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Haruaki Hirota † Hideo Yunoue ‡

Abstract

This paper considers the possible effects of broader-based local government, especially extended associations, in Japanese local public finance. We mainly analyze scale effects in public long-term care insurance expenditure, with our results indicating a U shaped expenditure structure.

We also show that expenditures associated with extended associations decrease more rapidly than ordinary municipal expenditures. These findings suggest that expenditure of appropriate population size extended associations larger than single municipality.

Key words: local public finance, scale effects, broader-based local government, extended association, long-term care insurance

JEL Classification: H73, H75, H83

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1. Introduction

In recent years, Japan has suffered from severe fiscal problems, particularly in local government. With the advance of decentralization, the role of the local government has become increasingly important, and there has been the active promotion of 'municipal mergers'[1] (*shi-tyou-son-gappei*) and 'broader-based local government' (*kouiki-gyousei*) through extended association to strengthen local administration and achieve fiscal reconstruction. Through the municipal merger process known as *Heisei-no-Daigapei*, the number of municipalities in Japan decreased from 3,232 in 1999 to 1,820 in 2006. At the same time, other municipalities have organized extended associations. There are, however, some municipalities that did not merged. In this case, implementing broader-based local government, municipality might be able to achieve appropriate and flexible fiscal management in local public service. Throughout this process, arguments over the 'wider-area local government system' (*Dou-shu-sei*)[2] that seeks to divide Japan into small blocks will likely remain.

Some studies have already analyzed local public finances in Japan. We briefly summarize their results as follows. Saito (1999), for instance, argued for the estimation of scale effects for each type of local government expenditure. One implication is that it may be better to consider broader-based local government than municipal mergers for some local public services. Akai and Takemoto (2008) also studied the efficient administration area for each type of expenditure in local government. They recommended the transfer to higher-level governments of some public services currently provided by local governments. However, while many studies concern municipal mergers and the wider-area local government system in Japan, few consider broader-based local government. For example, a number of municipalities in Japan currently organize an extended association for fire protection, garbage disposal services and public long-term care insurance (LTCI), with one justification for broader-based local government being the presence of scale effects.

[1] Hirota (2007) studied the incentive for municipal mergers in local public finance using a multinomial and nested logit model.
[2] The wider-area local government system currently under discussion in Japan differs from the state and county system in the United States. Unfortunately, space does not permit discussion here.

In view of an aging society, public LTCI commenced in Japan in 2000: Germany has adopted a similar program for the diversification of various risks. Municipalities and extended associations manage this program throughout the country. The municipality sets service content and premiums based on the situation in each area. The main difference between Japan and Germany is the fiscal burden of LTCI. While German insurers only levy insurance premiums from their residents, Japanese insurers receive both insurance premiums and transfers from the general account. If the fiscal condition of Japanese insurers then worsens, the general accounts of local government must then support the long-term care insurer through their own tax revenues. Thus, it is important to investigate the financing of LTCI in Japan.

In recent years, several studies have been devoted to the study of the relationship between public LTCI and local public finance in Japan. For instance, Tajika and Yui (2004) argued that the subsidy caused moral hazard. Using data from 2001 and 2002, Yamauchi (2006) showed that public LTCI office expenditure decreased because of scale effects.[3] In some studies, the empirical effects of a wider area of local government have been suggestive but tentative. Yamauchi (2006) concluded that the term for broader-based local government is insignificant.

The purpose of this paper is to estimate the possible effects of broader-based local government, including extended association, in Japanese local public finance. First, we analyze the scale effects of public LTCI expenditure. We extend the model in Yamauchi (2006) by introducing data from 2003 and 2005. This is because Yamauchi (2006) only used data from the first two years following the introduction of public LTCI in 2000; on this basis, it would be difficult to determine the true effect of broader-based local government. Second, we compare ordinary municipalities and those resulting from municipal mergers and extended association (multi and single tasks) by adding dummy variables to the estimated equation. This is useful for pointing out fundamental differences in the system of local government.

[3] Also, Yamauchi (2008) studied the incentive for broader-based local governance in public LTCI using a multinomial logit model.

