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JFMRA

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JFMRA

Japan Federation of Management Related Academies

Greetings to Our Readers on the Sixth Issue of the Journal of Japanese Management

The Journal of Japanese Management is an official publication of the Japan Federation of Management Related Academies (JFMRA). I am very pleased with the sixth electronic publication (Vol. 3, No. 2) of this scholarly journal of JFMRA. Through this journal, we aim to contribute to international academic progress through advanced studies in wide-ranging research fields related to management, management information, commerce, and accounting. JFMRA was originally established through the affiliation of 57 academic societies in the fields of management, accounting, and commerce on November 23, 2006.

I was appointed as the chief director of JFMRA on April 1, 2018. We gradually plan to change the composition of the editorial board to include some internationally renowned and/or active researchers in the aforementioned fields to ensure that this journal is suitable for an international audience.

To date, economic inequality, global environmental issues, the aging and depopulating of societies, accelerated development of new and emerging markets, or innovations like the Internet of things (IoT), artificial intelligence (AI), open innovation, and linkages that foster innovation have changed our lives and generated numerous research themes for our researchers. Accordingly, a wider ranging interdisciplinary approach that calls for cooperation beyond the existing academic framework of an individualistic society is needed. Therein lies the significance of JFMRA.

JFMRA has been focused on the following: (1) the development of research and spread of knowledge in fields related to management, management information, accounting, and commerce; (2) research and contributions to society through education related to management; (3) exchanges between various academies and researchers associated with management; (4) cooperation with researchers overseas related to management; and (5) cooperation with the Science Council of Japan and academic research communities working closely with it. JFMRA also organizes public lectures twice each year, an occasional meeting for the exchange of ideas among members of the affiliations, as well as an annual symposium. I rejoice at the release of the sixth issue, and would like to thank the members of the *Journal of Japanese Management* (JJM) editorial board, especially Professor Fangqi Xu, the vice-president of JFMRA, and Professor Yukio Takagaki, the chair of the editorial board. I am sure that this journal is beyond the expected levels of many academic researchers at home and abroad, and I am confident that it will stimulate the readers intellectually.

Dr. Yoshihiro Tokuga
President, Japan Federation of Management Related Academies
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Preface

I am very pleased to announce on the sixth electronic publication (Vol. 3, No. 2) of the *Journal of Japanese Management* (JJM), which is an official publication of the Japan Federation of Management Related Academies (JFMRA).

Though many academic associations exist in Japan, few appear to be active in disseminating Japanese knowledge abroad, particularly in the social sciences. It is incumbent on us to continue to conduct research on Japanese managerial practices that emphasize sound business management and disseminate relevant strategies to the world.

Needless to say, even if individual academic associations were interested in actively doing so, limited resources make it difficult to accomplish such a task. Fortunately, many academic associations representing management, commerce, accounting, and management information are participating in the Japan Federation of Management Related Academics (JFMRA). One of the main means of knowledge dissemination is the publication of an academic journal in English. In today's highly networked society—thanks to the Internet—, there is no doubt that electronic journals should be the most appropriate media accessible to anyone at anytime, anywhere in the world.

There are three categories of JJM papers; (1) paper of regular and/or equivalent members (such as postgraduate members, etc.) of the some affiliated academic associations of JFMRA; (2) selected paper from the international conference hosted by or sponsored by JFMRA.; (3) English translation of best paper from dissertation. For further detail, please refer to our web site < http://www.jfmra.org/jjm/>.

As the representative of the editorial board, I would like to acknowledge our appreciation to those academic associations that participated in this effort; additionally, we are grateful to the manuscript contributors and reviewers for their cooperation. We continue to work hard for the further development of JJM.

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The OCB Inducement Process: Mediating Effect of Work Values Sharing

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Abstract

Organizational citizenship behavior (OCB) is one of the most intensely investigated research topics in organizational behavior (OB). Compared to research focusing on the antecedents of OCB, there are far fewer studies that theoretically consider or empirically examine the relationship between OCB and its subsequent effects. This study aims to focus on the mediating effect of work values sharing on the relationship between supervisor's OCB and subordinate's OCB in a given organization. Shared work values comprise the foundation of this study in which employees perform their jobs smoothly without prior promises or explicit communication on how other employees behave at work. A supervisor's OCB can become a language with which he or she communicates his or her work values to subordinates, and these subordinates are encouraged to exhibit their own OCB. By analyzing the data collected from 2,000 Japanese employees, this study empirically examines the effect of supervisors' OCB-I (OCB for individuals) on subordinates' OCB-I and OCB-O (OCB for the organization), which is partially mediated by work values sharing.

Keywords: OCB (organizational citizenship behavior), OCB-I (OCB for individuals), OCB-O (OCB for the organization), work values

(1) Introduction

Organizational citizenship behavior (OCB) has received a significant amount of attention from researchers in organizational behavior (OB) around the world since Dennis W. Organ and his co-researchers proposed the groundbreaking idea that a worker's job satisfaction has a greater impact on his or her discretionary contributive behaviors to the organization (that is, OCB) than his or her formal role behaviors (Bateman & Organ, 1983; Smith, Organ, & Near, 1983). Research on OCB was first conducted by Western researchers using Western samples in the 1980s and early 1990s; OCB has also been focused on and empirically examined by researchers in Asia and other countries since the late 1990s (Farh, Early, & Lin, 1997; Ueda, 2009).

Although a large number of studies have focused on OCB thus far, they can essentially be classified into three groups according to their research objectives (Organ et al., 2006; Ueda, 2004, 2016). The first group addresses

the concept or dimensions of OCB. They aim to deepen discussions on the concept and dimensions of OCB. The second group includes research that aims to determine the antecedents of OCB. This group is further divided into several subgroups focusing on the individual, task, group, and organizational antecedents. Finally, there is a group of studies that address the effect of OCB on individual or organizational factors.

Among these three categories, the concept or dimension of OCB was primarily discussed in the 1980s and 1990s. A large portion of OCB research has focused on the individual or organizational antecedents of OCB and conducted empirical studies to determine the significant impact of these antecedents on various dimensions of OCB (Organ et al., 2006; Ueda, 2004, 2016). In contrast, how an employee's OCB impacts other employees or the organization has received far less attention from researchers.

Generally, compared to the causal relationship between antecedents and OCB, it is much more difficult to empirically examine the relationship between OCB and its subsequent effects. One of the reasons for this is related to the concept of OCB itself. Among several definitions of OCB, every OCB researcher recognizes that the following definition by Organ (1988) is most often cited: "(OCB is) individual behavior that is discretionary, not directly or explicitly recognized by the formal system, and that in the aggregate promotes the effective functioning of the organization" (Organ, 1988, p.4). From this definition, OCB consists of small behaviors by many employees, and each

of these behaviors has little impact on other employees or the organization. Only after these small behaviors have accumulated over a long period of time can an explicit effect on the organization be revealed.

Second, the characteristics of OCB also tend to inhibit researchers' investigation on the impact of OCB on the organization. Some typical behaviors of OCB, such as "help[ing] others," "punctuality," and "does not take extra breaks," (Smith et al., 1983) are inherently good and necessary for the organization. One also tends to develop some illusions about the positive effects of these behaviors on the organization that one does not have to consider because they seem to be clear. However, it is not sufficient to easily conclude that these behaviors are good for the organization, as will be discussed later.

As a nod to this trend in OCB research, this study aims to focus on how OCB impacts others and the OCBs of others and proposes a new framework that can be used to understand the causal process between the first OCB to subsequent OCBs or from one employee's OCB to another's OCB. An empirical study was conducted to confirm the validity of our framework. The next section classifies past research, focusing on the effect of OCB on consequent effects. The third section considers the important role of work values sharing as a mediator between OCBs. Following our proposed hypotheses, the fifth and sixth sections address the study's empirical method and results. The discussion and conclusion are delineated in the final two sections.

(2) Classification of Research on the Effects of OCB

As described above, there are far fewer studies that address the effects of OCB on individual or organizational factors than those focusing on the antecedents of OCB. Despite the limited number of studies, this type of research can be further classified into the following three categories: (1) research regarding OCB's effects on personnel evaluation of an OCB performer by his or her supervisor, (2) research focusing on OCB's effects on the psychological outcomes or productivity of an OCB performer, and (3) research investigating OCB's effects on the outcomes or productivity of the group or the organization that an OCB performer belongs to.

Researchers in the first category have attempted to empirically determine whether managers comprehensively consider not only task performance but also the OCB of subordinates when conducting evaluations (MacKenzie, Podsakoff, & Fetter, 1991, 1993). For example, MacKenzie et al. (1993) empirically examined the relative impact of the rated performance of various OCBs and objective sales productivity on sales managers' performance evaluations of their salespersons. Morrison (1994) also empirically indicated that a supervisor and his or her subordinates differed in whether they regarded subordinates' various behaviors as in-role or extra-role, and how broadly they considered subordinates' job responsibilities. Lam, Hui, and Low (1999) also found that supervisors had broader definitions of job roles than did their subordinates.

Although these findings have important implications for researchers, it cannot be said that this research examines the effects of OCB. These researchers merely measure how widely managers consider their subordinates' "obligatory" job roles to be. Even if researchers found that subordinates' OCB positively influences their supervisors' evaluation of them, they did not find the effect of OCB on supervisors' perceptions, but rather supervisors' implicit tendencies to consider a wider range of subordinate behavior, including OCB, for their evaluations. This is because they know these behaviors are not only effective but also necessary for the functioning of the organization.

The research in the second category focuses on the effect of OCB on performers. These studies vary depending on the type of effect they focus on, such as OCB effects on worker productivity (Bergeron, Ostroff, Schroeder, & Block, 2014), stress (Bolino, Turnley, Gilstrap, & Suazo, 2010), and intention to leave the organization (Bolino et al., 2010; Paille, Bourdeau, & Galois, 2010; Paille & Grima, 2011).

For example, Bergeron et al. (2014) focused on the effect of two types of academic members' OCB on their performance. Typically, academic members belong not only to the employing organization but also to a professional organization, and their OCB is classified into internal OCB, which directly contributes to the employing organization, and external professional OCB, which is directly related to a professional organization, such as an academic society. They empirically revealed that internal OCB had a negative impact on individuals' productivity and career

outcomes, while external professional OCB had a positive influence.

Bolino et al. (2010) paid attention to the fact that employees often feel pressured to perform OCBs as "good soldiers" in the organization because they know OCBs are often informally encouraged and rewarded. They named this type of pressure "citizenship pressure," and empirically found that citizenship pressure and actual OCB were significantly correlated with job stress, work-family conflict, work-leisure conflict, and the intention to quit. Paille et al. (2010) also indicated that OCB-O (OCB for the organization) had a negative impact on the intention to leave.

Compared to research in the first category, these studies have addressed some of the effects of OCB on individual consequent factors. However, among these findings, the diminishing impact on productivity or increasing impact on stress might not be the only effects attributable to the outcomes of OCB. They might commonly occur in any situation in which employees have to engage in behaviors that go beyond what they consider to be a part of their formal jobs.

In this context, Bergeron (2007) proposed the resource allocation model. According to his idea, for any employees, "(w)ithin a specified time interval (e.g., a day, week, or year), individuals make certain resource allocation decisions as to where to spend their time" (Bergeron, 2007, p.1083). He further notes that "individuals must make choices as to how much time to allocate to task performance versus OCB" (Bergeron, 2007, p.1084).

However, this tradeoff relationship holds for any two separate (independent) activities that are conducted during working hours. Therefore, they should have revealed that this effect comes not from extra role behaviors in general, but from extra *contributive* behaviors to the organization.

The final category is related to research that aims to empirically determine whether OCB contributes to some concrete measures of organizational performance or effectiveness (Dunlop & Lee, 2004; Ehrhart, Bliese, & Thomas, 2009; Koh, Steers, & Terborg, 1995; Podsakoff & MacKenzie, 1994; Podsakoff, Ahearne, & MacKenzie, 1997).

For example, Podsakoff and MacKenzie (1994) aggregated the OCBs of 839 sales agents in 116 sales units in a major insurance company in order to compile unit-level OCB, and examined the impact of these unit-level OCBs on agency performance. They found that civic virtues and sportsmanship positively affected unit performance, but helping behavior negatively impacted unit performance. Podsakoff et al. (1997) examined the effect of the aggregated work crew members' OCBs on quantity and quality measures of work crew performance. They found that helping behavior and sportsmanship had a positive impact on performance, while civic virtues had no effect on either performance measure. Further, while Koh et al. (1995) found a positive effect of helping behavior on school performance in schools in Singapore, Dunlop and Lee (2004) did not find a significant effect of helping behavior, civic virtues, and sportsmanship on several performance measures, such as counter service time and unexplained food figures at fast food restaurants.

As described before, because each employee's OCBs are usually too small and subtle to influence the whole organization, it is not meaningful to relate one individual's OCB to the effectiveness of the organization unless it is ensured that this individual, such as a CEO, has sufficient power to drive the organization. Many employees' OCBs should be aggregated and related to the organizational variable, assuming that the organization is composed of this employee type. Then, if it is empirically revealed that those aggregated OCBs have a positive impact on organizational performance or some measures of organizational effectiveness, this empirical result is not only convincing but also complies with Organ's (1988) original definition of OCB.

However, even if this relationship is statistically evident, it is not clear how or through what processes actual OCB can enhance organizational performance. For example, every researcher recognizes that "helping" is a typical OCB. How can a good employee's assistance to a bad employee eventually enhance organizational performance?

One might consider that if the performance of a bad employee is improved through the help of a good employee, the performance of the whole organization should necessarily also be enhanced. However, only focusing on the improvement of the performance of a bad employee is too simplistic. In many cases, helping a bad employee is a significant undertaking. In particular, when he or she is slow in comprehending how the work should be done, a good employee has to expend significant time and energy in order to help a

bad employee understand and master the work. It can also make a good employee experience significant additional stress.

Thus, helping a bad employee often utilizes a good employee's time and energy, which is important to the organization. When we consider that helping contributes to organizational performance, we have to implicitly assume that, through this type of helping and helping process, a bad employee's increased productivity is worth more than a good employee's decreased productivity. However, a good employee is often the most efficient employee, and a bad employee often does his or her job less efficiently. Thus, organizational performance could worsen if helping means that the time and energy of an efficient employee is sacrificed for the sake of a less efficient employee.

We have to move beyond an over-simplified argument that the helped employee will contribute significantly to the organization and need to develop a more persuasive logical foundation regarding what happens to other employees and the organization when OCB is performed.

(3) The Role of Work Values Sharing
1. Reciprocal Relationship between Helping and Helped Persons

While OCB researchers have considered that helping is one of the most basic dimensions of OCB, it is rare that they address how a person considers the help or behaves after they are helped. However, helping is not a special behavior performed only in the organization but a common behavior frequently performed in a variety of spaces. Thus, researchers outside of the field

of organizational behavior have also paid attention to this behavior. In particular, researchers in social psychology have addressed the problem regarding interpersonal relationships between helping and helped persons (reviewed by Ito, 2012; Mizuno & Ishikuma, 1999; Nishikawa & Takagi, 1986).

