.4 Financial performance

Financial performance is measured by ROA and 3-year sales growth rate following related studies (Arnold & Artz, 2015; Ittner et al., 2003). Data are collected from Nikkei NEEDS databases. ROA is measured by dividing earnings before interests and taxes by total assets of the 2013 fiscal year multiplied by 100. The sales growth rate is the rate of sales growth over 3 years in which the differences in the value of sales between the 2013 fiscal year and the 2011 fiscal year are divided by the sales of the 2011 fiscal year multiplied by 100.

3.2.5 Control variables

Several variables that impact financial performance should be controlled. First, industry performance (*INDUSTRY*) is controlled. To assess industry performance, the mean ROA of the 2013 fiscal year and the mean sales growth rate of 3 fiscal years on the industry level are constructed. Each *INDUSTRY* measure is included in ROA and sale growth rates as dependent variables (*INDROA*, *INDSGR*)⁷.

Second, organizational size (*SIZE*) is included. According to the prior literature, organizational size influences performance evaluation and organizational performance significantly (Bruns & Waterhous, 1975). In this study, organizational size is measured by the natural logarithm of total assets of the 2013 fiscal year, following related studies (Arnold & Artz, 2015; Ittner et al., 2003). Data are collected from Nikkei NEEDS databases.

⁷ The category of industry is based on the industrial classification and standard industrial classification code formulated by the Securities Identification Code Committee of the Japan Exchange Group. Data are collected from the database “eol.”

Finally, the performance measure of diversity (*DIVERSITY*) should be controlled. Previous studies demonstrate that *DIVERSITY*, including financial and non-financial measures, might influence organizational performance prominently (Hoque & James, 2000; Ittner et al., 2003; Van der Stede et al., 2006). Moreover, questionnaire items of *SPE* in this study are compatible with the typology of performance measures developed by Van der Stede et al. (2006). Because of this measurement, the financial performance effects of *SPE* might contain noise caused by *DIVERSITY*. Hence, *DIVERSITY* should be controlled. In this study, *DIVERSITY* is measured by eight items. These eight items are measured on Likert scales of 1–7, where 1 indicates “emphasis not at all” and 7 indicates “emphasis extremely.” One item that measures the importance of profit measures is eliminated because of the ceiling effect. The variable is operationalized by a simple average of seven items, following related studies (Ittner et al., 2003; Van der Stede et al., 2006). Cronbach’s alpha for this construct is 0.80, which is satisfactory.

The descriptive statistics of the questionnaire items and results of principle component analysis are presented in Appendix B.

4 Results

4.1 Descriptive statistics and variable correlation

Table 1 shows descriptive statistics and variable correlation. Panel B of Table 1 indicates that subjective performance evaluation and budget rigidity is positively correlated ($r= 0.117$, $p= 0.064$). This result suggests that the relationship between subjective performance evaluation and budget rigidity is not substitutional but also complementary, as Libby and Lindsay (2010) suggest. Furthermore, correlation between subjective performance evaluation and financial performance (ROA and sales growth rate) is statistically significant ($p> 0.10$). In addition, this result reflects that it is difficult to find a simple linear relationship between subjective performance evaluation and financial performance, as Govindarajan (1984) empirically shows.

Table 1

Descriptive statistics and variable correlation

Panel A: Descriptive statistics

	Mean	S.D.	Min	Max
1 <i>SPE</i>	4.38	.95	1.00	7.00
2 <i>EU</i>	4.14	.76	2.00	6.17
3 <i>BR</i>	4.93	.85	2.00	7.00
4 <i>INDROA</i>	5.12	1.73	.13	9.96
5 <i>INDSGR</i>	13.10	6.27	-25.52	31.87
6 <i>SIZE</i>	11.91	1.66	8.30	17.45
7 <i>DIVERSITY</i>	4.80	.85	2.57	7.00
8 <i>ROA</i>	4.38	4.43	-3.08	37.02
9 <i>Sales Growth Rate</i>	13.97	20.64	-29.60	170.40

Panel B: Variable correlation

	1	2	3	4	5	6	7	8	9
1 <i>SPE</i>	1								
2 <i>EU</i>	-.137*	1							
3 <i>BR</i>	.117 †	-.058	1						
4 <i>INDROA</i>	.169*	-.020	.015	1					
5 <i>INDSGR</i>	.059	-.105 †	-.026	.347***	1				
6 <i>SIZE</i>	-.071	-.077	-.007	-.493***	-.086	1			
7 <i>DIVERSITY</i>	.189**	-.131*	.388***	.073	.066	.052	1		
8 <i>ROA</i>	.117 †	.179**	-.065	.382***	.101	-.409***	.011	1	
9 <i>Sales Growth Rate</i>	.079	.090	-.165**	.090	.082	-.119 †	-.056	.543***	1

†, *, **, and *** denote significance at the 10%, 5%, 1% and 0.1% levels, respectively (two-tailed).

