The effects of the new fiscal rule and creative accounting: Empirical evidence from Japanese municipalities

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The effects of the new fiscal rule and creative accounting: Empirical evidence from Japanese municipalities *

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Abstract

The purpose of this paper is to analyze creative accounting by stock-flow adjustment in Japanese municipalities after the introduction of a new fiscal rule. We contribute to the literature by analyzing the interdependency of the new fiscal indexes, which comprise three flow indexes and one stock index. Our main contribution is the finding that municipalities tolerated an increase in their stock indexes while they decreased their flow indexes by reducing reserved funds to avoid exceeding the criteria of the new fiscal rule, as the stock index criterion is weaker than that of the three flow indexes.

JEL Classification: H72, H73, H74, H77

Keywords: fiscal rule, creative accounting, stock-flow adjustments

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1 Introduction

Previous studies have shown that fiscal policy encouraging issuance of government bonds tends to expand fiscal deficits due to political influences. Alesina and Perotti (1996) argue that the expansion of the fiscal deficit has been caused by a lack of specific fiscal rules or the low transparency of budget institutions. Many studies have shown the relationship between fiscal rules and fiscal deficits and have revealed that fiscal deficits are likely to be small when fiscal rules are strict [1]. However, some studies have noted that fiscal deficits may increase when fiscal rules are suddenly changed or the transparency of the budget institution is decreased, even when fiscal rules are strict. Tanaka (2011) indicated that fiscal deficits could be reduced in support of fiscal discipline through the introduction of fiscal rules before budgets are drafted.

However, previous studies have indicated that even if fiscal rules have a strong effect on improving fiscal conditions, introducing too strict fiscal rules may result in the use of fiscal gimmicks. Milesi - Ferretti (2003) conducted a theoretical analysis suggesting that fiscal gimmicks can easily result when introducing fiscal rules under fiscal institutions with low transparency. Koen and van den Noord (2005) pointed out that fiscal gimmicks can be categorized into two groups: The first group includes one-off measures that affect government net lending or borrowing for a few years but not permanently. The second group includes creative accounting measures that affect fiscal deficits or public debts but not net worth. Moreover, von Hagen and Wolff (2006) defined creative accounting as stock-flow adjustments. Stock-flow adjustments mean that SFA = B_t-B_{t-1}-D_t, in which the debt level at time t, B_t, should be the debt level from the last year minus the current fiscal deficit, D_t. These authors showed that there is a tendency to increase accumulated debts when stock variables are larger than the increase in fiscal deficits. These results were presented as flow variables using EU country data. Maltritz and Wüste (2015) showed an effect for fiscal rules and stock-flow adjustments using data from 27 countries in the EU. The authors indicated that fiscal deficits were increased by stock-flow adjustments. Clémenceau and Soguel (2017) showed that creative accounting is mainly implemented to hide surpluses by using Swiss canton-level data regardless of the finance minister's personal or ideological background. Moreover, they revealed that strict fiscal rules lead finance ministers towards more surplus-hiding accounting. Although the definition of fiscal gimmicks varies slightly, previous studies are clear that fiscal gimmicks affect the fiscal deficits and fiscal discipline of central governments.

[1] Eichengreen and Bayoumi (1994), von Hagen and Harden (1995), Kontopoulos and Perotti (1999), Persson and Tabellini (1999), Kirchgussner (2002), von Hagen (2006), Beetsma et al. (2007), Debrun et al. (2008), Beetsma et al. (2009), Debrun et al. (2009), Luechinger and Schaltegger (2013), Chatagny (2015).

However, most previous studies in this area have been conducted using country- or state-level data from places like the US, EU, OECD, Latin American countries and Swiss cantons [2]. As far as we know, there has been no empirical research focused on stock-flow adjustments for local governments, especially municipal-level data, after the introduction of new fiscal rules.

In this paper, we analyze creative accounting by stock-flow adjustment in Japanese municipalities by estimating the interdependency of the new fiscal indexes after the introduction of a new fiscal rule in Japan in FY2008. *The Law Relating to the Financial Soundness of Local Governments* [*Chiho zaisei kenzenka ho in Japanese*] was enacted in June 2007 in Japan and has been enforced for all municipalities since the settlement of FY2008 fiscal accounts in order to solve serious fiscal deficits. The law introduces four fiscal indexes comprising three flow indexes and one stock index. These new indexes target not only the general accounts of each municipality but also those of extra-governmental organizations to reveal the true fiscal conditions of all public sector entities. Before the introduction of the new fiscal rule, the fiscal management of all municipalities had been conducted under the previous rule for approximately 50 years. However, because the former rule included only one of the indexes relating to real deficit of general accounts as a target, some were easily able to shift a portion of the fiscal deficits of their general accounts to extra-governmental organizations to hide bad fiscal conditions. The new fiscal rule was introduced in FY2008 to address this problem.

We contribute to the literature in a number of ways. To reveal the true fiscal conditions of each municipality, including extra-governmental organizations, after the introduction of the new fiscal rule, it is necessary to investigate the impacts of the new fiscal rule and to determine whether municipalities employed creative accounting by stock-flow adjustment. In addition to assessing previous studies in the literature, we analyze the interdependency of four fiscal indexes to reveal stock-flow adjustments after the implementation of the new fiscal rule using a Seemingly Unrelated Regression (SUR) model and cross-sectional data on all municipalities. The reasons are as follows.