In most cases, they focus on a reciprocal relationship between two focal persons. A person tends to be more likely to help a person who previously helped him or her. This focus is different from OCB researchers who address helping behavior in the organization. OCB researchers discuss the situation in which a person helps another person in the same organization regardless of whether this other person had previously helped him or her.

In contrast, some researchers in social psychology also discuss the possibility that helping behavior could have some effect beyond interpersonal relationships between helping and helped persons. For example, Takagi (1997) proposed a model that assumed that a helping person evaluates his or her help not only in terms of how effective it was in solving the problem of a helped person but also from the perspective of how it contributed to his or her personal growth and development. It further assumed that a helped person also considers the value of the help he or she received not only by judging whether the help was useful in solving his or her problem, but also from the perspective of whether the help advanced the growth and development of the helping person. The effect of this type of evaluation can further facilitate both actors' assistance of other persons beyond their interpersonal relationship.

Takagi and Senoo (2006) also considered the possibility that this process spreads beyond this dyadic helping–helped relationship. They empirically confirmed that a helped person was encouraged to help not only the person who once helped him or her but also other persons beyond this dyadic relationship because a helped person expects that helping will contribute to the helping person's growth and development.

In this way, social psychology research on helping behavior has addressed the phenomenon that helping or helped persons recognize the growth or personal transformation that a helping person experiences through helping behavior. However, they have not considered the effect of helping behavior on employees' perception of work situations within the organization. How have OCB researchers considered this point?

2. What is Work Values Sharing?

Although each employee is required to work cooperatively with co-employees in the organization, the employee's behaviors are not in principle completely controlled by other employees. Employees have to communicate with each other about various things regarding their work, including their attitude toward the work and their co-employees.

Different methods of communication are required depending on the organizational situation (Daft & Wiginton, 1979; Daft & MacIntosh, 1981; Daft & Lengel, 1986). While explicit language is appropriate to convey concrete, definitive things, ambiguous language—including subtle motions and postures—is also used and is sometimes more

appropriate for communicating diverse, complicated ideas such as how to work cooperatively in an uncertain situation. Particularly, in organizations in which a limited number of people know each other and are working together for a long time, even if no explicit language is used to communicate between employees, each employee's behavior becomes an important message to other employees who have to coordinate their work in order to cooperate with each other. In other words, each employee knows what to do without exchanging explicit words with other employees.

The core of this implicit language that is communicated through employees' behaviors is the criteria for attitude and positivity toward jobs, supervisors, and co-employees. This is referred to as work values. Here, work values are "more specific than general human values, but are more abstract than both vocational interests and attitudes toward specific work" (Lyons, Higgins, & Duxbury, 2010, p.971), and we refer to "values as the underlying psychological criteria that guide an individual's preferences for certain behaviors and outcomes" (Lyons et al. 2010, p.972).

Even without prior appropriate communication or explanation, employees work in a harmonious way if they share common work values in which each can imagine what others consider and how they perform certain jobs. This type of work values sharing enables employees to work harmoniously in the organization. Work values sharing can more precisely be defined as a type of infrastructure that makes employees expect other employees' behaviors

without explicit communication or promises and allows employees to determine how they should behave at work.

A positive psychological human relationship between employees needs to be established in the organization for each employee to perform his or her job smoothly without worrying about how other employees are performing their jobs. OCB is considered to be one of the typical organizational behaviors that allows a positive atmosphere to be cultivated in which every employee works comfortably even if nothing is previously determined or nothing is explicitly communicated.

Although each OCB is a small, subtle behavior, employees observe other employees' OCBs or, at least, the results of their OCBs. For example, if they often see some employees helping others (helping behavior as OCB-I (OCB for individuals)) (Williams & Anderson, 1991), they come to consider the spirit of cooperation as being pervasive in the organization. They also consider that if they find themselves in trouble, someone will surely lend a helping hand. They are likely to experience low anxiety, even without prior promises or contracts with the organization regarding when and how they are to be helped. In a similar way, when they see that many of their co-employees proactively participate in every meeting (conscientiousness as OCB-O (OCB for the organization)) (Williams & Anderson, 1991), they do not worry that a plan will fall through because of the negativity of many of the participants at a meeting.

(4) Hypotheses

It is considered that work values are shared among employees not through one employee's behavior but through many employees' longtime contributive behaviors. Nonetheless, a supervisor is an iconic figure in a department or organization. His or her behavior and values have a huge impact on his or her subordinates' behaviors. Past research revealed that instrumental and supportive leadership behavior is positively related to subordinates' OCB (Podsakoff, MacKenzie, & Bommer, 1996; Shnake, Cochran, & Dumler, 1995). Adkins and Russel (1997) also revealed that a supervisor's valuing of fairness relates to his or her subordinates' performance.

If a supervisor often helps a newcomer perform his or her job, a spirit of mutual support is created in the department. Other employees also come to believe that they should help when someone is in need and expect that they will be helped when they are in need.

Here, we focus on the effect of supervisors' OCB-I on the OCB-I and OCB-O of subordinates. The following hypotheses were proposed.

H1: Supervisor's OCB-I will have a positive impact on subordinate's OCB-O.
H2: Supervisor's OCB-I will have a positive impact on subordinate's OCB-I.
H3: Supervisor's OCB-I will have a positive impact on work values sharing.
H4: Work values sharing will have a positive impact on subordinate's OCB-O.

H5: Work values sharing will have a positive impact on subordinate's OCB-I.

Following from this set of hypotheses, we assume that work values sharing *partially* mediates a supervisor's OCB and a subordinate's OCB. When a supervisor performs OCB-I, subordinates may simply emulate similar behavior without the mediating effect of work values sharing. This means that only the partial mediating effect of work values can be assumed. Even when a subordinate performs OCB-O, as Takagi (1997) imagined the effect on a subordinate's perception of some benefit received by the OCB performer, a different process is considered to link two persons' OCBs. These hypothetical relationships are shown in Figure 1.
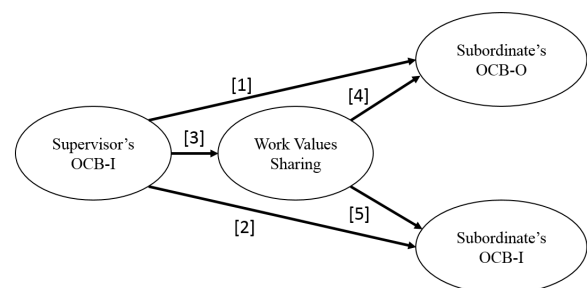
Figure 1 Hypothetical Model (Partial Mediation Model)

(5) Research Method

1. Sample

This study utilized data from an "attitude survey of people in their 20s and 50s with college degrees regarding their job growth, 2010" by Recruit Works Incorporated (RWI).[1] RWI collected the data in March 2010 using

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[1] The survey was conducted through the Internet. Among registered people, those who met the conditions of having attained a college degree, were currently employed, and were

an Internet survey and deposited the data at the Center for Social Research and Data Archives (CSRDA), Institute of Social Sciences, the University of Tokyo. CSRDA gave the author permission to use the data. The sample comprises 2,000 people with college degrees who work as regular or non-regular employees (1,000 males, 1,000 females).

2. Variables

Although these data were not originally collected to explore employees' OCB, some scale items were considered to be appropriate measures of OCB and work values sharing with careful attention to the internal reliability between these items.

This study then utilized OCB items that were slightly different from those established by past researchers in the West. This method may have made it difficult to compare our empirical results to those of Western studies. However, appropriate items with which OCB can be measured are dependent on national cultural factors (Farh, Earley, & Lin, 1997; Organ et al. 2006). Further, Williams and Anderson (1991) also first collected data on various behaviors and then separated OCB (OCB-I and OCB-O) from in-role behaviors. In fact, if only OCB items rather than various work behavior items, which include both OCB and in-role behaviors, are shown in the questionnaire, respondents may focus

inordinately on the visible behaviors of attention seekers (Bolino, 1999; Schnake, 1991). The method of blending OCB items into various work behaviors is also considered effective in investigating subtle OCB in Japanese organizations.

All the following items are measured using a regular five-point scale ranging from [1] "not at all" to [5] "very often / always."[2]

Subordinate' OCB-I: The questionnaire investigated how many of the 36 listed activities respondents engage in during their work. Four of these items were selected as representative behaviors of OCB-I. The average of these four items was calculated. Concretely, they were "I take on a leadership position," "I am asked by those around me for advice," "I encourage co-employees to build better human relationships," and "I raise someone well."

Subordinate's OCB-O: As with a subordinate's OCB-O, five items were used. Concretely, they were "I have my own goal for my daily job," "I am aware of the speed of my growth," "I am aware of job performance," "I make my own challenges," and "I try various methods."

Supervisor' OCB-I: As the variable for a supervisor's OCB-I, eight items out of thirty were selected to enquire about a current supervisor: "he or she helps me," "he or she is closely involved with me," "because he or she watches over me, I can try a difficult job with

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aged between 22 and 59 years were asked to answer the questionnaire.

[2] The questionnaire has 36 items that ask employees about the frequency of various behaviors using terms such as "did difficult things," "required high performance," and "competed with other employees." Further, it included 30 items asking about their

supervisors' behaviors, including "engaged honestly with me", "listened to my opinions", and "attractive as a person." For more detailed information on this survey, see https://ssjda.iss.u-tokyo.ac.jp/Direct/gaiyo.php?lang=eng&eid=0845

a sense of security," "he or she provides a pleasant working environment," "he or she lends an ear in a time of need," "he or she motivates me," "he or she gives good advice promptly when he or she notices that I need it," and "he or she suggests me my good points."

Work values sharing: Work values sharing is a newly proposed concept, and there is no question item that directly enquires about it. Thus, we selected appropriate items out of twenty to examine how respondents feel in their working and daily lives, assuming that they have good feelings if they share work values with other employees.

For example, when an employee shares work values with other employees at the workplace, he or she comes to believe that he or she can go through life with these values given that most employees spend so much of their time at work. Further, it is difficult to compare one's values with those of others in the organization; it is more effective to recognize shared work values by asking about the individual's impressions of daily life.

Concretely, the following four items were used as variables for the work context: "I think I can live by my own values in society," "I think others around me understand me well," "I am confident that I can live my life in my own way in society," and "I think I can fulfill my potential in society."

3. Analytical Method

First, exploratory factor analysis (EFA) was utilized to examine whether the items construct predefined variables. Confirmatory factor analysis (CFA) was also conducted to determine the reliability of the variables.

Next, structural equation modeling (SEM) was used after the basic statistics—such as means, standard deviations of the variables, and the correlations between two variables—were calculated. Although SEM is usually used to confirm the assumed validity of the model chosen by the researcher, we compare possible models to determine the best one. Although we assume the partial mediating effect of the work context between two different OCBs, other models that assume full or no mediating effect of the work context were considered as possible alternatives. It is thus crucial to compare our hypothetical model and the alternative models in order to test our hypotheses.

(6) Result
1. Result of EFA and CFA

First, EFA was conducted to examine whether all the question items would construct the predetermined variables. As the results in Table 1 show, all of the items were as expected. Four factors explained 60.04 percent of the total variance (principal axis factoring, promax with Kaiser normalization).

Next, we also conducted CFA to confirm the validity of our four-dimensional model. Table 1 depicts some indices of reliability and inter-correlations of all four constructs (all correlations are significant at a 0.05 significance level). First, all the values of Cronbach's alpha are over 0.7, those of AVE are over 0.5, and those of CR are over 0.7, which indicates that they satisfy the conditions of reliability (Hair, Black, Babin, & Anderson, 2010; Said, Badru, & Shahid, 2011). Further, the measures of goodness of fit are $\chi 2 = 976.966$, $df = 183$, CFI = 0.945, TLI =

0.931, and RMSEA = 0.047; these values are also satisfactory. Therefore, according to the results of the CFA, it can be concluded that our four-dimensional model is valid (Table 2).

Table 1. Result of Pattern Matrix of EFA

Pattern Matrix				
	Factor			
	1	2	3	4
SubOCB-I1	-0.114	0.066	-0.043	0.763
SubOCB-I2	-0.019	0.002	0.044	0.606
SubOCB-I3	0.096	0.239	-0.061	0.400
SubOCB-I4	0.023	-0.119	0.072	0.748
SubOCB-O1	0.080	0.626	0.025	0.064
SubOCB-O2	0.026	0.640	0.015	0.177
SubOCB-O3	-0.009	0.777	-0.053	0.034
SubOCB-O4	-0.059	0.995	-0.010	-0.111
SubOCB-O5	-0.002	0.803	0.045	-0.086
SupOCB-I1	0.823	-0.027	-0.021	-0.099
SupOCB-I2	0.846	-0.017	0.013	-0.008
SupOCB-I3	0.866	-0.017	0.055	0.008
SupOCB-I4	0.843	-0.057	-0.023	-0.009
SupOCB-I5	0.857	0.010	-0.010	-0.044
SupOCB-I6	0.806	0.077	-0.001	0.073
SupOCB-I7	0.790	0.072	0.009	-0.117
SupOCB-I8	0.764	-0.013	-0.020	0.172
WVS1	-0.007	-0.054	0.775	-0.033
WVS2	0.058	-0.069	0.556	0.124
WVS3	-0.010	0.045	0.905	-0.064
WVS4	-0.036	0.089	0.673	0.057

Extraction Method: Principal Axis Factoring.
Rotation Method: Promax with Kaiser Normalization.
a Rotation converged in 6 iterations.

Table 2. Indices of Reliability and Correlations between Two Constructs

	variables	Cronbach's alphas	AVE	CR	Correlations		
					1	2	3
1	Subordinates' OCB-I	0.807	0.516	0.810			
2	Subordinates' OCB-O	0.875	0.592	0.878	0.593		
3	Supervisor's OOB-I	0.944	0.678	0.944	0.227	0.386	
4	Work Values Sharing	0.836	0.57	0.840	0.388	0.419	0.251

2. Hypothesis Testing

The analysis was conducted as follows. First, the partial mediation model shown in Figure 1 was examined through SEM. A mediating relationship can be relative easily examined by applying SEM. Our model assumes that a supervisor's OCB-I has two separate effects on a subordinate's OCB. One effect is a direct positive impact on a subordinate's OCB-O [1] or OCB-I [2]. The other effect is indirect—a supervisor's OCB-I initially has an effect on work values sharing [3], and this work values sharing influences a subordinate's OCB-O [4] or OCB-I [5].

