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Katsuyoshi Nakazawa and Kota Sugahara and Minoru Kunizaki

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Coordination: Bernd Hayo • Philipps-University Marburg
Faculty of Business Administration and Economics • Universitätsstraße 24, D-35032 Marburg
Tel: +49-6421-2823091, Fax: +49-6421-2823088, e-mail: hayo@wiwi.uni-marburg.de

Linkage between Benefit Expenditure and Premium Burden: Long-Term Care Insurance in Japan

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Katsuyoshi Nakazawa*
Faculty of Economics, Toyo University
Kota Sugahara
Faculty of Economics, Kyoto Sangyo University
Minoru Kunizaki
Faculty of Economics, Aichi University

Abstract

This study considers the discretionary premium-setting behavior of municipalities in the Japanese system of long-term care insurance (LTCI). Although, the LTCI system is managed by the municipality, but the financial system is controlled by national health insurers, and the municipality seems to have no discretion in managing it. However, we find that the premium-setting forecast of each municipality is different, contrary to the intention of the LTCI system. Adjustment subsidy does not function in line with the intention of the system, affecting the standard premium-setting process. Moreover, our empirical results show that municipalities seem to have discretion in premium setting. Cities, in particular, set premiums low, reflecting elderly political power. In addition, premiums are influenced elderly political power when few neighboring municipalities are available for reference. Municipalities do have leeway in premium setting, contrary to the intention of the LTCI system.

JEL Classifications: H73, H75, H77, I18, I38
Keywords: long-term care insurance, inter-jurisdictional interaction, financial transfer, Japan

* Corresponding author. 5-28-20, Hakusan, Bunkyo-ku, Tokyo 112-8606 Japan
E-mail: nakazawa@toyo.jp

1. Introduction

Unlike in Germany or Korea, the municipality manages long-term care insurance (LTCI) in Japan. However, since the municipality has a limited budget compared to the national insurer, maintenance of the pay-as-you-go principle in the LTCI budget is a concern. In addition, macro statistics show a lack of linkage between benefit expenditure and premium burden. In this paper, we empirically analyze the factors that affect municipalities' benefit- and premium-setting behaviors and examine whether a linkage is established between them.

In most developed countries, the need for long-term care for the elderly has become a great problem with an increase in the aging population. Japan is one of the most aged countries in the world. In this situation, LTCI was introduced for the elderly in FY2000 to solve the long-term care problem. The insurer under LTCI is the municipality (i.e., cities, towns, and villages), and those aged 65 years and more (category I) and 40–64 years (category II) are covered. The insurers have established special accounts for LTCI and manage the program during a three-year "program management period." They forecast the total benefits for the next period, and maintain a constant ratio of the total insurance benefits to the category I insured. An increase in long-term care benefits leads to a high category I premium. On the other hand, the premiums for the category II insured are collected by the national health insurers at a uniform premium rate. Thus, municipalities can set the premium only for the category I insured. The premium for the category I insured must be set to balance the budget for the program management period. The benefit and premium synchronization is considerably clear in the LTCI system. Campbell and Ikegami (2000) and Mitchell et al. (2004) emphasize that the linkage between benefit expenditure and premium burden, and the discretion of municipalities in managing the LTCI program are important innovations.

The central government has established a highly uniform LTCI management system. Specifically, the central government has framed uniform rules regarding age ranges covered by LTCI, the certification standard of long-term care need, the procedure of certification, the self-burden ratio and the upper bound, types and contents of services covered by LTCI, and prices of services (Shimizutani and Inakura, 2006). However, while the LTCI system is managed by the municipality, the financial system is controlled by national health insurers. In these circumstances, does the municipality really have discretion in LTCI management?

Only a few studies have examined the role of municipalities' discretionary behavior in LTCI. Hayashi and Kazama (2008) and Shimizutani and Inakura (2006) conclude that municipalities control LTCI benefits by adjusting certification in order to balance the LTCI budget. Certification for long-term care and its processes are based on a nationwide system and require uniform application. However, these studies clarified that the municipality with tight fiscal conditions tends to decrease the number of eligible persons or users in order to reduce the

benefit expenditure. These results imply that the LTCI system is not fully institutionalized, and the municipality might have a discretionary role.

The studies focused on the certification side, which is under municipality control. However, we think municipalities have leeway in premium setting as well. On an examination of nationwide data from FY2000 to FY2009, we find that category I premiums have increased only 43%, on average, in spite of a 62% increase in benefit expenditure per category I insured person. That is, the premium does not seem to be sufficiently linked to an increase in benefit expenditure. If certification could function as a gatekeeper and constitute a powerful containment mechanism against increasing LTCI benefits, as previous studies suggest, how can one explain the dissociation between benefit and premium setting? Although a number of elements and burden ratios are uniformly decided by the central government, municipalities might set premiums different from what the system envisages through its forecasting authority. Moreover, forecast accuracy might be different between municipalities. Long-term care premium differentials vary across municipalities. When the LTCI was introduced, the average, the maximum, and the minimum premium of a category I insured person (aged 65 years or more) were 2,784 JPY, 4,010 JPY, and 1,533 JPY, respectively. The maximum premium was 2.6 times the minimum across municipalities. The maximum premium has since increased to 3.3 times the minimum from FY2000 to FY2009.

How does the municipality forecast and set the next period's premium? Does the municipality forecast the benefit and set the premium in a routine fashion as envisaged in the LTCI system? Does the municipality, on the other hand, decide the premium arbitrarily considering the uncertainty of the forecast and the characteristics of the municipality? The discretion of the municipality has not been examined so far in regard to benefit and premium setting in LTCI. In this paper, we examine the discretion of the municipality from this viewpoint. First, we design a financial structure for LTCI. Second, we estimate the equations that govern the benefit- and premium-setting decisions. Through these estimations, we check the linkage between the benefit and premium setting. In addition, we also check the effect of subsidy provided by the central government. Third, we focus on the influence of political and inter-jurisdictional interaction factors that the institutional design of the LTCI does not envisage.

