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

Haruaki Hirota [†] Hideo Yunoue [‡]

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Abstract

The purpose of this paper is to analyze creative accounting by fiscal adjustments in Japanese municipalities after the introduction of a new fiscal rule using a seemingly unrelated regression with the difference in differences method. We contribute to the literature by analyzing the interdependency of new fiscal indexes, which include three flow indexes and one stock index, and identifying the causal effects of the new fiscal rule. In addition, we focus on both the "targeted indexes" and "untargeted indexes" of the new fiscal rule because some municipalities might take advantage of loopholes in the new fiscal rule to improve their "targeted indexes". Our main contribution is the finding that municipalities increase their money transfers to public enterprise accounts, which is one of "untargeted indexes", after the introduction of the new fiscal rule to avoid the applicable punishments. This phenomenon is creative accounting by fiscal adjustments because municipalities postpone improving their true fiscal deficits.

JEL Classification: H72, H73, H74, H77

Keywords: fiscal rule, creative accounting, fiscal adjustments, seemingly unrelated regression with difference in differences

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1 Introduction

Alesina and Perotti (1996) show that fiscal policy encouraging the issuance of government bonds tends to expand fiscal deficits due to political influences. They argue that the expansion of the fiscal deficit is caused by a lack of specific fiscal rules or the low transparency of budget institutions. Many studies show that a relationship exists between fiscal rules and fiscal deficits and reveal that fiscal deficits are likely to be small when fiscal rules are strict ¹. However, some studies note 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. Previous studies indicate that fiscal deficits could be reduced, which supports fiscal discipline through the introduction of fiscal rules before budgets are drafted. In addition, previous studies indicate that even if fiscal rules have a strong effect on improving fiscal conditions, introducing overly strict fiscal rules may result in the use of fiscal gimmicks. Milesi - Ferretti (2003) conduct 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) point 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 debt but not net worth. Von Hagen and Wolff (2006) define creative accounting as stock-flow adjustments (SFA), where $SFA = B_t - B_{t-1} - D_t$, where B_t , and the debt level at time t is the debt level from the previous year minus the current fiscal deficit, D_t . These authors show that there is a tendency to increase accumulated debt when the stock variables are higher than the increase in fiscal deficits. These results are illustrated with flow variables using EU country data. Maltritz and Wüste (2015) show that there is an effect for fiscal rules and stock-flow adjustments using data from 27 countries in the EU. The authors indicate that fiscal deficits are increased by stock-flow adjustments. Clémenceau and Soguel (2017) use Swiss canton-level data to show that creative accounting is mainly implemented to hide surpluses. Burret and Feld (2018a) investigate the fiscal effects of Swiss cantonal debt brakes by using the difference in differences (DID) method. The results show that the fiscal rule improved fiscal deficits in Swiss cantons, but cantonal debt brakes are not related to substantial evasive measures. In contrast, Burret and Feld (2018b) investigate the fiscal effects of Swiss cantonal debt brakes on municipal finance using the DID method. These scholars show that budget constraints at the cantonal level have little effect on average municipal finances and fiscal decentralization.

Most previous studies on this topic are conducted using country- or state-level data from places such as the US, the EU, the OECD, Latin American countries and Swiss cantons ². To the best of our knowledge, there have been few empirical studies focused on creative accounting in local governments and even fewer that are

¹Eichengreen 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).

²See Foremny(2014), Maltritz and Wüste (2015), and Goto et al.(2017). As an example of another perspective, Goto et al.(2017) empirically investigates whether creative accounting is employed when municipalities engage in negotiations for municipal mergers.

based on municipal-level data after the introduction of new fiscal rules. Balduzzi and Grembi (2011) empirically investigate creative accounting and focus on changes in the fiscal rules of Italian municipalities in 2001 using the DID method. These scholars show that municipalities in Italy were not affected by changes in the fiscal rules. Using the difference in discontinuity method, Grembi et al. (2016) analyze the fiscal rule of Italian municipalities that was relaxed for municipalities with fewer than 5,000 inhabitants in 2001 and reveal that relaxing fiscal rules increases fiscal deficits and lowers the tax receipts of Italian municipalities. Moreover, Alpino et al. (2018) reveal that Italian municipalities rise local income taxes on middle- and high-income earners but do not increase local income taxes for low incomes after the introduction of a new population cutoff.

In this paper, we identify the causal effects of the new fiscal rule - called "*The Law Relating to the Financial Soundness of Local Governments*" [*Chiho zaisei kenzenka ho in Japanese*] - which focuses on creative accounting and reveals the interdependency of the new fiscal indexes, by applying a seemingly unrelated regression with the difference in differences (SUR-DID) method and using data from FY2007 to FY2010. The new fiscal rule 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 has operated under the former fiscal rule for approximately 50 years. However, because the former fiscal rule included only two of the indexes relating to fiscal balances and targeting general accounts, some municipalities were easily able to shift a portion of the fiscal deficits in their general accounts to extra-governmental organizations to hide their poor fiscal condition. The new fiscal rule was introduced in FY2007 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, it is necessary to investigate the impacts of the new fiscal rule and determine whether municipalities employ creative accounting through fiscal adjustments or stock-flow adjustments. In addition to assessing previous studies on this topic, we analyze the interdependency of four fiscal indexes to reveal creative accounting after the implementation of the new fiscal rule. Thus, we apply the SUR-DID method, which is a new approach for this type of study, for the following reasons.

First, we focus on the effects of the four new fiscal indexes that were employed due to the introduction of the new fiscal rule in terms of creative accounting. From a global perspective, this new fiscal rule in Japan is atypical because in many countries, local governments introduce either balanced-budget or debt limit rules. Previous studies investigate the effects of only one type of fiscal rule. However, the new fiscal rule in Japan simultaneously adopts three flow indexes and one stock index for municipalities. These three flow indexes have both "yellow cards", which require municipalities to plan for early financial soundness, and "red cards", which require municipalities 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 engage in creative accounting to avoid fiscal management under the supervision of the central government. In other words, there is a possibility that these municipalities

will decrease their flow indexes without increasing the stock index, which does not include a red card. Moreover, the Japanese new fiscal rule is clearly different than that of other countries. The new fiscal indexes target not only the general accounts but also extra-governmental organizations. Another contribution of this study is its focus on extra-governmental organizations after the introduction of the new fiscal rule. Thus, we consider creative accounting that may occur among all public sector accounts.

Second, we also focus on the differences in the "targeted indexes" and "untargeted indexes" of the new fiscal rule. In this paper, "targeted indexes" refer to the new four fiscal indexes, and "untargeted indexes" refer to the indexes of reserved funds and money transfers. Even if it appears that municipalities improve their new fiscal indexes, we must investigate whether they make fiscal adjustments without breaking the new fiscal rule by decreasing the reserved funds or increasing money transfers. For example, under the former fiscal rule, some municipalities hid the fiscal deficits of extra-governmental organizations by decreasing their funds or increasing the money transfers from general accounts to other accounts. Through this behavior, municipalities can postpone improving their fiscal conditions. Therefore, we focus not only on the "targeted indexes" of the new fiscal rule but also on the "untargeted indexes", such as reserved funds and money transfers.