Customarily, SEM examines whether paths between constructs are significant and whether measures of goodness of fit meet criteria to determine the validity of the model that represents hypothetical causal and correlational relationships. However, one drawback of this method is that it is not sufficient to simply determine significant relationships between variables in the hypothetical model. Our study aims to confirm that considerations relating to work values sharing necessarily explain the effect of certain OCBs on other OCBs. Thus, SEM has to reveal that our hypothetical model is better than alternative models in terms of measures of goodness of fit.

For this purpose, the goodness of fit of other models with or without paths should be considered. For example, the model with [3], [4], and [5] paths considers that the work context fully moderates the relationship between a supervisor's OCB and a subordinate's OCB. The model with only [1], [2], and [3] assumes that the work context has no effect on subordinates' OCBs. Concretely, this study adopted the specification search method of AMOS. According to this method, each path is added to and removed from the model, and the validity of each of the 32 ($2^5 = 32$) models is examined (Table 3).

Table 3 Comparison of All 32 Models

models	arrow	names of model	para-meters	df	C	C-df	AIC 0	BCC 0	BIC 0	CFI	TLI	RMSEA
1	None		63	189	25015.3	24826.3	778.338	778.227	750.333	0.878	0.851	0.068
2	4		64	188	24732.82	24544.82	497.864	497.775	475.461	0.897	0.874	0.063
3	5		64	188	24794.18	24606.18	559.217	559.128	536.814	0.893	0.869	0.064
4	1		64	188	24965.53	24777.53	730.569	730.48	708.166	0.881	0.854	0.068
5	3		64	188	24999.14	24811.14	764.179	764.09	741.776	0.879	0.851	0.068
6	2		64	188	25005.73	24817.73	770.775	770.686	748.371	0.879	0.851	0.069
7	4, 5		65	187	24469.76	24282.76	236.802	236.735	219.999	0.915	0.896	0.057
8	1, 2		65	187	24626.93	24439.93	393.969	393.902	377.166	0.905	0.882	0.061
9	1, 4		65	187	24699.5	24512.5	466.537	466.471	449.735	0.900	0.876	0.062
10	3, 4		65	187	24713.3	24526.3	480.336	480.27	463.534	0.894	0.869	0.064
11	2, 4		65	187	24723.26	24536.26	490.301	490.234	473.499	0.898	0.874	0.063
12	1, 5		65	187	24744.41	24557.41	511.448	511.382	494.646	0.897	0.872	0.063
13	3, 5		65	187	24777.1	24590.1	544.144	544.077	527.341	0.899	0.875	0.063
14	1, 3		65	187	24784.36	24597.36	551.396	551.329	534.593	0.894	0.869	0.064
15	2, 5		65	187	24791.27	24604.27	558.311	558.244	541.508	0.893	0.868	0.064
16	2, 3		65	187	24882.19	24695.19	649.225	649.159	632.423	0.887	0.861	0.066
17	1, 2, 3	direct model	66	186	24328.34	24142.34	97.378	97.333	86.176	0.925	0.907	0.054
18	1, 4, 5		66	186	24437.73	24251.73	206.767	206.723	195.566	0.918	0.898	0.057
19	3, 4, 5	full mediation model	66	186	24448.75	24262.75	217.795	217.75	206.593	0.917	0.897	0.057
20	1, 2, 4		66	186	24465.82	24279.82	234.859	234.814	223.657	0.916	0.895	0.057
21	2, 4, 5		66	186	24467.76	24281.76	236.8	236.755	225.598	0.916	0.895	0.057
22	1, 2, 5		66	186	24526	24340	295.042	294.998	283.841	0.912	0.890	0.059
23	1, 3, 5	full mediation and direct-1	66	186	24538.36	24352.36	307.401	307.356	296.199	0.911	0.889	0.059
24	2, 3, 4	full mediation and direct-2	66	186	24571.46	24385.46	340.501	340.456	329.299	0.908	0.886	0.060
25	1, 3, 4		66	186	24677.01	24491.01	446.054	446.01	434.852	0.901	0.877	0.062
26	2, 3, 5		66	186	24773.05	24587.05	542.089	542.045	530.887	0.895	0.869	0.064
27	1, 2, 4, 5		67	185	24255.43	24070.43	26.474	26.452	20.873	0.930	0.913	0.052
28	1, 2, 3, 4	partial mediation and direct-1	67	185	24293.26	24108.26	64.301	64.279	58.7	0.927	0.909	0.053
29	1, 2, 3, 5	partial mediation and direct-2	67	185	24311.88	24126.88	82.92	82.898	77.319	0.926	0.908	0.054
30	1, 3, 4, 5	partial and full mediation-1	67	185	24413.85	24228.85	184.889	184.867	179.289	0.919	0.899	0.056
31	2, 3, 4, 5	partial and full mediation-2	67	185	24445.68	24260.68	216.72	216.698	211.119	0.917	0.896	0.057
32	1, 2, 3, 4, 5	partial mediation model	68	184	24226.96	24042.96	0	0	0	0.932	0.915	0.052

When the specification search method was adopted, it showed that our hypothetical model [model 32] is the best model according to the measures of goodness of fit. This model has CFI = 0.932, TLI = 0.915, and RMSEA = 0.052. Although the value of RMSEA might be slightly higher than the criteria, it can be concluded that this model has high validity.

This model demonstrates that it is not only a subordinate's OCB-I but also his or her OCB-O that is significantly influenced by a supervisor's OCB-I.

The more subordinates perceive their supervisor as "helping me" or "is closely involved with me," the more subordinates tend to perceive that they "encourage co-employees to build better human relationships" and "have my own goal for my daily job." Furthermore, the model depicts this effect as being partially mediated by

work values sharing, which enhances the perception that "I think I can be myself in society." All the paths are significant for the 5 percent significance level. From this result, all of our hypotheses are supported.
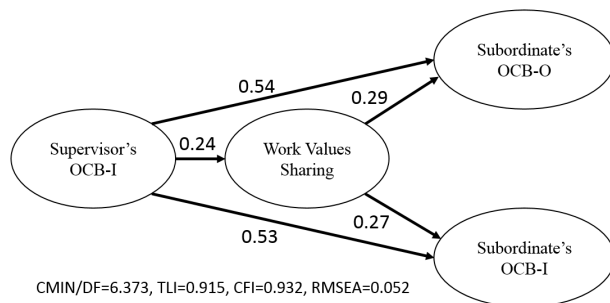

Figure 2 Result of the Partial Mediation Model

CMIN/DF=6.373, TLI=0.915, CFI=0.932, RMSEA=0.052

(7) Discussion

The results of this empirical analysis show that considering work values sharing is effective for understanding the processes by which a supervisor's OCB has an effect on a subordinate's OCB.

As previously mentioned, some past studies in social psychology regarding the relationship between helping and helped persons have revealed that the helped person sometimes tends to help others other than the helping person when he or she considers that helping contributes to a helper's sense of growth or accomplishment. From this finding, it could be easily inferred that employees similarly tend to exhibit more OCB when they receive OCB from their supervisor in the organization. The unique contribution of this study is the finding that work values sharing can mediate the relationship between employees' OCB and their supervisor's OCB.

Traditionally, there are two beliefs of why OCB is performed by employees who know that these types of behaviors are not formally

required. Western ideas consider that an employee hopes to repay the organization for tangible and intangible benefits he or she has received from the organization based on the social exchange between the organization and an employee (Organ, 1988). Further, this idea can be applied not only to OCB-O but also to OCB-I, which helps other employees or a supervisor in the organization, by assuming that a helping employee considers employees who he or she has helped to finally contribute to the organization.

In contrast, Hui, Lee, and Rousseau (2004) described "(a) perspective ignoring interpersonal ties is likely to be inadequate in accounting for organizational commitment and citizenship behavior in the context of the Chinese organization-employee relationship" (Hui, Lee, & Rousseau, 2004, p.233). In both Chinese and Japanese society, employees tend to consider not only their relationships with the organization but also their interpersonal relationships with others in the organization when they perform OCB-I. Their OCB-I is exhibited not as a way to receive benefits from the organization but in consideration of maintaining good relationships with other employees in the organization. Hui et al. (2004) described this point as follows:

"The Chinese are expected to relate to an organization through the particular relationships that exist between individuals and their superiors. Hence, traditional Chinese people tend to approach organizations 'thinking interpersonally,' in contrast to the Western view of the employment relationship that is based upon 'thinking organizationally'." (Hui et al, 2004,

p.233)

To judge the relative persuasiveness of these two ideas, we must refer to the empirical result; while the effect of a supervisor's OCB-I on a subordinate's OCB-I can be interpreted in either the Western or Asian framework, it is much easier to explain the effect of a supervisor's OCB-I on a subordinate's OCB-O by using the Western framework. This finding is very important because it means that the validity of the Western framework is supported despite the data having been collected from Japanese employees.

(8) Conclusion

This study aimed to propose a new framework to understand the effect of OCB and empirically examine its validity. In particular, this study empirically revealed that a supervisor's OCB had a positive impact on subordinates' OCB, and this relationship was found to be mediated by their shared work values. This indicates that a supervisor's OCB can become a language with which his or her work values are communicated to his or her subordinates; in turn, this encourages subordinates to have the same work values and exhibit their own OCB.

Although this study contributes to confirming the proposed framework by focusing on the effect of sharing work values between two OCBs, it has several limitations. First, this study utilized data collected by an outside institution with objectives other than testing our hypotheses. Many western OCB researchers have developed sets of questionnaire items to measure OCB

dimensions, and some of the OCB items used here are different from those established items. However, as described previously, it is also true that the actual behaviors that should be considered as OCB are culturally dependent (Organ et al., 2006); it might be effective to identify and adopt appropriate behaviors among those that are in accordance with the established definition of OCB.

Second, measuring shared work values is problematic. In fact, it is quite difficult to measure how much work values are shared among employees in an organization. Although some studies have proposed scale items to examine work values (Fields, 2002), work values sharing has a similar effect on employees' minds as that of organizational culture. As Schein (2016) described, organizational culture is not explicitly recognized by employees because it is too natural for them to be conscious of it. Therefore, we had to accept the use of proxy variables to represent work values sharing. We selected certain items assuming that employees come to believe they are understood by other employees and are able to act like themselves if they have shared work values with other employees. Therefore, this variable does not directly measure the degree of sharing work values but rather measures an employee's mindset that is expected to be produced by work values sharing. However, the relationship between the employee's mindset and work values sharing is not obvious and should be further investigated.

Third, we assumed the existence of a relationship between OCB, work values sharing, and another OCB. However,

employees are not, or are not able to be, explicitly conscious of work values sharing. Therefore, to properly explain the effect of work values sharing, the model that directly links work values sharing with another OCB might not be sufficient to explain the work situation. For example, if one employee's OCB has a positive effect on another employee's job satisfaction, the satisfied employee may exhibit further OCB, even if work values are not shared between them. The validity of alternative models that include other attitudinal factors, such as job satisfaction between the work context and other OCB, should be explored.

Finally, although SEM analysis of cross-sectional data is effective for determining the effect of one factor on another, it is limited in its ability to precisely clarify how one employee's behavior is repeated/adopted by other employees. Time-series data acquired through long-term observation are necessary to investigate the process of one OCB affecting another OCB. This should be addressed in future research.

As mentioned in the introduction, the problem of how OCB is influential in an organization has not been rigorously investigated. Although this study has several limitations, we believe that it serves to highlight the importance of further discussion and empirical examination of the effect of OCB on the organization.

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Verification of Asymmetric Cost Behavior in Merged Local Public Enterprises

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Abstract

   In this study, the author verifies how the cost behavior of Japanese local public enterprises changes before and after municipal amalgamations, and also clarifies the effect of the amalgamation of municipalities on their cost management. While it is expected that merged public organizations acquire advantages (i.e., synergy effects and economies of scale) through expanding the organization size and increasing management resources, these factors affect resource adjustment costs upon the amalgamations, which influence cost behavior. In order to confirm the effect of amalgamations on resource adjustment costs, the author analyzes a panel of 17,049 financial data points from 1999 to 2013 and finds that sticky costs were strengthened after municipal amalgamation. Thus, the administrative capability of resource adjustment declined after municipal amalgamations. The results of this study do not suggest that synergy effects or scale advantages arise in post-merged local public enterprises. These results may be due to three main factors: the possibility that expanding the organization size may increase the inefficiency of the functional organizational structure; the growing scale of management resources may increase committed capacity costs; and the institutional restriction, that public service must be provided even if unprofitable, may be affected from the viewpoint of public interest as a specific problem of public organization.

(1) Introduction

   This study examines how public organization administrators manage their costs through municipal amalgamations with a focus on the change in cost behavior as a method for verifying cost management.

   Cost behavior is affected by a variety of factors, such as changes in the external environment, and management decisions. For this reason, it is important to understand cost behavior when managing costs. In traditional studies on cost behavior, changes in cost and activity levels are explained in a linear and symmetric function. Also, in terms of cost

classification, costs consist of fixed and variable costs. However, the capacity costs-related studies have a different perspective from their traditional counterparts. They also confirm that a non-linear relationship appears between costs, which includes the adjustment of management resources and activity levels (Anderson et al., 2003). In other words, an asymmetric cost behavior appears between an increase and decrease in activity. Anderson et al. (2003) coined the term "sticky costs" (or "cost stickiness") for the phenomenon in which the cost reduction rate when activity falls is smaller than the cost increase rate when activity rises. These studies look at changes in cost behavior from the perspective of capacity costs, including changes in management resources (Noreen and Soderstrom, 1997).

One of the factors that cause sticky costs is the influence of resource adjustment costs (e.g., Anderson et al., 2003; Banker et al., 2013; Günther et al., 2014). Resource adjustment costs are generated when management resources are adjusted to match the activity level. Günther et al. 2014 organized and described the relationship between holding costs and adjustment costs based on the prior cost stickiness literature. In terms of human resources, for example, when activity increases, the costs of hiring and training new employees are incurred; conversely, dismissing employees involves compensation costs, such as retirement allowances according to legal requirements. In terms of material resources, for example, when the facilities or equipment are integrated by mergers, these events may incur disposal expenses, relocation expenses, and repair expenses.

One of the greatest fluctuations in timing of management resources is an event of mergers

and acquisitions (M&A) (Jang et al. 2016). M&A is expected to bring the economies of scale effect of gaining a competitive advantage by acquiring the capabilities of the external organization and converting them to internal resources (Vermeulen and Barkema, 2001). Synergy effects may also be contemplated with the acquisition of the management resources and capacity of the other company following a merger (Capron, 1999; Graebner et al., 2010).

However, few cases of mergers exhibit the expected effect (King et al., 2004). After a merger, the improvement of financial indicators is confirmed in the short term, but a negative effect on innovation is reported then the new organization cannot achieve the competitiveness of long-term companies (Hitt et al., 1991). In the research on empirical cost behavior, Sepasi and Hassani (2015) pointed out that sticky costs are strengthened in the case of both large organization size and large scale of management resources, rather than small ones. Therefore, the firm size is one of the things that can affect cost stickiness. In the case of M&A, Jang et al. (2016) indicated that the association between cost stickiness and synergies could be a negative effect. Especially, the scale of tangible assets also affects sticky costs more negatively after mergers.