Generally, the elderly are not favor to an increase in premium. If municipalities have leeway in LTCI premium setting, they might have an incentive to reduce the category I premium as much as possible in order to win elderly votes. In addition, we consider inter-jurisdictional interaction (e.g., mimicking or reference behavior) because the municipality has an incentive to refer to and align with the neighboring municipalities' premium-setting behavior when the municipality has leeway in premium setting and faces forecast uncertainty. Thus, municipalities might set the next program period's premium for the category I insured according to the

premium level in the neighboring municipalities, presumably based on a reasonable forecast.

In this study, we focus on the benefit- and premium-setting behavior of municipalities with regard to premium revision from the first management period (2000–02) to the second (2003–05). We choose this period because forecast uncertainty was higher in the initial period of the LTCI system. Although it would be best to use premium levels at the first program management period, forecast data of the first period has not been made public.

Our empirical analysis shows the following results. First, municipality forecasts are fundamentally based on the linkage between benefit expenditure and premium burden in line with the intention of the LTCI system. However, this result does not apply to towns and villages as much as to cities. Second, the adjustment subsidy does not function as the system intended, which affects the standard premium-setting behavior. Third, municipalities seem to have discretion in premium setting. Cities, in particular, set premiums low, reflecting elderly political power. Finally, the premium rate is influenced by elderly political power when few municipalities are available for reference in the neighborhood. Municipalities have leeway in premium setting contrary to the intention of the LTCI system.

The remaining sections of this paper are structured as follows. In section 2, we outline the particulars of the Japanese LTCI system and focus on the relationship between premium revenue and benefit expenditure. In section 3, we set up an empirical model to examine the effect of inter-jurisdictional interaction on premium setting, and present the results in section 4. Finally, section 5 concludes the study.

2. Background and motivation

2.1. Institutional background

Benefits

Category I and II insured individuals can be grouped according to the nature of care required. When an insured needs long-term care, the Certification Committee for Long-term Care Need of the municipality in which he or she resides evaluates the condition requiring care (certification of long-term care need). The conditions requiring care range from a mild to a serious case in a multistep approach. An allowance is set for each stage. For example, the benefit limits for at-home long-term care range from approximately 50,000JPY (US$620) to 358,000JPY (US$4,420) per month. Benefit limitations are also set for the utilization of facility services by facility type, according to the stage of care need.[1] By these institutional criteria, universal service use and horizontal equity vis-à-vis eligibility for LTCI benefits are guaranteed, irrespective of the insured individual's income and place of residence.

[1] Of course, the insured can purchase additional services above the limit at his or her own expense.

Eligible insured individuals can purchase long-term care services at a fixed-rate burden of 10% of the service cost.[2] The remaining 90% of the service cost is covered by LTCI benefits, which are financed by premium revenues, subsidies from upper-level governments (i.e., the central and prefectural governments) and financial transfers from the general account of the municipality to the LTCI special account.

Financing

The annual budget for each LTCI special account is required to balance on a three-year basis. The three-year period for budget planning is called the "program management period." When a municipality draws up its budget, it forecasts local LTCI expenditures for full three years. The municipality forecasts the next period's LTCI benefit based on recent results and estimations of the number of eligible persons, number of applications for LTCI certification, and long-term care costs. Long-term care costs are divided into at-home care services and welfare facilities.

After benefit are forecasted, revenues are considered. The revenues of an LTCI special account consist of 1) subsidies from upper-level governments (i.e., central and prefectural governments), 2) financial transfers from the municipal general account, 3) premiums directly paid by category I insured individuals within the municipality, and 4) distributed premiums from category II insured individuals via national health insurers.

In the national average for all municipalities, the central government covers 20% of the LTCI special account revenues through a long-term care benefit subsidy. The 20% points of the central government subsidies are available to all municipalities. In addition, prefectural governments and municipalities each cover 12.5%. These 45% subsidies are available to all municipalities. The central government also covers 5% as an adjustment subsidy that allocated to the disadvantaged municipalities.

The remainder is basically covered by premium revenues. Categories I and II cover 20% and 30%, respectively, of LTCI expenditures, according to the statutory standard. This ratio has changed over time: the shares of categories I and II were, respectively, 17% and 33% in the first three-year program management period (2000–02), 18% and 32% in the second period (2003–05), and 19% and 31% in the third period (2006–08). The premium rate, based on the income of category II insured individuals, is decided by the respective national health insurer. This premium is collected along with the health insurance premium. Category II income is not under municipality control.

However, category I premium is decided by each municipality based on the burden-bearing

[2] While benefits typically do not cover meals or residence expenses for those hospitalized and institutionalized, individuals from low-income households (e.g., incomes lower than the municipal tax exemption level) are granted coverage with a ceiling amount for extra benefits.

ability of the insured. Differential premium rates are set by each municipality according to the income level of the insured. In a typical case, an individual's income is classified into one of six levels.[3] Municipalities can discretionally decide the standard premium based on the distribution of the insured's income and forecasts of benefit expenditures. The standard premium is revised at the start of the program management period and fixed for the full three-year period.

If deficits occur, municipalities must be covered by withdrawals from the Long-term Care Benefits Fund of the municipality, extra intra-municipal transfers, or loans from the Fiscal Stabilization Fund managed by the prefecture. Loans borrowed in a previous management period need to be repaid in the next period.