Third, the four new indexes of the new fiscal rule must be applied annually. If at least one index exceeds the red card criterion, then the municipality will come under the supervision of the central government. Thus, municipalities must simultaneously improve all indexes, except for the stock index, every year. In this case, when we estimate these indexes as outcome variables, it is inappropriate to expect the estimation equation error terms to be uncorrelated. Specifically, it is statistically appropriate to use the contemporaneous error terms to address estimation biases relating to the decisions of municipal fiscal management. Additionally, we consider the fiscal relationships that exist in the public sector, such as general accounts, public enterprise accounts, local public corporations, and third sector enterprises. Since these indexes have contemporaneous cross-equation error correlations, we apply an SUR model, which has not been previously used in this field.

Fourth, to identify the causal effects of the new fiscal rule, we apply a DID method, which has been used in previous studies. In particular, we focus on the institutional change between the partial enforcement in FY2007 and the total enforcement in FY2008 because the partial enforcement of the new fiscal rule does not distribute any punishment even if municipalities exceed the criteria of the new fiscal indexes. Some municipalities that suffer from a large former redemption or a low former fiscal balance index might engage in creative accounting under the new fiscal rule. For these reasons, in this paper, we combine SUR with the DID method to identify the causal effects and reveal the interdependency of the new fiscal indexes.

This paper is structured as follows. Section 2 explains Japan's new fiscal rule. Section 3 explains the empirical method that is used. Section 4 presents and discusses the results, and Section 5 concludes the paper.

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 many public services, including public education, welfare, public health, fire services, public construction, and waste disposal.

In FY2007, gross domestic expenditures of Japan were 503 trillion Japanese yen. Local public finances included 60 trillion Japanese yen, while the central government budget was 21 trillion Japanese yen. That is, gross domestic expenditures were approximately 5 trillion dollars at an exchange rate of 100 yen to one U.S. dollar. Accordingly, local public finances represent 0.6 trillion dollars, and the central government budget is 0.2 trillion dollars. The proportion of local public finances relative to gross domestic expenditures was approximately 12 percent in FY2007, which is approximately three times higher than that of the central government. In addition, the central government has accumulated debts of approximately 6 trillion dollars, and local governments have debts of approximately 2 trillion dollars.

The Japanese government includes a central government as well as 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 special 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 part of their authority is delegated by prefectures, although 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 part of their authority is delegated by prefectures, although 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 the authority of cities, towns, and villages.

Normally, in public finance, municipal accounts are divided into general accounts and special accounts. Special accounts consist of public enterprise accounts, such as those used 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 and rescue services, waste removal services, and public long-term care insurance. Partial administrative associations provide a single service in cooperation with neighboring municipalities,

whereas 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. This new fiscal rule was enacted in June 2007 and includes four new fiscal indexes: three flow indexes and one stock index. These new indexes target not only ordinary accounts in each municipality but also extra-governmental organizations to reveal the true fiscal condition 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 two of the indexes as targets, the index relating to fiscal balances and the redemption index of ordinary accounts, some municipalities could easily shift a portion of the fiscal deficits of their ordinary accounts to extra-governmental organizations to hide their poor fiscal condition. 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 that they had to repay to other accounts, it accumulated debt that was approximately 65 times larger than its tax revenue prior to bankruptcy.

Fig. 1 shows the timeline for the introduction of the new fiscal rule. The new fiscal rule was partially enforced in FY2007. Partial enforcement of the rule means that the municipalities only had to disclose their new fiscal indexes in FY2007. That is, municipalities did not receive any punishment even if their indexes exceeded the criteria set by the new fiscal rule. However, since the settlement of the FY2008 fiscal accounts, the new fiscal rule has been consistently enforced for all municipalities. Total enforcement of the rule means that municipalities must not only disclose their indexes, but they will be punished if they do not meet the criteria and could come under the control of the central government.

Fig. 2 presents the new fiscal indexes that measure the degree of municipal fiscal soundness. In this paper, we call the new four indexes "targeted indexes". The Balance1 Index is the ratio of the fiscal surplus of the ordinary accounts to the standard financial scale of municipalities as a flow index³.

$$Balance1 = \frac{fiscal\ surplus}{standard\ financial\ scale} \quad (1)$$

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

³Balance1 and Balance2 are the real deficit index (Jishitsu Akaji Hiritsu) and the consolidated real deficit index (Renketsu Jishitsu Akaji Hiritsu), respectively. We multiplied both indexes by -1 to be able to compare them with the former balance index. In this section, we follow the "White Paper on Local Public Finance, 2007" that was published by the Ministry of Internal Affairs and Communications.

to each municipality is determined by the central government based on municipal fiscal shortages for each fiscal year⁴. The Balance1 Index targets only ordinary accounts with nearly the same scope as the former fiscal rule.

The Balance2 Index is the ratio of the consolidated fiscal surplus of ordinary accounts and public enterprise accounts to the standard financial scale of municipalities as a flow index.

$$Balance2 = \frac{\textit{consolidated fiscal surplus}}{\textit{standard financial scale}} \quad (2)$$

The Balance2 Index targets ordinary accounts and public enterprise accounts. Under the former rule, we were only able to check for the bad debt of each public enterprise. Although municipalities generally manage public enterprises, it was difficult to confirm the relationship between the ordinary accounts and the public enterprise accounts.

The Redemption Index is the ratio of the number of redeemed bonds of ordinary accounts, public enterprise accounts, partial administrative associations, and wide-area local public bodies to the standard financial scale of the municipality as a flow index.

$$Redemption = \frac{\textit{redemption of bond}}{\textit{standard financial scale}} \quad (3)$$

The Redemption Index targets ordinary accounts and wide-area local public bodies and shows how much debt the municipalities must repay each year⁵.

However, the Redemption Index 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 Redemption index.

The Future Burden Index is the ratio of the current outstanding balance of the future 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.

$$Future\ burden = \frac{\textit{future burden}}{\textit{standard financial scale}} \quad (4)$$

The Future Burden Index targets all public sector entities in each municipality. The numerator of the Future Burden Index consists of the accumulated debts in the ordinary accounts and the debt burdens of extra-governmental organizations and includes consolidated fiscal surplus as a stock variable. Thus, if municipalities have a large debt burden in their third-sector enterprise accounts, their Future Burden Index increases. However, the Future Burden Index 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

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

⁵Under the new fiscal rule, if the Redemption Index of a municipality exceeds 18 percent, then the municipality needs to obtain permission to issue new bonds from the central government.

increase the amount of their specific grants or decrease their reserved funds, then they can reduce their Future Burden index.

