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**Identifying Municipality Discretion Using a Quasi-Experimental  
Approach: The Case of Eligibility Assessments for Japan’s Long-Term  
Care Insurance Program**

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**Abstract**

This study adopts a quasi-experimental approach to empirically identify the discretion exercised by municipalities in conducting eligibility assessments for Japan’s Long-Term Care Insurance (LTCI) program. It leverages the municipal merger phenomenon in the first half of the 2000s as a significant factor in creating an extrapolation shock. Prior to the merger, municipalities had a clear incentive to enhance their eligibility ratios as they could transfer eligible recipients to the merged municipalities. This study’s difference-in-difference regression analysis provides concrete evidence that pre-merger municipalities did, indeed, escalate their eligibility ratios immediately before the merger, underscoring discretionary conduct in eligibility assessments. Moreover, it suggests that pre-merger municipalities tended to upgrade the eligibility status of insured residents from “Support needs” to “Long-term care needs I.” These findings not only highlight the deviation of the Japanese LTCI system from its institutional design but also point towards potential mismanagement within the system. Understanding these dynamics is crucial for improving the efficacy and fairness of LTCI programs.

**Keywords**

Long-term care insurance; Eligibility assessment; Municipal merger; Free-rider behavior; Difference-in-difference

**JEL Classifications**

H51, H73, H75, I13, I18, R51

## 1 Introduction

Developed countries face common challenges with rapid aging and the weakening role of the family as the primary caretaker for the elderly. In Japan, approximately 36 million elderly people—constituting 29% of the total population in 2022—make it one of the world’s most aged nations. The public Long-Term Care Insurance (LTCI) program was introduced in fiscal year (FY) 2000 to address the increasing demand for long-term care. LTCI is managed at the municipal level and financed by premiums from individuals aged 40 and over, municipal expenditures, and subsidies from higher levels of government. The stable operation of LTCI is critically important in Japan’s aging society.

Eligibility assessments are crucial in Japan’s LTCI, designed to prevent municipalities from exercising discretion. To qualify for LTCI benefits, individuals needing long-term care must undergo a certification process called eligibility assessment. Removing discretion from this assessment is vital for the LTCI system, which aims to evaluate long-term care necessity uniformly, irrespective of income, family status, or residence. Discretionary assessments could lead to differing treatments for individuals with similar conditions across municipalities. However, studies indicate that municipalities facing financial strain tend to enforce stricter eligibility assessments for long-term care.

Shimizutani and Inakura (2006) analyzed municipal-level data spanning from FY 2000 to FY 2001 and FY 2003 to FY 2004. They observed that municipalities experiencing financial challenges tend to influence changes in the eligibility ratio.<sup>1</sup> Similarly, Hayashi and Kazama (2008) utilized dynamic panel estimation covering FY 2003 to FY 2005, revealing that municipalities facing fiscal difficulties adjust eligibility assessments to balance the LTCI

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<sup>1</sup> The eligibility ratio is the ratio of the number of the eligible persons as a percentage of the elderly people.

budget. These findings suggest that the eligibility assessment serves as a gatekeeper, controlling increasing LTCI benefits. If eligibility assessments vary based on municipal fiscal capacity, it contradicts the LTCI's goal of ensuring long-term care as a universal service. Despite its policy significance, the possibility of discretion in eligibility assessments for care needs has received little examination outside of these studies. This underscores the importance of further research in addressing this critical policy issue.

The abovementioned studies focus on the correlation between changes in the eligibility ratio and the financial health of municipalities. In contrast, this study enhances internal validity by employing a quasi-experimental approach, leveraging the municipal mergers that occurred in the first half of the 2000s as the extrapolation shock, and investigating the discretionary nature of LTCI eligibility assessments. All municipalities face a dilemma between increasing the number of eligible recipients and shouldering the fiscal burden. In essence, if there is no additional financial burden and if allowed, all municipalities could potentially relax eligibility assessments for long-term care. Following a municipal merger, eligible recipients from the pre-merger municipality are transferred to the post-merger entity. Consequently, if eligibility assessments are conducted with discretion, the pre-merger municipality is likely to increase the number of eligible recipients immediately before the merger, anticipating that the burden would shift to the larger entity resulting from the merger.