Adjustment subsidy

The burden ratios of the central government (20%), the prefecture government (12.5%), the municipality (12.5%), and the category II insured (30%) are constant among municipalities. However, the category I burden ratio is not fixed at 20% for every municipality. This percentage is the national average for all municipalities. The burden-bearing ability for residential long-term care needs of the category I insured is different in each municipality. If the municipality has a high ratio of elderly individuals who need long-term care, the LTCI standard premium for category I insured will rise because of an increase in benefits. On the other hand, if the municipality has a high ratio of low-income elderly persons, the LTCI standard premium for category I insured will rise because the elderly with a standard income level cover the premium burden of the low-income elderly.

To maintain horizontal equity with regard to the standard premium in each municipality, the central government provides an adjustment subsidy to a disadvantaged municipality. The amount of the subsidy corresponds to 5% of the entire LTCI account. This subsidy is distributed with a matching rate, according to the ratio of elderly individuals aged 75 years and more and the share of low-income insured individuals within the municipalities. Thus, the matching rates of this subsidy vary by municipality.

The Ministry of Health, Labour and Welfare (MHLW) explains that the difference between the standard premiums of municipalities represents certification rate differences and amount-of-use differences among the insured, because differences between municipalities' ratios of elderly persons requiring care and premium-bearing capacity are already adjusted to a

[3] An insured individual with income exempt from municipal tax is defined as being at the standard level (level 4) and is required to pay the standard premium rate. A level 1 insured individual—a beneficiary of public assistance—is allowed to pay one-half the standard premium rate; meanwhile, the highest-level insured—with annual income of ¥2 million and over (level 6)—are required to pay 1.5 times the standard premium.

nationwide mean value by the adjustment subsidy.[4]

Thus, the linkage between forecasted benefits and premium setting of category I insured is not completed synchronized. To examine the linkage between the forecasted benefits and premium setting of category I insured, we need to consider the effect of adjustment subsidy.

2.2. Discretion for municipality in LTCI management

Linkage between benefit and premium

Based on the institutional design of LTCI, category I benefits and premiums are sure to have considerable linkages because a constant ratio of the benefit expenditure is covered by the premium revenue. The statutory ratio of category I premium revenue to benefit expenditure increased from 17% in the first management period to 18% in the second period, to 19% in the third period, and to 20% in the fourth period.

[Figure 1 here]

Figure 1 shows the actual ratios of category I premium revenue to benefit expenditure from the first to the third management period. It seems that the discretion on premium setting has not adequately worked to balance the LTCI budget in accordance with the national policy. The actual premium burden ratios in the first management period were considerably lower than the statutory required ratio because the premium burden was kept low in the first half of the period. However, while the second period's premium burden ratios were also lower than the statutory required ratio, the third period's premium burden ratios were fixed higher than the statutory required ratio. In addition, the premium burden ratios of cities were higher than those of towns and villages for all periods. This means that no linkage existed between benefit expenditure and premium burden. We could find such insurance-setting differences between the first and second period. Figure 2 shows the category I standard premium for all municipalities.

[Figure 2 here]

Figure 2 shows category I premiums of the first and second periods. We used data samples from 548 cities and 1,738 towns and villages.[5] Cities whose premiums were low in the first

[4] Ministry of Health, Labour and Welfare (2004).

[5] To be considered a city, a municipality needs to be certified by the central government. A city is allowed special administrative discretions in accordance with its type. There are four city types in Japan: designated cities, core cities, special cities, and regular cities. They are basically distinguished by population size: designated cities, over 500,000; core cities, 300,000–500,000; special cities, 200,000–300,000; and regular cities, 50,000–200,000. Figure 2 excludes data of designated cities as well as municipalities that co-manage the LTCI program due to institutional differences.

period tended to restrain premium increases in the second period. Consequently, the coefficient of variance (CV) of city premiums increased by 51.2% (i.e., from 0.104 to 0.157). On the other hand, in the case of towns and villages, although the CV was larger than that of the cities (i.e., 0.149 in the first period and 0.184 in the second period), they raised their premiums fully. Of course, this may be due to the demographic characteristics of each municipality. However, there is a possibility that other factors misinterpret the linkage between benefit expenditure and premium burdens.

One possible factor is the influence of the adjustment subsidy. As stated below, the adjustment subsidy was introduced to ensure horizontal equity with regard to the standard premium in each municipality. If the adjustment subsidy functions as envisaged by the LTCI system, the standard premium of category I insured in each municipality should be influenced only by certification rate and per-person amount-of-use differences. If the adjustment subsidy is either excessive or deficient, it would affect the standard premium setting of municipalities with a high ratio of elderly individuals aged 75 years and more or of those with low income. Thus, when we examine the linkage between the long-term care benefit and the standard premium, we should consider the influence of adjustment subsidy.

Discretion in premium setting

The other possible factor that misinterprets the linkage between benefit expenditure and premium burden is the premium-setting discretion of municipalities. Figure 1 shows the overall results at the national level. Although the category I premium burden ratio of each municipality is different according to the delivery of the adjustment subsidy, the nationwide category I premium burden ratio ought to be constant. Thus, considering the premium-setting differences between cities on the one hand and towns and villages on the other, national policy objectives seem to have been ignored regardless of the influence of the adjustment subsidy.

For LTCI premium setting, municipalities should forecast the next program period's benefits and premium for category I insured based on the results of the current period. Thus, each municipality faces a trade-off between benefit expenditure and premium income. Aged residents tend to evade increased premiums. Municipalities should deal with this problem of the ambivalent insured. According to the consciousness survey, voter turnout in the regional election is 81.9% among the 60s and 85% among the 70s.[6] Moreover, "medical treatment and long-term care" was a consideration for about 50% of voters when they voted. With the high voter turnout and strong awareness of the problems of long-term care for the elderly, LTCI revision is an important policy issue. In this political situation, municipalities might have an incentive to suppress premiums for the category I insured as much as possible in order to win

[6] The Association for Promoting Fair Elections (2004)

elderly votes. If municipalities have leeway in LTCI premium setting, they might set premiums lower than required by the system, reflecting elderly political power.