First, the three flow indexes have both "yellow cards", in which municipalities have to plan for early financial soundness, and "red cards", in which municipalities have to be under the control of the central government to rebuild stable financial conditions. The stock index does not include a red card. Thus, some municipalities that suffer from large fiscal deficits may have an incentive to create stock-flow adjustments to avoid fiscal management under the surveillance of the central government. In other words, there is a possibility that these municipalities will have to decrease their flow in-

[2] See, Maltritz and Wüste (2015)

dexes while ignoring increasing the stock index, which does not include a red card.

Second, we believe that Japanese fiscal institutions adopt the single annual budget principle, in which the expenditures for each fiscal year must be financed by the revenue within that fiscal year. For example, if municipalities do not spend all of their budgets within the fiscal year, their grants from the central government can later be reduced. As a result, public investments have a tendency to increase at the end of each fiscal year. The four new indexes of the new fiscal rule must be applied annually. When at least one index exceeds the red card criterion, municipalities must enter the surveillance of the central government. Thus, municipalities must simultaneously improve all indexes every year except for the stock index. In this case, when we estimate these indexes as dependent variables, it is inappropriate to expect the estimation equation error terms to be uncorrelated. Since these indexes have contemporaneous cross-equation error correlations, we should apply an SUR model, which is different from the methods applied by previous studies, including von Hagen and Wolff (2006) and Maltritz and Wüste (2015).

As mentioned above, focusing on the new fiscal indexes and applying the SUR model allows us to investigate creative accounting by stock-flow adjustment in Japan after the introduction of the new fiscal rule. Specifically, we can statistically consider the contemporaneous error terms to deal with estimation biases relating to the decisions of municipal fiscal management. Additionally, we can practically consider the fiscal relationships within the public sector, such as general accounts, public enterprise accounts, local public corporations, and third sector enterprises.

This paper is structured as follows. Section 2 explains the new fiscal rule in Japan. Section 3 explains the empirical method. Section 4 provides a detailed summary of the data. Section 5 presents and discusses the results, especially the correlation among the new four indexes, and Section 6 concludes.

2 Institutional background and the new fiscal rule for local governments in Japan

2.1 Institutional background

In this section, we briefly describe the institutional background of Japanese local public finance and the new fiscal rule. Local governments play an important role in providing public services, including school education, welfare, public health, fire services, public construction, and waste disposal. The proportion of local public finance relative to the gross domestic expenditure is approximately 11 percent, which is approximately three times larger than

that of the central government. The Japanese government comprises central, prefectural, and municipal governments (ordinance-designated cities, core cities, special cities, cities, towns, and villages). Ordinance-designated cities are those with a population of 500,000 or more and are designated by a cabinet order under a provision. Such cities have nearly the same level of authority and financial resources as prefectures. Core cities are those with a population size of at least 300,000, and parts of their authority are delegated by prefectures, though the scope of their authority is smaller than that of ordinance-designated cities. Similarly, special case cities are those with a population size of at least 200,000, and parts of their of authority are delegated by prefectures, though the scope of their authority is smaller than that of core cities. Cities are defined as having a population size of at least 50,000; however, there is little or no difference in authority between cities, towns, and villages.

Normally, the accounts of municipalities are divided into general accounts and special accounts in public finance. Special accounts consist of public enterprise accounts, such as those for transport businesses, electricity businesses, gas businesses, and residential land development projects. However, because each municipality provides different services depending on the local conditions, there are different types of special accounts. To compare the accounts of all municipalities uniformly, the Japanese central government establishes ordinary accounts that cover general accounts and a common component of special accounts. Thus, we can elucidate the fiscal conditions of municipalities and conduct a statistical comparison among municipalities using ordinary accounts and other public enterprise accounts.

Municipalities include some extra-governmental organizations, including partial administrative associations, wide-area local public bodies, local public corporations, and third-sector enterprises. Partial administrative associations and wide-area local public bodies are extra-governmental organizations that cooperate with neighboring municipalities to provide public services, including fire rescue, waste removal services, and public long-term care insurance. Partial administrative associations provide a single service in cooperation with neighboring municipalities. Wide-area local public bodies provide multiple services in cooperation with neighboring municipalities.

2.2 The new fiscal rule for local governments in Japan

To improve fiscal conditions and work towards a high level of transparency in fiscal management, the central government enacted *The Law Relating to the Financial Soundness of Local Governments* for local governments. The new fiscal rule has been enforced for all municipalities since the settlement of FY2008 fiscal accounts. There are four new fiscal indexes, comprising three flow indexes and one stock index. These new indexes target not only ordinary accounts in each municipality but also extra-governmental orga-

nizations to reveal the true fiscal conditions of the public sector. Before the new fiscal rule was introduced, the fiscal management of all municipalities had been conducted under the former rule for approximately 50 years. Because the former rule included only one of the indexes relating to real deficits of ordinary accounts as a target, some municipalities were able to easily shift a part of the fiscal deficits of their ordinary accounts to extra-governmental organizations to hide bad municipal fiscal conditions. For example, Yubari city in Hokkaido went practically bankrupt in 2007. This event was in fact due to creative accounting between the ordinary accounts and extra-governmental organizations, such as third sector enterprises. Because Yubari city transferred large debts, which they had to repay, to other accounts, it accumulated debts approximately 65 times as large as its tax revenue prior to bankruptcy.

Fig. 1 presents the new fiscal indexes for measuring the degree of municipal fiscal soundness[3]. The real deficit (RD) ratio is the ratio of the real deficit of ordinary accounts to the standard financial scale of municipalities as a flow index.

$$Real\,deficit\,ratio = \frac{real\,deficit}{standard\,financial\,scale} \tag{1}$$

The standard financial scale includes the general revenues of municipalities for each fiscal year, which consist of standard local tax revenues and Local Allocation Tax grants (LAT grants) from the central government. An LAT grant is a lump-sum, unspecific grant for local governments. The number of LAT grants provided to each municipality is determined by the central government based on municipal fiscal shortages for each fiscal year[4]. The RD ratio targets only ordinary accounts, with nearly the same scope as the former rule.