Variable Definitions:

SPE= Subjective Performance Evaluation, *EU*= Environmental Uncertainty, *BR*= Budget Rigidity, *INDROA*= Industry ROA, *INDSGR*= Industry Sales Growth Rate, *SIZE*= Organizational Size, *DIVERSITY*= Performance Measure Diversity

4.2 Main analysis

In order to test the hypothesis, the following regression formula is estimated.

$$FINANCIAL\ PERFORMANCE = \alpha + \beta_1 SPE + \beta_2 EU + \beta_3 BR + \beta_4 SPE*EU + \beta_5 SPE*BR + \beta_6 EU*BR + \beta_7 SPE*EU*BR + \Sigma Controls + \varepsilon$$

Specifically, three models are used to examine the hypothesis. Model 1 contains each main exploratory variable, *SPE*, *EU*, and *BR*. Furthermore, *INDUSTRY*, *SIZE*, and *DIVERSTY* are included as control variables. Two-way and three-way interaction terms are included in Models 2 and 3, respectively. For the hypothesis of the study to be supported, the coefficients of the three-way interaction terms become negative, because this study assumes that high *BR* decreases the positive performance effects of *SPE* in high *EU*. It should be noted that interaction terms might produce a multicollinearity problem. To avoid this problem, all independent variables are centered and interaction terms are formed later.

Table 2 shows the estimation results on ROA and sales growth rate⁸. Initially, no statistically significant relationship can be found between *SPE* and both financial performance (ROA and sales growth rate) ($p > 0.10$, respectively). These results reflect the difficulty of finding a linear relationship between them. Next, for Models 2a and 2b, which include two-way-interaction terms, negative coefficients of *EU*BR* on financial performance are found ($\beta = -0.879$, $p = 0.001$, $\beta = -2.933$, $p = 0.030$, respectively). In addition, the increases of the coefficients of determination from Models 1a and 1b are statistically significant ($\Delta R^2 = 0.048$, $\Delta F = 4.959$, $p = 0.002$, $\Delta R^2 = 0.033$, $\Delta F = 2.935$, $p = 0.034$, respectively). These results reflect incongruence between high *EU* and high *BR*, as primary studies indicate empirically (Merchant, 1990). Furthermore, Model 2b suggests that the negative coefficients of *SPE*BR* are statistically significant ($\beta = -0.436$, $p = 0.046$). By taking into account the positive coefficients of *SPE* in Model 1a, it can be assumed that high *BR* mitigates positive performance effects of *SPE*, as expected. Finally, Models 3a 3b, which contain three-way-interaction terms among *SPE*, *EU*, and *BR*, indicate that their coefficients are statistically significant, with the predicted signs ($\beta = -0.921$, $p = 0.000$, $\beta = -5.314$, $p = 0.000$, respectively). Moreover, an increase of R^2 is significant ($\Delta R^2 = 0.061$, $\Delta F = 22.566$, $p = 0.000$, $\Delta R^2 = 0.094$, $\Delta F = 27.484$, $p = 0.000$, respectively). Hence, it can be said that the combined influences of *SPE*, *EU*, and *BR* on financial performance are prominent, as expected^{9,10}.

⁸ The sample for analysis is 252, but financial performance data on some firms cannot be obtained from the database. Hence, the sample for the actual estimation decreased from 252.

⁹ In order to confirm the robust stability of coefficients of the three-way-interaction term in Models 3a and 3b, a non-parametric bootstrap procedure as the most common

re-sampling method is applied (Wooldridge, 2013). Specifically, this test draws random samples that are the same as the analysis shown in Table 2 from the abovementioned original survey data with 1,000 bootstrap replications (Efron & Tibshirani, 1986) for hypothesis testing and standard error estimation (Efron & Tibshirani, 1993). The results of the bootstrap approach indicate that the negative coefficients of these three-way-interaction terms are statistically significant ($\beta = -0.95$, $p = 0.047$, $\beta = -5.32$, $p = 0.060$, respectively) based on the bootstrap estimates of standard errors ($SE = 0.478$, $SE = 2.829$). The absence of the validation problems of these models is supported because the bootstrapped p -value and bootstrap estimator reflect similar results of Models 3a and 3b in Table 2.