Recently, several studies have examined the concept of free-rider behavior among pre-merger municipalities. Municipal mergers create an incentive for municipalities to accumulate public debt before the merger, as the new entity formed after the merger assumes the debt burden. Hinnerich (2009) and Jordahl and Liang (2010) found that smaller local governments tend to increase public debt to take advantage of the larger taxpayer base in the new, expanded municipal entity. This phenomenon echoes the common-pool problem initially explored by Tullock (1959) and Buchanan and Tullock (1962). Hinnerich (2009) focused on the 1969–1974

boundary reform in Sweden, while Jordahl and Liang (2010) investigated the country's first wave of boundary reform in 1952. These studies utilized difference-in-difference (DID) estimations to clarify municipalities' free-rider behavior before mergers. Similarly, Blom-Hansen (2010) and Hansen (2014) employed the same estimation method to explore this issue in Denmark. Saarimaa and Tukiainen (2015) investigated this issue in Finland, while Nakazawa (2016) and Hirota and Yunoue (2017) confirmed the occurrence of free-rider behavior in Japan.

In the context of LTCI eligibility assessments in Japan, following a municipal merger, eligible beneficiaries from the pre-merger municipality are transferred to the post-merger entity. Consequently, if eligibility assessments are conducted with discretion, the pre-merger municipality is likely to increase the number of eligible recipients immediately before the merger, anticipating that the larger entity post-merger would bear the benefit load. Therefore, this study investigates municipal discretion in eligibility assessments by examining the free-rider behavior of pre-merger municipalities. Furthermore, the study explores changes in both the eligibility ratio and the degree of eligibility. The pre-merger municipality might not only raise eligibility ratios but also elevate the degree of eligibility.

This study makes two significant contributions. First, it investigates the discretionary nature of LTCI eligibility assessments, regardless of a municipality's financial situation, using the municipal merger in the early 2000s as an extrapolation shock. Unlike prior research focusing on how a municipality's fiscal condition affects changes in eligibility ratios, this study explores the discretion involved in eligibility assessments by examining free-rider behavior during a municipal merger event, independent of fiscal circumstances. Second, it explores the context of free-rider behavior within municipal mergers and the LTCI system. Nakazawa (2017) revealed that pre-merger municipalities tend to draw from the municipal LTCI fund in anticipation of future burdens. Additionally, Nakazawa (2018) noted that pre-merger municipalities often charge lower LTCI premiums for elderly residents compared to

municipalities that have not undergone mergers. Building on these findings, this study extends the analysis: if pre-merger municipalities exhibit a greater increase in eligibility ratios compared to those that have not merged, it suggests a consistent adoption of free-rider behavior—withdrawal of funds, elevation of eligibility ratios, and suppression of premiums—by pre-merger municipalities.

DID regression analysis confirms that pre-merger municipalities experience a significant increase in the eligibility ratio shortly before a merger. Moreover, it appears that pre-merger municipalities tend to upgrade the eligibility categories of insured individuals from mild to severe. These findings suggest that the Japanese LTCI system deviates from its institutional design.

The remainder of this paper is organized as follows. Section 2 provides a concise overview of Japan's LTCI system, while Section 3 outlines the empirical methodology and describes the data used. The estimation results and key findings are presented in Section 3, followed by a discussion. Finally, Section 4 presents the conclusion.

## **2 LTCI system in Japan**

LTCI is managed at the municipal level, covering residents aged 65 years and over (category I) as well as those aged 40–64 years (category II). When an insured resident requires long-term care, the Certification Committee for Long-Term Care Needs (CCLTCN), established within each municipality, conducts an eligibility assessment. These assessments involve an objective evaluation of the resident's physical and mental care needs and are conducted in two stages. In the first stage, the resident responds to a standardized questionnaire regarding their physical and mental condition, evaluated by a universal judgment computer program. Additionally, the resident's physician is required to provide comments in a uniform format. In the second stage,

the CCLTCN, comprising medical and welfare specialists, determines the eligibility level based on the first-stage results. As such, the eligibility assessment process appears to maintain objectivity and uniformity.

Recipients are categorized based on the nature of care needed, as determined by the eligibility assessment process. The spectrum of care requirements spans from mild to severe in a multi-tiered approach, while the eligibility degree encompasses six levels, ranging from “Support needs” (the lowest) to “Long-term care needs V” (the highest).<sup>2</sup> Benefit limits correspond to the degree of eligibility, with monthly benefit ceilings varying from approximately 50,320 JPY (for “Support needs I”) to 362,170 JPY (for “Long-term care needs V”).<sup>3</sup> Moreover, benefit limits for facility services are determined by facility type and the level of eligibility.<sup>4</sup> Under these institutional criteria, eligible recipients contribute 10% of the care cost, with LTCI covering the remaining 90%.<sup>5</sup> This framework ensures universal service utilization and horizontal equity regarding eligibility for LTCI benefits, regardless of the insured resident’s income or place of residence.