The consolidated real deficit (CRD) ratio is the ratio of the consolidated real deficit of ordinary accounts and public enterprise accounts to the standard financial scale of municipalities as a flow index.

$$Consolidated\,real\,deficit\,ratio = \frac{consolidated\,real\,deficit}{standard\,financial\,scale} \tag{2}$$

The CRD ratio targets ordinary accounts and public enterprise accounts. Under the former rule, we were able to check only bad debts for each public enterprise. Although municipalities practically manage each public enter-

[3]In this section, we refer to the "White Paper on Local Public Finance, 2007" by the Ministry of Internal Affairs and Communications.

[4]For further information on the LAT grant system, see Ihori (2009), Saito and Yunoue (2009), and Hirota and Yunoue (2017).

prise, it was difficult to confirm the relationship between ordinary accounts and public enterprise accounts.

The real debt service (RDS) ratio is the ratio of the bond redemption amount of ordinary accounts, public enterprise accounts, partial administrative associations, and wide-area local public bodies to the standard financial scale of municipalities as a flow index.

$$Real\ debt\ service\ ratio = \frac{redemption\ of\ bond}{standard\ financial\ scale} \tag{3}$$

The RDS ratio targets ordinary accounts and wide-area local public bodies, showing how much debt the municipalities have to repay each year [5]. However, the RDS ratio is calculated by excluding specific grants from the numerator of the index. Therefore, if municipalities increase the number of specific grants they are awarded, they can reduce their RDS ratios.

The future burden (FB) ratio is the ratio of the current outstanding balance of burden, including that of the debts of the local general account as well as other likely future payments, and represents the extent to which finances may be tight in the future.

$$Future\ burden\ ratio = \frac{future\ burden}{standard\ financial\ scale} \tag{4}$$

The FB ratio targets all public sector entities in each municipality. The numerator of the FB ratio consists of accumulated debts in ordinary accounts and the debt burdens of extra-governmental organizations as a stock variable. Thus, if municipalities have a large debt burden in third-sector enterprise accounts, their FB ratios rise. However, the FB ratio is calculated by excluding the estimated amount of specific grants and appropriable funds, including reserved funds and others, from the numerator of the index. Therefore, if municipalities increase their specific grants or decrease their reserved funds, they can reduce their FB ratios.

In addition to the new four indexes, we define the reserved funds (RF) ratio for the repayment of bonds for each municipality. The RF ratio is obtained by dividing the total amount of reserved funds by the population size[6] because municipalities can decrease their RD and CRD ratios by reducing funds reserved for the repayment of bonds while allowing for an increase in their FB ratios, which do not include a red card.

Fig. 2 presents a diagram of the financial status of local governments.

[5] If the RDS ratio of a municipality exceeds 18 percent, the municipality needs to obtain permission to issue new bonds from the central government after applying the new fiscal rule.

[6] The total reserved fund figures are in thousands of Japanese yen in this paper.

The new fiscal rule establishes four new indexes and requires local governments to disclose them thoroughly with the aim of quickly achieving financial soundness or rebuilding. The four new indexes include a number of financial criteria: for example, if municipalities exceed RD ratios of between 11.25 and 15 percent, depending on the financial size of the municipality, they are within the early financial soundness restoration stage (yellow card) and must improve their fiscal conditions by themselves. In this case, municipalities must formulate a financial soundness plan approved by local councils and conduct a mandatory external audit. Additionally, municipalities must report on their implementation progress to local councils and via public announcements every fiscal year. If the early achievement of financial soundness is deemed to be very difficult, the Minister for Internal Affairs and Communications or the prefectural governor makes necessary recommendations. All four indexes include a yellow card.

Moreover, if municipalities exceed an RD ratio of 20 percent, they are within the financial rebuilding stage (red card) and must be fiscally managed under the surveillance of the central government. These municipalities must perform a thorough financial rebuilding with the involvement of the central government. In this case, municipalities must formulate a financial rebuilding plan approved by local councils and conduct a mandatory external audit. Additionally, municipalities must obtain agreement on the financial rebuilding plan in consultation with the Minister for Internal Affairs and Communications. The criteria for the CRD, RDS, and FB ratios are determined by the new fiscal rule. Although the FB ratio includes a yellow card, for which the criteria is 350 percent, it does not include a red card.

3 Empirical framework

3.1 Estimation method

In this section, we investigate the interdependency of the new fiscal indexes in the new fiscal rule to reveal creative accounting by stock-flow adjustment in Japanese municipalities. Technically, an SUR model can better address contemporaneous correlations between the error terms in the interdependency of these indexes compared to the methods employed in previous studies. This advantage is because each index is interdependently determined by each municipality at the same time and because each municipality has to continue watching both the stock and flow indexes to avoid exceeding each criteria. However, since the FB ratio index does not include a red card, municipalities may decide to decrease their RD or CRD ratios while allowing an increase in their FB ratios.