In addition to the four new indexes, we consider two "untargeted indexes" in this paper. First, we define the reserved funds (Funds) index for the repayment of bonds for each municipality. We use this index because if municipalities decrease the amount of their funds or increase their money transfers to hide their fiscal deficits, they do not receive any punishment from the central government. The Funds Index is calculated by dividing the total amount of reserved funds (in thousands and using the Japanese yen as the currency) by the population size⁶ because municipalities can improve their Balance1 and Balance2 indexes by reducing the funds reserved for the repayment of bonds while allowing for an increase in their Future Burden Index, as this does not include a red card.

Second, we define the Money Transfer Index, which represents money transfers from ordinary accounts to public enterprise accounts. The Money Transfer Index is calculated by dividing the total amount of money transfers (in thousands and using the Japanese yen as the currency) by the population size; this index is the reason some municipalities shifted their fiscal deficits to their own extra-governmental organizations such as public enterprise accounts to hide their fiscal deficits under the former fiscal rule. In addition, money transfers from ordinary accounts to public enterprise accounts affects the Balance2 and Future Burden Indexes because if municipalities increase their money transfers, they can pretend to improve their Balance2 and Future Burden Indexes through a consolidated fiscal surplus.

Fig. 3 presents a diagram of the financial status of local governments. The new fiscal rule establishes four new indexes and requires local governments to disclose them completely with the aim of quickly achieving financial soundness or rebuilding. The four new indexes include a number of financial criteria: for example, if municipalities have a Balance1 Index ranging from -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 condition independently. In this case, municipalities must develop a financial soundness plan that is approved by their local councils and conduct a mandatory external audit. Additionally, municipalities must report 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, then the Ministry of Internal Affairs and Communications or the prefectural governor will make the necessary recommendations. All four indexes include a yellow card.

Moreover, if municipalities have a Balance1 Index that exceeds -20 percent, then they are within the financial rebuilding stage (red card) and must be fiscally managed under the supervision of the central government. These municipalities must conduct a thorough financial restructuring with the involvement of the central government. In this case, municipalities must formulate a financial restructuring plan that must be approved by the local councils; then, they must conduct a mandatory external audit. Additionally, the Ministry of Internal Affairs and Communications must agree with the municipalities' financial rebuilding plan. The criteria for the Balance2, Redemption, and Future Burden Indexes are determined by the new fiscal rule. Although the Future Burden Index includes a yellow card, where the

⁶In this paper, the total amount of reserved funds and money transfers are presented in thousands and using the Japanese yen as the currency.

criterion is 350 percent, it does not include a red card.

3 Empirical framework

3.1 Estimation method

In this section, we identify the causal effects of the new fiscal rule with a focus on creative accounting and reveal the interdependency of the new fiscal indexes by applying the SUR-DID method to the data between FY2007 and FY2010. In particular, we focus on the institutional change between the partial enforcement in FY2007 and the total enforcement in FY2008 because the partial enforcement of the new fiscal rule did not include any punishment, even for municipalities exceeding the criteria of the new fiscal indexes. Some municipalities that suffered from a previously high Redemption Index or a formerly low Balance Index before the introduction of the new fiscal rule might manipulate their accounts within the allowable range of the new fiscal rule.

First, an SUR model can better address the contemporaneous correlations between the error terms given the interdependency of these indexes than the methods employed in previous studies. This advantage exists because each index is interdependently determined by each municipality at the same time and because each municipality must continue watching both the stock and flow indexes to avoid exceeding each criterion. However, since the Future Burden Index does not include a red card, municipalities might decide to decrease their Balance1 or Balance2 Indexes while allowing an increase in their Future Burden Index. Municipalities might also manipulate their accounts within the allowable range of the new fiscal rule even if most of the indexes improved after the introduction of the new fiscal rule. Therefore, we also use both the Funds and Money Transfer Indexes as outcome variables.

Second, we need to apply a DID method to identify the causal effects of the new fiscal rule. Naturally, since there were no new fiscal indexes before the introduction of the new fiscal rule, we cannot compare the new fiscal indexes before and after the new fiscal rule. We employ the former Redemption Index under the former fiscal rule as a treatment variable. If the former Redemption Index in FY2006, which is just before the introduction of the rule in FY2007, is higher than 15 percent, *Treatment* equals 1, and zero, otherwise. Under the former Redemption Index, municipalities whose indexes ranged from 15 percent to 20 percent were called a caution group but were not punished in any way. However, municipalities whose indexes were higher 20 percent were called a limitation group and had to obtain permission from the central government to issue new bonds. By contrast, if the new Redemption Index is higher than 18 percent, municipalities must obtain permission from the central government to issue a new bond under the new fiscal rule. The formulas for the former and new Redemption Indexes are almost identical, but their targeted accounts are quite different. Because the target of the new Redemption Index was expanded to include not only ordinary accounts but also public enterprise accounts and other associations after the introduction of the new fiscal rule, each municipality must improve the fiscal conditions of public enterprise accounts and other accounts. Therefore, some municipalities might fiscally adjust their accounts between ordinary accounts and public enterprise accounts to avoid a reduction in

the new Redemption Index. For this reason, we apply the SUR-DID method by using data between FY2007 and FY2010.

Equation (5) presents an estimation model.

$$Y_{ijt} = \beta_{0j} + \beta_{1,j}Treatment * d2008_{ijt} + \beta_{2,j}Treatment * d2009_{ijt} + \beta_{3,j}Treatment * d2010_{ijt} + \beta_{3,j}X_{ijt} + \mu_{ij} + \tau_{jt} + \epsilon_{ijt} \quad (5)$$

where i represents the municipality, j represents the fiscal index, and t represents the year. The outcome variables, Y_{ijt} , consist of $Balance1_{it}$, $Balance2_{it}$, $Redemption_{it}$, and $FutureBurden_{it}$. We use $Funds_{it}$, which represents the funds reserved per capita for the repayment of bonds in each municipality, as an outcome variable because municipalities can decrease their Balance1 and Balance2 Indexes by reducing the amount of funds that is reserved for the repayment of bonds while allowing their Future Burden Index to increase, which does not include a red card. In addition, we use $MoneyTransfer_{it}$, which is calculated as the money transfers from ordinary accounts to public enterprise accounts per capita. β_0 is a constant, and the error terms are ϵ_{ijt} . We assume that the error terms for each equation have contemporaneous correlations because of decisions stemming from the fiscal indexes.