The LTCI program operates at the municipal level under a 3-year program management cycle, following the pay-as-you-go principle. Municipalities act as insurers and maintain special LTCI accounts for this purpose. Campbell and Ikegami (2000) and Mitchell et al. (2004) underscored the innovative link between benefit expenditure and premium burden within Japan’s LTCI program. Municipalities forecast total benefits for the upcoming period and

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<sup>2</sup> The eligibility levels have been increased to seven since FY 2006 with “Support needs” divided into two stages (I and II).

<sup>3</sup> The data relate to the eighth program management period from FY 2021 to FY 2023.

<sup>4</sup> Nonetheless, an insured resident can purchase additional services above the limit at their own cost.

<sup>5</sup> The co-payment rate is basically 10% of the care cost, but depending on income, it is either 20% (from 2015) or 30% (from 2018).

maintain a consistent ratio between total insurance benefits for category I insured individuals (aged 65 years and over) and insurance premiums. Therefore, the premium for category I is tied to the benefit level. Any surpluses are transferred to the Long-Term Care Benefit Fund (LTCBF) to hedge against future deficits. In instances where fiscal resources for a program management period are insufficient due to higher-than-expected benefits or lower-than-expected revenue (owing to forecasting errors in eligible recipient increases, premium setting failures, etc.), municipalities may draw from the LTCBF or borrow from the Fiscal Stabilization Fund (FSF). However, repaying an FSF loan necessitates increasing premiums in the subsequent program period. If the number of recipients and benefit amounts rise in a period, municipalities must raise premiums for category I residents in the next period to maintain budget equilibrium. Additionally, increased benefits translate to a higher municipal budget burden, as municipalities cover 12.5% of associated costs.

From FY 2000 to FY 2012, the total number of eligible recipients surged from 2.18 million to 6.89 million. Simultaneously, the total cost of the LTCI escalated from 3.6 trillion JPY to 11.0 trillion JPY during the same period. Additionally, the average LTCI premium for category I residents rose from 2,911 JPY per month in the initial period to 6,014 JPY per month in the sixth period.<sup>6</sup> As the number of eligible recipients has grown, both the fiscal burden on municipalities and the insurance premium burden on category I insured residents have increased accordingly.

### **3 Empirical framework and data**

#### **3.1 Empirical framework**

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<sup>6</sup> The first period is from FY 2000 to FY 2002 and the eighth period is from FY 2021 to FY 2023.



Weingast et al. (1981) analyzed the incentive for free riding within a formal framework. They proposed that at an efficient spending level, the marginal social cost of a public-spending project in a specific district should equal the marginal social benefit. However, if the costs of the project must be divided among  $n$  districts, only  $1/n$  of the social marginal cost should be imposed on each district. Consequently, when municipalities merge, smaller municipalities tend to have a stronger incentive to engage in free riding. Hinnerich (2009) formulated the strength of municipality  $i$ 's incentive to free ride as  $Freeride_i = 1 - N_i/N_j \in [0,1]$ . The social marginal borrowing cost of municipality  $i$  equals  $N_i/N_j < 1$ , where  $N_i$  represents the population of municipality  $i$  participating in the merger, and  $N_j$  is the total population of the post-merged municipality, including municipality  $i$ .

In this study, Hinnerich's (2009) definition of the free-rider incentive associated with municipal mergers is applied to the eligibility assessments of the Japanese LTCI. In the LTCI system, the burden of LTCI premiums falls on the elderly. Therefore, the scope of  $N_i$  and  $N_j$  are adjusted from the total population to the elderly population. The following relationship is defined as:

$$Eligibility_i = \alpha + \beta Freeride_i + u_i \quad (1)$$

where  $Eligibility_i$  represents the eligibility ratio, calculated as the number of eligible recipients divided by the number of category I insured individuals. The parameter  $\beta$  represents the free-rider effect, while  $u_i$  represents observed or unobserved determinants of the eligibility ratio. As the first-difference estimate aligns with the fixed-effect estimate in the two-period model, the DID estimation can also be derived through a first-difference approach. Considering the difference of Eq. (1), the following equation is derived:

$$\Delta Eligibility_i = \theta + \beta \Delta Freeride_i + v_i \quad (2)$$

where  $\Delta$  represents the difference operator, signifying the variance between the base fiscal year and the fiscal year preceding the merger. In instances where the pre-merger municipality increases the eligibility ratio significantly before the merger, the municipality bears the resultant burden. Therefore, this study assumes that the pre-merger municipality raises the eligibility ratio only 1 FY before the merger. Consequently, all incentives to freeride (*Freeride*) for pre-merger municipalities more than 1 FY before the merger equal zero. Since  $\Delta Freeride = Freeride$ , Eq. (2) may be rewritten as follows:

$$\Delta Eligibility_i = \theta + \beta Freeride_i + v_i \quad (3)$$

To address the issue of municipalities facing financial difficulties in managing assessments to balance the LTCI budget, as raised by Shimizutani and Inakura (2006) and Hayashi and Kazama (2008), variables related to the municipality's LTCI finances are utilized. The first variable is the LTCBF balance per category I insured resident, while the second is the amount of FSF loan per category I insured resident. Additionally, the ratio of the local allocation tax (LAT) grant per capita is utilized as an indicator of the municipality's reliance on inter-governmental subsidies. The LAT grant serves as an inter-governmental subsidy aimed at rectifying the unequal distribution of central government resources among local governments and compensating for local government resource deficiencies. Furthermore, the LTCI premium for category I insured residents is included since municipalities may regulate eligibility assessments for this category, considering that premiums are already high and therefore challenging to increase further. Consequently, Eq. (3) can be expressed as:

$$\Delta Eligibility_i = \theta + \beta_1 Freeride_i + \beta_2 LTCBF_i + \beta_3 FSF_i + \beta_4 LAT_i + \beta_5 Premium_i + v_i$$

(4)

The fiscal condition of the LTCI is considered robust when the *LTCBF* balance is high but precarious when the *FSF* amount is high. Consequently, the former is anticipated to exert a positive influence, while the latter is expected to have a negative impact on the change in the eligibility ratio. The proportion of LTCI benefits financed from the municipality's general budget is partly offset by *LAT* disbursements. Thus, *LAT* per capita is used as an indicator of dependency on *LAT* revenue. Moreover, a high *LTCI Premium* in a given period indicates a limited capacity to raise premiums in the future. Consequently, both the amount of *LAT* and *LTCI Premium* are expected to exert negative effects on the change in the eligibility ratio.

### 3.2 Data

The LTCI system operates over a 3-year program management period, during which significant components such as eligibility levels, benefit limits at each level, and income thresholds for premium reduction may vary considerably. Additionally, premiums are adjusted at the commencement of a new period. Thus, merger scenarios should, preferably, be compared within the same management period. This ensures that the DID regression, which necessitates at least one difference estimation, is appropriately applied.

The legislation governing municipal mergers underwent an amendment in 1999, which introduced additional measures to offer financial assistance for such mergers. Consequently, numerous municipalities pursued mergers until the conclusion of FY 2005, which marked the termination of the financial support for mergers provided by the national government under the

law. Municipal mergers primarily commenced in the first half of the 2000s, with a concentration observed in FY 2004 and FY 2005. During FY 2004, there were 215 mergers, while FY 2005 witnessed 325 mergers. Figure 1 illustrates the number of municipal mergers per year.

[Insert Figure 1 here]

While municipal mergers in both FY 2004 and FY 2005 occurred during the second management period and were suitable for selecting an appropriate treatment group, analyzing the former would necessitate estimating differences between FY 2002 in the first management period and FY 2003 in the second management period.<sup>7</sup> Additionally, data for FY 2002 regarding LTCBF and FSF loans are only available at the aggregated prefecture level. Consequently, FY 2004 mergers are unsuitable for regression analysis. However, for FY 2005, difference estimation is viable within the same management period, and municipality-level data is accessible. Therefore, pre-merger municipalities that merged in FY 2005 are considered the treatment group to test the hypothesis that a municipality opting to merge increases the number of eligible recipients immediately before the merger. Municipalities that did not merged serve as the control group. The treatment group consists of 798 municipalities, while the control group comprises 1,057 municipalities.<sup>8</sup>

Based on the preceding discussion,  $\Delta Eligibility_i$  represents the difference between the FY 2004 and FY 2003 eligibility ratios. The data for  $LTCBF_i$ ,  $FSF_i$ ,  $LAT_i$ , and  $Premium_i$  are collected from FY 2003. Table 1 provides a summary of the statistics and their respective

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<sup>7</sup> The first management period is from FY 2000 to FY 2002 and the second from FY 2003 to FY 2005.