The Japanese local public finance system is practically centralized and is highly dependent on grants from the central government. For example,

in FY2008, 1647 out of a total of 1788 municipalities received LAT grants. Municipalities follow the principle of a single annual budget every year. The expenditures for each fiscal year have to be financed by the revenues from that fiscal year. If municipalities do not spend all of their budgets within the fiscal year, grants such as LAT grants or specific grants can be reduced in the following fiscal year. The public project expenditures of some municipalities have a tendency to increase at the end of the fiscal year. We can consider the relationship between ordinary accounts and extra-governmental organizations and that between stock and flow indexes simultaneously by applying an SUR model. Equation (5) presents an estimation model.

$$\begin{aligned} Y_{ij} =& \beta_0 + \beta_{pop,j} ln(Pop_i) + \beta_{pop2,j} ln(Pop_i)^2 + \beta_{area,j} ln(Area_i) \\ &+ \beta_{Sgrants,j} Sgrants_{i,t-1} + \beta_{LAT,j} LATgrants_{i,t-1} \\ &+ \beta_{Mergedtrend,j} Mergedtrend_i + \beta_{Citysize,j} Citysize_i + \epsilon_{ij} \end{aligned} \tag{5}$$

where i represents municipalities and j represents the fiscal indexes. The dependent variables, Y_{ij}, consist of RD_i, CRD_i, RDS_i, and FB_i. We use RF_i, which is the funds reserved per capita for the repayment of bonds in each municipality as a dependent variable because municipalities can decrease their RD and CRD ratios by reducing the amount of funds reserved for the repayment of bonds while allowing an increase in their FB ratios, which does not include a red card. β_0 is a constant, and the error terms are ϵ_{ij}. We assume that the error terms for each equation have contemporaneous correlations because of decisions stemming from the fiscal indexes.

The independent variables consist of $ln(Pop_i)$, the square of $ln(Pop_i)$, $ln(Area_i)$, $Sgrants_{i,t-1}$, $LATgrants_{i,t-1}$, and $Mergedtrend_i$. $Mergedtrend_i$ is the number of years after a municipal merger because the number of municipalities rapidly decreased through municipal mergers between FY1999 and FY2006.

$Sgrants_{i,t-1}$ and $LATgrants_{i,t-1}$ are the ratios of grants to total revenues. t is a time period. We specifically focus on both $Sgrants_{i,t-1}$ and $LATgrants_{i,t-1}$, first because Japanese municipalities have been highly dependent on certain specific and LAT grants from the central government for about 50 years. Japanese municipalities have little right to impose their own local taxes as the system is centralized. Most local tax rates are determined by the central government for obtaining horizontal fiscal equity among municipalities. Therefore, the tax capacity of municipalities depends on their population size or area. The second reason that we focus on these grants is because the new fiscal indexes include the standard financial scale in their denominators. The standard financial scale consists of ordinary revenues, such as local tax revenues and LAT grants. Thus, when municipalities receive larger LAT grants than usual, their new fiscal indexes can decrease. Moreover, the numerators of the RDS and FB ratios are calculated by eliminating the amount of revenue from specific grants. Thus, we have to consider

the effects of both specific and LAT grants on the new fiscal indexes in our estimation.

The $Citysize_i$ dummy variables consist of an ordinance-designated cities dummy, a core cities dummy, a special case cities dummy, and a cities dummy. Because these cities provide different types of public services depending on their size, we have to consider city size in our estimation. Specifically, the yellow card FB ratio criterion for ordinance-designated cities is 400 percent, while that of other cities is 350 percent.

3.2 Data and summary statistics

In the SUR model, we use Japanese municipal data from FY2008 to FY2010 because the new fiscal rule has been in force since FY2008[7]. In FY2008, the new fiscal rule was enforced, and 2, 2, 20, and 3 municipalities were classified into the early financial soundness stages (the yellow card) of the RD, CRD, RDS, and FB ratio indexes, respectively. In FY2009, 0, 0, 12, and 3 municipalities and 0, 0, 4, and 2 municipalities in FY2010 were classified into the early financial soundness stages of the RD, CRD, RDS, and FB ratio indexes, respectively. The data on municipal governments are derived primarily from the Shi Cyo Son Kessan Jyokyo (Statistics of the Final Accounts of Municipal Governments), Zaisei Jyokyo tou Ichiran hyo (Municipal Financial Situation list) and the Gappei Digital Archive (Digital Archive of Municipal Mergers).

Summary statistics are reported in Table 1. In this paper, the RD and CRD ratios are multiplied by -1. When the RD and CRD ratios have a surplus, they are positive, and when they have a deficit, they are negative. We excluded the data for Yubari city in our estimation because the city went practically bankrupt before the introduction of the new fiscal rule[8]. The mean RD ratio values gradually increased to 4.5 in FY2008, 5.2 in FY2009 and 5.9 in FY2010. The mean CRD ratio values increased to 15 in FY2008, 15.6 in FY2009, and 16.6 in FY2010. In other words, we can see that real deficits improved not only in ordinary accounts but also in public enterprise accounts for the period. Likewise, the mean RDS ratio values gradually decreased to 14.2 in FY2008, 13.4 in FY2009 and 12.4 in FY2010. Mean FB ratio values also decreased to 89.8 in FY2008, 77 in FY2009 and 59.2 in FY2010. All indexes improved on average for the period. However, we suspect that municipalities control these indexes to avoid exceeding the

[7]To properly evaluate the effects of the new fiscal rule, we did not use data after FY2011 because a number of municipalities were severely damaged by the Great East Japan Earthquake on 11 March, 2011. In the following years, these municipalities received many kinds of support, including a large number of special grants issued by the central government and others. Therefore, we decided to drop the data after FY2011 in this paper to avoid the effects of the earthquake.

[8]The FB ratio of Yubari city was more than 1,000 percent for a few years.

index criteria. Thus, we try to estimate the interdependency of the new fiscal indexes by using an SUR model to address the contemporaneous correlation.