The covariates X_{it} consist of Pop_{it} , $Pop15_{it}$, $Pop65_{it}$, $LATgrants_{it}$, and $Mergedtrend_{it}$. $Pop15_{it}$ is the share of the population under the age of 15, and $Pop65_{it}$ is the share of the population over the age of 65. $Mergedtrend_{it}$ is the number of years after a municipal merger because the number of municipalities rapidly decreased through municipal mergers between FY1999 and FY2006. $LATgrants_{it}$ is a dummy variable, and t is the time period. We also focus on $LATgrants_{it}$, first, because Japanese municipalities have been highly dependent on certain specific and LAT grants from the central government for approximately 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 to ensure horizontal fiscal equity among the municipalities. Therefore, the tax capacity of municipalities depends on their population size or area. The second reason 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. The amount of LAT grants provided to each municipality is determined by the central government based on the municipal fiscal shortages for each fiscal year. 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 use a single annual budget every year. The expenditures for each fiscal year must be financed by the revenues received in that fiscal year. If municipalities do not spend all of their budgets within the fiscal year, then grants such as LAT grants or specific grants may be reduced in the subsequent fiscal year. The public project expenditures of some municipalities have a tendency to increase at the end of each fiscal year. Thus, when municipalities receive larger LAT grants than usual, their new fiscal indexes may decrease. Moreover, the numerators of the Redemption and Future Burden Indexes are calculated by eliminating the amount of revenue from specific grants. Thus, we must consider the effects of LAT grants on the new fiscal indexes in our estimation.

The $Citysize_{it}$ 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 must consider city size in our estimation. Specifically, for ordinance-designated cities, the Future Burden Index criterion, which has a yellow card, is 400 percent, while for other cities, it is 350 percent.

3.2 Data and summary statistics

In the SUR-DID model, we use Japanese municipal data from FY2007 to FY2010 because the new fiscal rule has been in force since FY2007⁷. The data on municipal governments are derived primarily from the Shi Cyo Son Kessan Jyokyo (Statistics of the Final Accounts of Municipal Governments), the Zaisei Jyokyo tou Ichiran hyo (Municipal Financial Situation List) and the Gappei Digital Archive (Digital Archive of Municipal Mergers).

The summary statistics are reported in Table 1. The number of municipalities in the treatment and control groups between FY2007 and FY2010 is 572 and 4554, respectively. We excluded the data for Yubari city in our estimation because Yubari city went practically bankrupt before the introduction of the new fiscal rule⁸. Since we include municipalities whose former Redemption Indexes were higher than 15 percent just before the introduction of the new fiscal rule, the outcome variables of the treatment group are comparatively worse than those of the control group. On average, there are almost no differences in our covariates.

4 Empirical results

4.1 Estimation results using an SUR-DID model

Table 2 shows the results of the estimation using the SUR-DID method for the period from FY2007 to FY2010. Given the results of the Breusch-Pagan test of estimation models (1) and (2), which are shown in Table 2, we reject the hypothesis that the error term correlations are zero for the study period. The error terms are correlated for each equation, indicating that we can achieve more effective statistical results with an SUR model than with an OLS model. The results show that these fiscal indexes are independently decided by each municipality at the same time. We reveal that it is much better to apply an SUR model to consider the effects of the new fiscal rule applied in Japan rather than using the methods used in previous studies.

As a benchmark, estimation model (1) in Table 2 reports the SUR-DID model without covariates. Almost all treatment variables are statistically significant for each outcome variable. For both the Balance1 and Balance2 indexes, the treatment variables for each year are positive and significant. The treatment variables of the Redemption and Future Burden Indexes are negative and significant. The

⁷To properly evaluate the effects of the new fiscal rule, we did not use data after FY2010 because a number of municipalities were severely damaged by the Great East Japan Earthquake that occurred on 11 March 2011. In the following years, these municipalities received many types of support, including a large number of special grants issued by the central government and others. Therefore, in this paper, we exclude data after FY2010 to avoid the effects of the earthquake.

⁸The future Burden Index of Yubari city was higher than 1,000 percent for a few years.

treatment variables of the Funds Index are positive and significant. Thus, it appears that municipalities improve their fiscal conditions without stock-flow adjustments after the introduction of the new fiscal rule, and the new fiscal rule is very effective. However, the treatment variables for money transfers from ordinary accounts to public enterprise accounts are statistically positive and significant at standard levels each year. These results should be interpreted with caution because there are fiscal adjustments between accounts to avoid exceeding the criterion of the new fiscal index relating to public enterprise accounts.

Estimation model (2), which is shown in Table 2, reports the results from the SUR-DID model with covariates. For the Balance1 Index, the treatment variables each year are statistically positive and significant. The average treatment effects on the treated (ATT) variables of the Balance1 Index are 0.663, 1.055, and 1.616 from FY2008 to FY2010, respectively. The ordinary accounts of municipalities have improved after the introduction of the new fiscal rule. The population size coefficients are significant with negative signs. The merger coefficient is significant with a negative sign. Merged municipalities generally improve their fiscal deficits following municipal mergers. The LAT grants coefficient is significant with a positive sign, that is, the Balance1 Index of municipalities that receive grants from the central government is large. Of the city size dummy variables, those for core cities, special case cities, and cities are significant with negative signs, while the dummy variable for designated cities is not significant.

The results of the Balance2 Index have a tendency similar to those of the Balance1. The treatment variables for each year are also statistically positive and significant. The ATTs of the Balance2 Index are 1.263, 2.183, and 2.635 from FY2008 to FY2010, respectively. These figures are higher than those for the Balance1 Index each year. The results indicate that the municipalities show more improvement in the fiscal conditions of public enterprises than in those of their ordinary accounts. The coefficients of population size and mergers are negative and significant. The coefficient for LAT grants is significant with a positive sign for the Balance2 Index as well as for the Balance1 index. Additionally, it is natural that the coefficient for the LAT grants has a positive sign because the denominators of the Balance1 and Balance2 indexes include the standard financial scale, which includes both local tax revenues and LAT grants.

For the Redemption Index, the treatment variables for FY2009 and FY2010 are statistically negative and significant. The ATTs of the Redemption Index are -1.014, and -2.003 in FY2009 and FY2010, respectively. Municipalities improve their Redemption Index except for a settlement that occurred in FY2008 just after the introduction of the new fiscal rule. The merger coefficient is significant with a negative sign. The merged municipalities decrease their Redemption Indexes. The LAT grants coefficient is significant with a negative sign. Therefore, municipalities that receive LAT grants reduce the redemption of their accumulated debts. Of the city size dummy variables, those for designated cities, core cities, special case cities, and cities are positive and significant. Municipalities of a comparatively large size increase their redemption.

For the Future Burden Index, the treatment variables each year are statistically negative and significant. The ATTs of the Future Burden Index are -5.712, -16.413, and -24.656 from FY2008 to FY2010, respectively. Municipalities improve their future burden as well as other new fiscal indexes. The merger coefficient is significant

with a negative sign. The LAT grant coefficient is significant with a negative sign. Therefore, because municipalities depend on LAT grants from the central government, they have a lower Future Burden Index than others. In addition, of the city size dummy variables, those for ordinance-designated cities, core cities, special case cities, and cities are significant with positive signs. Large municipalities increase their future burden through activities such as accumulating debts.