<sup>8</sup> The number of municipalities employed is lower than the total number of municipalities in Japan as this analysis excludes municipalities that jointly manage the LTCI system.

sources.

[Insert Table 1 here]

In FY 2003, the average, minimum, and maximum eligibility ratios were 14.95, 7.89, and 30.07, respectively, with the highest eligibility ratio for a municipality reaching approximately 30% (for category I insured residents). During the second management period, the average LTCI premium per month was 3,159 JPY. The difference between the highest and lowest premiums across municipalities was 4,157 JPY.

## **4 Estimation results**

### **4.1 Parallel trend assumption**

The parallel trend assumption must be assessed to validate the use of the DID method. Figure 2 illustrates the average change in eligibility ratios of both the treatment and control municipalities. As eligibility ratio data for FY 2000 are solely accessible at the aggregated prefecture level, data from FY 2001 to FY 2004 are utilized for analysis.

[Insert Figure 2 here]

The solid line represents the treatment group, while the dotted line represents the control group in Figure 2. A comparable trend is observed between the control and treatment groups. Consequently, a two-sample mean comparison test is conducted on the average change in eligibility ratio for each group. The t-values for the treatment and control municipalities are

0.759, 0.139, and 2.591 for FY 2001 to FY 2002, FY 2002 to FY 2003, and FY 2003 to FY 2004, respectively. Notably, the t-value is significantly different at the 1% level only from FY 2003 to FY 2004, specifically 1 fiscal year before merger. This outcome suggests that the parallel trend assumption between the treatment and control municipalities in the pre-treatment period is appropriate.

## 4.2 Baseline result

Table 2 shows the regression results of Eq. (4) as the baseline specification.

[Insert Table 2 here]

All estimated values of *Freeride* are significantly positive, indicating that smaller municipalities have an incentive to augment eligibility assessments before merger and indeed proceed to do so. Specifically, pre-merger municipalities increase the eligibility ratio by approximately 0.1 percentage points more on average compared to municipalities that never merged.<sup>9</sup>

The coefficient of *LTCBF* is significantly positive, suggesting that municipalities have a surplus of LTCI finances, enabling them to raise the eligibility ratio. Conversely, the estimated coefficient of the *FSF* loan is negative but not significant. This may be attributed to the overall health of LTCI finances in most municipalities during that period. Furthermore, the coefficient of LAT per capita is negative but not significant. Lastly, the higher premium clearly indicates

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<sup>9</sup> Average treatment effect of the treated (ATT) is also utilized. The regression result of the ATT is 0.105 and is significantly positive at the 1% level.

a controlled increase in the eligibility ratio.

Consistent with the findings of Shimizutani and Inakura (2006) and Hayashi and Kazama (2008), these results demonstrate that municipalities have the discretion to regulate eligibility assessments based on their fiscal conditions. Furthermore, with the free-rider incentive associated with municipal mergers, pre-merger municipalities engage in opportunistic behavior by increasing the eligibility ratio, regardless of their fiscal situation. These outcomes remain consistent regardless of pre-treatment controls. While the free-rider effect may appear modest, these findings underscore the significant fact that municipalities have discretion over their eligibility assessments.

### **4.3 Robustness check**

As discussed in subsection 4.1, pre-merger municipalities are expected to increase their eligibility ratios immediately before the merger, as doing so considerably before the merger date would entail bearing the load themselves. Therefore, pre-merger municipalities that merged in the latter half of FY 2005 had a lower free-rider incentive to increase their eligibility ratios from FY 2003 to FY 2004 compared to municipalities that merged in the first half of FY 2005. In this subsection, the regression is reanalyzed by categorizing the pre-merger municipalities based on the merger date. Specifically, pre-merger municipalities that merged in the first half of FY 2005 (from April 1 to September 30, 2005) and those that merged in the latter half of FY 2005 (from October 1, 2005, to March 31, 2006) are divided. The regression results are summarized in Table 3.

[Insert Table 3 here]

The estimated coefficients of *Freeride* are significantly positive for the pre-merger municipalities that merged in the first half of FY 2005, whereas they are not significant for those that merged in the latter half of FY 2005. Furthermore, the point estimate of *Freeride* for the former is 0.302, significantly higher than the result presented in Table 2. This outcome underscores the significance of the timing of free-rider behavior in increasing the eligibility ratio.