In general, municipal amalgamations are also expected to provide the benefits of scale and synergy effects. Furthermore, it is thought that municipal amalgamations can provide efficient and effective public services. From this point of view, the verification of the efficiency of services and the effect of fiscal reduction has been carried out in the fields of public finance and public economics. The various studies in these fields can be categorized according to three claims: those that find

amalgamation effects, those that do not find amalgamation effects, and those that explain that the effect is limited. In other words, these studies have not reached a conclusion on whether the amalgamations of municipalities are effective or not.

Therefore, in this study, the author intends to verify the effects of municipal amalgamations focusing on cost behavior, namely, whether the administrators in merged municipalities manage their costs to improve efficiency or effectiveness from the viewpoint of cost management in comparison with pre-amalgamation costs. At the same time, it means to clarify how the cost behavior fluctuates due to resource adjustment costs changes by amalgamations.

As the research subject, this study focuses on local public enterprises (LPEs) in Japan as representative municipalities. Since LPEs adopt the same accounting methods as for-profit enterprises, they are suitable for analyzing public organizations using existing empirical research methods for cost behavior. Furthermore, the management of LPEs is also integrated as part of municipal amalgamations. Under LPE law, LPEs are considered a part of municipal organizations. However, from the viewpoint of business management, the mayors generally give management authority to the LPEs' administrators so that they can manage their LPEs independently from municipalities. LPEs generally provide services, such as water services, and receive service charges. Therefore the LPE administrators have to manage based only on their service charges without depending on taxes from municipalities.

Therefore, by analyzing LPEs, it is possible to understand not only public organizations' cost behavior, but also the changes in cost management due to municipal amalgamations.

The article proceeds as follows. Section 2 discusses the characteristics of LPEs and the effect of municipal amalgamations. Section 3 presents a review of the literature on public organization cost behavior and develops the research hypotheses. Section 4 describes the research methodology, including the sample data, the variable measures, and the models. Section 5 presents and discusses the results. Finally, Section 6 concludes with a discussion of the limitations of this study and suggestions for future research.

(2) Characteristics of LPEs and Effects of Municipal Amalgamations

1. Characteristics of LPEs

LPEs in Japan deal with functions, such as the water supply, industrial water supply, sewer, automobile transportation, railways, electricity, gas, and hospitals, and each municipality deals independently with its own businesses. These services can be provided not only by LPEs, but also by commercial enterprises. However, before starting such businesses, government approval and authorization are required, since these services are critical necessities for living. In other words, LPEs provide public goods and services based on public interest and operate mainly in the areas where commercial enterprises do not do business because they are not profitable or they need to large investment (Oshima, 1971).

The organizational forms of LPEs have some unique characteristics. Since a LPE is an internal bureau of a municipal organization, it is not completely independent from a municipality under the law. However, LPEs have their own business administrators apart

from the mayors who are the heads of the municipalities. Therefore, administrators manage LPE businesses independently from municipalities. This business system is intended to allow LPE administrators to make quick and flexible cost management decisions since their services should be provided efficiently and effectively (Kawarata, 2005). Additionally, LPEs' settlements and budgets are also separate from those of municipalities. Thus, LPEs have to continue to provide stable services to residents based only on the service charges without depending on taxes from municipalities. On the other hand, LPEs are not fully independent from municipalities because the management of the LPE administrator must be monitored by the local parliament and the mayor to ensure that the public services are provided safely and continuously. For this reason, LPE administrators cannot make important management decisions on their own but rather must get approval from the mayors and local parliament. In other words, the mayor and councilors who are elected as representatives oversee the state of LPE management. LPE administrators have their own stakeholders, and their main purpose is to maintain their businesses efficiently and effectively; they are different from commercial enterprises, whose main objective is the maximization of profit (Eldenburg et al., 2004; Holzhacker et al., 2015).

Next, since this study focuses on resource adjustment costs, it is important to understand the features of LPE management resources. Among LPEs' material resources, the ratio of fixed assets to net assets and that of fixed assets to equity capital are both high.

Hence, the material resources of a LPE might mainly consist of high committed capacity costs. Furthermore, a LPE may be in charge of social infrastructure facilities, such as dams and piping for the water supply or rolling stocks and rails for transportation, which require large-scale equipment. Thus, given these ratios, one of the problems for LPE management is a low fixed asset turnover rate[1]. Therefore, LPE administrators should manage in the direction of reducing the idle capacity in material resources in order to manage their LPEs more efficiently. They also have to reduce their equipment repair or maintenance costs.

Finally, it is important to understand the features of human resources in the context of LPEs. LPE employees are guaranteed almost the same status as that of public officers. By law, LPE administrators must continue to employ their workers. For this reason, even if the business situation deteriorates, the dismissal of LPE employees is difficult for LPE administrators. Even after municipal amalgamations, LPE administrators are obliged to continue the employment of both their own employees and the employees of the merged LPE. Thus, LPE human resources have a high committed capacity cost and a low managed capacity cost.

2. Effects of Municipal Amalgamations

In Japan, since 1999 and with a peak in 2004, many amalgamations have been conducted among municipalities. As a result, the number of municipalities decreased from 3,232 organizations in 1999 to 1,719 organiza-

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[1] The fixed asset component ratio is 91.6%, the fixed ratio is 146.7%, and the fixed asset turnover rate is 0.11% (Local Public Enterprise Yearbook No. 61).

tions in 2013. Since LPEs are one of the internal divisions of municipalities, they were also integrated as part of municipal amalgamations. The number of LPEs decreased from 11,712 businesses in 1999 to 8,703 businesses in 2013[2].

The nationwide increase in municipal amalgamations occurred for three reasons: the pressure for efficiency improvements caused by the long-term downturn of the Japanese economy, the influence of the population decline and the expansion of the depopulated area, and the requirement of effective and high-quality public services. First, the long-term downturn of the Japanese economy caused the deterioration of the financial status of municipalities. For this reason, small- and medium-sized municipalities had to strengthen their financial basis through amalgamations; specifically, municipal amalgamations aimed to achieve economies of scale. Second, due to the expansion of the depopulated area, demand for public services changed significantly. In other words, in order to secure profitability, municipalities had to provide services to wider areas. Thus, amalgamations also aimed to achieve economies of size. Finally, municipalities were expected to share knowledge through amalgamations and enhance synergy effects. Moreover, when municipal amalgamations were carried out, subsidies from the Japanese government increased, which created incentives for stakeholders in municipalities.

The Japanese government reported the effectiveness of municipal amalgamations in 2008 and 2010. These reports stated that the effects of municipal amalgamations appeared in the expansion of the financial scale, the reduction of service costs, and improvements in the quality of service. However, academic studies in the field of public economics, public administration, and public finance argue for various opinions regarding the effects of municipal amalgamations, and their evidences are mixed (Liner, 1992; Edwards and Xiao, 2009; Drew et al., 2017). These studies mainly focus on the correlation between municipal amalgamations and municipal expenditures. So far, no previous studies have focused on changes in cost management due to municipal amalgamations. In other words, this study is the first to verify the effects of municipal amalgamations from the viewpoint of the management accounting field.

(3) Prior Research and Development of Hypotheses

In recent years, empirical research on cost behavior has focused on capacity costs. In other words, researchers are focusing on cost fluctuations, including changes in management resources (Banker and Byzalov, 2014). Anderson et al. (2003) clarify that the relationship between costs and activities is not proportional or linear, and they call this phenomenon sticky costs. Resource adjustment costs are one of the factors that cause sticky costs. For example, the costs of human resource development, such as training costs or the costs for dismissal compensation, need to be adjusted depending on the activity level. Similarly, in the case of material resources, maintenance costs or repair costs for facilities

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[2] There are several reasons why the rate of decrease in the number of municipalities due to the amalgamation differs from the rate of decrease in the number of local public enterprises.

One of the major reasons is that some local public enterprises started their operations after the amalgamation of municipalities.

or equipment need to be adjusted according to the increase or decrease in the activity level. In situations where resource adjustments must be made in accordance with changes in activities, adjustment costs, as represented by agency costs, are generated.

These studies on cost fluctuations mainly target commercial companies and exclude public services, such as utilities, since the authors argue that public services adopt a different accounting system (Shust and Weiss, 2014), and that cost behavior analysis models only apply to competitive business fields and not to public service fields (Weiss, 2010). For this reason, only a few studies focus on public organizations. However, these studies insist that there is evidence of asymmetric cost behavior among public organizations (Yasukata et al. 2011; Bradbury and Scott, 2014; Cohen et al., 2014; Holzhacker et al., 2015). Bradbury and Scott (2014) analyze the cost behavior of New Zealand municipalities, Cohen et al. (2014) focus on Greek municipalities, and Holzhacker et al. (2015) target German hospitals. These studies also find evidence of sticky costs in public organizations, and they argue that sticky costs originate from the mission of public interest. In other words, public organization administrators are pressured by institutional constraints and have to serve constantly even if doing so causes a reduction in revenue. Thus, sticky costs are strengthened among public organizations (Holzhacker et al., 2015). Since LPEs in Japan are also public organizations, my prediction is that sticky costs will strongly appear for merged LPEs.

Furthermore, Sepasi and Hassani (2015) clarify that sticky costs are stronger for large organizations than for smaller organizations, and they argue that organization size affects cost management. Specifically, managers of large organizations have to get agreement from many stakeholders before making cost management decisions. In other words, resource adjustment costs are greater for large organizations than they are for small ones. In the case of M&A, sticky costs also increase after the amalgamations, since resource adjustment costs are increased by amalgamations (Jang et al., 2016).

Thus, first of all, I focus on the change in organization size. When the organization scale is expanded due to an amalgamation, LPE administrators should have more difficulty adjusting to their management resources. In the case of merging LPEs, because the scale of the organization becomes larger after the amalgamation, the sticky costs should be stronger after an amalgamation than they are before an amalgamation.

Hypothesis 1: Sticky costs after amalgamation are stronger than before in merged local public enterprises.

The merging LPE should provide more effective and efficiency through an improvement in its management resources with the passage of time after the amalgamation. However, amalgamations have the expected effect in few cases (King et al., 2004). After an amalgamation, the improvement of financial indicators is generally confirmed in the short term, but amalgamations may negatively influence innovation, and companies cannot acquire a competitive advantage in the long term (Hitt et al., 1991). There is concern that an amalgamation makes it difficult to make long-term adjustments to cost management.

Hypothesis H2: Sticky costs increase as time passes after an amalgamation.

Next, as management resources are consolidated and eliminated by the amalgamations, the author needs to consider the impact of resource adjustment costs on cost behavior. Dalla Via and Perego (2014), and Sepasi and Hassani (2015) describe the relationship between the scale of the organization and the change in resource adjustment costs, and clarify the evidence of stronger sticky costs on larger organizations than on smaller organizations. One factor in highly sticky costs in large organizations is committed capacity cost. The larger scale of the organization creates less flexibility in adjusting to material resource costs and human resource costs. Therefore, when management resources are greater, the committed capacity cost increases, and managers have more difficulty in flexibly adjusting to material resources or human resources costs. In addition, Jang et al. (2016) focus on the M&A of enterprises and clarify that the sticky costs will also increase for enterprises with a large scale of material resources. LPEs should integrate their facilities and equipment through amalgamations, so the scale of material resources should expand. Therefore, as material resources increase, resource adjustment costs increase, and sticky costs are strengthened.

Hypothesis H3: The influence of the scale of material resources may affect cost behavior by strengthening sticky costs as compared with those before the amalgamation.

Next, I examine the influence on the cost behavior accompanying the adjustment of human resources. Prior researches confirm that human resources adjustment costs act to strengthen sticky costs by using the labor costs or the number of staff as a proxy for human resources (Anderson et al., 2003; Banker et al., 2013). One reason for these high sticky costs is worker protection laws. Namely, worker protection laws require managers to retain human resources even when sales decrease since they cannot dismiss employees easily in order to protect workers. Therefore, human resources adjustment costs act to increase sticky costs (Banker et al., 2013). Thus, sticky costs strengthen as the scale of an organization expands, since adjusting to human resources costs becomes more difficult for managers (Sepasi and Hassani, 2015).

In the case of LPEs, worker protection laws also make it difficult for management to dismiss employees easily. If the LPE administrators dismiss employees, then there are still huge resource adjustment costs, such as an increase in compensation costs or the prolongation of adjustment by litigation. For this reason, amalgamations of LPEs may increase the committed capacity cost of human resources, so LPE administrators will likely lose the flexibility of cost adjustment.

Hypothesis H4: The influence of the scale of human resources may affect cost behavior by strengthening sticky costs as compared with those before the amalgamation.

(4) Research Method
1. Sample Selection
To verify these hypotheses, I run a panel data analysis. The analysis period begins in fiscal year 1999, when municipal amalgamations started, and ends in fiscal year 2013, giving a time period of fifteen years.

Analytical samples were collected from the "Local Public Enterprise Yearbook" edited by

the Local Public Finance Bureau of the Ministry of Internal Affairs and Communications. This yearbook lists the financial data for eight industries (i.e., the water supply, industrial water supply, transportation, gas, hospital, sewerage, marketing, and parking lot businesses) for each municipality. The financial data used for the analysis are classified as per year, municipality, and service. Additionally, data from each profit and loss statement and balance sheet were used. Also, operating revenue, operating expenses, total assets, and labor costs were used as proxy indices for activity amount, cost, material resources, and human resources, respectively.

The collected data represent 17,471 firm-years. To control for the effect of outliers, I delete the top and bottom 1% of observations. The final sample data includes data for 17,049 firm-years. Therefore, the panel data is unbalanced. Looking at the breakdown of the sample data, the sample of pre-merger LPEs includes 7,888 data points, and 9,161 data points post-merger.

2. Method of Analysis

Anderson et al. (2003) develop the empirical research method of cost behavior based on a Cobb-Douglas type cost function. They also clarify asymmetric cost behavior using their models. This model has been adopted in many subsequent studies (Banker and Byzalov, 2014). Therefore, hypothesis 1 of this study will also be examined with this model.

Model I

$$\ln\left(\frac{Cost_{i,t}}{Cost_{i,t-1}}\right) = \beta_0 + \beta_1 * \ln\left(\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right) + \beta_2 * Decrease\_Dummy_{i,t} * \ln\left(\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right) + \varepsilon_{i,t}$$

LPEs' operating expenses are substituted for Cost (hereafter "C" in the models). Additionally, Revenue takes operating revenue (hereafter "R" in the models) as a proxy for the activity amount. Decrease_Dummy (hereafter "Dec_D" in the models) is a dummy variable that takes the value of 1 when operating revenue decreases between the t period and the previous period, and 0 otherwise. All the data are natural logarithms ("ln" in the models).