¹⁰ The questionnaire items for *SPE* include evaluation about managerial capability or attitude, which is general in Japan. Because of this item, some criticism might arise that the findings of this study are limited to Japanese firms. To generalize the results of this study for western companies, estimation of the regression formula, which measures *SPE* from the other three items, is implemented. The results indicate no prominent changes for performance effects of the three-way-interaction term in the case of either ROA or sales growth rate ($\beta = -0.899$, $p = 0.000$, $\beta = -4.68$, $p = 0.000$). These results give reasonable evidence that findings are not driven by Japanese unique practices and can apply to western companies.

Table 2
Effects of association between subjective performance evaluation,
environmental uncertainty, and budget rigidity on financial performance

Dependent	ROA			Sales growth rate		
	Model 1a	Model 2a	Model 3a	Model 1b	Model 2b	Model 3b
<i>SPE</i>	.363 (.255)	.297 (.249)	.130 (.242)	2.094 (1.323)	1.916 (1.311)	.960 (1.257)
<i>EU</i>	.786** (.250)	.731** (.245)	.684** (.235)	1.984 (1.314)	1.770 (1.301)	1.535 (1.235)
<i>BR</i>	-.415 (.267)	-.422 (.262)	-.556* (.253)	-3.617* (1.404)	-3.610* (1.394)	-4.384** (1.331)
<i>SPE*EU</i>		-.013 (.205)	-.286 (.204)		1.462 (1.081)	-.100 (1.068)
<i>SPE*BR</i>		-.436* (.217)	-.286 (.210)		-1.558 (1.148)	-.697 (1.101)
<i>EU*BR</i>		-.879*** (.252)	-.778** (.243)		-2.933* (1.342)	-2.392 † (1.277)
<i>SPE*EU*BR</i>			-.921*** (.194)			-5.314*** (1.014)
<i>INDUSTRY</i>	.567*** (.167)	.571*** (.164)	.569*** (.157)	.259 (.211)	.306 (.210)	.349 † (.199)
<i>SIZE</i>	-.757*** (.171)	-.742*** (.168)	-.682*** (.161)	-1.240 (.793)	-1.246 (.788)	-.866 (.751)
<i>DIVERSITY</i>	.237 (.272)	.203 (.269)	.256 (.258)	.097 (1.420)	.013 (1.419)	.283 (1.348)
Intercepts	11.884***	11.683***	10.881***	25.347*	25.046*	19.412*
N		251			248	
R ²	.248	.292	.353	.063	.097	.191
Adj. R ²	.230	.266	.326	.040	.063	.157
ΔF		4.959**	22.566***		2.935*	27.484***

†, *, **, and *** denote significance at the 10%, 5%, 1%, and 0.1% levels, respectively (two-tailed). Estimated with ordinary least squares. Unstandardized coefficients are reported and standard errors are in parentheses. VIF (variance inflation factor) is less than 1.3.

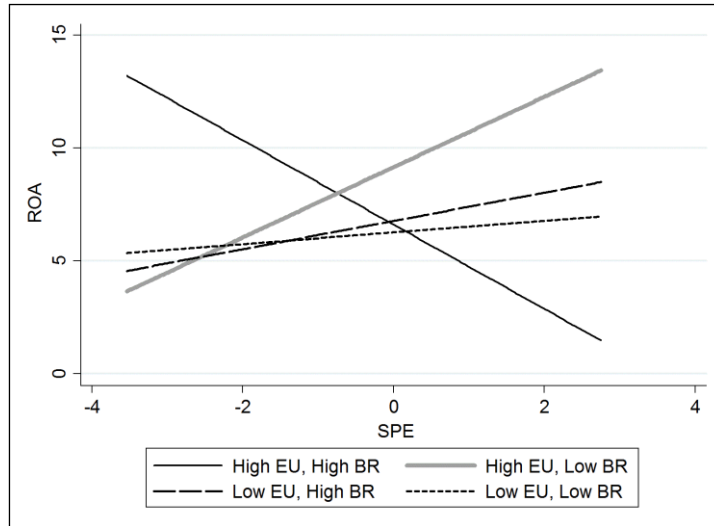
In order to understand the content of interaction, ad hoc analysis is implemented. Following Aiken and West (1991), the regression line on financial performance when