In addition, according to the literature on fiscal decentralization, if municipalities have leeway in LTCI premium setting, their discretion can create externalities that bring about inter-jurisdictional interaction and distort resource allocation among municipalities. Empirical findings on strategic interaction are surveyed by Brueckner (2003) and Revelli (2005). Inter-jurisdictional interaction could conceivably be a factor that affects variations in premium-setting behavior. Taking the seminal study by Besley and Case (1995) as a starting point, we empirically analyzed yardstick competition on municipal property tax in the Netherlands (Allers and Elhorst, 2005), Italy (Bordignon et al., 2003), and Spain (Bosch and Solé-Ollé, 2007) and on income tax in Belgian municipalities (Heyndels and Vuchelen, 1998).

We can well imagine a scenario in which municipalities have leeway in premium setting and face forecast uncertainty. In this situation, they have an incentive to adjust to the premium-setting level of surrounding municipalities. With the fear of missing the forecast, towns and villages might find it easy to adjust to the premium-setting level of a municipality in the neighborhood. They have less decision-making ability than the city because they had no authority to make decisions on the aged welfare service until the 1990s. Municipalities refer to surrounding municipalities to adjust their premium because they do not understand elderly persons' political premium-setting requests.

3. Empirical strategy

3.1. Hypotheses

We set some hypotheses based on a current statement, and verify them by simple empirical analysis. In this section, we set some hypotheses and show empirical models. The municipality forecasts the second program management period benefits and premium based on the first program management period's demographic and long-term care factors. Thus, we use second-period data as dependent variables, and first-period data as explanatory variables.

Hypothesis 1: After controlling for the adjustment subsidy effect, we can find the linkage between premium burdens and benefit expenditure.

To check this hypothesis, we set the following estimation equations:

$$b_i = a_k X_{i,k} + u_i \quad (1\text{-}1)$$

$$p_i = a_k X_{i,k} + u_i \quad (1\text{-}2)$$

We employ estimations with two types of dependent variables: long-term care benefit per elderly insured person (category I) in the second program management period (b) and the standard category I premium in the second program management period (p). $X_{i,k}$ is a vector of explanatory variables, and a_k a vector of their coefficients. $X_{i,k}$ includes variables representing cost factors that affect the target LTCI benefit. They are basically represented by values in the first program management period. Since a policy-maker would forecast particularly the costs of providing long-term care service based on those seen in the previous management period, the sign of a_k ought to be same in the above two equations.

As cost factors that are thought to increase benefit expenditure and premiums, we employ an average cost of at-home care service (*HOME*), that of facility care service (*FACI*), the ratio of early-stage (age 65–74) eligible people (*RELI65*) to the number of early-stage category I insured individuals, and the ratio of late-stage (age 75 and over) eligible people (*RELI75*) to the number of late-stage category I insured individuals in a municipality. MHLW explains that the certification rate of the late-stage elderly is 7.5 times that of the early-stage elderly, and late-stage eligible people use most of the LTCI services. Thus, late-stage eligible people are the main beneficiaries of LTCI benefits.

As stated above, the adjustment subsidy serves to accommodate the differences between the characteristics of municipalities that determine the standard premium. The ratio of the number of late-stage elderly ($R75_i$) and the ratio of the low-income elderly (LOW_i) should be considered when the adjustment subsidy is decided. From the viewpoint of the standard premium, both $R75_i$ and LOW_i ought to be insignificant if the adjustment subsidy regularly works because the adjustment subsidy's role is to offset the effects of these variables on the standard premium.

To compare the estimation of premium, we use these two variables for the estimation of benefit. On the benefit side, the sign of β_1 ($R75_i$) and β_2 (LOW_i) would be significantly positive. From the *National Survey of Japan* (2010), the general family form of the elderly is "late-stage married couple" or "late-stage husband and early-stage wife." Often, the married couple resides alone, without a child or children. In such a situation, at-home care is difficult when the consort needs long-term care. Thus, an increase in $R75_i$ leads to an increase in the use of LTCI services. LOW_i might also be positive for the benefit side because of the policy of self-burden reduction for low-income persons who might show excessively large demand for care services.

$$b_i = a_k X_{i,k} + \beta_1 R75_i + \beta_2 LOW_i + u_i \quad (2\text{-}1)$$

$$p_i = a_k X_{i,k} + \beta_1 R75_i + \beta_2 LOW_i + u_i \quad (2\text{-}2)$$

Hypothesis 2: If municipalities have discretion in premium setting, they would decide their standard premium by considering elderly political power.

We adopt the median age of voters in each municipality ($MEDI\_V_i$) as the political power. If the municipality has discretion in premium setting and $MEDI\_V_i$ is high, we believe the municipality would be under high pressure to suppress elderly premium. Thus, $MEDI\_V_i$ would be significantly negative for the estimation of premium.

The voter turnout rate of each municipality according to age is not published. Therefore, we use the voter turnout rate according to age based on consciousness survey results of regional elections.[7] It is assumed that the voter turnout rate according to age is a constant between municipalities. We calculate the turnout according to age by multiplying the population of each municipality according to age by the voter turnout rate according to age. Then, we calculate the median age of voters in each municipality.

If this hypothesis is appropriate, the coefficient of $MEDI\_V_i$ would be significantly negative for the premium-side estimation and significantly positive or not significant for the benefit-side estimation.

$$b_i = a_k X_{i,k} + \beta_1 R75_i + \beta_2 LOW_i + \beta_3 MEDI\_V_i + u_i \qquad (3\text{-}1)$$

$$p_i = a_k X_{i,k} + \beta_1 R75_i + \beta_2 LOW_i + \beta_3 MEDI\_V_i + u_i \qquad (3\text{-}2)$$

Hypothesis 3: If municipalities have discretion in premium setting, they would decide their standard premium by considering the trend of the municipalities in the neighborhood.