Using this model, it can be confirmed that when operating revenue increases by 1%, the cost changes by the value indicated by β1. Additionally, because of the Decrease Dummy, when operating revenue decreases by 1%, the cost decreases by β1 + β2, whereas β2 indicates the value of the sticky or anti-sticky costs. Therefore, when there is cost stickiness, β2 will be negative, and when cost stickiness is not present (anti-sticky costs), β2 will be positive. If the sticky costs are strengthened after the amalgamation, β1>β1+β2 should hold true.

In order to verify hypothesis 2, it is necessary to capture the changes in cost behavior due to the passage of time after amalgamations. Holzhacker et al. (2015) adopt a time trend dummy to reflect changes over time, so the same method is used in this analysis.

Model II

$$\ln\left(\frac{C_{i,t}}{C_{i,t-1}}\right) = \beta_0 + \beta_1 * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right) + \beta_2 * Dec\_D_{i,t} * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right) + \beta_3 * timet\_trend + \beta_4 * Dec\_D_{i,t} * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right) * timet\_trend + \varepsilon_{i,t}$$

In this model, time_trend is 1 in the year of the amalgamation and increases by 1 in the subsequent years. The use of the time trend can show the change in the degree of sticky costs over time. The other variables are the same as in model I.

Next, in order to verify hypotheses 3 and 4, total assets are used as a proxy for material resources, and labor costs are used as a proxy for human resources. Therefore, the author verifies the effect on cost behavior using Model III.

Model III

$$\ln\left(\frac{C_{i,t}}{C_{i,t-1}}\right) = \beta_0 + \beta_1 * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right) + \beta_2$$

$$* Dec\_D_{i,t} * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right)$$

$$+ \sum_{m=3}^{4} \beta_m \, Resources_{i,t,m}$$

$$+ \sum_{n=5}^{6} \beta_n \, Resources_{i,t,n}$$

$$* Dec\_D_{i,t} * \ln\left(\frac{R_{i,t}}{R_{i,t-1}}\right) + \varepsilon_{i,t}$$

Resources represent total assets divided by operating revenue and labor costs divided by operating revenue, respectively. The other variables are the same as in model I.

(5) Analysis Result
1. Descriptive Statistics

Table 1 shows the descriptive statistics. The first rows are the total sample, the second rows are the sample of pre-amalgamated LPEs, and the third rows are the sample of post-amalgamated LPEs respectively. Each row includes data on cost (operating expenses), revenue (operating revenue), total assets, labor costs, and the natural logarithms of each of these items. The revenue, total assets, and labor costs include 0 yen as the minimum value, which means that the sample includes financial data for the periods of preparation for start-up and preparation for discontinuance. Some studies exclude such data points, but in this study, the author includes them in the analysis[3], taking into consideration the influence of survival bias when they are excluded.

Based on the descriptive statistics, there are three notable characteristics of the data for the whole sample. First is that the operating balances of the LPEs are not in deficit on average, which confirms the soundness of the LPEs' financial conditions. Second is that the scale of the total assets is large on average. LPEs mainly operate in the field of living infrastructure businesses, such as water supply and transportation, so they require a large scale of facilities. Third, the differences can illustrate between LPEs before and after merging sample. After amalgamations, each descriptive statistic increases.

The descriptive statistics as a whole do not indicate any serious defect points that would affect the subsequent data analysis.

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[3] For robustness check, similar results were obtained when analyzing excluding 0 yen sample.

Table 1. Descriptive statistics

(*Scale: 1,000Yen)

		Mean	Standard deviation	Minimum	Lower quartile	Median	Upper quartile	Maximum	Number
Total	Cost*	2,024,249	4,015,146	896	199,571	569,507	1,828,052	49,143,211	17,049
	Revenue*	2,134,425	4,409,089	0	208,549	596,456	1,921,935	53,791,218	
	Assets*	19,209,685	65,935,863	77	2,011,582	4,824,222	13,375,953	1,026,677,522	
	Labor costs*	653,136	1,482,802	0	32,005	88,453	469,751	19,582,768	
	ln C t/C t-1	0.0073	0.0824	-0.4951	-0.0265	0.0035	0.0344	0.5015	
	ln R t/R t-1	0.0043	0.0749	-0.5630	-0.0221	-0.0012	0.0236	0.5567	
	ln A t/R t	2.1570	1.2003	-4.4576	1.4875	2.2847	2.7311	10.4686	
	ln L t/R t	-1.6390	0.8651	-9.4928	-2.1810	-1.7226	-0.9029	4.8141	
Before amalga mation	Cost*	1,494,557	3,380,642	1,677	153,665	333,526	1,087,361	33,444,824	7,888
	Revenue*	1,617,380	3,863,543	0	175,802	377,021	1,166,930	53,791,218	
	Assets*	13,024,617	57,061,789	25,770	1,557,399	3,028,554	6,946,847	959,833,266	
	Labor costs*	506,584	1,217,538	0	29,388	57,420	330,520	18,609,940	
	ln C t/C t-1	0.0049	0.0832	-0.4829	-0.0312	0.0023	0.0362	0.4994	
	ln R t/R t-1	0.0046	0.0716	-0.5331	-0.0219	-0.0002	0.0243	0.5567	
	ln A t/R t	1.9983	1.0481	-1.2580	1.5540	2.1825	2.5709	7.2456	
	ln L t/R t	-1.5987	0.7529	-6.7757	-2.0658	-1.6674	-1.1141	1.3749	
After amalga mation	Cost*	2,480,336	4,440,046	896	301,784	848,920	2,461,973	49,143,211	9,161
	Revenue*	2,579,622	4,785,358	0	288,278	848,640	2,519,457	47,581,762	
	Assets*	24,535,284	72,294,581	77	3,172,107	7,801,138	18,753,095	1,026,677,522	
	Labor costs*	779,323	1,667,716	0	38,454	129,653	652,896	19,582,768	
	ln C t/C t-1	0.0094	0.0816	-0.4951	-0.0227	0.0043	0.0328	0.5015	
	ln R t/R t-1	0.0041	0.0777	-0.5630	-0.0223	-0.0019	0.0228	0.5522	
	ln A t/R t	2.2940	1.3023	-4.4576	1.3406	2.3696	2.9307	10.4686	
	ln L t/R t	-1.6748	0.9526	-9.4928	-2.3051	-1.7783	-0.7692	4.8141	

2. The results of analysis

In the panel data analysis, three models were used for verification: the pooled model, the fixed effect model, and the random effect model. Then, the author conducts a Hausman test to confirm the result of the most effective model. The results of these analyses using models from I to III are shown in Tables 2 to 4, respectively.

Beginning with the confirmation of the analysis results of model I in Table 2, the Hausman test indicate that the most effective model before the amalgamation is the random effect model, while after the amalgamation, the fixed-effect model is most effective. In the samples before the amalgamation, $\beta 1$ is 0.5117 and $\beta 1 + \beta 2$ are 0.6788. This result shows that when revenue increases 1%, then costs are increased 0.5177%, conversely the revenue decreases 1%, then costs are decreased 0.6788%.

Thus, costs changes ratio when revenue increases are larger than 1 when revenue decreases (i.e., anti-sticky costs). Meanwhile, in the samples after the amalgamation, $\beta 1$ is 0.6746 and $\beta 1 + \beta 2$ are 0.3380, which indicates the occurrence of sticky costs. Therefore, costs changes ratio when revenue increases are smaller than 1 when revenue decreases (i.e., sticky costs). These analysis results suggest that the cost adjustment capabilities decreased after the amalgamation, which supports hypothesis 1.

Table 2. The before / after cost behavior results using Model I

	Before amalgamation	After amalgamation
β_0	0.0058 ***	0.0000
	5.50	0.02
β_1	0.5117 ***	0.6746 ***
	30.33	44.35
β_2	0.1671 ***	-0.3366 ***
	5.58	-12.49
Adj.R^2	0.2515	0.2711
N	7,882	9,128
DW	2.2055	2.3959
H-Test p-value	0.6827	0.0000
Model	Random effect	Fixed effect

Table 3. The results of time trend tests using Model II

β_0	0.0039 ***
	3.90
β_1	0.6019 ***
	49.29
β_2	-0.0238
	-0.91
β_3	-0.0006 **
	-2.27
β_4	-0.0381 ***
	-7.82
Adj.R^2	0.2431
N	17,010
DW	2.4361
H-Test p-value	0.0037
Model	Fixed effects

For β_0, β_1, and β_2, the upper value is the coefficient estimate and the lower value is the t-statistic, *significant at the 10% level, **significant at the 5% level, ***significant at the 1% level, N=Number of observations, Adj.R^2= Adjusted R^2, DW = Durbin-Watson ratio, H-Test = Hausman Test.

Next, the author confirms the change in post-amalgamation cost behavior. The analysis results are shown in Table 3. Changes in sticky costs over time can be confirmed by β_4 and it indicates a negative value of -0.0381. Thus, sticky costs are strengthened as time passes following amalgamations, supporting hypothesis 2.

For β_0, β_1, β_2, β_3, and β_4, the upper value is the coefficient estimate and the lower value is the t-statistic, *significant at the 10% level, **significant at the 5% level, ***significant at the 1% level, N=Number of observations, Adj.R^2= Adjusted R^2, DW = Durbin-Watson ratio, H-Test = Hausman Test.

Next, the author verifies whether resource adjustment costs with expanding management resources due to the amalgamations affect the amalgamated LPEs' cost behavior using Model III. The results are shown in Table 4.

The author performs a panel data analysis on the samples before and after the amalgamation, and this analysis shows that the fixed effect model is supported both before and after the amalgamation.

Regarding hypothesis 3, the influence of total assets is verified in terms of β_5. The negative value of -0.0641 before the amalgamation increased to -0.1328 afterwards. This result

reveals that the influence of material resources on sticky costs strengthened after the amalgamation, which supports hypothesis 3.

Lastly, regarding hypothesis 4, the influence of human resources is indicated by β_6. The negative value of -0.2253 before the amalgamation decreases to -0.0809 afterwards, which confirms that the influence of human resources on sticky costs weakens after the amalgamation. Therefore, hypothesis 4 is not supported.

Table 4. The influence of total assets and labor costs using Model III

	Before amalgamation	After amalgamation
β_0	0.0216	0.0590 ***
	1.26	5.51
β_1	0.5180 ***	0.7214 ***
	23.57	48.50
β_2	0.0603	-0.1566 ***
	1.08	-4.43
β_3	0.0373 ***	-0.0011
	5.22	-0.29
β_4	0.0550 ***	0.0331 ***
	9.88	10.23
β_5	-0.0641 ***	-0.1328 ***
	-2.76	-9.92
β_6	-0.2253 ***	-0.0809 ***
	-7.21	-4.09
Adj.R^2	0.2255	0.3368
N	7,776	8,722
DW	2.6022	2.4313
H-Test p-value	0.0000	0.0000
Model	Fixed effect	Fixed effect

For β_0 to β_6, the upper value is the coefficient estimate and the lower value is the t-statistic, *significant at the 10% level, **significant at the 5% level, ***significant at the 1% level, N=Number of observations, Adj.R^2 = Adjusted R^2, DW = Durbin-Watson ratio, H-Test = Hausman Test.

(6) Conclusion

In this study, the author examines how the cost behavior of Japanese local public enterprises changes before and after municipal amalgamations, focusing on the relationship between amalgamations and resource adjustment costs as a factor in asymmetric cost behavior.

This study finds some interesting results through the comparison between pre- and post-amalgamation. First, sticky costs are revealed in the sample of post-merging LPEs. Hence, amalgamations tended to strengthen sticky costs on average. Second, it is clarified that the post-amalgamation sticky cost is affected by the adjustment costs of material resources. Third, on the contrary, the influence of human resources adjustment costs weakens the post-amalgamation cost behavior. The author supposes that these results are induced from two aspects; organization size and management resources.

First, I argue that it is difficult to make quick cost management decisions when the size of an organization increases due to an amalgamation because of the inefficiency of the functional organizational structure and the influence of the specific approval system (i.e., the "Ringi" system) in Japanese organizations. In public organizations, including LPEs, a functional organizational system is adopted. Then, as the organization scale expands, job divisions are subdivided and become more specialized. The middle-bottom-up type of decision-making is usually adopted in Japan rather than top down decision-making (Ala and Cordeiro, 1999). For this reason, it is necessary to form a consensus among departments for cost management decision-making, which means that it takes a long time to make decisions (Martinsons and Davison, 2007).

Therefore, coordination of each opinion among departments becomes more complicated. In some cases, there is a possibility that opinions may conflict among departments, and, then, agency costs can also arise. As the result of amalgamations, the size of an organization also grows; the author conjectures that, for the cost management of LPEs, decision-making slows and flexible resource adjustment becomes more difficult after amalgamations.

Secondly, the author argues that the adjustment costs of management resources due to municipal amalgamations will have a negative impact on cost management. As the result of amalgamations, with the integration of management resources, subsequent resource adjustment becomes more difficult than it is before the amalgamation.

Especially, material resources acted to strengthen sticky costs after an amalgamation. This result may be due to the inability to abolish facilities or equipment because LPEs cannot discontinue utility service even if it is inefficient or unprofitable; i.e., the responsibility to support people's everyday lives. In other words, in the case of material resources, municipal amalgamations increase the committed capacity costs for LPEs' cost management.

Conversely, regarding human resources, the analysis yielded results which were surprisingly the opposite of the hypothesis. Namely, the human resource influence on the sticky costs tends to be weakened after amalgamation. LPE administrators manage to flexibly maintain their cost adjustment capabilities in the case of human resources. In other words, the LPEs managed to cover their cost adjustment ability in human resources in order to compensate for the decline in their cost adjustment ability for material resources. One of the reasons for the analysis results is the reduction in recruiting regular staff and instead adopting a large number of non-regular staff to restructure the administration[4]. Although dismissal of regular recruitment is restricted, the author supposes that at the time of employee retirement, they are converting to hire non- regular staff. As the result, administrators could be decrease the adjustment costs of human resources and may be able to maintain the flexibility of cost adjustment.

In future research, regarding with organization size, it is necessary to verify the relationship between sticky costs and the internal (in-corporating) effect of the functional organization system using empirical method. Regarding with management resources, more detailed analysis according to the characteristics of management resources is required to identify factors that affect sticky costs. Furthermore, it is necessary to analyze considering different business environments for each industry of LPEs. There is a continuing need for detailed investigations of and research on public organizations' asymmetric cost behavior, especially that of LPEs.

There is a continuing need for detailed investigations of and research on amalgamated LPEs' asymmetric cost behavior.

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[4] The number of non-regular employees increased from 456,000 in 2005 to 599,000 in 2012 according to "The report on temporary and part-time employees of local public officials" (Dec. 27, 2016), by the Ministry of Internal Affairs and Communications, Japan.