EU and *BR* take $\pm 1SD$, respectively, is estimated by using simple slope analysis. Figure 2 shows the estimation results of four patterns of *SPE*'s regression line on financial performance. The results indicate that *SPE* enhances financial performance when *EU* takes high and *BR* takes low ($\beta = 1.56, p = 0.000, \beta = 8.33, p = 0.000$, respectively). In addition, the results show that *SPE* decreases financial performance when both *EU* and *BR* are high ($\beta = -1.87, p = 0.000, \beta = -6.52, p = 0.012$, respectively). These results indicate that congruence among high *SPE*, high *EU*, and low *BR* is associated with higher financial performance. Hence, the hypothesis of this study is supported.

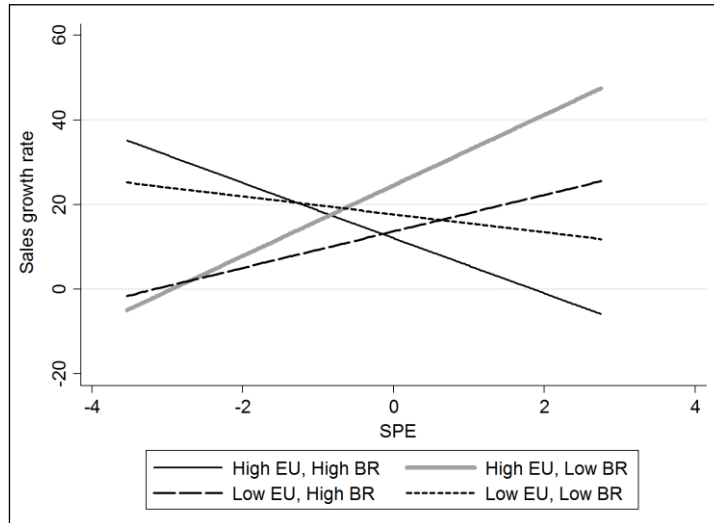
Figure 2

Effects of interaction between subjective performance evaluation, environmental uncertainty, and budget rigidity on financial performance

Panel A: ROA as a dependent variable



Panel B: Sales growth rate as a dependent variable



4.3 Supplementary analysis

Some economic-based studies investigate the relationship between subjective performance evaluation and performance measure diversity. Based on the

informativeness principle (Holmstrom, 1979), subjective performance evaluation improves incentive contracts when it brings additional information about managerial behavior (Baker, Gibbons, & Murphy, 1994). Similarly, using multiple performance measures is effective for the same reason (Feltham & Xie, 1994; Hemmer, 1996). Regarding the relationship between both approaches, Hoppe and Moers (2011) find that discretionary bonus allocation is used more in contracts based solely on financial measures than in contracts that also include non-financial measures for risk-reduction purposes. The authors interpret their results as follows: the use of multiple performance measures is effective for risk reduction, but this effectiveness lowers the necessity of using subjectivity in performance evaluation. Their results and interpretations suggest a substitutional relationship between both approaches, but empirical evidence about the performance effects of their substitutional relationship is not enough. Hence, it is unclear that substitutional use is rational for performance improvement.

In this study, supplementary analysis is implemented to examine whether the performance effects of the three-way-interaction term vary by the degree of *DIVERSITY*. Specifically, samples are divided by three groups in response to the score of *DIVERSITY* and the regression formula is estimated for each group¹¹. Three groups are divided at the score of *DIVERSITY* at below 25 percent, from 25 percent to 75 percent, and above 75 percent respectively¹².

Tables 3 and 4 show the estimation results on financial performance for each group. The results indicate that the regression line is not statistically significant for medium and high degrees of *DIVERSITY* groups ($p > 0.10$). On the contrary, negative coefficients of the three-way interaction term are statistically significant for the low *DIVERSITY* group ($\beta = -1.42$, $p = 0.000$, $\beta = -5.87$, $p = 0.002$, respectively).

¹¹ *DIVERSITY* is removed from the regression formula because this variable is used as a grouping variable.

¹² The Score position of 25 percent is 4.2857 and that of 75 percent is 5.4286.