Using estimated expenditure of a similar type as our principal independent variable, our results reveal the existence of fiscal policy interdependence. This is because in fiscal policy decisions, municipal expenditure may depend on expenditures in similar municipalities (see, for example, Case *et al*. (1993) and Revelli (2005)). Therefore, this estimation employs a *financial index table of organizations and municipalities classified by similar types.*

The rest of the paper is organized as follows. Section 2 discusses municipal mergers and broader-based local government. Section 3 presents the empirical method using cost functions and describes the data set. Section 4 provides the results of the estimation and Section 5 concludes the paper.

2. Municipal Mergers and Broader-Based Local Government

The previous section discussed the system of local government in Japan. Generally, the main reason for promoting wider-area government is expectations of fiscal sustainability through an expansion in scale. The focus of this paper is whether differences in local government influence local public expenditure.

To start with, we explain the system of wider-area government in Japan. This system draws on two patterns: municipal mergers and broader-based local government.[4] The key difference is whether the municipality merges with other municipalities or cooperates with existing municipalities in providing some local public service. The principal objective of municipal mergers is to achieve a strengthening of administration and an improvement in its fiscal condition. In local public finance, mergers can be used as a means of reducing expenditure because of the presence of economies of scale in total expenditure. However, we should note that the merger of existing municipalities could also lead to inefficient expenditures because of adjustment costs.

[4] For a discussion of broader-based local government, see Yamauchi (2008) and the MIAC website at http://www.soumu.go.jp/kouiki/kouiki.html.

Broader-based local government may be divided into two types: multitask extended association (*Kouiki-rengo*) and single task extended association (*Ichibu-jimu-kumiai*). The main difference is whether a multiple or single service is provided. Further, multitask extended association involves a stronger level of authority than single task extended association. For example, local government rules may need changing in municipalities of extended association and the setting up of a conference comprising local government representatives. As a result, differences among authorities influence expenditure in extended associations.

Table 1 show the numbers of municipalities in multitask extended association in 2003. On average, there are eight municipalities in each multitask extended association. Table 2 also shows the number of municipalities in single task extended association in 2003. There are about six municipalities on average in each single task extended association. The smallest number in any municipality for both forms of extended association is three. The highest number in a single task extended association is 17 in Shimabara, though in the Fukuoka multitask extended association there are 71 municipalities.[5]

3. Empirical Analysis

3.1 Empirical Model

When considering the provision of Japanese public LTCI, local public government aims to minimize costs while achieving some certain level of public service. Following Yamauchi (2006), the regression equation is:

$$E_i = \beta_0 + \beta_1 \ln pop_i + \beta_2 (\ln pop_i)^2 + \beta_3 r\_over40_i + \beta_4 (pop65/pop40)_i + \beta_5 r\_LTCIpayments_i + \beta_6 r\_transfer_i + \beta_7 group_i + \beta_8 \ln w_i + \beta_9 MD_i + \beta_{10} D_i + \varepsilon_i \quad (1)$$

where i refers to municipality i, β represents the coefficients of the independent variables, and ε_i is

[5] There are 96 in municipality in Fukuoka prefecture. It is to be notice that this particular municipality accounts for 76% of all municipalities in the Fukuoka prefecture.

an error term composed of identically independent random variables with a normal distribution. The variable E_i is per capita office expenditures on public LTCI between 2003 and 2005. There are two reasons for specifying office expenditure. First, the primary purpose of this study is to explain scale effects in broader-based local government. Administrative capacity of extended association can be strengthened by interaction with other municipalities, allowing joint work of handling of public LTCI. Second, temporary expenditure not observed in our data set, such as construction costs, increases total expenditure. The variable $\ln pop_i$ is population (in logs) and $\ln w_i$ is the average wage of public officers (in logs). As an environmental factor, the level of population controls for the scale effects in local government expenditure. A U shape arises in equation (1) when $\hat{\beta}_1$ is negative and $\hat{\beta}_2$ is positive; this captures the increasing effect of population on office expenditures.

All insured persons aged over 40 years are included in the public LTCI program. These comprise two categories. The first category includes persons aged 65 years or over. The second category includes those aged between 40 and 65 years.

r_over40_i represents the ratio of citizens aged 40 and over to the entire population in i th municipality. The ratio of citizens of over 65 to citizens aged over 40 represents aging population in LTCI. $r\_LTCIpayments_i$ is the rate of the number of LTCI payments to aged over 65; this variable shows the density of payments. $r\_transfer_i$ represents the ratio of transfer from the upper government to total revenue in municipality i. When municipalities supply public LTCI, their revenues include not only the premiums they collect but also subsidies from upper level governments. There is a possibility that transfers increase LTCI expenditure.