Given the results for the new fiscal indexes, we now consider the estimation result of the Funds and Money Transfer Indexes. For the Funds Index, the treatment variables for FY2009 and FY2010 are statistically positive and significant. The ATTs of the Funds Index are 21.392 and 43.756 for FY2009 and FY2010, respectively. In other words, the ATTs are 210 and 440 dollars per capita at an exchange rate of 100 Japanese yen to one U.S. dollar. The coefficients of the share of population under the age of 15 and over the age of 65 are negative and significant. These results show that municipalities, which are facing a declining birth rate and an aging population, avoid exceeding the criteria of the new fiscal rule by drawing on their savings. The merger coefficient is significant with a positive sign. For the city size dummy variables, we can see different results for the four new fiscal indexes. We reveal that the coefficients for the ordinance-designated cities, core cities, special case cities, and cities are significant with negative signs, indicating that these large cities avoid exceeding the criteria of the new fiscal indexes by reducing their reserve funds. As a result, their Future Burden Indexes increase, while their Funds Index decreases. Because larger municipalities are drawing on their reserved funds to repay their bonds in the future, it cannot be said that they achieve true fiscal soundness.

For the Money Transfer Index, the treatment variables for each year are statistically positive and significant. The ATTs of the Money Transfer Index are 3.999, 8.270, and 8.645 from FY2008 to FY2010, respectively. In other words, these ATTs are 40, 83 and 87 dollars per capita at an exchange rate of 100 Japanese yen to the U.S. dollar. Interestingly, we clearly reveal that municipalities that suffer from a high former Redemption Index engage in creative accounting through fiscal adjustments to address the criterion of the new fiscal index under the new fiscal rule, especially for public enterprise accounts. In addition, the merger coefficient is positive and significant. The dummy variables for core cities and cities are negative and significant. These cities have decreased their money transfers from ordinary accounts to public enterprise accounts.

4.2 Robustness checks

In this section, we conduct robustness and validity checks by formally testing for the common pre-trend assumption for our main outcomes of interest using both placebo outcome variables and placebo treatment periods. Not surprisingly, we cannot see the new fiscal indexes before the introduction of the new fiscal rule. To check the common trends assumption between the treatment and control groups in the pre-treatment period, we apply the former Balance, Funds, and Money Transfer Indexes as placebo outcome variables. For this reason, the former Balance Index is almost same as the Balance1 Index.

Fig. 4 shows the trends of the former Balance, Funds, and Money Transfer Indexes both before and after the introduction of the new fiscal rule. There is

no change in these indexes between the treatment and control groups in the pre-treatment period, but the treatment group rapidly increases its Balance Index after the partial enforcement of the new fiscal rule. Although the former Balance Index of the control group is approximately 5 percent before and after the introduction of the new fiscal rule, its representation in the treatment group clearly increases from approximately 3 percent in FY2007 to 6 percent in FY2010. The Funds Index gradually increases after the introduction of the new fiscal rule. The Funds Index of the treatment group increases from approximately 240 in FY2007 to 340 in FY2010. In addition, the Money Transfer Index rapidly increases after FY2007. By analyzing the graphical results for this period, we find the common pre-trend assumption using the DID method.

Next, Table 3 reports the estimation results for the placebo treatment periods. To analyze the placebo treatments, we use only 2 control and 2 treatment period years, which includes the data between FY2004 and FY2005. The placebo SUR-DID estimation with control variables can statistically confirm the common pre-trend assumption. We observe that the treatment variables of the former Balance, Funds, and Money Transfer Indexes are statistically nonsignificant. This result is not surprising given the trends we find in Fig. 4.

As with these results, our main results in Table 2 are consistent with creative accounting by fiscal adjustments under the new fiscal rule. Thus, the treatment group, which faces a large former Redemption Index, engaged in creative accounting by using money transfers from ordinary accounts to public enterprise accounts after the introduction of the new fiscal rule.

5 Conclusion

This paper contributes to the literature in several ways. We analyze whether creative accounting occurred after the introduction of a new fiscal rule in Japanese municipalities. In particular, we focus on the institutional changes that occurred between partial and total enforcement. Our primary contribution is that we identify the causal effects of the new fiscal rule on creative accounting by focusing on fiscal adjustments. In addition, we reveal the interdependency of the new fiscal indexes after the introduction of a new fiscal rule by applying the SUR-DID method.

We find that the new fiscal indexes of the new fiscal rule are interdependent. Each municipality independently determines its new fiscal indexes at the same time. Thus, we have to consider the interdependency between stock and flow indexes to reveal the effects of the new Japanese fiscal rule. Our results appear to indicate that Japan's new fiscal rule is effective because, on average, municipalities improve all four of the new indexes. That is, the "targeted indexes" are improved after the new four indexes.

However, we clearly find that municipalities improve these new indexes by increasing their money transfers from ordinary accounts to public enterprise accounts. This result shows that one of the "untargeted indexes" becomes worse to improve their "targeted indexes" just after the new fiscal rule was introduced. The municipalities can do this without consequences because money transfers do not have a corresponding criterion in the new fiscal rule. Municipalities that had a large former Redemption Index just before the introduction of the new fiscal rule can now manipulate their fiscal indexes through money transfers if they have large accumulated

debts that are related to the operation of public enterprises. Therefore, we find that under the new rule, municipalities implement creative accounting through fiscal adjustments. By contrast, large municipalities, which include ordinance-designated cities, core cities, special case cities, and cities, reduce their reserved funds to levels that are below the criterion of the yellow card. These municipalities engage in creative accounting by reducing their reserved funds to avoid exceeding the criteria established for their indexes.

We believe that municipalities myopically postpone improving their fiscal problems even though the aim of introducing the new fiscal rule was to achieve true fiscal soundness and prevent creative accounting such as fiscal adjustments. Given that a number of municipalities depend on grants from the central government and that they have a large amount of accumulated debt, we conclude that municipalities engage in creative accounting by increasing money transfers, and larger municipalities reduce their reserved funds. These municipalities do so because they do not want to be fiscally managed and overseen by the central government. Furthermore, these findings demonstrate that municipalities postpone improving their actual fiscal condition.

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Figure 1: Timeline for the introduction of the new fiscal rule