Table 3
Effects of association between subjective performance evaluation, environmental uncertainty,
and budget rigidity on ROA for each diversity group

DIVERSITY	Low			Medium			High		
	Model 1a	Model 2a	Model 3a	Model 1b	Model 2b	Model 3b	Model 1c	Model 2c	Model 3c
<i>SPE</i>	.639 (.633)	-.307 (.635)	-.260 (.561)	.003 (.348)	.021 (.356)	.018 (.356)	.310 (.408)	.280 (.619)	.265 (.632)
<i>EU</i>	1.780** (.615)	.800 (.632)	-.131 (.607)	.793* (.335)	.794* (.338)	.915* (.355)	-.243 (.396)	.014 (.519)	.031 (.533)
<i>BR</i>	-.689 (.618)	-.805 (.576)	-.953 † (.511)	.235 (.365)	.224 (.370)	.128 (.379)	-1.457** (.471)	-1.384** (.487)	-1.351* (.531)
<i>SPE*EU</i>		.610 (.507)	-.711 (.561)		-.415 (.318)	-.528 (.333)		-.455 (.370)	-.501 (.466)
<i>SPE*BR</i>		-.993 † (.521)	-.551 (.474)		.009 (.322)	.047 (.324)		-.198 (.540)	-.169 (.572)
<i>EU*BR</i>		-1.360* (.537)	-1.318** (.474)		.299 (.500)	.180 (.511)		-.244 (.519)	-.225 (.536)
<i>SPE*EU*BR</i>			-1.417*** (.362)			-.488 (.440)			.105 (.632)
<i>INDUSTRY</i>	.314 (.475)	.415 (.421)	.168 (.377)	.683** (.219)	.682** (.220)	.691** (.220)	.520 † (.264)	.560* (.271)	.557* (.274)
<i>SIZE</i>	-1.049* (.449)	-.741 † (.405)	-.760* (.358)	-.704** (.242)	-.654** (.247)	-.642* (.247)	-.732* (.257)	-.672* (.267)	-.670* (.270)
Intercepts	16.219*	11.789 †	12.872*	10.545**	9.922**	9.734**	12.691**	11.626**	11.614**
N		60			135			56	
R ²	.341	.515	.629	.249	.259	.267	.344	.366	.367
Adj. R ²	.280	.438	.562	.220	.212	.214	.278	.259	.243
ΔF		6.068	15.350		.580	1.232		.561	.028

†, *, **, and *** denote significance at the 10%, 5%, 1%, and 0.1% levels, respectively (two-tailed).

Estimated with ordinary least squares. Unstandardized coefficients are reported and standard errors are in parentheses.

VIF is less than 2.6.

Table 4

Effects of association between subjective performance evaluation, environmental uncertainty, and budget rigidity on sales growth rate for low diversity group

DIVERSITY	Low		
	Model 4	Model 5	Model 6
<i>SPE</i>	4.273 (3.310)	-1.288 (3.136)	-1.197 (2.882)
<i>EU</i>	8.072* (3.248)	4.336 (3.152)	.473 (3.138)
<i>BR</i>	-4.610 (3.257)	-5.039 † (2.904)	-5.596* (2.674)
<i>SPE*EU</i>		5.940* (2.529)	.581 (2.865)
<i>SPE*BR</i>		-6.750* (2.590)	-4.885 † (2.450)
<i>EU*BR</i>		-4.497* (2.671)	-4.292 † (2.455)
<i>SPE*EU*BR</i>			-5.873** (1.837)
<i>INDUSTRY</i>	-.020 (.505)	.196 (.429)	.286 (.395)
<i>SIZE</i>	-.482 (1.783)	1.107 (1.553)	1.680 (1.438)
Intercepts	20.202	-2.502	-12.181
N		59	
R ²	.165	.443	.539
Adj. R ²	.086	.354	.455
ΔF		8.333***	10.220**

†, *, **, and *** denote significance at the 10%, 5%, 1%, and 0.1% levels, respectively (two-tailed). Estimated with ordinary least squares. Unstandardized coefficients are reported and standard errors are in parentheses. VIF is less than 2.4. Results for medium and high degree of *DIVERSITY* groups are not shown because regression lines for both groups are not statistically significant ($p > 0.10$).