The variable $group_i$ represents the number of municipalities included in an extended association. An increase in the number of members requires greater expenditure. D_i is a dummy variable indicating the difference in intercept of ordinary municipalities and those in an extended association. Ordinary municipalities are the reference group. MD_i is a dummy variable taking a value of one if the municipality has merged and zero otherwise. Equation (1) is estimated using ordinary least squares (OLS) and cross-sectional municipal level data. The extended association data used in this estimation is

comparable with the municipal data. We also estimate the model by adding an interaction term between municipalities and extended associations. We employ heteroskedasticity robust standard errors in estimating the equations.[6]

3.2 Data

Table 3 summarizes the characteristics of the data used.[7] The fiscal data on public LTCI is mainly derived from the *Kaigo Hoken Tokubetsu Kaikei* (Ministry of Health, Labor and Welfare), while the data on the Japanese municipalities is from the *Shi Tyo Son Betsu Kessan Jyokyo Shirabe* (Ministry of Internal Affairs and Communications, MIAC). The number of observations (including extended associations and municipalities) vary during the sample period with 2,632 in 2003, 2,183 in 2004, and 1,633 in 2005.[8] There are also some missing values on wages and the number of local officers in the extended associations. The number of wage and local officers of extended association represented it in the mean value of the relevant municipalities. The extended association (E.A.) dummy is made by three patterns. First, E.A.dummy=1 when the municipality set up extended association, otherwise zero. Second, E.A.dummy different multitask E.A. from single task E.A. The expenditure structure of these two types of extended association differ across the three groups. Third, we estimate the model by adding an interaction term. In 2003, 2004, and 2005, the number of multitask and single task extended associations is 35, 30, and 26 and 29, 21, and 13, respectively. Tables 4 and 5 summarize the characteristics of the extended association data.

Figure 1 provides a scatter diagram of per capita office expenditure and logged population in 2003. This figure literally implies that at low values of logged population, one additional logged population has a negative effect on per capita office expenditure. At some point, the effect becomes positive, and

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[6] See Wooldridge (2005)

[7] MIAC Website (Kouiki Gyosei) http://www.soumu.go.jp/kouiki/pdf/rengo_H20.pdf
MIAC Website (Gapei Soudan Corner) http://www.soumu.go.jp/gapei/
MHLW Website (Kaigo Hoken Jigyo Hokoku) http://wwwdbtk.mhlw.go.jp/toukei/kouhyo/indexk-kousei.html#kou7

[8] We exclude isolated islands and the 23 wards in Tokyo from our sample because their services differ from those of typical Japanese municipalities.

the U shape means that per capita office expenditure with respect to logged population is increasing as logged population increases.

3.3 Municipal Organizations by Type

We also consider the fiscal condition of public LTCI on municipalities. We use the *financial index table of organizations and municipalities classified by similar types* compiled by the MIAC. This index compares each municipality's own fiscal condition with fiscal conditions in other municipalities. With the aim of providing comparison data, the MIAC has created a category of municipalities classified by similar types (hereafter abbreviated as "similar type"). Each category of municipal organizations by similar type employs criteria that measure population and the ratio of secondary and tertiary industry in cities (except for ordinance-designated cities) and towns and villages. Table 6 provides the matrix of the categories of similar types and the number of municipalities in each type.

Using this index, we can compare the expenditure of municipality and extended association. The expenditure of a municipality might be "similar" to the expenditure of another municipality in the same similar type. For the purposes of comparison of expenditure of each municipality with municipality with similar type, the value of estimated expenditure is calculated using the following steps: E_i is each municipality's real office expenditure. $\tilde{E}_i$ represents the estimated office expenditure of a similar type.