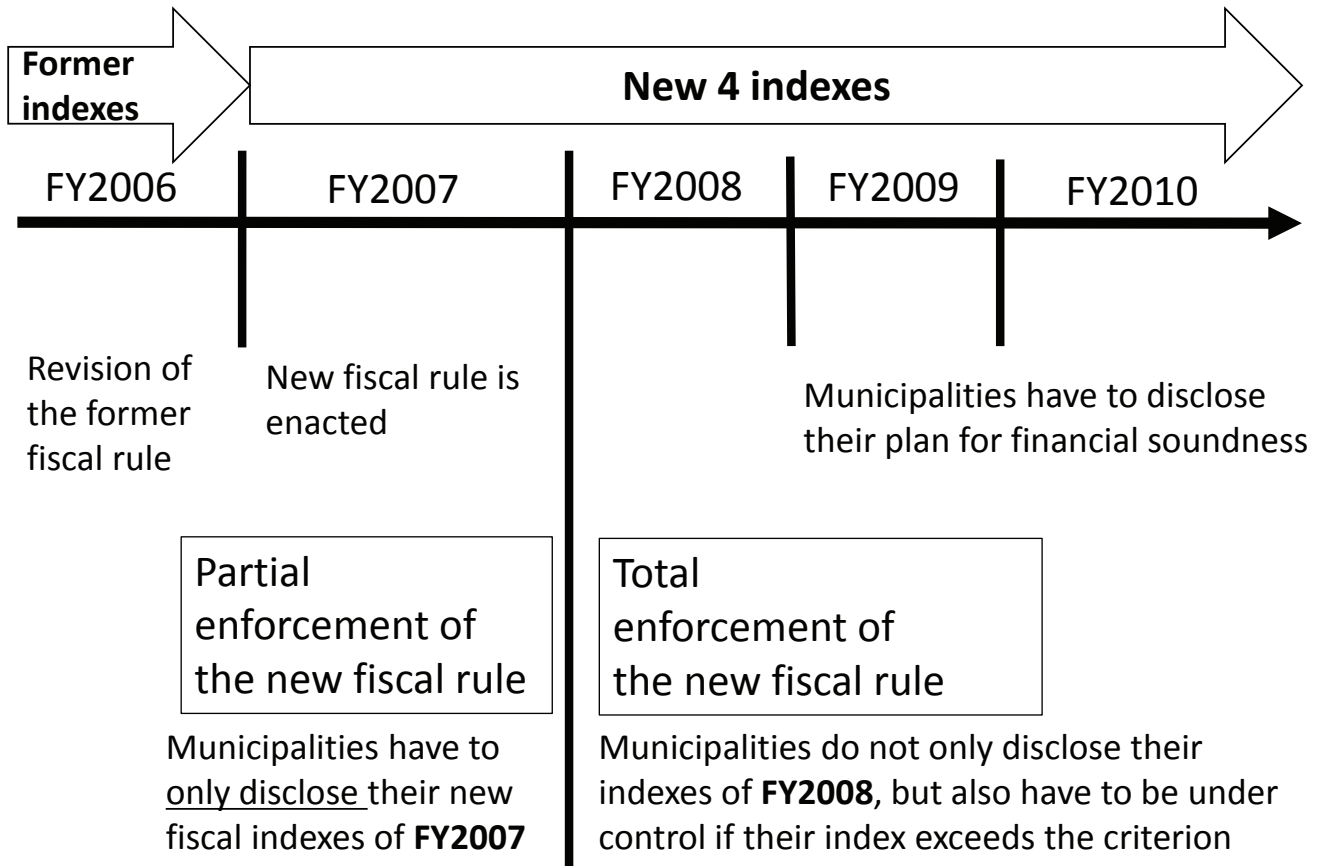


Figure 2: Subject of the ratio for determining soundness

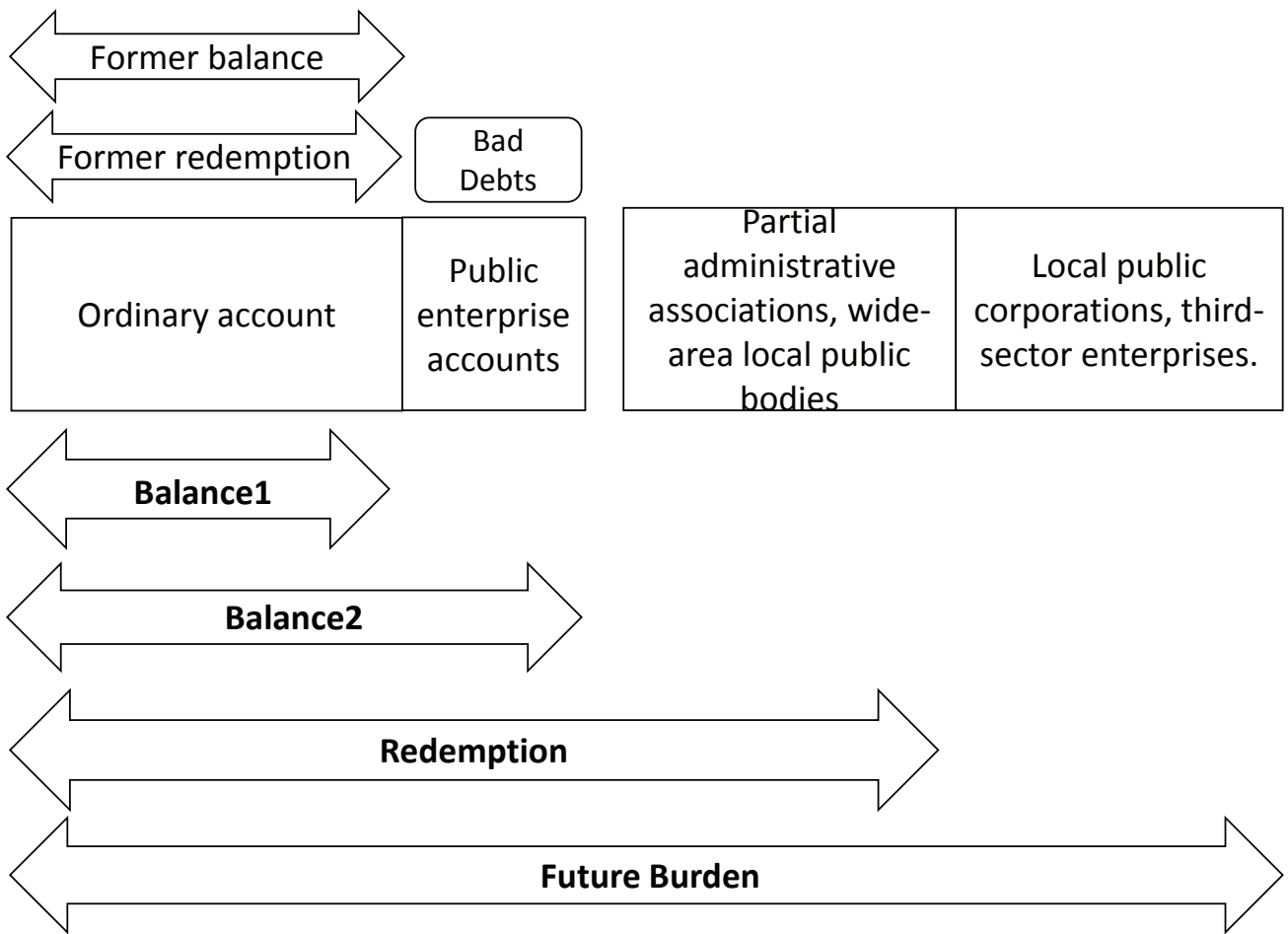


Figure 3: Image of the early financial soundness, financial rebuilding and soundness of public enterprise management