We adopt an alternative simple method to check the discretion in premium setting. Fujimura (1999) pointed out that municipalities consider other municipalities of the same population scale within the same prefecture for welfare policy decision making, using surveys of the National Association of Towns and Villages. Considering this viewpoint, how many municipalities of the same population scale are available in the same prefecture for reference becomes an important issue. However, if a number of municipalities with the same population scale are located in the same prefecture, such references can be made and premium setting adjusted easily.

For such references by municipalities, we calculate the number of neighboring municipalities with similar conditions as an index. According to the Similar Group Classification by the Ministry of Inter Affairs and Communications (MIAC), cities are classified by population into four groups: (A) under 50,000, (B) 50,000–100,000, (C) 100,000–150,000,

[7] The Association for Promoting Fair Elections (2004)

and (D) 150,000 and over. Towns and villages are classified into five groups: (a) under 5,000, (b) 5,000–10,000, (c) 10,000–15,000, (d) 15,000–20,000, and (e) 20,000 and over. We calculate the ratio of the same-population-scale municipalities in the prefecture ($RSPS_i$) based on this classification. Then, we divide the sample of cities and towns and villages into three quantiles using $RSPS_i$.

3.2. Data

Our empirical estimation uses cross-sectional data, including a sample of 548 cities and 1,738 towns and villages, on premium revision from the first program management period (2000-02) to the second period (2003–05). Standard premium data for the second period were obtained from the Ministry of Health, Labour and Welfare (MHLW). Other long-term care data were obtained from the *Annual Report on LTCI Programs 2002 and 2003* (MHLW). The voter turnout rate according to age are based on consciousness survey results of regional elections by the Association for Promoting Fair Elections (2004). Table 1 provides the definition of each variable as well as the computational method. Table 2 shows the descriptive statistics for each variable.

[Table 1 here]

[Table 2 here]

The highest premium is 3.3 times the lowest across municipalities. The premium burden differs according to the municipality by about 50,000 JPY annually. On the other hand, the highest benefit per user is 4.4 times the lowest across municipalities. When the premium is compared with the benefit per user, the benefit difference across municipalities is larger.

4. Estimation results

4.1. Linkage between benefit and premium

This section shows the estimation results for the hypotheses described earlier. In order to examine the effect of the explanatory factors on the dependent variable, we apply log transformation to the dependent and explanatory variables. First, we divide the data set into two groups (cities; towns and villages) to estimate equations (1-1) and (2-1). The ordinary least squares (OLS) method with HCSEs for heteroskedasticity is implemented.

[Table 3 here]

Explanatory variables *HOME*, *FACI*, and *RELI75* are significantly positive for all estimation

results in accordance with our prediction. The explanatory variable *RELI65* is not significant for cities and negatively significant (10%) for towns and villages. This result differs from our assumption. This is because the late-stage elderly are the main users of LTCI services, as previously mentioned. The explanatory variable *LOW* is significantly positive, but *R75* for towns and villages is not significant.

[Table 4 here]

Second, we estimate equations (1-2) and (2-2). For the estimation results of both the benefit- and premium-setting sides, the coefficient of determination for cities is higher than that for towns and villages. Explanatory variables *HOME*, *FACI*, and *RELI75* are significantly positive for all estimation results in line with our prediction.

LOW is significantly positive for all estimation results. This result is contrary to the intention of the adjustment subsidy. The adjustment subsidy should offset the effect of an increase in the number of low-income elderly people on the standard premium. This result means that the low-income elderly effect was underestimated for adjustment subsidy determination. Under this situation, an increase in the number of low-income elderly people eligible for discounted premium rates leads to an increase in the standard premium, because the municipality would be concerned about the shortage of premium revenue. Thus, the adjustment subsidy does not function as intended by the system, affecting standard premium setting.

R75 is significantly negative for all estimation results in contrast to the benefit results. This shows that the adjustment subsidy does not function in accordance with the intention of the system. The adjustment subsidy is excessive for standard premium setting. That is, excessive subsidy for municipalities with more late-stage elderly people creates an incentive for excessively low premium rates.

From the viewpoint of the linkage between benefit and premium setting, it can be confirmed that such linkages exist at several levels. However, adjustment subsidy is either excessive or deficient with regard to standard premium setting. Moreover, comparing cities with towns and villages, we find that the coefficient of determination for cities is higher than that for towns and villages. This means that cities have better forecasting ability than towns and villages. Cities had a role in elderly welfare long before LTCI was introduced. Moreover, cities have a number of long-term care management specialists than towns and villages. We believe these are the reasons cities have better forecasting ability than towns and villages.

4.2. Estimation of discretion in premium setting

Third, we estimate equations (3-1) and (3-2) to check the political pressure by the elderly

voter.

[Table 5 here]

Other variables do not differ from the estimation results. Considering the coefficient of the median age of the voter, the estimation result on cities' premium-setting behavior is significantly negative. On the other hand, the benefit-side estimation result is not significant. As stated earlier, the central government has established a highly uniform LTCI management system. Municipalities could not have leeway in increasing benefits to the elderly voter. On the other hand, cities could lower the premium to reflect elderly voter sentiments. From this result, cities had leeway in premium setting contrary to the intention of the system. However, the results are not significant for towns and villages. From this result, it seems towns and villages did not have leeway in premium setting. Compared to the AIC and BIC of each estimated result, model (2-1) offers the best goodness of fit for the benefit side. On the other hand, for the premium-setting side, model (3-2) for cities and model (2-2) for towns and villages provide the best goodness of fit. From these results, cities have high forecasting ability and leeway in premium setting to reflect elderly political power. However, towns and villages have neither high forecasting ability nor leeway in premium setting.