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Managers' Discretionary Behavior in Segment Reporting

: A Study Based on the Internal Data of Japanese Listed

Companies

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Abstract

        This paper verifies managers' discretionary behavior in segment reporting. Pseudo-segments were produced based on the internal data of companies and compared with their externally reported segments. As a result, it was found that before adopting the management approach (MA), the managers of Japanese companies tends to refrain from disclosing the results of non-competitive businesses that have a high present value or unprofitable businesses that have a low present value. This finding is consistent with the proprietary cost (PC) hypothesis and the agency cost (AC) hypothesis. Through the study of the situation after the adoption of the MA, it was confirmed that the ratio reporting pseudo-segments increased significantly. However, not all businesses are reported equally, and the managers still tends to refrain from disclosing the results of business segments whose PC or AC is large. Little evidence was found for indicating the restraint on the above-mentioned discretionary behavior. After the introduction of MA, I rather found some evidence implying the augmentation of this tendency. By using the internal and publicly disclosed data of Japanese listed companies, this study contributed by giving initial evidence of managers' discretionary behavior in the segmentation before the adoption of the MA and the effects of applying the MA on the behavior.

Keywords

Segment reporting, Discretionary Disclosure, Management Approach, Proprietary cost, Agency cost, Individual data

(1) Introduction

    This paper empirically elucidates, based on the internal data of publicly listed companies in Japan, the following two points: the motivation and method of segmentation by managers, and the effect of adopting the

management approach (MA) on managers' behavior towards the segmentation[1].

In the United States, where segment reporting was institutionalized ahead of any other countries, the segmentation was first virtually left to managers' full discretion under the standard called an industry approach (hereinafter referred to as the "IA") (FASB, 1976). There was a conspicuous trend suggesting that, under the IA, managers aggregated "segments for internal reporting purposes" (hereinafter referred to as "internal segments") and defined "segments for external reporting purposes" (hereinafter referred to as "external segments") for their own convenience. In the wake of criticism from the users of financial statements, the MA was adopted in the second half of the 1990s with the aim of decreasing room for managers' discretion (FASB, 1997). Following the United States, the MA was introduced to the International Financial Reporting Standards (IFRS) in 2010 and the Japanese generally accepted accounting principles (J-GAAP) in 2011 (IASB, 2006: ASBJ, 2008). Before the adoption of the MA, J-GAAP had employed the IA similar to that used in the United States.

However, regarding whether or not managers of Japanese companies actually defined external segments for their convenience, such anecdotes were told by practitioners but have not been verified in an academically reliable methodology. The effect of the introduction of the MA on managers' behavior towards segmentation has not been examined either. As segment reporting is essential for financial statement users, this issue is worth verifying on an academic level.

Considering these issues, this study examines whether or not the managers of Japanese companies aggregates internal segments in accordance with specific motivation and defines external segments[2] for their own convenience. However, internal segments are confidential information, and therefore, it is difficult to verify using only publicly disclosed data. In this research, I have directly observed the type of business in which each company has engaged and established pseudo-segments based on internal data, and then compared them with external segments. This study has made contributions by exhibiting the very first evidence regarding managers' discretionary behavior towards segmentation before adoption of the MA, and the effect and issues of the MA on their behavior, with the use of both internal and publicly available data of Japanese listed companies.

This research is composed of three parts. Firstly, I develop hypotheses for verification by overviewing the previous work on managers' discretionary behavior towards segmentation. Secondly, I describe the research design and the verification results. Finally, I summarize findings and mention limitations and future issues to address.

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[1] In this paper, segment reporting is used as a synonym of segment information disclosure. Furthermore, the segment information herein refers only to the "information reported for industry segments" before adoption of the MA and the "segment information" after the adoption.

[2] In this paper, while segments for internal reporting purposes refer to the segment used within a company for the purpose of internal management, segments for external reporting purposes mean the segment disclosed in the notes in financial statements.

(2) Previous Research and Hypotheses

1. Prior Research

In this section, I look back at prior studies related to this research. If segments were defined as they were, high-quality information was disclosed, and then the costs exceeded benefits[3], managers should have the motivation to lower information quality, that is, the disclosure costs through various efforts such as aggregating internal segments, within their discretion approved by accounting standards. What has been conventionally pointed out as the aforementioned costs is proprietary costs (PC), which is the cost incurred due to leakage of confidential information to competitors through segment reporting, creating competitive disadvantages.

Hayes and Lundholm (1996) conducted an analytical research, through which they have theoretically unraveled the PC generated due to segment reporting. Their research with a company running two businesses set as a model has, in an analytical manner, led to an economic consequence that, when there is an enormous gap in the profit margin between two of the company's businesses, segment reporting conveys information that supports the competitive strategy of competitors, that is, which of the two businesses has a larger future cash flow, competitors enter into

the company's product market, and finally the corporate value is impaired.

The research by Harris (1998) is the first to have demonstrated managers' discretionary behavior regarding segmentation. Taking the aforementioned theoretical analysis into account, she made an assumption that managers had the motivation of aggregating the business with a higher profit margin whose product market was more monopolistic or less competitive, and carried out examination using the following model with U.S. companies that provided segment reporting based on an IA (1987-1991):

$$
\begin{aligned}
Match_{ij} = \alpha &+ \beta_1\big(SpeedAdj_j\big) \\
&+ \beta_2\big(Con4_j \text{ or } IndHi_j\big) \\
&+ \sum Controls + \varepsilon_{ij}
\end{aligned}
\tag{1}
$$

The objective variable $Match_{ij}$ is a binary variable[4], which becomes 1 if business category j in which firm i engages is reported by segment or 0 if the category is not reported. The variables of interest are $SpeedAd_j$, $Con4_j$, and $IndHi_j$ ("the rate of adjustment of excess profits," "4-company concentration ratio," and "Herfindahl-Hirschman Index by business category" for business category j), which indicate that the greater these values are, the less intense the competition is in the relevant business category. As a result of logit estimation of Equation (1), the coefficients of all of the variables of interest were significantly

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[3] The benefits expected through high-quality segment reporting include effects on financing, such as a reduction in the cost of capital.

[4] In Compustat's database at that time, while North American Standard Industry Codes (SIC) were

contained for the business categories in which companies engaged, a maximum of two SICs were given to each segment. $Match_{ij}$ was identified as 1 when the former was included in the latter on the 3-digit basis, and 0 when not included.

negative, suggesting that the managers did not report segments for less competitive businesses.

The finding by Harris (1998) has been further verified in ensuing studies by other researchers, as a PC hypothesis that "managers hold the motivation to prevent the performance of their companies' less competitive businesses with greater excess profits from being disclosed to other enterprises through segment reporting." Harris (1998) calculated the variable of the market concentration ratio using only the data of listed companies, from which, however, glaring errors resulted; thus, the opinion that unlisted public companies should also be included is prevailing today[5].

In the second half of the 1990s, the MA was adopted in the United States. Comparing the data before the adoption with post-adoption data, Berger and Hann (2007) analyzed the characteristics of the newly disclosed segments, in other words, the segments concealed before the MA was introduced. The research had an important contribution by taking up not only the PC hypothesis, but also the agency cost (AC) hypothesis for discussion. The AC hypothesis proposes that managers hold the motivation to prevent stakeholders, such as shareholders, from recognizing their poorly performing businesses through segment reporting, on the assumption that opportunity costs are inflicted because the

managers do not withdraw from the stagnant business due to their moral hazard. As a result of verification with a model being based on the study by Harris (1998), several pieces of robust evidence that supports the AC hypothesis (suggesting that businesses with a lower excessive profit margin are concealed before the MA is adopted) and several pieces of weak evidence that supports the PC hypothesis (suggesting that businesses with a higher excessive profit margin are concealed before the adoption)[6] were obtained in the research.

However, while being intended to identify how external segments were aggregated against internal segments, these empirical studies observed internal segments only indirectly. I consider Harris (1998) based on a strong assumption that the businesses managers did not want to disclose to third parties were contained in the commercial database[7], while Berger and Hann (2007) made a potent supposition that all the segments newly disclosed after the MA was adopted were concealed by managers, therefore, their studies possibly failed to properly identify internal segments.

It is Bens et al. (2011) who overcame this point. Their study established pseudo-segments based on data by factory in the manufacturing industry and compared them with external segments, using individual data of a

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[5] As a result of an replication study for Harris (1998) by calculating the variable of the concentration ratio using the data of a U.S. census survey that included both listed and unlisted companies, Ali et al. (2009) reported that the coefficient of the variable did not become significant.

[6] Botosan and Stanford (2005) also obtained a weak evidence consistent with the PC hypothesis arguing that

the segments newly disclosed after MA adoption are relatively less competitive and have a higher excessive profit margin.

[7] Because the commercial database is on the premise of publication, the managers is unlikely to declare all businesses as they are.

U.S. census survey. As a result of an analysis with a model based on the research by Harris (1998), evidence that supports both the PC and AC hypotheses was acquired. Although the number of sample companies was only 1,625 firms-years in the period before the MA was adopted (1987, 1992, and 1997), the study directly observed internal segments, contributing considerably to shedding light on the managers' discretionary behavior.

These are the previous studies pertinent to this research; however, their findings are limited. That is, the only fact revealed is that, while being given ample room for discretion before adoption of the MA, managers aggregated business with the considerable PC or AC accompanying segment reporting into other segments and suppressed their business results. No study has included in the matters for discussion whether or not managers' discretionary behavior changed following the MA adoption.

2. Hypotheses

In this section, I develop hypotheses. The Accounting Standards Board of Japan (ASBJ) pointed out that there was criticism before adoption of the MA, which mentioned that segmentation was insufficient and information disclosure did not properly reflect diversified management[8]. The Japanese industrial circle had strongly opposed institutionalization of segment reporting, citing as a major reason that the PC accompanying segment reporting, such as leakage of confidential information, was enormous[9]. As the government has traditionally regulated industries and the practice of cooperative transactions through affiliates has existed in Japan, the PC becomes relatively huge when highly profitable businesses are revealed through segment reporting. Meanwhile, the reality is that Japanese companies, compared to the U.S. and European enterprises, have held less profitable businesses (Industrial Structure Council, 2017). This means that the AC, too, becomes comparatively considerable when businesses with low profit margins are articulated through segment reporting. The larger

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[8] The Theme Advisory Council of the Accounting Standards Board of Japan (November 2001) pointed out that nearly 20% of large-sized leading companies in Japan, at that time, seemingly, made financial reporting in a single segment, or had not established industry segments on the ground that the importance was minor; thus, it was necessary to consider a method of determining viable business segments, including consideration for "the management approach in the United States" (ASBJ, 2008, para. 42). Furthermore, upon establishing Statement No. 17: *Accounting*

Standard for Disclosures about Segments of an Enterprise and Related Information, the Board indicated that, regarding the conventional way of disclosing segment information, some held negative opinions that segmentation was not sufficiently and therefore the expectations of financial statement users were possibly not be satisfied, and that information disclosure did not properly reflect diversification of corporate management (ASBJ, 2008, para. 47).

[9] Yamaji et al. (1994) analyzed the process of the institutionalization in detail.

relevant costs are, the bigger incentives managers have. In addition, the managers were given the discretion of freely segmentation before the MA was employed. Based on these points, I formulate hypotheses as follows. In this research, hypotheses are described in the form of the alternative hypothesis.

> *H1-1 (H1-2): Businesses with the higher PC (AC) accompanying segment reporting are aggregated into other segments before adoption of the MA.*

The MA was adopted in the fiscal year ended March 2011. Since the adoption, managers have not been granted, in principle, liberty to aggregate segments and been forced to define external segments in faithful conformity to internal segments. I expect that the situation in which external segments are too few compared with internal segments will be ameliorated, given that other conditions are fixed. Thus, I formulate the following hypothesis:

> *H2: The degree to which each business is reported by segment becomes greater after adoption of the MA.*

It is difficult, however, to offer an across-the-board prediction about how H1 changes after MA is adopted. Firstly, on the premise that a business with the larger PC (AC) is

independent as an internal segment, is identified as an operating segment, and serves as a reportable segment as it is, I infer that H1 is mitigated according to the trend of H2 after adoption of the MA.

Meanwhile, there are two factors based on which I presume that H1 is not ameliorated. The first factor is associated with the room for the managers' discretion. In determining reportable segments based on the MA, it is allowed to apply the aggregation criteria after "operating segments" are identified (ASBJ, 2008, para. 6-11). Here, as operating segments are identified based on the unit of actual internal performance evaluation, room for managers' discretion is fundamentally eliminated; however, there is room for discretion for applying the criteria [10], therefore, there is a possibility that the managers intentionally aggregate a specific business into another segment by applying the criteria. In fact, the Financial Accounting Foundation (FAF) pointed out that, as a result of a review after the segment accounting standard (FASB, 1997) was applied, investors recognized that determination on reportable segments involved managers' judgment, and, in particular, that managers avoided disclosing competitive confidential information and poorly performing businesses by applying the aggregation criteria (FAF, 2012, pp. 7-8). The U.S. Securities and Exchange Commission (SEC) has also seen this point as a problem. Wang (2016)

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[10] Managers were given discretion for freely segmentation under an IA; however, under the MA, application of the "aggregation criteria" has been approved for determining reportable segments only after business segments have been identified according to the units of internal business performance evaluation.

Managers' arbitrariness is highly likely to intervene in segmentation under an IA, and in application of the "aggregation criteria" under the MA. Please refer to Asano (2018, pp. 101-104) for details of the differences between an IA and the MA, including room for the managers' discretion.

has revealed, through analysis of 1,392 comment letters (from August 2004 to July 2007) concerning cases where segment reporting was improved after the review[11] by the SEC for legal disclosure documents, that half of the letters were related to "segment identification and aggregation" and that the greater companies' PC accompanying segment reporting was, the more the companies were subjected to the letters. Based on the aforementioned facts, specific businesses are possibly aggregated into other segments in an arbitrary manner through application of the aggregation criteria" even after the MA has been adopted, and H1 is facilitated in aspects different from that before the adoption.

The second factor is relevant to the characteristics intrinsic to the MA. The MA only requires identifying operating segments existing in an enterprise and does not ask whether or not business with different profit margins are intermingled there. I presume that the person in charge of a department often assumes responsibility for business with different profit margins particularly when the department is highly independent and higher authority is given to the person in charge. In such cases, H1 is likely to be actually facilitated when the managers strictly apply the MA.

As the above-mentioned factors affect each other in a complex manner and it is impossible to identify beforehand the direction of a change which will eventually develop to H1, I will set the following hypotheses:

H3-1a (H3-2a): The trend that businesses with the higher PC (AC) accompanying segment reporting are aggregated into other segments (H1) is ameliorated after adoption of the MA.

H3-1b (H3-2b): The trend that businesses with the higher PC (AC) accompanying segment reporting are aggregated into other segments (H1) is facilitated after adoption of the MA.