4 Empirical results

4.1 Estimation results using an SUR model

Table 2 - 4 shows the results of the estimation using an SUR model for the period from FY2008 to FY2010. Per the results of the Breusch-Pagan test, we rejected the hypothesis that the error term correlations are zero for the study period. The error terms are correlated for each equation, indicating that we would achieve more effective statistical results with an SUR model than with an OLS model. Additionally, we find that the results for FY2008 to FY2010 are very similar in each fiscal year.

For the RD ratios from FY2008 to FY2010, the population size coefficients are significant with negative signs. The coefficients for the square of the population size are significant with positive signs[9]. Thus, small municipalities have small fiscal surpluses, while large municipalities have larger fiscal surpluses. The coefficients for municipal area are significant with negative signs. Municipalities with large areas have small fiscal surpluses. The specific and LAT grants coefficients are significant with negative signs; that is, the RD ratios of municipalities that receive a large number of grants from the central government is small. The merger coefficient is significant with a positive sign. Merged municipalities improved their fiscal deficits following municipal mergers. The city size dummy variables are not significant.

For the CRD ratios, the population size coefficients are significant, but they have the opposite sign as those for the RD ratio. Using the CRD ratio, the coefficients for population size have positive signs and those for the square of the population size have negative signs. When we include the fiscal deficits of public enterprise accounts, we find that small municipalities have large fiscal surpluses while large municipalities have small fiscal surpluses. This finding means that larger municipalities tend to have large public enterprises, such as transport businesses and public hospitals. Thus, fiscal surpluses for large municipalities are small. The coefficients for specific and LAT grants are significant with negative signs for the CRD ratios as well as the RD ratios. For both RD and CRD ratios, these results indicate that these grants cause a flypaper effect or a soft budget problem[10]. Additionally, it is natural that the coefficients for LAT grants have negative signs because the denominators of the RD and CRD ratios consist of the standard financial scale, which includes both local tax revenue and LAT grants.

[9]Note that our RD and CRD ratios are multiplied by -1.

[10]Kakamu et al. (2014) revealed the flypaper effects for Japanese prefectural government expenditures.

For the RDS ratios, the population size coefficients are significant with positive signs, and those of the square of the population size are significant with negative signs. When the area of municipalities is large, the RDS ratio is large because the area coefficients have positive signs. For the RDS ratio, the LAT grant coefficients are significant with positive signs. Therefore, municipalities that receive more LAT grants suffer from large accumulated debts that they must repay each year. The merger coefficient is significant with a positive sign. The merged municipalities increased the RDS ratio. The ordinance-designated cities dummy variables are significant with positive signs. The city size dummy variables are significant with negative signs. However, the city size dummy variables in FY2010 are positive and significant.

For the FB ratios, the population size coefficients are significant with positive signs ,and those of the square of the population size are significant with negative signs. The LAT grant coefficients are significant with positive signs. Therefore, because municipalities that heavily depend on LAT grants from the central government suffer from a large amount of accumulated debt, they have larger FB ratios than others. Among the city size dummy variables, those for ordinance-designated cities, core cities, and special case cities are significant with positive signs. The city size dummy variables in FY2008 and FY2009 are significant with negative signs, but that in FY2010 is significant with a positive sign.

Given these results for the new fiscal indexes, we consider the estimation result of the per capita RF. Both the coefficients for population size and the square of population size are significant. When the population size of a municipality increases, its RF ratio decreases. Large municipalities have larger RF ratios than others. The coefficients for city area are significant with positive signs. Moreover, the coefficients for specific grants in FY2008 and FY2009 are significant with a positive sign. This result indicates that municipalities with a large number of specific grants have larger RF ratios. However, the same coefficients in FY2010 are not significant. The coefficients for LAT grants are significant with negative signs because municipalities that receive a large number of LAT grants from the central government cannot afford to reserve their funds. The merger coefficient is positive and significant. In the city size dummy variables, we can see different results for the new fiscal indexes. We revealed that the coefficients for ordinance-designated cities, core cities, and special case cities are significant with negative signs, indicating that these large cities avoided exceeding the criteria of the new fiscal indexes, especially those of the flow indexes, by reducing their reserved funds. As a result, their FB ratios increased while their RF ratios decreased.

4.2 Interdependency of the new fiscal indexes

In this section, we investigate the interdependency between the new fiscal indexes and reserved funds using the correlation matrix of the residuals from the SUR model. Using this correlation matrix, we can confirm the relationship between ordinary accounts and extra-governmental organization accounts. We specifically focus on stock-flow adjustments among these indexes. Table 5 shows the correlation matrix of the residuals from the SUR model for the data from FY2008 to FY2010.

Naturally, the RD and CRD ratios have strongly positive correlations between FY2008 and FY2010. We reveal that the real deficits of ordinary accounts and public enterprise accounts improved in this period. A negative correlation is observed between the the RD and RDS ratios, showing that municipalities that improved their real deficits reduced their debt repayments to improve their fiscal soundness. However, the RD and FB ratios have negative correlations of -0.182 in FY2008, -0.114 in FY2009, and -0.052 in FY2010. In other words, municipalities were willing to increase their FB ratios, which is the stock index, just after the introduction of the new fiscal rule, in turn decreasing their RD ratios, one of the flow indexes. We also find that municipalities made stock-flow adjustments by reducing their reserved funds because the RD and RF ratios have a slightly negative correlation in addition to the estimation results of the SUR model in Table 2 - 4. These correlations between the RD ratio and other indexes between FY2008 and FY2010 are statistically significant per a test of the correlation coefficients.