#### **4.4 Degree-of-eligibility changes**

The preceding regression analyses use the overall eligibility ratio. However, in this subsection, the change in eligibility ratio at each level is assessed. As described in Section 2, LTCI limits are set according to the level of eligibility. Figure 3 illustrates that support limits are set according to the eligibility level in the second management period from FY 2003 to FY 2005.

[Insert Figure 3 here]

The most significant difference in care benefits limits exists between “Support needs” and “Long-term care needs I,” amounting to 104,300 JPY per month. Furthermore, individuals eligible solely for “Support needs” are unable to utilize facility services. Notably, the difference in unit costs between at-home and facility care is substantial, with an average unit cost of 3,400 JPY for at-home care and 33,645 JPY for facility care.<sup>10</sup> Consequently, whether insured

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<sup>10</sup> These figures were computed from *The Annual Report on LTCI Programs 2003*, Ministry of Health, Labour, and Welfare.



residents qualify for “Support needs” or “Long-term care needs I” is significant for the LTCI finances of the municipality. In this subsection, regressions are employed to examine changes in the degree of eligibility within the pre-merger municipality.

For all levels of care needs, the municipality makes simultaneous decisions regarding whether to increase the eligibility ratio. Consequently, these decisions may influence each other, and ordinary least squares (OLS) regression may not adequately capture the unobserved relationship. To address this issue, simultaneous equation methods, such as seemingly unrelated regression (SUR), are employed to estimate a system of equations considering contemporaneous correlations between the errors of different equations for the same period. It is important to note that while the regression coefficients estimated by SUR and OLS are equivalent since both equations utilize the same explanatory variables, the standard errors and significance levels may differ. Following the estimation of SUR, the hypothesis of independence of both equations is assessed using the Breusch–Pagan (BP) test. The regression results are presented in Table 4.

[Insert Table 4 here]

The chi-square value of the BP test of independence is 209.61, indicating support for the use of SUR. As shown in Table 4, the free-rider effect is positively significant for Long-term care needs I, II, and IV. Notably, the point estimate of *Freeride* in Long-term care needs I is significant at the 1% level and possesses the highest value. This finding suggests that pre-merger municipalities exercise control over the eligibility ratio, with a particular focus on Long-term care needs I. Moreover, based on these results, pre-merger municipalities appear to have upgraded the eligibility of insured residents from “Support needs” to “Long-term care needs I.”

## 5 Conclusion

Eligibility assessments for the Japanese LTCI program are crucially important to ensure the provision of universal long-term care services. These assessments should be conducted objectively, taking into account the physical and mental care needs of individuals. However, certain studies have highlighted that municipalities, especially those facing financial constraints, may manipulate eligibility assessments to balance the LTCI budget. This study offers a fresh perspective by empirically identifying the discretion exercised by municipalities in conducting eligibility assessments. Employing a quasi-experimental approach, this study diverges from previous research methods. By investigating the concept of free-rider behavior among pre-merger municipalities, this study clarifies how these municipalities approach eligibility assessments.

The findings from the DID regression reveal that smaller pre-merger municipalities tended to increase their eligibility ratios 1 fiscal year before the merger. The presence of significantly positive free-rider incentives indicates a notable impact on the change in the eligibility ratio. Additionally, the savings accumulated in the LTCBF positively influence the change in the eligibility ratio, while the LTCI premium of category I insured residents has a significantly negative impact. These results suggest that municipalities possess discretion in setting their eligibility ratios and exhibit a tendency to augment these ratios before merger events. Furthermore, the results of the SUR regression highlight that pre-merger municipalities often elevate the eligibility status of insured residents from “Support needs” to “Long-term care needs I.”

This study confirms the existence of municipalities’ discretion in conducting eligibility assessments for Japan’s LTCI program. While the free-rider effect may be marginal, it

underscores the crucial point that municipalities possess discretion over eligibility assessments. The implications of these findings suggest that the Japanese LTCI system is not aligned with its institutional design. If this trend persists, municipalities grappling with poor LTCI finances may experience a surge in the number of insured residents who are ineligible for coverage. This poses a significant threat to the horizontal equity of the LTCI system in Japan.