(3) Research Design

1. Data

In this section, I describe the data used in verification. To begin with, I establish pseudo-segments for each listed company based on the internal data of the companies. Internal data are the individual data of the "Basic Survey of Business Structure and Activities" by the Ministry of Economy, Trade and Industry of Japan (METI) (hereinafter referred to as "the Basic Survey"). The Basic Survey is a fundamental statistical survey in accordance with the Statistics Act, which covers about 37,000 companies all over Japan, excluding some business categories, and collects information, such as "financial statement accounts" and "sales breakdown."

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[11] The review was executed in accordance with Article 408 of the Sarbanes–Oxley Act (officially referred to as the Public Company Accounting Reform and Investor Protection Act of 2002, or SOX Act for short), and the comment letters have been disclosed in the Electronic Data-Gathering, Analysis, and Retrieval system (EDGAR).

Table 1   Definition of Variables

Variable Name	Variable Definition
(1) $Match_{ij}$	Binary variable, which is 1 when the industrial code for the pseudo-segment j of Company i accords with the industrial code of the segment file of Company i based on Nikkei NEEDS, and 0 when the codes do not match each other.
(2) (3) ROA_High_j (Low_j)	[High (low) ROA dummy] Binary variable, which will be 1 when the median of Return on Asset (ROA) in Business Category j is in the 5th quintile of all the companies (the first quintile), and 0 otherwise.
(4) (5) PBR_High_j (Low_j)	[High (low) ROA dummy] Binary variable, which will be 1 when the median of the Price Book-value Ratio (PBR) in Business Category j is in the 5th quintile of all the companies (the 1st quintile), and 0 otherwise.
(6) $Con4_j$	[4 company concentration ratio] Total sales of the leading 4 companies in Business Category j ÷ Total sales of all the companies in Business Category j.
(7) $IndHi_j$	[Herfindahl-Hirschman Index by business category] Σ (Sales of each company in Business Category j ÷ Total sales of all the companies in Business Category j)^2.
(8) $Post\_MA_i$	[Dummy after MA adoption] Binary variable, which will be 1 when Company i is in the period after the MA has been adopted, or 0 when in the period before the adoption.
Control variables:	
(9) $Private_j$	[Proportion of unlisted companies] (Total sales of unlisted public companies ÷ Total sales of all the companies) in Business Category j.
(10) $Barrier_j$	[Barrier to entry] Median of (Fixed assets ÷ Total assets) in Business Category j.
(11) $Fsize_i$	[Corporate scale] Natural logarithm of the total assets of Company i.
(12) $IntSegN_i$	[Number of pseudo-segments] The number of pseudo-segments of Company i based on the Basic Survey.
(13) $IntSegSize_{ij}$	[Scale of pseudo-segment] (Sales in Business Category j ÷ Total sales) of Company i based on the Basic Survey.

Note: Although the variables of *ROA_High* (*Low*), *Private*, and *Barrier* are based on listed and unlisted companies contained in the Basic Survey, companies with advanced diversification (which means that the major product accounts for less than 70%) are excluded in order to accurately measure the situation of the business category. *PBR_High* (*Low*) was calculated based on the sample of this research (in accordance with the industrial classification based on Nikkei's middle classification). *Con4* and *IndHi* were calculated based on the sales included in the Basic Survey Segment File.

Two processes, however, are required in order to use the data for analyzing listed companies. Firstly, as either a flag that indicates whether or not a company is listed or a common ID to link to the commercial database, such as a securities number, has not been given to the data, in this research, I identified listed companies and gave common IDs in accordance with the procedure described in Appendix A "Procedure for Linking Nikkei NEEDS with Data from Basic Survey of Business Structure and Activities." Secondly, it is necessary to aggregate data on a consolidated basis because the data from the Basic Survey

are on an individual company basis while segment information is on a consolidated basis. Regarding this point, I also followed the procedure contained in Appendix A for building a consolidated-based database.

I use the data of "sales breakdown" from the Basic Survey for setting up pseudo-segments. The "corporate group-based sales breakdown" created through the aforementioned processes (hereinafter referred to as "the Basic Survey Segment File") contains sales by business category, and the name and code of the business categories. The industrial classification of the Basic Survey is revised relatively frequently and is not consistent with either the Japanese Standard Industrial Classification codes or the Nikkei industrial classification codes. In accordance with the procedure stated in Appendix B "Business Category Arrangement," I unified the industrial code of the Basic Survey in chronological order and created a conversion table for linking the codes with other business category codes.

I use the data from the Basic Survey for purposes other than establishment of pseudo-segments. I use the data of "financial statement accounts" for setting up variables by business category, such as product market concentration rate. As the opinion that major errors arise if product market variables are based only on the data of listed companies is prevailing, I make calculation based on the individual data from the Basic Survey that covers about 37,000 companies each year, including unlisted companies.

In addition to the aforementioned Basic Survey data, I obtained financial data, including the publicly available segment data of listed companies, from Nikkei NEEDS FinancialQUEST2.0 (hereinafter referred to as "Nikkei NEEDS").

2. Regression Model

This research verifies the above-mentioned hypotheses through logit estimation with the following equation set as a basic model. Based on the study by Harris (1998) as the previous study did as discussed in Section 2.1, I have derived the equation below, intending to examine whether or not the probability that businesses with the greater PC (AC) accompanying segment reporting are aggregated into other segments is strong. The definition of each variable is as described in Table 1.

$$
\begin{aligned}
Match_{ij} &= \alpha + \beta_1\big(ROA\_High_j\big) \\
&+ \beta_2\big(ROA\_Low_j\big) + \beta_3\big(PBR\_High_j\big) \\
&+ \beta_4\big(PBR\_Low_j\big) + \beta_5\big(Con4[IndHi]_j\big) \\
&+ \sum Controls + \varepsilon_{ij}
\end{aligned} \tag{2}
$$

First of all, I describe the method of establishing the objective variable, *Match*. As mentioned above, while an industrial code is given for each pseudo-segment in the Basic Survey Segment File, a maximum of three industrial codes are given by external segment in the segment file of Nikkei NEEDS. *Match* is a binary variable that, after being matched against the code of Nikkei NEEDS for each pseudo-segment, becomes 1 when the pseudo-segment accords with the Nikkei code, or 0

when they are not congruent with each other. The variable indicates that, when it is 1, the pseudo-segment is reported, and in contrast, that the pseudo-segment is aggregated into another segment and is not reported as an independent external segment when it is 0.

The independent variable includes the following as proxy variables for the PC (AC): (1) *ROA_High* (*Low*) [high (low) ROA dummy] and (2) *PBR_High* (*Low*) [high (low) PBR dummy]. I deem both to be the proxy variables for the PC (AC), considering that competitors, shareholders, and other stakeholders have interest in not only (1) the current profit margin but also (2) the future cash flow of each business. The actual values of (1) Return on Asset (ROA) and (2) Price Book-value Ratio (PBR) are not available even from the Basic Survey Segment File, thus, I use the median of each business category as each expectation[12]. Although (1) profit margin also includes Return on Sales (ROS), the ROS correlates negatively with an asset turnover ratio, which means that it contains errors, and

therefore, I use *ROA_High* (*Low*) as a scale for profit margin variances among industries[13]. However, I report the results of estimation using *ROS_High* (*Low*) for checking the robustness.

Although the variables of *ROA_High* (*Low*), *Private*, and *Barrier* are based on listed and unlisted companies contained in the Basic Survey, companies with advanced diversification (which means that the major product accounts for less than 70%) are excluded in order to accurately measure the situation of the business category. *PBR_High* (*Low*) was calculated based on the sample of this research (in accordance with the industrial classification based on Nikkei's middle classification). *Con4* and *IndHi* were calculated based on the sales included in the Basic Survey Segment File.

Furthermore, I include (3) *Con4* [4 company concentration ratio] and *IndHi* [Herfindahl-Hirschman Index by business category] as the proxy variables for the PC[14].

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[12] Because the Basic Survey Segment File includes only sales for each business category, and the name and code of the industries, it is impossible to calculate the profit margin by pseudo-segment, and thus, I have to rely on the expected value by business category.

[13] The reason why ROS is not suited to measuring the profit margin variance among industries is that ROS is susceptible to asset turnover ratio. According to our examination utilizing the data by business category which are used in this research, it happens not infrequently, compared to other business categories, that "ROA is high, ROS is low, and asset turnover ratio is high" in categories which handle characteristic products among wholesalers and retailers and that "ROA is low, ROS is high, and asset turnover ratio is low"

in the categories being on the decline in the manufacturing industry. This means that application of ROS as a profit margin scale will contribute to underestimation of the former while resulting in overestimation of the latter.

[14] In the prior research such as Harris (1998), *SpeedAdj* (Adjustment Speed Adjustment Speed) is used as a variable of the competitive situation of the product market, but this variable takes the same sign not only for PC but also for AC hypothesis (Bens et al. 2011). In the framework of this study, which covers both PC and AC hypothesis, it is difficult to clearly rationalize this variable, so it is not included in the verification. I would like to set as future challenges to be left.

In addition to the aforementioned note-worthy variables, in reference to the previous work, I include variables that control factors affecting the objective variable *Match*. With respect to the plus and minus signs of the co-efficient of each variable, I deduce the follow-ing: the variable *Private* becomes negative as the greater the number of private companies a business category has, the higher the cost related to segment reporting is in the cate-gory; *Barrier* becomes positive because the higher the barriers to entry are, the lower the cost associated with segment reporting is; *Fsize* becomes positive since the larger the scale of a company is, the more positive stance the company takes towards financial report-ing; *IntSegN* becomes negative because the larger the number of pseudo-segments is, the greater the possibility of aggregation of the pseudo-segments is; and *IntSegSize* becomes positive as the more considerable the scale of pseudo-segments is, the higher the chance that companies submit reports is.

I estimate Equation (2) with the sample before adoption of the MA regarding H1. H1-1 is supported when the coefficients of the proxy variables for the PC (*ROA_High*, *PBR_High*, *Con4*, and *IndHi*) become signifi-cantly negative, and H1-2 is confirmed when the coefficients of the proxy variables for the AC (*ROA_Low* and *PBR_Low*) are signifi-cantly negative.

Meanwhile, concerning H2 and H3, I es-timate an equation, which is obtained by add-ing *Post_MA* [dummy after adoption of the MA], and the cross term of its variable and the aforementioned proxy variables for the PC and AC, to Equation (2), based on all the sam-ples. In the estimation, when the coefficient of

Post_MA becomes significantly positive, H2 is proven. Furthermore, H3-1a (H3-1b) is sup-ported when the coefficient of the cross term of the proxy variables for the PC and *Post_MA* becomes significantly positive (negative), and H3-2a (H3-2b) is confirmed when the coeffi-cient of the cross term of the proxy variables for the AC and *Post_MA* becomes signifi-cantly positive (negative).

3. Sample

The samples used in this research are pseudo-segments of listed companies. I classi-fied sample selection into the following as shown in Table 2: (1) selection of listed com-panies based on Nikkei NEEDS and (2) selec-tion of pseudo-segments based on the Basic Survey.

In (1), I selected 14,710 firms-years, which satisfy the following conditions: they are not in industries other than construction, finance, and real estate, they are listed on the first or second section of the Tokyo, Osaka, or Nagoya Stock Exchange in the period be-tween 2000 and 2015, the fiscal year ends in March and an accounting period is for 12 months, the J-GAAP are applied, and consol-idated financial statements and segment in-formation are disclosed. I excluded the afore-mentioned business categories in order to avoid the possibility that the Basic Survey data have not been collected in the long term or that the level of accuracy of variables drops due to broad industry classification.

Then, in (2), I linked the Basic Survey Segment File to the companies selected above.

The percentage of companies that I failed to link here is only 16% (2,370 firms-years / 14,710 firms-years), indicating how high the response rate and data management standard of the Basic Survey is. Finally, I selected firms-pseudo-segments-years, excluding

business categories whose Basic Survey data were not collected in the long term based on the industrial codes given to the pseudo-segments or whose industrial classification was not accurate enough.

Table 2　Sample Selection

	firms-pseudo-segments-years	firms-years
(1) Selection of listed companies based on Nikkei NEEDS		
Firms listed on 1st or 2nd sections of Tokyo, Osaka, or Nagoya Stock Exchanges (2000 – 2015)		40,424
Less firms that are in construction, finance, real estate, and transport industries, whose fiscal year ends in other than March or accounting period is not for 12 months, and that do not disclose consolidated financial statements		(18,658)
Less firms that apply the accounting standards other than the J-GAAP		(560)
Less firms that do not disclose segment information		(6,496)
Sub total		14,710
(2) Selection of pseudo-segments based on Basic Survey		
Less linkage with Basic Survey: firms that do not have, in Basic Survey, industrial codes, sales by industry, and other data necessary for linking to Nikkei NEEDS	91,844	(2,370)
Less firms whose pseudo-segment falls under any of the following business categories: Construction, transport and postal activities, finance/insurance, real estate/goods rental and leasing, medical services/social welfare, compound services, and other	(13,062)	(139)
Final sample (firms-pseudo-segments-years)	78,782	12,201

(4) Results

1. Descriptive Statistics

　　Table 3 shows descriptive statistics of the number of pseudo-segments, the number of external segments, and the variables used in

verification of the hypotheses. I present the statistical values of the samples before adoption of the MA separately from those after the adoption in an attempt to observe the changes before and after the MA was introduced.

　　Panel A shows statistics of the numbers of pseudo-segments and external segments

per company. Before adoption of the MA, the average proportion of the number of external segments to the number of pseudo-segments was 44.7% (3.39 / 7.58), which is slightly less than 50%. Furthermore, while the standard deviation of the number of pseudo-segments was considerable (7.12) and the status of diversification in reality varied substantially from company to company, the standard deviation of the number of external segments was slight (1.25) and I observed that the number of external segments tended strongly to be around 3 regardless of the progress with diversification. This trend remained almost unchanged after the MA was adopted[15].

Panel B shows the basic statistics and correlation of the variables used in verification of the hypotheses. To begin with, I focus on the samples before adoption of the MA. The mean value of Match is 0.295, indicating that the ratio of pseudo-segments reported as an independent external segment is 29.5%. The means of *ROA_High* (*PBR_High*) and *ROA_Low* (*PBR_Low*) are 0.193 (0.241) and 0.141 (0.145), respectively, which suggests that sample companies have engaged more in business categories with greater profit margins and future cash flows than less profitable industries with smaller future cash flows. Secondly, regarding correlation coefficients, the proxy variables for the PC (AC), excluding *Con4* and *IndHi*, relate negatively to *Match* and therefore consistent with H1-1 (H1-2).

The correlation coefficients of *ROA_High* (*PBR_High*) and *ROA_Low* (*PBR_Low*) are 0.41 at the maximum, meaning that both of them grasp different factors as inferred in Section (3) 2. The correlation coefficients of *Con4* and *IndHi* have reached 0.99 (Spearman's rank correlation coefficient), and I deem both of them, as the product market concentration rate, to be almost the same as each other in terms of scale.