Fourth, we estimate premium-setting behavior based on samples divided into three quantiles. As mentioned in section 3.1, we calculate the ratio of same-population-scale municipalities in the prefecture ($RSPS_i$). The cutoff points of the city sample are 0.23, 0.35, and 0.50, and those of the town and village sample are 0.18, 0.29, and 0.38. We estimated the benefits with the same cutoff point. The coefficients of $MEDI\_V_i$ are not all significant.

[Table 6 here]

The results show that the coefficients of $MEDI\_V_i$ are not significant as $RSPS_i$ goes up. The median age of the voter is significantly negative for the town and village sample where $RSPS_i$ is low. This means that premium setting is influenced by elderly political power where few reference municipalities are available in the neighborhood. On the other hand, elderly political power did not influence premium setting as the number of reference municipalities increases. Where a number of reference municipalities are available, the premium might not reflect political demands of the elderly voter in the municipality, but the reference municipality's premium-setting behavior. The result seems to show a "follow-the-crowd" mentality, the simplest and most frequently used mechanism for policy implementation, especially in the Japanese bureaucracy. This method becomes easy to use in a situation in which

there are several similar-size municipalities in the neighborhood.

Our empirical analysis shows the following results. First, municipalities basically forecasted according to the linkage between benefit expenditure and premium burden as envisaged by the LTCI system. However, this result does not apply to towns and villages as much as to cities. Second, the adjustment subsidy does not function as intended by the system, which affects standard premium setting. Third, municipalities seem to have discretion in premium setting. Cities, in particular, recognize elderly political power and set premium low. Finally, premiums have been influenced by elderly political power when few reference municipalities are available in the neighborhood. Municipalities have leeway in premium setting, contrary to the intention of the LTCI system.

5. Concluding remarks

In this study, we examined the discretion of the municipality in LTCI premium setting. The LTCI system is designed with strong linkages between benefit and premium setting. From this viewpoint, the municipality does not have leeway in premium setting. Some previous papers clarified that municipalities controlled benefit expenditure by limiting the number of eligible persons using the certification of long-term care need. However, these papers have not examined the municipality's discretion in LTCI premium setting.

We set some hypotheses based on a current statement, and verify the hypotheses by simple empirical analysis. The first examines the influence of adjustment subsidy. We find that the adjustment subsidy does not function as envisaged by the system, which affects the standard premium-setting behavior of municipalities. In particular, the adjustment subsidy, which is intended to counterbalance the increase in the number of low-income elderly, is underestimated. This means that a municipality with a high ratio of low-income elderly people would face a higher LTCI premium.

The second examines the effect of elderly political power on standard premium setting. If municipalities have leeway in premium setting, the incentive to reflect elderly political (voting) power would be great. We found that the median age of the voter had a significantly negative effect on premium setting in the city sample. We think this result is robust because the median age of the voter is not significant for the benefit side. Moreover, premium setting is influenced by elderly political power when few reference municipalities are available in the neighborhood. Municipalities have leeway in premium setting contrary to the intention of the LTCI system.

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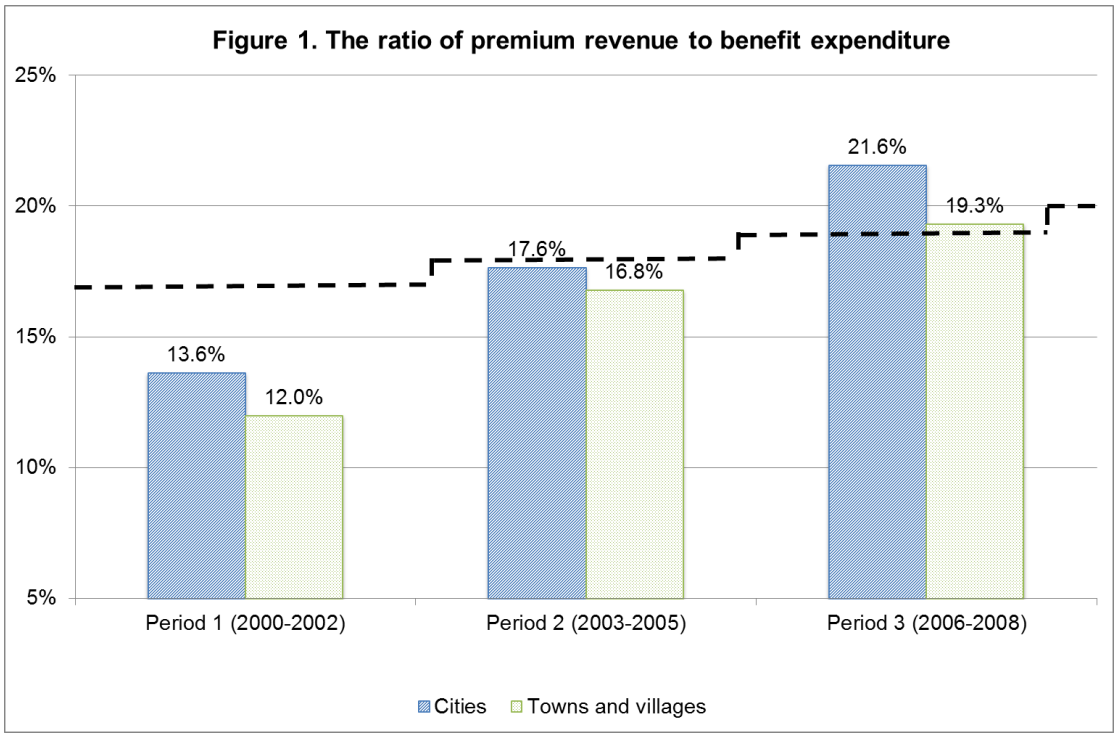
Figure 1. The ratio of premium revenue to benefit expenditure



Note: The short dashed line shows the statutory required ratio.