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**Table 1***Summary statistics*

Variables	N	Mean	SD	Min	Max
Eligibility ratio in 2003 (%)	1,855	14.95	2.84	7.89	30.07
Change in eligibility ratio (treatment)	798	0.65	0.81	-3.00	4.94
Change in eligibility ratio (control)	1,057	0.56	0.69	-2.80	2.95
Freeride	1,855	0.29	0.38	0	0.99
LTCBF per category I insured (1,000 JPY)	1,855	9.24	8.49	0	52.05
FSF per category I insured (1,000 JPY)	1,855	0.17	0.87	0	10.05
LAT per capita (1,000 JPY)	1,855	1.79	1.89	0	23.70
LTCI Premium for category I insured (1 JPY)	1,855	3,159	561	1,785	5,942

Sources: Ministry of Health, Labour and Welfare (2003). *The Annual Report on LTCI Programs 2003 and 2004*; The Statistics Bureau, Ministry of Internal Affairs and Communications *The Survey of the Long-term Care Facilities and Offices*

**Table 2***Free-rider effect of smaller municipalities before merger*

	Estimation 1	Estimation 2	Estimation 3
Freeride	0.120** (0.051)	0.132*** (0.051)	0.134*** (0.051)
LTCBF		0.012*** (0.002)	0.005** (0.003)
FSF loan		-0.013 (0.023)	-0.002 (0.024)
LAT			-0.021 (0.013)
Premium			-0.000*** (0.000)
Constant	0.565*** (0.020)	0.452*** (0.031)	1.280*** (0.138)
N	1855	1855	1855
R <sup>2</sup>	0.004	0.024	0.053

\*\*\*, \*\*, and \* indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Robust standard errors are in parentheses.

**Table 3***Free-rider effect before merger for municipalities grouped by date of merger*

	First half of FY 2005 From April 1 to September 30	Latter half of FY 2005 From October 1 to March 31
Freeride	0.302*** (0.076)	0.058 (0.059)
LTCBF	0.005* (0.003)	0.006** (0.003)
FSF loan	-0.000 (0.029)	-0.004 (0.026)
LAT	-0.000 (0.014)	-0.023 (0.015)
Premium	-0.000*** (0.000)	-0.000*** (0.000)
Constant	1.073*** (0.163)	1.254*** (0.146)
N	1304	1608
R <sup>2</sup>	0.049	0.051

\*\*\*, \*\*, and \* indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Robust standard errors are in parentheses.



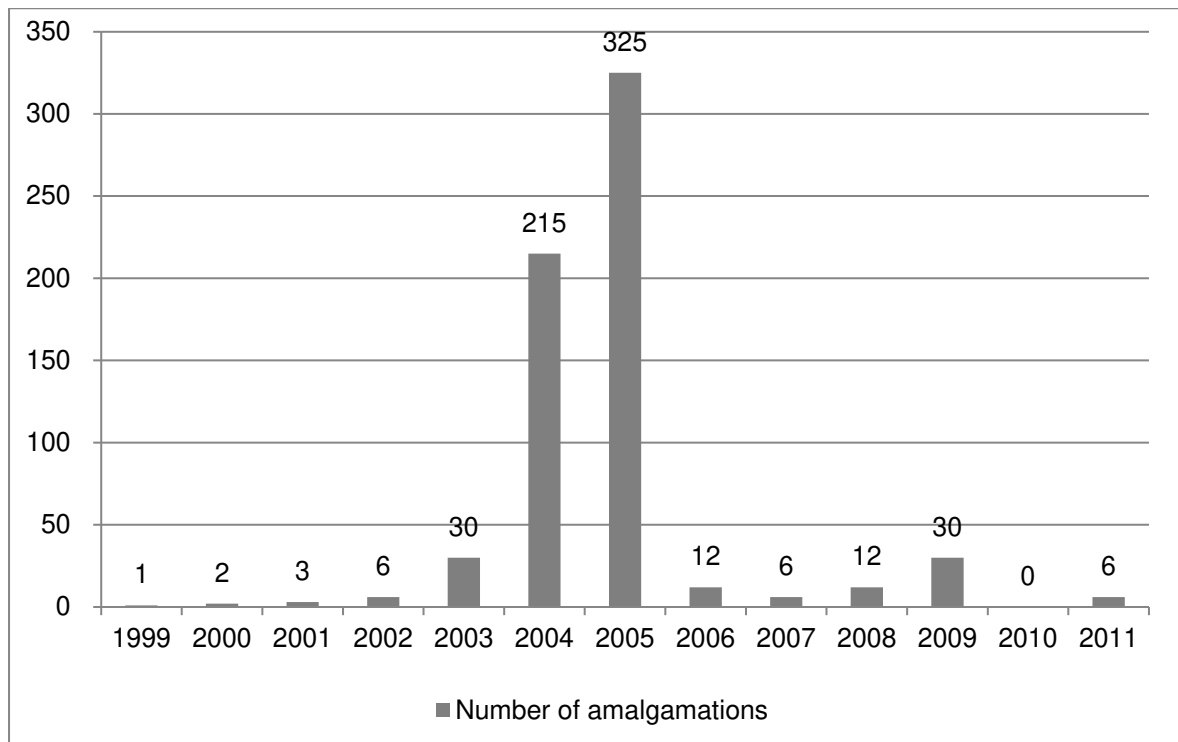
**Table 4***Free-rider effect by degree of eligibility levels*