Simple slope analysis on financial performance for the low *DIVERSITY* group is implemented when *EU* and *BR* take $\pm 1SD$, respectively. Figure 3 shows the results,

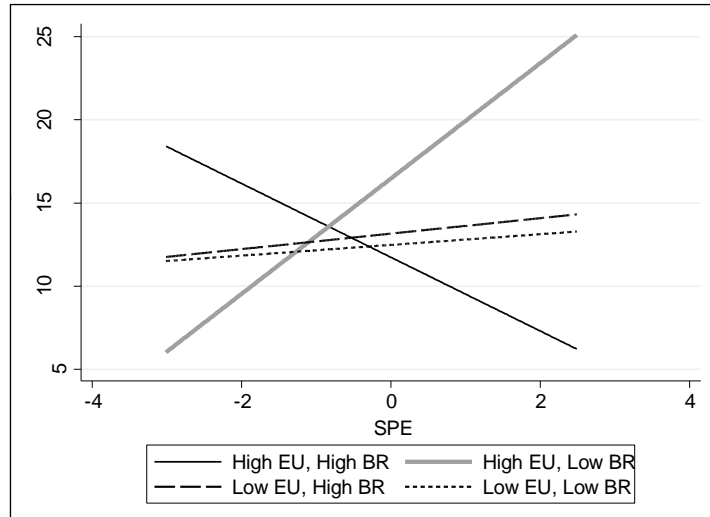
which indicate that *SPE* enhances financial performance when *EU* is high and *BR* is low ($\beta= 3.47, p= 0.000, \beta= 14.99, p= 0.001$, respectively). These results are consistent with those for the full sample analysis. Furthermore, R^2 of Models 3a and 4 is higher than for the full sample analysis ($R^2= .651, .539$, respectively). This result suggests that the exploratory power of changes of financial performance is higher than for the full sample analysis. Hence, it can be said that *SPE* enhances financial performance when *EU* is high, *BR* is low, and *DIVERSITY* is low¹³.

¹³ In order to confirm the robustness of these results, estimation not only for three groups but also for two groups is implemented. Two groups are divided at the mean score 4.7143. The results indicate that there are no prominent changes for performance effects of the three-way-interaction term for either ROA or sales growth rate ($\beta= -1.23, p= 0.000, \beta= -5.75, p= 0.001$, respectively). Furthermore, simple slope analysis shows consistent results for the results of the three groups ($\beta= 2.37, p= 0.001, \beta= 8.71, p= 0.006$, respectively). Hence, the results of the supplementary analysis are not caused by grouping standards.

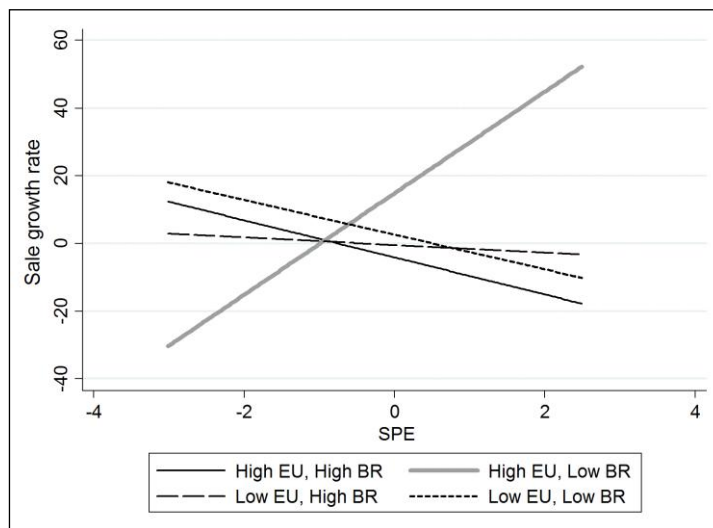
Figure 3

Effects of interaction between subjective performance evaluation, environmental uncertainty, and budget rigidity on financial performance when performance measure diversity is low

Panel A: ROA as a dependent variable



Panel B: Sales growth rate as a dependent variable



5 Conclusion

This study investigates the combined effects of subjective performance evaluation, environmental uncertainty, and budget rigidity on financial performance. The results based on a survey and archival data are consistent with expectations. In other words, subjective performance evaluation enhances financial performance (both ROA and sales growth rate) as environmental uncertainty increases and budget rigidity decreases. Furthermore, ad hoc analysis indicates that positive performance effects of subjective performance evaluation become prominent when performance measure diversity is low.