Next, I cast a spotlight on the samples after the adoption. The mean value of *Match* stands at 0.320, which increased by 0.025 from the mean before the MA adoption. This proposes that the percentage of the pseudo-segment reported as independent external segments has risen by 2.5%, which is consistent with H2. Other mean values than that of *Match* remain nearly unchanged; however, *PBR_Low* has grown about 10%, suggesting that the proportion of companies that have recently devoted to businesses with less future cash flows, that is, the larger AC accompanying segment reporting, is rising. There is a high possibility that Japanese companies have not rearranged their business portfolios appropriately against the modern-day changes in the industrial structure.

The proxy variables for the PC (AC) and *Match* correlated negatively with each other, excluding *ROA_Low* and *Con4*, and the correlation, compared to that before the MA was adopted, tended to expand in the negative

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[15] Nakano (2016) studied the change in the number of external segments before and after adoption of the MA. The research presented evidence demonstrating that the number of external segments increased both before and after the adoption, including single-segment companies; however, the number of external segments

slightly decreased when it came solely to multiple-segment companies. As the samples of this research were limited to multiple-segment companies, the results concerning the number of external segments (Panel A, Table 3) conforms to the evidence.

direction. The trend is consistent with H3-1b (H3-2b). On the other hand, as far as correlation coefficients are concerned, I do not detect

almost no trend that is in conformance with H3-1a (H3-2a).

Table 3   Descriptive Statistics

Panel A   Pseudo-Segment vs. External Segment

	Before MA (n = 54,149)			After MA (n = 24,633)		
	mean	median	standard deviation	mean	median	standard deviation
No. of pseudo-segments	7.58	5	7.12	7.39	5	7.35
No. of external segments	3.39	3	1.25	3.29	3	1.27

Panel B   Basic Statistics and Correlation of Variables

	Before MA (n = 54,149)									After MA (n = 24,633)								
	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Match	0.295	0.456		-0.02	-0.04	-0.06	-0.03	0.02	0.03	0.320	0.466		-0.09	0.00	-0.10	-0.11	0.01	0.02
(2) ROA_High	0.193	0.394	-0.02		-0.20	0.41	-0.16	0.09	0.09	0.212	0.409	-0.09		-0.19	0.26	-0.27	0.08	0.06
(3) ROA_Low	0.141	0.348	-0.04	-0.20		-0.05	0.06	-0.03	-0.03	0.119	0.324	0.00	-0.19		-0.02	0.06	0.07	0.08
(4) PBR_High	0.241	0.428	-0.06	0.41	-0.05		-0.23	0.13	0.13	0.242	0.429	-0.10	0.26	-0.02		-0.33	0.21	0.21
(5) PBR_Low	0.145	0.352	-0.03	-0.16	0.06	-0.23		-0.01	-0.02	0.253	0.435	-0.11	-0.27	0.06	-0.33		-0.18	-0.19
(6) Con4	0.274	0.132	0.03	0.08	-0.02	0.16	-0.03		0.99	0.276	0.139	0.00	0.06	0.09	0.22	-0.19		0.99
(7) IndHi	0.037	0.040	0.02	0.08	-0.02	0.19	-0.06	0.89		0.038	0.043	-0.02	0.05	0.07	0.23	-0.17	0.89	

Note: In this table, the control variable is omitted. Regarding correlation, values in the lower part of the diagonal are the Pearson's correlation coefficient and those in the upper part are the Spearman's rank correlation coefficient, and the bold-faced values indicate they are significant at the level of 10% (two-sided test).

2. Verification Results of Hypotheses

The results of the verification of the hypotheses are as shown in Table 4. Although the control variable is omitted due to the paper size limitation, the signs of all the variables, excluding *Fsize*, are as presumed in all the estimations.

Firstly, I pay attention to columns (1) of Table 4 based on the samples before adoption of the MA. As the coefficients of *PBR_High*, *Con4*, and *IndHi*, all of which serve as a proxy for the PC, were significantly negative, H1-1

(Businesses with the higher PC accompanying segment reporting are aggregated into other segments before adoption of the MA) was supported. The coefficient of *ROA_High* was significantly positive, which was not consistent with H1-1. Meanwhile, the coefficients of *ROA_Low* and *PBR_Low* as the proxy for the AC were significantly negative, and therefore, H1-2 (businesses with the higher AC accompanying segment reporting are aggregated into other segments before adoption of the MA) was supported. These results have indicated a significantly strong probability

that, before adopting the MA, the managers aggregated less competitive businesses with more enormous present value, or less

profitable businesses with lower present value into other segments and did not report them as independent segments.

Table 4   Verification Results of Hypotheses

Independent Variable	Expected Sign	(1) Samples before MA		(2) All Samples	
		(1.1)	(1.2)	(2.1)	(2.2)
Post_MA	+			0.728***	0.744***
				(7.83)	(10.44)
ROA_High	-	0.347***	0.356***	0.325***	0.333***
		(6.05)	(6.20)	(5.67)	(5.82)
ROA_High × Post_MA	±			-0.400***	-0.404***
				(-4.92)	(-4.96)
ROA_Low	-	-0.260***	-0.265***	-0.262***	-0.267***
		(-4.60)	(-4.69)	(-4.62)	(-4.70)
ROA_Low × Post_MA	±			0.122	0.126
				(1.43)	(1.48)
PBR_High	-	-0.268***	-0.265***	-0.242***	-0.240***
		(-4.71)	(-4.66)	(-4.25)	(-4.22)
PBR_High × Post_MA	±			-0.358***	-0.344***
				(-4.37)	(-4.22)
PBR_Low	-	-0.151**	-0.161**	-0.182**	-0.191***
		(-2.15)	(-2.31)	(-2.52)	(-2.65)
PBR_Low × Post_MA	±			-0.333***	-0.319***
				(-3.35)	(-3.21)
Con4	-	-1.149***		-1.033***	
		(-5.19)		(-4.80)	
Con4 × Post_MA	±			-0.0635	
				(-0.25)	
IndHi	-		-4.027***		-3.538***
			(-5.51)		(-5.03)
IndHi × Post_MA	±				-1.001
					(-1.11)
Year effect		included	included	included	included
Observations		54,149	54,149	78,782	78,782
Pseudo-R^2		0.211	0.211	0.226	0.227

Note: *, **, and *** represent statistical significance at the levels of 10%, 5% and 1%, respectively (two-sided test). Equation (2) was estimated through logit regression. The numerical values shown in parentheses are the Z value based on the robust standard deviation with the corporate cluster adjusted. The intercept and control variable are omitted here.

Secondly, I give our attention to columns (2) of Table 4 based on all the samples. The coefficient of *Post_MA* was 0.728 in (2.1) and 0.744 in (2.2), both of which were significantly positive; thus, H2 (The degree to which each business is reported by segment becomes greater after adoption of the MA) was supported. With the scale of the coefficient being

brought into shape, when other variables were fixed, in both estimations, the extent to which the pseudo-segments are reported became 2.1 times higher, or up 11%, from that before the adoption [16], which is a powerful piece of evidence that indicates the actual development of positive effects of the MA adoption.

[16] Based on the odds ratio and the mean value of the marginal utility.

Then, regarding H3, I focus on the cross terms of the proxy variables for the PC [*ROA_High*, *PBR_High*, *Con4*, and *IndHi*] and those for the AC [*ROA_Low* and *PBR_Low*], and *Post_MA*. Among the cross terms, as no cross term had a significantly positive coefficient, H3-1a (H3-2a) (The trend that businesses with the higher PC (AC) accompanying segment reporting are aggregated into other segments (H1) is ameliorated after adoption of the MA) was not supported at all. On the other hand, the coefficients of the respective cross terms between *Post_MA* and *ROA_High*, *PBR_High*, and *PBR_Low* were all significantly negative in both estimations, thus, concerning these variables, H3-1b (H3-2b) (The trend that businesses with the higher PC (AC) accompanying segment reporting are aggregated into other segments (H1) is facilitated after adoption of the MA) was supported; however, as the cross terms of *Post_MA* respectively with *ROA_Low*, *Con4*, and *IndHi* were not significant in either of the estimations, neither H3-1a (H3-2a) nor H3-1b (H3-2b) was supported for these variables.

According to the above-mentioned results in relation to H3, the trend that businesses with the greater PC (AC) accompanying segment reporting are aggregated into other segments remain strong, and any evidence on mitigation of the trend has not been obtained at all. In addition, some evidence indicating that the trend has been facilitated rather than mitigated after the adoption of the MA has been found.

In columns (2) of Table 4, I estimated only samples in 2006 and later because the MA had not been adopted for 11 years (2000-2010), which was long enough for the economic

environment to change in the post-adoption period; however, the estimation results shown in Table 4 are basically robust. Furthermore, according to the estimation I conducted by replacing *ROA_High* (*Low*) with *ROS_High* (*Low*), I confirmed that the sign of the coefficient of the variable was consistent with all the signs of the coefficients of the variables related to *ROA_High* (*Low*) in Table 3. Through a significance test, however, I found results different in that the coefficient of *ROS_High×Post_MA* was not significant and that the coefficient of *ROS_Low×Post_MA* was significant, both in columns (2.1) and (2.2) of Table 4. Although the fact that the coefficient of *ROS_Low×Post_MA* was significantly positive supports H3-2a, I believe that, even when I take the aforementioned additional pieces of evidence into account, there is little evidence proving that the trend of aggregation of businesses with the greater PC (AC) accompanying segment reporting into other segments is ameliorated after adoption of the MA, because the ROS contains errors as a profit margin scale variance among industries as mentioned above.

(5) Conclusion

As described above, this paper has verified managers' discretionary behavior toward segmentation by matching pseudo-segments I established using internal data of listed companies against external segments. The evidence discovered through this paper is as follows:

Firstly, I obtained a robust piece of evidence that conforms to the PC and AC hypotheses that suggest a strong trend that,

before adopting the MA, the managers of Japanese companies did not report by segment the performance of less competitive businesses with higher present value or less profitable businesses with lower present value. Secondly, examining the situations after the adoption, I found a piece of evidence revealing that, given that other conditions were fixed, the degree to which the pseudo-segments were reported increased 2.1 times, or 11%, compared to the period before the MA was introduced; however, not all businesses were started to be reported equally. The trend that businesses with the greater PC or AC were not reported for each segment remained strong, and I obtained little evidence that supports mitigation of the trend. I uncovered some evidence, if anything, which demonstrates that the trend was facilitated after the MA adoption.

However, it is necessary to be careful about interpreting the evidence relating to the effects of the MA toward the trend that businesses with the greater PC or AC were not reported by segment. As stated in Section (2) 2, the following are two factors that facilitated the trend when managers determined reportable segments: a possibility that the managers intentionally aggregated specific businesses into other segments by applying "the aggregation criteria" and a possibility that the managers facilitated rather than mitigated aggregation of business groups with different profit margins by stringently applying the MA through which the business were mixed. These are the issues coherent the MA, eventually the segment accounting standards. Especially the former raises an extremely important problem for setting up

accounting standards in that it suggests that there is room for intervention of the managers' arbitrariness in decisions on reportable segments. Based on the samples used in this research, although some evidence has shown that factors that facilitated the aforementioned trend are greater than factors mitigating it, I did not contain in the scope of the analysis what kind of effect was brought about by each factor, particularly each of the two facilitating factors, and therefore I have not elucidated the question. In addition, interaction effects between these factors and other factors, such as the effectiveness of the governance system and characteristics of corporate organizations, possibly have developed. As Accounting standards setters such as FASB have been focusing on the issues surrounding decisions on reportable segments under the MA and seeking methods for improvement (FAF, 2012; FASB, 2013; FASB, 2018), it is important to reveal these points, which has been left as a challenge for this research.

Although the above issues remain unsolved, this research has successfully revealed unsettled facts regarding the managers' discretionary behavior in segment reporting. This research has made contributions by using internal data and publicly available data of Japanese listed companies in combination and presenting the very first evidence concerning the managers' discretionary behavior toward segmentation before adoption of the MA, and the effects and issues of the adoption against the behavior.

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Appendix A   Procedure for Linking Nikkei NEEDS with Data from Basic Survey of Business Structure and Activities

(1) Linkage of Listed Companies Contained in Nikkei NEEDS with Basic Survey Data

I linked them in accordance with the following procedure:

1. Using only the data of specific numerical accounting figures and corporate names that do not overlap with those of other companies, I matched listed companies contained in Nikkei NEEDS against ones included in the Basic Survey under the condition that the accounting figures and the corporate names of Nikkei NEEDS are congruent completely with those of the Basic Survey. Adopting the following account titles in descending order, including (a) assets, sales, cost of sales, and selling and general administrative expenses (in the unit of 10 million yen), and for companies that did not match, (b) the aforementioned titles in the unit of 100 million yen, (c) assets and sales (in the unit of 10 million yen), and (d) assets and sales (in the unit of 100 million yen), I moved ahead with the procedure step by step.

2. Concerning the companies contained in Nikkei NEEDS that do not match any companies in the Basic Survey in Step 1 above, I divided the data by rank of assets

and sales (in increments of 10 billion yen, with the number of ranks being 1,501) and compared the data of NEEDS against the data of the Basic Survey based on the corporate names by utilizing only data of corporate names that do not overlap with other companies' names.

3. I listed companies included in Nikkei NEEDS, which did not match companies in the Basic Survey in the steps above, and visually checked them according to the address of their respective headquarters, phone numbers, and other information for matching them against their counterparts.

I referred to the research by Matsuura et al. (2007) when establishing the aforementioned procedure as the studies clearly describe procedures for linking individual data of the government statistics, such as the Basic Survey, with each other.

(2) Identification of Parent Company and Subsidiaries in Companies Included in Basic Survey

Covering companies other than the listed companies contained in the Basic Survey, which were identified in the above process (1), firstly, I identified the parent-subsidiary relationship based on the data of "securities codes of the parent company." Then, within the scope in which the "parent company name" does not overlap, covering companies other than the aforementioned ones, I identified the relationship between the parent company and subsidiaries, including indirectly owned subsidiaries.

Appendix B   Business Category Arrangement

The Basic Survey has employed its unique industrial codes which are based on the three-digit codes of the Japanese Standard Industrial Classification (hereinafter referred to as the "JSIC") and have been revised seven times since 2000. Meanwhile, the JSIC given to the segment file of Nikkei NEEDS was based on the standard of 2002 (11th revision) for settlement of the accounts in or before May 2014 and has been based on the standard of 2013 (13th revision) since June 2014. Furthermore, I calculated the PBR by business category in accordance with Nikkei's middle classification. In order to link the JSIC and Nikkei's middle classification with the Basic Survey industrial classification, I conducted the following procedure; Firstly, I unified the Basic Survey industrial codes chronologically in accordance with the standard of 2004. Then, I established respective conversion tables for linking the JSIC and Nikkei's middle classification to the unified codes