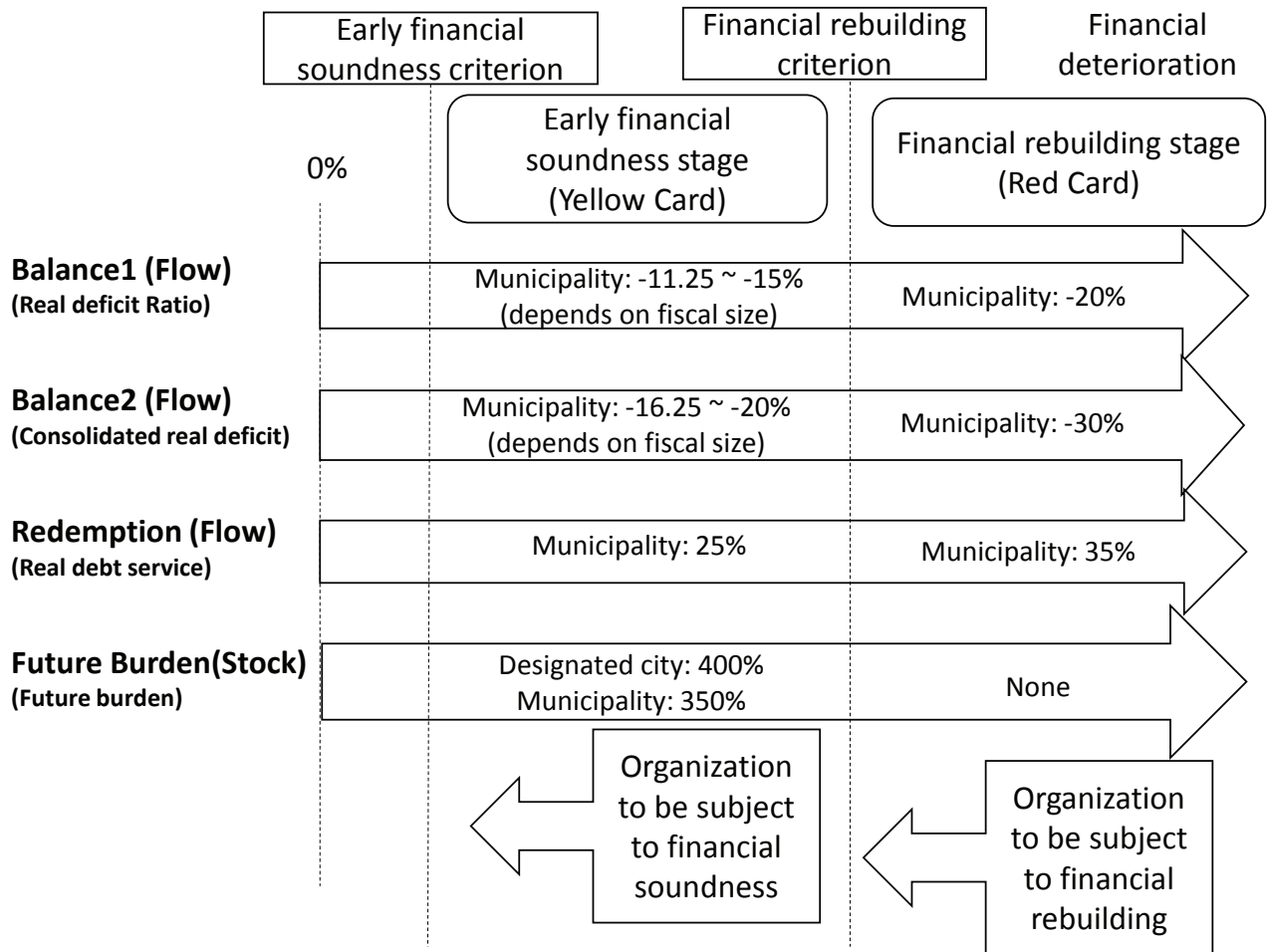


Figure 4: Former balance, funds, and money transfers

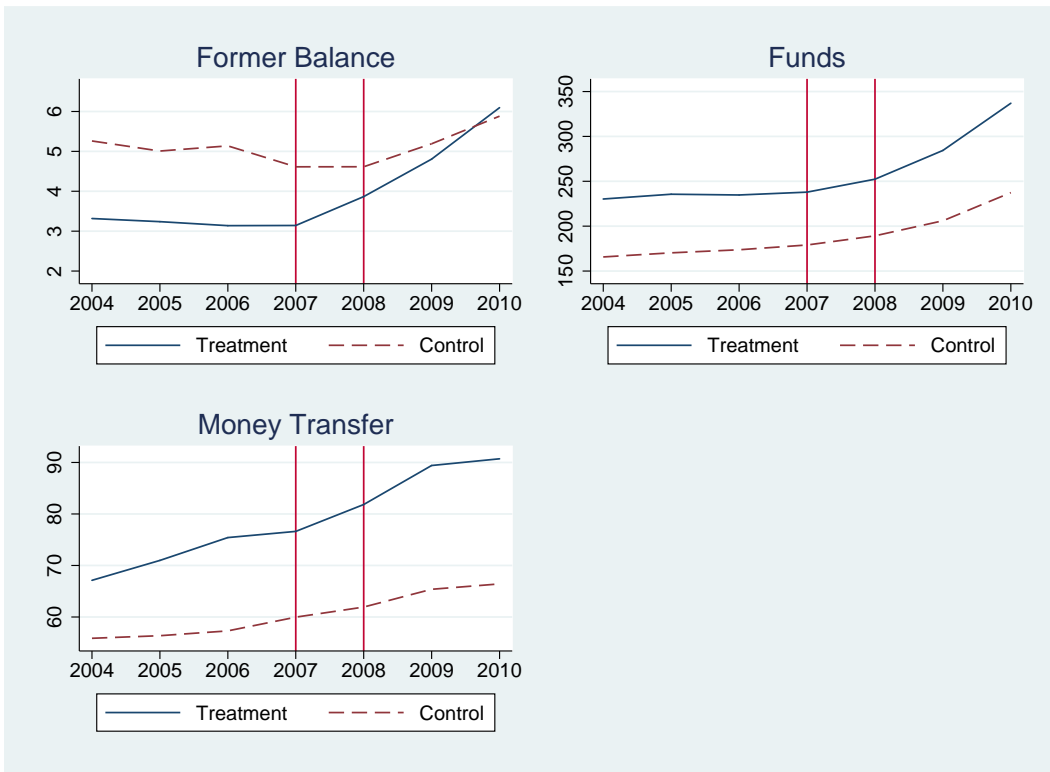


Table 1: Summary statistics

| | Treatment | | Control | |
|---|-----------|-----------|---------|-----------|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Number of observations | 572 | | 4554 | |
| Outcome variables | | | | |
| Balance1 | 4.881 | 5.153 | 5.176 | 3.418 |
| Balance2 | 12.589 | 11.359 | 16.105 | 11.314 |
| Redemption | 18.350 | 4.247 | 12.723 | 4.601 |
| Future burden | 114.346 | 91.726 | 70.478 | 81.195 |
| Funds (thousand yen per capita) | 290.908 | 528.208 | 210.757 | 387.470 |
| Money transfers (thousand yen per capita) | 87.273 | 56.502 | 64.565 | 41.365 |
| Covariates | | | | |
| Pop | 65587 | 240310 | 66050 | 164989 |
| Pop. 15 | 0.120 | 0.025 | 0.130 | 0.024 |
| Pop. 65 | 0.276 | 0.079 | 0.241 | 0.075 |
| Merged trend | 1.801 | 2.648 | 1.776 | 2.666 |
| LAT grants dummy | 0.979 | 0.143 | 0.930 | 0.255 |
| Designated cities | 0.030 | 0.170 | 0.007 | 0.086 |
| Core cities | 0.007 | 0.083 | 0.023 | 0.151 |
| Special case cities | 0.000 | 0.000 | 0.024 | 0.154 |
| Cities | 0.316 | 0.465 | 0.394 | 0.489 |