This study contributes to the growing body of related literature. First, this study finds specific conditions in which subjective performance evaluation enhances organizational performance. Previous research shows that contextual factors, such as environmental uncertainty, business unit strategy, and trust, determine the effectiveness of subjective performance evaluation on organizational performance (Gibbs et al., 2004; Govindarajan, 1984; Govindarajan & Gupta, 1985). This study finds that the effectiveness of subjective performance evaluation is determined not only by congruence with environmental uncertainty, but also by congruence with budget rigidity, which is not considered sufficiently by prior studies. In addition, supplementary analysis suggests that the performance effects of subjective performance evaluation under specific conditions become prominent when performance measure diversity is low. Prior studies suggest there is a substitutional relationship between subjective performance evaluation and performance measure diversity (Hoppe & Moers, 2011; Luft et al., 2016). However, this study extends the line of research by revealing the effectiveness of the relationship by clarifying its performance effects.

Second, this study finds effects of subjective performance evaluation on financial performance. One subject of performance evaluation literature is whether outstanding performance evaluation theoretically enhances financial performance (Franco-Santos et al., 2012; Ittner et al., 2003). Although some literature examines the effects of performance measure diversity or alignment between business strategy and performance measures on financial performance (Davis & Albright, 2004; Ittner et al., 2003), few studies examine the effects of subjective performance evaluation. The results of this study contribute to this stream of literature by clarifying the financial performance effects in certain situations.

Finally, the results of this study suggest the importance of empirically dividing the two notions of performance evaluation style and budget rigidity. Research on RAPM uses two terms, performance evaluation styles (objective, subjective, and both) and budget rigidity, without clear distinction (Govindarajan, 1984; Hartmann, 2000).

Some studies determine the cause of inconsistency of empirical results or theory–practice gaps on undisposed notions (Hansen et al., 2003; Libby & Lindsay, 2010; Otley & Fakiolas, 2000). Against these problems that RAPM research embraces, the results of this study in which two overlapping notions are clearly divided show that financial performance effects vary depending on the combination of subjective performance evaluation and budget rigidity in highly uncertain environments. It is important to indicate the necessity of dividing the two overlapping notions by empirical results because prior studies continue to suggest this theoretically.

The present study has some limitations. First, the performance effects of combining objective and subjective performance evaluation could not be considered in the analysis. It can be assumed that performance evaluation based on both formal rules and subjectivity of the evaluator’s perception exists in practice (Govindarajan, 1984; Hopwood, 1972). The current study cannot clarify the optimal level of objectivity and subjectivity in performance evaluation.

The second limitation relates to the problems of variable measurement of subjective performance evaluation and budget rigidity. It cannot be stated that the survey constructs of these notions are established. Furthermore, the measures of budget rigidity are diverse because there is no consensus about the definition of budget rigidity. For this study, the statistical reliability of subjective performance evaluation cannot be stated highly enough. Although the reliability of budget rigidity is sufficient, there are some measurement errors, because of lack of consensus about its definition.

The third limitation is noise that financial performance effects contain. This study measures financial performance as an aggregated variable at firm level, whereas variables that use questionnaire items are measured as a core business unit. These differences bring noise in financial performance effects (Van der Stede, Young, & Chen, 2005). Hence, it is appropriate to measure financial performance at business unit level, not at firm level, in order to explain the performance effects of subjective performance evaluation accurately,

The results of this study provide several avenues for future research. The first is to examine the effects of the combination of subjective performance evaluation and budget rigidity on organizational processes. Merchant (1990) cannot find mitigating effects of the considerations of superiors that contain subjectivity on the manipulation of performance measures caused by high pressure of budgetary targets. In addition, the results of this study indicate that performance effects vary depending on the combination of subjective performance evaluation and budget rigidity. These results provide the possibility that effects on organizational processes might vary in response to combinations of subjective performance evaluation and budget rigidity. Specifically,

it is important to examine managerial short-termism or manipulation of performance measures as dependent variables.

Furthermore, additional research is needed to examine the relationship between subjective performance evaluation and performance measure diversity. The results of this study indicate that the performance effects of subjective performance evaluation under specific conditions become prominent when performance measure diversity is low. Some studies indicate similar results (Hoppe & Moers, 2011; Luft et al., 2016), although the reason for the results is not revealed sufficiently and future research is required.