Figure 2. The changes in category I premium

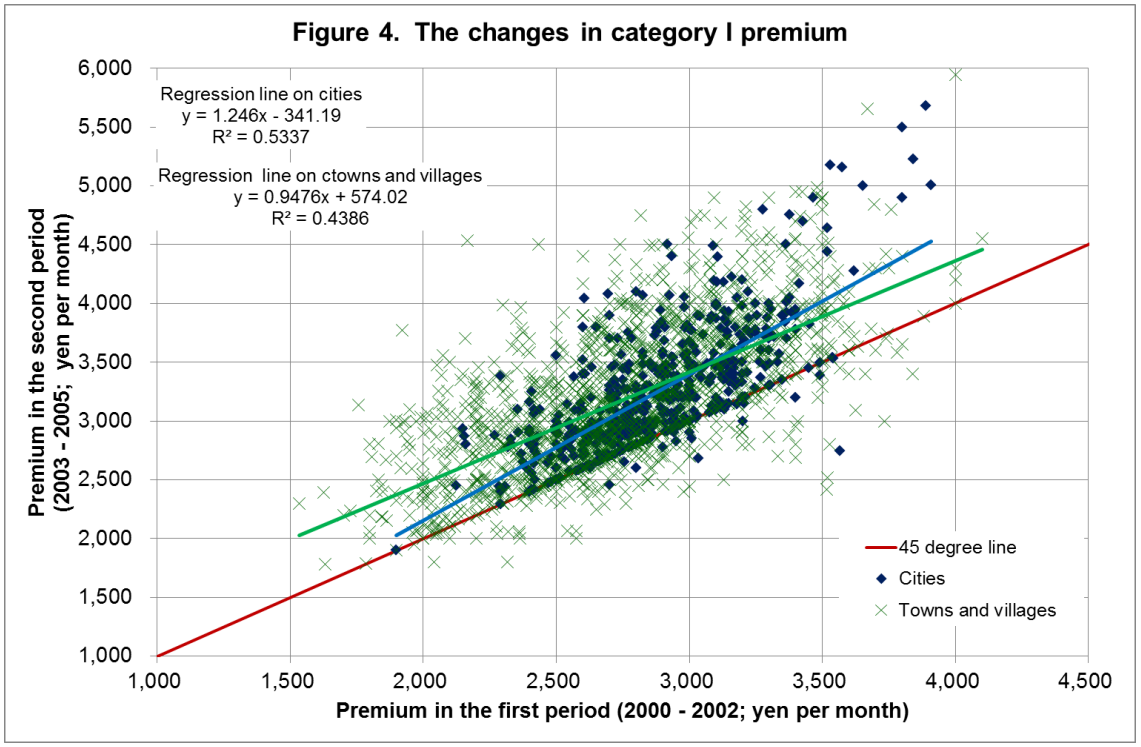


Table 1. Definition and a computational method of each variable

Valuable	Year	Definition and Computational Method
b	2003	Total long-term care benefit / The number of category I insured
p	2003	Standard premium of category I insured
HOME	2002	Total cost of at-home service / The number of at-home service users
FACI	2002	Total cost of facility service / The number of facility service users
RELI65	2002	The number of eligible persons (ages 65–74) / The number of category I insured (ages 65–74)
RELI75	2002	The number of eligible persons (age 75 and over) / The number of category I insured (age 75 and over)
LOW	2003	The number of insured of level 1 and 2 income levels / The number of category I insured
R75	2002	The number of insured aged 75 and over / The number of category I insured
MEDI_V	2002	Size of population by age Turnout ratio by age
RSPS	2002	Ratio of municipalities of the same population scale in the prefecture

Note: *LOW* data can be captured from 2003.

Table 2. Descriptive statistics (Obs. 2300)

	Mean	SD	Min	Max
1) Long-term care benefits per elderly person (FY2003; 1,000 JPY per year)	209.271	42.501	96.300	427.618
2) Premium in the 2nd period (1 JPY per month)	3,202	570	1,783	5,942
3) *HOME*: Average cost of in-home care service (1,000 JPY per year)	32.894	4.731	15.038	56.157
4) *FACI*: Average cost of facility care service (1,000 JPY per year)	344.781	20.536	165.454	426.892
5) *RELI64*: Ratio of early-stage eligible people	0.026	0.008	0.003	0.085
6) *RELI75*: Ratio of late-stage eligible people	0.116	0.033	0.025	0.486
7) *LOW*: Ratio of low-income insured	0.374	0.122	0.116	0.852
8) *R75*: Ratio of the late elderly	0.461	0.044	0.311	0.639
9) *MEDI_V*: Median age of voters	56.316	4.237	44.000	67.000
10) *RSPS*: Ratio of the same population scale	0.306	0.143	0.022	1.000

Table 3. Regression results on the 2nd program period benefit per elderly person

Dependent variable: Benefit per elderly person	Cities		Towns and Villages	
	(1-1)	(2-1)	(1-1)	(2-1)
	coef.	coef.	coef.	coef.
HOME	0.304 ***	0.363 ***	0.218 ***	0.261 ***
	(0.039)	(0.036)	(0.027)	(0.028)
FACI	0.550 ***	0.545 ***	0.264 ***	0.258 ***
	(0.166)	(0.158)	(0.070)	(0.069)
RELI65	-0.055	0.020	-0.077 *	-0.052 *
	(0.040)	(0.062)	(0.022)	(0.078)
RELI75	0.788 ***	0.633 ***	0.529 ***	0.461 ***
	(0.335)	(0.042)	(0.025)	(0.035)
LOW		0.088 ***		0.090 ***
		(0.033)		(0.014)
R75		0.233 ***		0.099
		(0.076)		(0.077)
Constant	2.553 **	2.591 **	3.901 ***	3.902 ***
	(1.081)	(1.039)	(0.425)	(0.419)
Adj-R^2	0.787	0.803	0.400	0.419
AIC	-1,178	-1,217	-1,348	-1,397
BIC	-1,157	-1,187	-1,320	-1,358
Sample	548	548	1,738	1,738