Next, we focus on the relationship between the CRD ratio and the other indexes. We reveal a negative correlation between the CRD and FB ratios between FY2008 and FY2010, the same as the correlation between the RD and FB ratios. This result indicates that municipalities increased their FB ratios to reduce their CRD ratios and reduced their RF ratios to decrease their CRD ratios.

The correlation between the RDS and FB ratios is strongly positive. Municipalities that have a large amount of accumulated debt must repay their debt each year. Additionally, the RDS and RF ratios have a negative correlation, showing that it is not easy to reserve additional funds each year because municipalities have to repay a large amount of debt that they borrowed before the implementation of the new fiscal rule.

Finally, we reveal a strongly negative correlation between the FB and RF ratios of approximately -0.5 between FY2008 and FY2010. These results indicate that municipalities create stock-flow adjustments by reducing their reserved funds to improve their real deficits while they ignore increases in their FB ratios.

From both of these results in Table 5 and the estimation results in Tables 2 - 4, we can reveal that large municipalities, which are specific kinds of cities, including ordinance-designated cities, core cities, and special case

cities, adjusted their fiscal indexes to avoid exceeding the criteria established by the new fiscal rule. The reason for this behavior is that municipalities did not want to be fiscally managed under the surveillance of the central government and wanted to avoid reductions in their LAT grants from the central government. We conclude that municipalities implemented stock-flow adjustments to the extent permitted by the new fiscal rule to avoid these situations.

5 Conclusion

In this paper, we contribute to this literature in several ways. We analyzed creative accounting by stock-flow adjustment after the introduction of the new fiscal rule in Japanese municipalities. Our primary contribution is that we focused on the interdependency of the new fiscal indexes of new fiscal rule by applying an SUR model, a method that is different from those employed in previous studies.

First, using an SUR model, we revealed that the flow indexes of the municipalities that depend on specific and LAT grants from the central government exhibited increased real deficits for both ordinary accounts and public enterprise accounts. This finding indicates that the flypaper effect and soft budget problem are caused by the large number of grants awarded by the central government. Moreover, the stock indexes of large municipalities that depend on LAT grants are higher than those of other municipalities. Specifically, the stock indexes of large municipalities that are ordinance-designated cities, core cities, or special case cities are higher than those of other municipalities. Municipalities that receive a large number of specific grants reserve their funds. However, municipalities that receive a large number of LAT grants have smaller amounts of reserved funds than other municipalities. Additionally, large municipalities, which include ordinance-designated cities, core cities, and special case cities, have smaller amounts of reserved funds.

Second, we revealed an interdependency between the new fiscal indexes of the new fiscal rule using a correlation matrix of the residuals. The flow indexes and stock index have a negative correlation. This result shows that municipalities create stock-flow adjustments in which they allow increases in the stock index while decreasing their flow indexes by reducing their reserved funds to avoid exceeding the criteria of the new fiscal rule. Specifically, we found that large municipalities implemented stock-flow adjustments because they had larger amounts of reserved funds than towns and villages.

Therefore, we believe that municipalities myopically postponed solving their fiscal problems even though the aim of introducing the new fiscal rule was to achieve true fiscal soundness and to prevent stock-flow adjustments between ordinary accounts and extra-governmental organizations. Given

that a number of municipalities depend on a large number of grants from the central government and that they have a large amount of accumulated debt, we conclude that municipalities implemented stock-flow adjustments by reducing their reserved funds after the introduction of the new fiscal rule.

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Figure 1: Subject of ratio for determining soundness