In the ordinary municipal case, for example, we consider the case of Iizuka city which belong to type is III–5. There are 37 municipalities in this type (see Table 7). The estimated expenditure of Iizuka city is calculated using the following equation,

$$\tilde{E}_{mun,Iizuka} = \frac{E_{(III-5),1} + E_{(III-5),2} + \cdots + E_{(III-5),36}}{37-1}. \quad (2)$$

Equation (2) represents estimated expenditure with a similar type. The numerator of equation (2) is sum of expenditure with type III-5 except for Iizuka city. The denominator of equation is the number of municipalities in type III-5 except for Iizuka city. We can use this calculating formula in other municipalities. Thus, the general formulation is as follows:

$$\tilde{E}_{mun,i} = \frac{\sum_{i \in S_{type}} E_{type} - E_i}{n_{type} - 1}, \quad (3)$$

$$\text{for } type \in [0-0 \cdots\cdots VIII-4].$$

where $\tilde{E}_{mun,i}$ represents the i th municipality and set of municipalities S_{type} whose type is the same as i.

Now consider the extended association. For example, the Hidaka multitask extended association comprises three towns (Niikappu, Shizunai, and Mitsuishi). The population of Niikappu is 6,204 persons. The secondary industry ratio is 15.8%. The tertiary industry ratio is 41.2%. A similar type of town to Niikappu is classified II-0. Likewise, the respective population and secondary and tertiary industry ratios are 23,125 persons, 19.9%, and 62.6% in Shizunai and 5,313 persons, 18.3%, and 39.3% in Mitsuishi. Therefore, town types VI-2 and I-0 (Table 6) classify Shizunai and Mitsuishi, respectively.

In the case of the Hidaka extended association (there are 32 municipalities in type II-0, 12 in type VI-2, and 52 in type I-0, see Table 7), our estimated expenditure equation takes the form:

$$\begin{aligned}\tilde{E}_{EA,k} &= \frac{E_{(II-0),1} + \cdots + E_{(II-0),31}}{32-1} + \frac{E_{(VI-1),1} + \cdots E_{(VI-1),11}}{12-1} + \frac{E_{(I-0),1} + \cdots + E_{(I-0),51}}{52-1} \\ &= \tilde{E}_{mun,Niikappu} + \tilde{E}_{mun,Shizunai} + \tilde{E}_{mun,Mitsuishi}\end{aligned} \quad . (4)$$

Each municipal and extended association faces estimated expenditure of a similar type:

$$\tilde{E}_{EA,k} = \sum_{i \in S_{EA,k}} \tilde{E}_{mun,i} \quad (5)$$

Similarly, $\tilde{E}_{EA,k}$ in equation (5) represents the kth extended association and set $S_{EA,k}$ represents a similar type of extended association.

$$\frac{E_i}{\tilde{E}_{EA,k}} \begin{matrix} > \\ = \\ < \end{matrix} 1 \quad . (6)$$

Equation (6) represents the ratio of observed office expenditure to estimated expenditure. Figure 2 compares the estimated expenditure of a similar type with actual office expenditure. As shown, this ratio is nearly one in ordinary municipalities, while the mean in multitask extended associations is 0.93 and 1.04 in the single task extended associations.[9] This suggests that multitask extended associations are able to provide broader-based local government at lower cost.

4. Empirical Results

4.1 Scale Effects

The empirical results are reported in Table 8.[10] The regression estimate for the population term is statistically significant at the 1% level. Because the coefficient on $\ln pop_i$ is negative and the coefficient on the squared term is positive, this literally implies that at low values of logged population, an additional logged population has a negative effect on per capita office expenditure. At some point, the effect becomes positive, and the U shape means that per capita office expenditure with respect to logged

[9] The ratio of the Iga multitask extended association has the highest score of 2.19.
[10] Table 5 is for 2003. Detailed results for 2004 and 2005 are available upon request.

population is increasing as logged population increases. In general, the population coefficients for each data set are almost identical. This finding is in agreement with the account in Yamauchi (2006). The demographic structures of the population aged over 40 years and over 65 years are significantly positive.[11] The results show that the progress of aging society in the LTCI increases office expenditure, because of the ratio of over 65 is positive significant. The coefficient of transfer ratio, represented in all cases, is significant. Thus, an increase in transfer may pose moral hazard problems. The dummy variable for extended association is statistically significant and positive at the 1% level in column (1). In column (2), the single task dummy is positive and significant, but the dummy for multitask association is insignificant. However, the multitask dummy has a positive coefficient.[12] This needs further consideration. To interpret the coefficients on the dummy variables, we must remember that the reference group is municipalities. Comparing the dummy variable coefficients, the order is ordinary municipality < merged municipality < multitask extended association < single task extended association.