Table 2: Estimation results of SUR-DID

| | (1) | | | | | |
|--------------------|-------------------------|---------------------|----------------------|-----------------------|----------------------|---------------------|
| | Outcome variables | | | | | |
| | Balance1 | Balance2 | Redemption | Future Burden | Funds | Money Transfer |
| Treatment*2008 | 0.747*** (0.200) | 1.308*** (0.411) | -0.114 (0.126) | -7.455*** (2.043) | 7.600 (6.748) | 4.327** (1.956) |
| Treatment*2009 | 1.107*** (0.203) | 2.220*** (0.417) | -1.056*** (0.127) | -17.582*** (2.072) | 26.292*** (6.845) | 8.591*** (1.984) |
| Treatment*2010 | 1.657*** (0.203) | 2.653*** (0.417) | -2.039*** (0.127) | -25.566*** (2.073) | 48.716*** (6.846) | 8.948*** (1.984) |
| 2009 | 0.610*** (0.095) | 0.512*** (0.195) | -0.658*** (0.060) | -11.892*** (0.970) | 14.780*** (3.203) | 3.000*** (0.928) |
| 2010 | 1.299*** (0.095) | 1.478*** (0.195) | -1.625*** (0.060) | -28.796*** (0.971) | 44.963*** (3.206) | 3.939*** (0.929) |
| Constant | 0.005 (0.066) | 0.395*** (0.136) | -0.275*** (0.042) | -10.290*** (0.677) | 9.090*** (2.238) | 1.807*** (0.649) |
| FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Breusch-Pagan test | chi2(15) = 3391.586 *** | | | | | |
| Observations | 5,131 | 5,131 | 5,131 | 5,131 | 5,131 | 5,131 |
| R-squared | 0.065 | 0.030 | 0.215 | 0.212 | 0.063 | 0.014 |

Table 2: (continued) Estimation results of SUR-DID model

| | (2) | | | | | |
|---------------------|------------------------|----------------------|----------------------|-----------------------|--------------------------|----------------------|
| | Outcome variables | | | | | |
| | Balance1 | Balance2 | Redemption | Future Burden | Funds | Money Transfer |
| Treatment*2008 | 0.663*** (0.201) | 1.263*** (0.409) | -0.061 (0.126) | -5.712*** (2.029) | 0.761 (6.618) | 3.999** (1.957) |
| Treatment*2009 | 1.055*** (0.203) | 2.183*** (0.415) | -1.014*** (0.126) | -16.413*** (2.036) | 21.392*** (6.644) | 8.270*** (1.985) |
| Treatment*2010 | 1.616*** (0.202) | 2.635*** (0.414) | -2.003*** (0.126) | -24.656*** (2.035) | 43.756*** (6.643) | 8.645*** (1.984) |
| Pop | -0.000*** (0.000) | -0.000*** (0.000) | | | -0.001 (0.001) | -0.000 (0.000) |
| Pop. 15 | | -6.365 (6.423) | | | -589.445*** (116.091) | |
| Pop. 65 | -1.420 (1.377) | | 0.283 (0.947) | 22.259 (15.425) | -90.760* (53.287) | |
| Merged years | -0.029* (0.015) | -0.220*** (0.029) | -0.039*** (0.010) | -0.551*** (0.154) | 1.111** (0.510) | 0.511*** (0.152) |
| LAT grants dummy | 0.367** (0.157) | 0.680** (0.317) | -0.284*** (0.096) | -10.711*** (1.553) | 0.779 (5.137) | 0.580 (1.525) |
| Designated cities | -0.517 (0.397) | | 1.222*** (0.233) | 18.978*** (3.748) | -43.595*** (14.656) | -3.779 (4.437) |
| Core cities | -0.705*** (0.226) | | 0.757*** (0.162) | 13.038*** (2.603) | -45.086*** (8.522) | -4.436* (2.532) |
| Special case cities | -0.413* (0.224) | | 0.536*** (0.161) | 4.491* (2.587) | -42.627*** (8.466) | -3.988 (2.513) |
| Cities | -0.311*** (0.074) | | 0.370*** (0.053) | 8.664*** (0.852) | -38.672*** (2.775) | -2.649*** (0.811) |
| 2009 | 0.737*** (0.150) | 0.587*** (0.194) | -0.668*** (0.100) | -13.552*** (1.619) | 22.977*** (5.441) | 2.820*** (0.927) |
| 2010 | 1.420*** (0.156) | 1.570*** (0.195) | -1.613*** (0.104) | -29.951*** (1.687) | 51.711*** (5.764) | 3.545*** (0.933) |
| Constant | -0.240 (0.181) | 0.065 (0.316) | -0.124 (0.116) | -2.062 (1.870) | 15.564** (6.182) | 1.799 (1.570) |
| FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Breusch-Pagan test | chi2(15) = 3247.657*** | | | | | |
| Observations | 5,131 | 5,131 | 5,131 | 5,131 | 5,131 | 5,131 |
| R-squared | 0.071 | 0.043 | 0.232 | 0.244 | 0.121 | 0.019 |

Note: The models in the table include year and municipality fixed effects. Standard errors are reported in brackets. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 3: Placebo treatments for the former balance, funds, and money transfers

| | Outcome variables | | |
|--------------------|-----------------------|----------------------|----------------------|
| | Former Balance | Funds | Money Transfer |
| Treatment | 0.014 (0.071) | 0.701 (1.221) | 0.739 (0.488) |
| Constant | 0.742*** (0.176) | 18.802*** (2.939) | -2.636*** (1.014) |
| Covariates | Yes | Yes | Yes |
| FE | Yes | Yes | Yes |
| Breusch-Pagan test | chi2(3) = 138.130 *** | | |
| Observations | 4,339 | 4,339 | 4,339 |
| R-squared | 0.008 | 0.013 | 0.009 |

Note: The models in the table use two years of data from FY2004 to FY2005. The models include year, municipality fixed effects and the following covariates: population, ratio of the population under 15 years old to the total population, ratio of population over 65 years old to the total population, merged years, LAT grants, designated cities, core cities, special case cities, and cities. Standard errors are reported in brackets. ***, **, * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.