Note: The asterisks ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Table 4. Regression results on the 2nd program period standard premium

Dependent variable:	Cities		Towns and Villages	
Standard premium	(1-2)	(2-2)	(1-2)	(2-2)
	coef.	coef.	coef.	coef.
HOME	0.308 ***	0.319 ***	0.198 ***	0.233 ***
	(0.046)	(0.042)	(0.026)	(0.025)
FACI	0.549 ***	0.459 ***	0.226 ***	0.183 ***
	(0.189)	(0.168)	(0.075)	(0.068)
RELI65	0.138 ***	-0.005	0.030 *	-0.016
	(0.035)	(0.049)	(0.015)	(0.018)
RELI75	0.474 ***	0.560 ***	0.342 ***	0.347 ***
	(0.032)	(0.043)	(0.021)	(0.029)
LOW		0.109 ***		0.121 ***
		(0.027)		(0.013)
R75		-0.336 ***		-0.363 ***
		(0.073)		(0.058)
Constant	5.313 ***	5.321 ***	6.899 ***	6.717 ***
	(1.206)	(1.049)	(0.453)	(0.410)
Adj-R^2	0.658	0.691	0.310	0.363
AIC	-1,110	-1,161	-1,607	-1,743
BIC	-1,088	-1,131	-1,580	-1,704
Sample	548	548	1,738	1,738

Note: The asterisks ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Table 5. Regression results with median age of voters

Dependent variable	Cities		Towns and Villages	
	Benefit (3-1)	Premium (3-2)	Benefit (3-1)	Premium (3-2)
	coef.	coef.	coef.	coef.
HOME	0.346 ***	0.277 ***	0.267 ***	0.232 ***
	(0.038)	(0.040)	(0.029)	(0.026)
FACI	0.541 ***	0.448 ***	0.262 ***	0.183 ***
	(0.160)	(0.170)	(0.069)	(0.068)
RELI65	0.014	-0.019	-0.046 *	-0.017
	(0.062)	(0.050)	(0.027)	(0.018)
RELI75	0.631 ***	0.557 ***	0.460 ***	0.348 ***
	(0.043)	(0.042)	(0.035)	(0.029)
LOW	0.097 ***	0.130 ***	0.079 ***	0.122 ***
	(0.033)	(0.028)	(0.018)	(0.015)
R75	0.279 ***	-0.227 ***	0.060	-0.358 ***
	(0.079)	(0.077)	(0.088)	(0.066)
MRDI_V	-0.147	-0.353 ***	0.123	-0.018
	(0.102)	(0.115)	(0.105)	(0.083)
Constant	3.286 ***	6.991 ***	3.331 ***	6.800 ***
	(1.127)	(1.179)	(0.674)	(0.572)
Adj-R^2	0.804	0.697	0.420	0.363
AIC	-1,217	-1,171	-1,397	-1,741
BIC	-1,183	-1,137	-1,353	-1,697
Sample	548	548	1,738	1,738

Note: The asterisks ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

Table 6. Regression results on the 2nd program period standard premium (three quantiles)

Dependent variable	Cities			Towns and Villages		
	1st quantiles	2nd quantiles	3rd quantiles	1st quantiles	2nd quantiles	3rd quantiles
	coef.	coef.	coef.	coef.	coef.	coef.
HOME	0.344 ***	0.311 ***	0.253 ***	0.262 ***	0.310 ***	0.188 ***
	(0.077)	(0.086)	(0.058)	(0.053)	(0.047)	(0.039)
FACI	0.795 ***	0.211	0.750 ***	0.201	0.217 **	0.130
	(0.162)	(0.131)	(0.134)	(0.169)	(0.097)	(0.102)
RELI65	-0.124	-0.004	0.085 *	-0.106 ***	-0.033	0.049 *
	(0.109)	(0.057)	(0.049)	(0.032)	(0.033)	(0.026)
RELI75	0.565 ***	0.667 ***	0.456 ***	0.350 ***	0.360 ***	0.414 ***
	(0.076)	(0.071)	(0.058)	(0.026)	(0.052)	(0.056)
LOW	0.125 **	0.120 ***	0.099 ***	0.157 ***	0.107 ***	0.088 ***
	(0.058)	(0.037)	(0.031)	(0.026)	(0.031)	(0.023)
R75	-0.192	-0.273 **	-0.178	-0.402 ***	-0.347 **	-0.365 ***
	(0.156)	(0.114)	(0.121)	(0.103)	(0.141)	(0.099)
MRDI_V	-0.562 **	-0.376 *	-0.116	-0.242 *	0.257	-0.022
	(0.239)	(0.193)	(0.204)	(0.134)	(0.175)	(0.133)
Constant	5.211 ***	8.590 ***	4.521 ***	7.167 ***	5.166 ***	7.637 ***
	(1.616)	(1.261)	(1.315)	(1.157)	(1.055)	(0.863)
Adj-R^2	0.690	0.746	0.715	0.361	0.394	0.396
AIC	-378	-390	-411	-561	-597	-621
BIC	-352	-365	-385	-526	-563	-586
Sample	185	179	184	565	554	619

Note: The asterisks ***, **, and *indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.