Finally, future research should examine the effects of subjective performance evaluation on future organizational performance. Gibbs et al. (2004) find that subjectivity in performance evaluation is positively associated with the extent of long-term investments, such as training costs for employees. Furthermore, the results of this study show that subjective performance evaluation enhances the sales growth rate over multiple years in certain situations. Based on these results, it can be presumed that subjective performance evaluation enhances future performance by increasing investments for building organizational capabilities. Hence, future research should examine the performance effects of subjective performance evaluation not only on short-term financial performance but also on long-term financial and non-financial performance.

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APPENDIX A

Sample by Industries and Employees

Panel A: Sample by Industries (%)			
Food	2.4	Fishery, Agriculture and Forestry	0.4
Textile Mill	3.6	Construction	6.0
Pulp and Paper	0.4	Electric Power and Gas	0.4
Chemical	8.7	Land Transportation	4.4
Drugs and Medicines	2.0	Marine Transportation	.4
Oil and Coal	0.8	Warehousing and Harbor Transportation	2.0
Rubber	2.0	Information Communication	6.0
Glass and Clay	2.0	Wholesale Trade	9.9
Steel	1.2	Retail Trade	11.9
Non-Ferrous and Fabricated Metal	1.6	Banks	4.8
Fabricated Metal	2.0	Securities and Commodities Futures	.4
Machinery	4.8	Securities and Commodities Futures	.4
Electrical and Electronics	8.3	Other Financing Business	1.2
Transportation Equipment	3.6	Real Estate	1.2
Precision Equipment	2.4	Services	5.2
Other Manufacturing	1.2		
Panel B: Sample by Employees (%)			
Less than 1,000	23.9%		
1,000-2,499	25.9%		
2,500-4,999	19.5%		
5,000-9,999	13.2%		
More than 10,000	17.5%		

APPENDIX B

Descriptive Statistics of Questionnaire Items and Results of Principal Component Analysis

	Mean	S. D.	Min	Max	First-order loading	Second-order loading
<i>Subjective Performance Evaluation</i>						
Evaluate quantitative nonfinancial targets subjectively on the basis of change of conditions or explanation by manager	4.02	1.32	1	7	.827	
Evaluate budget target subjectively on the basis of change of conditions or explanation by manager	3.88	1.40	1	7	.708	
Evaluate manager's abilities and attitudes excepting objective performance	4.80	1.33	1	7	.678	
Evaluate qualitative nonfinancial targets subjectively	4.79	1.29	1	7	.634	
Cronbach's Alpha					0.68	
<i>Environmental Uncertainty</i>						
Diffusion of proprietary knowledge	3.56	.90	2	7	.750	-.227
Production, service, and information technologies	3.84	.99	2	7	.729	-.315
Suppliers' actions	3.90	.95	2	6	.720	.193
Customer demands, tastes and preferences	4.03	1.03	2	7	.719	-.343
Emergence of new competitors	4.37	1.30	1	7	.704	-.021
Market activities of competitors	4.13	1.02	2	7	.682	-.194
Industrial relations	3.21	1.03	1	6	.502	.642
Government regulation and policies	4.18	1.09	2	7	.519	.641
Cronbach's Alpha					0.82	
<i>Budget Rigidity</i>						
Not achieving my budget has a strong impact on manager's performance evaluation	4.74	1.17	2	7	.842	
Promotion prospects depend heavily on ability to meet the budget	4.44	1.17	1	7	.804	
Achieving the budget is an accurate reflection	4.74	1.09	2	7	.751	

of whether managers are succeeding in business

Performance of business unit's managers are judged predominantly on the basis of attaining budgetary targets	5.46	1.16	1	7	.708
Control over business unit is achieved by monitoring how well budget is on target	5.29	1.09	2	7	.699
Not achieving the budget reflects poor performance	4.89	1.18	1	7	.650
Business unit's managers constantly are constantly conscious of meeting budgetary targets	6.21	1.04	2	7	—

Cronbach's Alpha 0.84

Performance Measure Diversity

Sales	5.54	1.28	2	7
Profits	6.22	.88	3	7
Operating cash flow	4.33	1.51	1	7
Rate of profits	5.56	1.15	2	7
Customer relevant	4.66	1.28	1	7
Internal-process relevant	4.72	1.24	1	7
Human development	4.54	1.21	1	7
Brand	4.27	1.25	1	7

Cronbach's Alpha 0.80