	Support needs	Long- term care needs I	Long- term care needs II	Long- term care needs III	Long- term care needs IV	Long- term care needs V
Freeride	-0.009 (0.038)	0.124*** (0.048)	0.088** (0.034)	0.003 (0.029)	0.058** (0.027)	0.037 (0.024)
LTCBF	0.001 (0.002)	0.012 (0.002)	0.002 (0.001)	-0.001 (0.001)	0.001 (0.001)	-0.000 (0.001)
FSF loan	0.003 (0.013)	0.030* (0.018)	-0.043*** (0.012)	-0.000 (0.010)	0.022** (0.010)	-0.012 (0.009)
LAT	-0.003 (0.006)	-0.018** (0.007)	0.009* (0.005)	0.002 (0.005)	-0.011** (0.004)	0.001 (0.004)
Premium	0.000* (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Constant	0.067 (0.083)	0.651*** (0.105)	0.079 (0.074)	0.138** (0.063)	0.125* (0.059)	0.018 (0.052)
N	1304	1304	1304	1304	1304	1304
R <sup>2</sup>	0.003	0.037	0.026	0.000	0.016	0.003
Breusch–Pagan test 209.61***						

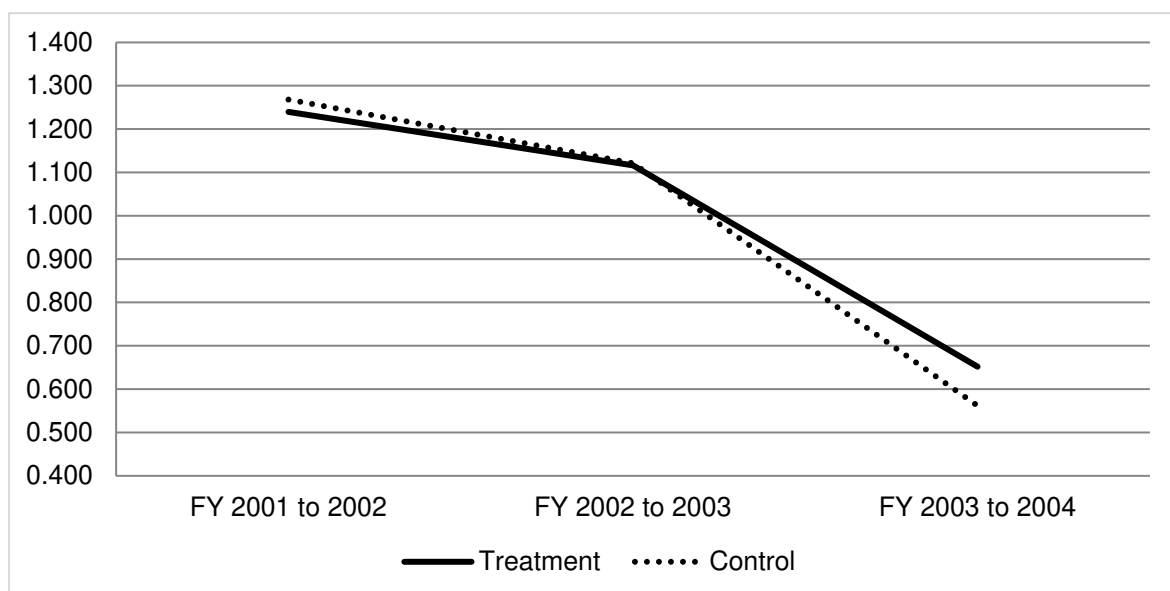
\*\*\*, \*\*, and \* indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Robust standard errors are in parentheses.

**Figure 1** *Number of municipal mergers by year from 1999 to 2011*



**Figure 2** *Average change in eligibility ratio (percentage point) by year from FY 2001 to 2002 to FY 2003 to 2004*



**Figure 3** Support limits based on level of eligibility in the second management period from FY 2003 to FY 2005