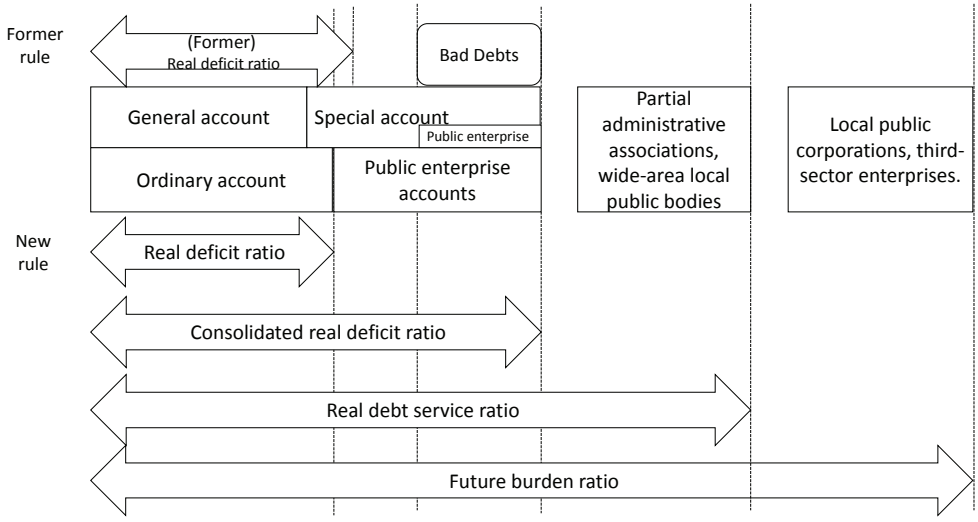

Figure 2: Image of sound financial status of local governments

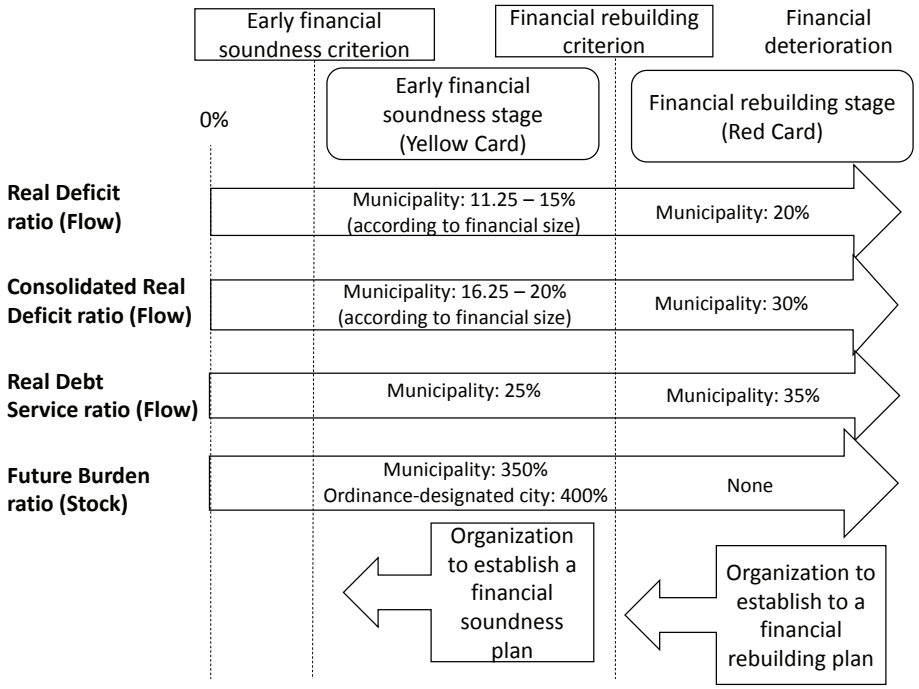

Table 1: Summary statistics

FY2008				
Variable	Mean	Std. Dev.	Min	Max
RD	4.503	3.266	-16.31	29.56
CRD	15.032	11.280	-26.42	116.06
RDS	14.193	5.034	-0.3	32.1
FB	89.830	83.430	-392.883	393.511
RF	195.458	363.571	0.187	5260.392
ln(Pop)	10.080	1.416	5.056	15.0981
ln(Area)	4.701	1.224	1.244	7.686
Specific grants	0.073	0.041	0.000	0.413
LAT grants	0.257	0.161	0	0.649
Merged trend	1.439	2.152	0	10
Designated cities	0.010	0.097	0	1
Core cities	0.022	0.147	0	1
Special case cities	0.024	0.152	0	1
Cities	0.382	0.486	0	1

FY2009				
Variable	Mean	Std. Dev.	Min	Max
RD	5.119	3.559	-10.31	42.49
CRD	15.604	11.275	-14.02	104.31
RDS	13.432	4.840	-0.2	28.4
FB	77.029	81.962	-442.842	372.562
RF	212.616	400.109	1.460	5540.666
ln(Pop)	10.101	1.432	5.106	15.102
ln(Area)	4.735	1.223	1.244	7.686
Specific grants	0.087	0.042	0.001	0.434
LAT grants	0.265	0.165	0	0.619
Merged trend	1.790	2.609	0	11
Designated cities	0.010	0.102	0	1
Core cities	0.024	0.152	0	1
Special case cities	0.023	0.151	0	1
Cities	0.394	0.489	0	1

FY2010				
Variable	Mean	Std. Dev.	Min	Max
RD	5.857	3.958	-9.56	35
CRD	16.631	11.413	-8.54	117.83
RDS	12.365	4.541	-3.1	26.2
FB	59.186	80.851	-492.446	383.067
RF	244.847	441.706	0.895	6398.282
ln(Pop)	10.093	1.436	5.136	15.104
ln(Area)	4.736	1.223	1.244	7.686
Specific grants	0.140	0.038	0.015	0.352
LAT grants	0.247	0.148	0	0.565
Merged trend	2.130	3.065	0	12
Designated cities	0.011	0.104	0	1
Core cities	0.023	0.151	0	1
Special case cities	0.023	0.151	0	1
Cities	0.394	0.489	0	1

Table 2: Estimation results

	FY2008				
Variables	RD	CRD	RDS	FB	RF
ln(Pop)	-3.032***	12.132***	3.915***	173.085***	-1,413.656***
	(0.693)	(2.521)	(0.964)	(17.150)	(57.256)
ln(Pop)*2	0.097***	-0.641***	-0.230***	-7.595***	59.277***
	(0.037)	(0.136)	(0.052)	(0.923)	(3.082)
ln(Area)	-0.252***	-0.003	0.589***	0.909	53.805***
	(0.078)	(0.283)	(0.108)	(1.927)	(6.435)
Specific grants (lag)	-9.882***	-40.144***	-0.161	-71.618	1,080.486***
	(1.924)	(7.000)	(2.678)	(47.617)	(158.977)
LAT grants (lag)	-6.763***	-18.245***	12.549***	213.758***	-940.290***
	(0.738)	(2.687)	(1.028)	(18.277)	(61.019)
Mergers trend	0.228***	0.104	0.209***	-0.288	22.796***
	(0.041)	(0.148)	(0.056)	(1.004)	(3.353)
Designated cities	-1.583	4.664	6.196***	159.620***	-495.265***
	(1.103)	(4.014)	(1.535)	(27.304)	(91.157)
Core cities	0.126	2.974	0.167	28.226*	-216.946***
	(0.645)	(2.347)	(0.898)	(15.968)	(53.313)
Special case cities	-0.677	0.916	0.868	31.603**	-126.649***
	(0.557)	(2.025)	(0.775)	(13.778)	(45.999)
Cities	-0.099	0.807	-0.951***	-21.607***	-23.588
	(0.257)	(0.935)	(0.358)	(6.362)	(21.239)
Constant	28.450***	-34.756***	-6.369	-890.270***	8,228.239***
	(3.218)	(11.710)	(4.479)	(79.658)	(265.948)
Breusch-Pagan test	Chi2(10) = 1662.659 ***				
Observations	1,763	1,763	1,763	1,763	1,763
R-squared	0.165	0.076	0.322	0.220	0.543

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are reported in brackets.