We add an interaction term to extended association in columns (3) and (4). The interaction term of the population is statistically significant. The slope of the population of extended association decreases rapidly. Figure 3 shows the estimated population value by ordinary municipality and extended association. The scale effect of extended association is larger than that of ordinary municipality. In terms of cost efficiency, one way to decrease local government cost is through merger. However, if an appropriate population size is possible, extended association can also achieve a cost decrease.

4.2 Fiscal Policy Interdependence: The Case of LTCI in Japan

This section identifies public expenditure interdependence in public LTCI. If municipality *i* has

[11] In place of aged over 65 years, we included a variable for aged over 75 years. However, the empirical results remain unchanged.

[12] There is the possibility that the group variable influences estimation because the Fukuoka multitask extended association is composed of 71 municipalities. However, the estimation results did not change when we excluded Fukuoka from our sample.

interdependence with policy decisions in municipalities of a similar type, it may influence its expenditure. Our attempt at classification by similar type helps us better understand a spatially and temporally varying local government. Recent empirical models of fiscal policy interdependence have employed spatial econometrics methods (for example, Anselin (1988), Case *et al*. (1993), Revelli (2005), and Geys (2006)).[13]

For estimation, we can write the linear specification as:

$$E_i = \beta_0 + \beta X_i + \lambda \tilde{E}_i + \varepsilon_i \text{ , (7)}$$

where β_0 is the constant term, and X_i are independent variables as in equation (1). In addition to these variables, the estimated expenditure with similar type $\tilde{E}_i$ is used.[14] The parameter λ is supposed to reveal that municipality i and municipalities classified by similar type have interdependence. Generally, the empirical model of spatial interdependence has two problems.[15]

First, estimating equation (7) with OLS may result in a biased coefficient estimate because the dependent variable, office expenditure, and estimated expenditure as an independent variable invoke simultaneity in the determination of fiscal policy. As a result, the estimation in this paper uses lagged estimated expenditure in 2001.[16] Therefore, it deals with simultaneity by using lagged variables.

Second, the estimated expenditure of a similar type correlates with the error term (spatial autocorrelation). This may also provide inconsistent estimators using OLS. Instead, the estimation should use instrumental variables (IV) and two-stage least squares (2SLS) or maximum likelihood (ML) estimation (see Anselin (1988)). However, a number of factors contribute to heteroskedasticity in addition to spatial autocorrelation when municipalities in Japan are considered. Unfortunately, it is

[13] Sugawara and Kunisaki (2006) studied for fiscal competition among Japanese prefectures.

[14] $\tilde{E}_i$ of below value represents below the mean value of the similar type, which belongs.

[15] For further details of spatial econometrics methods, see Anselin (1988) and Revelli (2005). However, the fuller study of spatial interdependence lies outside the scope of this paper.

[16] The public LTCI program was introduced in Japan in 2000. However, data from 2001 is used because of problems with the postponement of insurance premiums in 2000.

difficult to make these specific. Therefore, equation (7) is estimated using heteroskedasticity robust standard errors.

The empirical findings are reported in Table 9. X_i are almost the same as in Table 8 excluding the municipal mergers dummy. The coefficients of $\tilde{E}_i$ and $\tilde{E}_i$ of below value of municipal i are estimated to be positively significant at the 1% level. The results provide convincing evidence that expenditure in municipality i contributes to expenditure of municipalities of a similar type. In other words, there is a possibility that municipality i and municipalities of a similar type are interdependent in fiscal policy decisions on public LTCI. Consequently, expenditure in municipality i increases with expenditure in similar municipalities. The coefficient of $\tilde{E}_i$ of below value of municipal i is 0.529. This has a larger influence on fiscal policy decisions on expenditure by municipality i.