Table 3: Estimation results

	FY2009				
Variables	RD	CRD	RDS	FB	RF
ln(Pop)	-3.102***	11.290***	6.205***	190.641***	-1,588.658***
	(0.758)	(2.518)	(0.933)	(16.544)	(62.529)
ln(Pop)*2	0.095**	-0.614***	-0.333***	-8.308***	66.993***
	(0.041)	(0.136)	(0.050)	(0.891)	(3.367)
ln(Area)	-0.250***	-0.141	0.486***	0.948	56.520***
	(0.087)	(0.289)	(0.107)	(1.898)	(7.174)
Specific grants (lag)	-6.533***	-38.357***	1.116	-28.243	650.763***
	(2.094)	(6.957)	(2.578)	(45.708)	(172.758)
LAT grants (lag)	-6.458***	-18.188***	12.597***	200.228***	-986.088***
	(0.813)	(2.702)	(1.001)	(17.753)	(67.099)
Mergers trend	0.229***	0.046	0.147***	-1.033	23.084***
	(0.037)	(0.124)	(0.046)	(0.815)	(3.081)
Designated cities	-1.618	4.423	7.574***	156.946***	-542.543***
	(1.158)	(3.846)	(1.425)	(25.271)	(95.515)
Core cities	0.074	4.119*	0.683	31.283**	-236.179***
	(0.709)	(2.355)	(0.872)	(15.469)	(58.468)
Special case cities	-0.254	0.751	0.822	24.896*	-135.853***
	(0.633)	(2.103)	(0.779)	(13.819)	(52.231)
Cities	0.028	0.285	-0.965***	-18.503***	-41.409*
	(0.284)	(0.942)	(0.349)	(6.189)	(23.393)
Constant	29.579***	-26.482**	-19.159***	-1,010.949***	9,258.860***
	(3.530)	(11.728)	(4.345)	(77.051)	(291.223)
Breusch-Pagan test	Chi2(10) = 1622.225 ***				
Observations	1,697	1,697	1,697	1,697	1,697
R-squared	0.155	0.076	0.316	0.252	0.552

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are reported in brackets.

Table 4: Estimation results

	FY2010				
Variables	RD	CRD	RDS	FB	RF
ln(Pop)	-3.271***	10.562***	6.932***	192.483***	-1,820.131***
	(0.837)	(2.537)	(0.883)	(15.864)	(65.815)
ln(Pop)*2	0.094**	-0.570***	-0.357***	-8.289***	77.750***
	(0.045)	(0.137)	(0.048)	(0.854)	(3.544)
ln(Area)	-0.445***	-0.262	0.381***	1.277	54.150***
	(0.097)	(0.294)	(0.102)	(1.838)	(7.626)
Specific grants (lag)	-6.553***	-23.939***	-1.322	-8.389	65.737
	(2.389)	(7.241)	(2.520)	(45.278)	(187.842)
LAT grants (lag)	-6.404***	-18.861***	13.535***	209.734***	-1,075.453***
	(1.023)	(3.100)	(1.079)	(19.386)	(80.426)
Mergers trend	0.226***	0.053	0.077**	-1.862***	22.947***
	(0.035)	(0.107)	(0.037)	(0.670)	(2.780)
Designated cities	-0.743	1.801	8.304***	159.578***	-584.509***
	(1.405)	(4.259)	(1.482)	(26.633)	(110.491)
Core cities	0.359	2.677	2.189**	48.012***	-201.099***
	(0.919)	(2.784)	(0.969)	(17.410)	(72.229)
Special case cities	0.297	-0.020	1.884**	37.567**	-102.005
	(0.807)	(2.445)	(0.851)	(15.286)	(63.418)
Cities	0.502	-0.480	0.924***	16.222***	62.115**
	(0.314)	(0.952)	(0.331)	(5.954)	(24.702)
Constant	33.017***	-21.479*	-26.227***	-1,085.056***	10,475.681***
	(3.975)	(12.047)	(4.192)	(75.327)	(312.502)
Breusch-Pagan test	Chi2(10) = 1638.718 ***				
Observations	1,722	1,722	1,722	1,722	1,722
R-squared	0.153	0.065	0.285	0.271	0.581

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are reported in brackets.

Table 5: Correlation matrix of residuals

FY2008

	RD	CRD	RDS	FB	RF
RD	1.000				
CRD	0.389***	1.000			
RDS	-0.161***	-0.039	1.000		
FB	-0.182***	-0.143***	0.648***	1.000	
RF	-0.062**	-0.058	-0.212***	-0.492***	1.000

FY2009

	RD	CRD	RDS	FB	RF
RD	1.000				
CRD	0.409***	1.000			
RDS	-0.137***	-0.041	1.000		
FB	-0.114***	-0.1***	0.66***	1.000	
RF	-0.124***	-0.04*	-0.195***	-0.505***	1.000

FY2010

	RD	CRD	RDS	FB	RF
RD	1.000				
CRD	0.437***	1.000			
RDS	-0.069***	-0.033	1.000		
FB	-0.052**	-0.066***	0.662***	1.000	
RF	-0.13***	-0.041*	-0.1867***	-0.506***	1.000

Notes: ***, **, and * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Standard errors are reported in brackets.