5. Conclusion

The purpose of this paper is to provide empirical evidence of the differences in expenditure structures between ordinary municipalities and extended associations in public LTCI. The main finding is that there is indeed a difference in the expenditure structure between ordinary municipalities and extended associations. The expenditure structure is also found to be U shaped. In addition, the expenditure of extended associations decreases more rapidly than ordinary municipalities. This result shows that expenditure of appropriate population size extended associations larger than single municipality. Accordingly, existing municipalities are too small to provide local public services such as public LTCI. That said, the prefecture, as the municipality's upper government, is too large because it is impossible to provide generous care. In this case, it is necessary for Japanese municipalities to apply broader-based government in local public service.

This paper also examined fiscal policy interdependence in expenditures on LTCI. This revealed

municipal expenditure depends on expenditures by municipalities of a similar type. In other words, the fact that members of a similar type influence municipal policy decisions indicates the possibility of mimic policy decisions. While this is too involved a subject to treat in detail here, we cannot rule out entirely the possibility of mimicking.

Most importantly, while municipal mergers were widely promoted in Japan, some small municipalities (such as towns and villages) remain. Our findings show that municipal mergers are not the only solution to fiscal reconstruction. Rather, the extended association system is effective in per capita expenditure savings. These stand-alone municipalities are then able to improve their fiscal condition with the extended association system.

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Tables and Figures

Table 1. Multitask Extended Associations

Name	Num. of municipalities	Name	Num. of municipalities
Hidaka	3	Kinan	5
Sorachi	6	Kazushi	6
Hiyama	4	Suzuka	3
Ichinoseki	3	Konishi	6
Kuji	6	Kusunoki	3
Hakusanroku	5	NanbuMikaya	4
Sakai	5	Unnan	10
Kitaarupusu	7	Oki	7
Kiso	11	Oku	3
Suwa	6	Suouoshima	4
Anpachigun	4	Miyoshi	8
Ibi	8	Tyugei	5
Motosu	3	Fukuoka	71
Takayama-Ono	9	Sagatyubu	18
Titahokubu	4	Nishisonogi	9
Iga	6	Hokushounanbu	6
Kihoku	3	Hioki	7

Notes: Num. of municipalities is the number of member municipalities in the extended association. For example, there are three municipalities in Hidaka.

Table 2. Single Task Extended Associations

Name	Num. of municipalities	Name	Num. of municipalities
Ninohe	5	Kumanogawa	3
Moriokahokubu	6	Otashi	3
Honjyo	9	Aki	3
Omagari	14	Izumoshi	7
Niihari	4	Matue	9
Osato	9	Othigun	7
Higashikanbara	4	Hamada	6
Imizu	5	Ashin	5
Nakaniikawa	3	Kamiishi	4
Tonami	12	Karatu	10
Kaminei	6	Kitou	12
Niikawa	4	Tosu	6
Yodakubo	3	Shimabara	17
Tagatananbu	3	Simogotou	6
Watarai	4		

Notes: Num. of municipalities is the number of member municipalities in the extended association. For example, there are five municipalities in Ninohe.

Table 3. Summary Statistics, 2003

Variables	Obs.	Mean.	Std. Dev.	Min.	Max.
Total expenditure (thousands of yen)	2,630	1,886,668	5,650,858	20,910	118,000,000
Office expenditure (thousands of yen)	2,630	68,909	230,404	467	6,698,898
LTCI payments (thousands of yen)	2,630	1,782,518	5,355,100	16,622	111,000,000
Population	2,630	44,224	140,798	219	3,495,117
Pop.over 40	2,630	22,876	69,429	124	1,651,255
Pop.over 65	2,630	1,292	4,114	15	100,063
Number of care insurance payments	2,630	28,694	90,297	196	2,001,295
Group	2,630	1	2	1	71
Total revenue (thousands of yen)	2,630	1,913,814	5,682,864	24,310	118,000,000
Transfer (thousand of yen)	2,630	56,297	193,982	190	5,713,811
Total wage (thousands of yen)	2,630	3,417,030	11,500,000	137,038	324,000,000
Public officer	2,630	362	1,137	15	31,048
Per capita expenditure	2,630	58.11	22.79	16.28	194.37
Per capita office expenditure	2,630	2.29	1.68	0.03	18.85
Per capita LTC payments	2,630	54.38	21.40	14.55	185.19
Per capita wage of public officer	2,630	9,033.51	864.06	4,212.99	13,665.70

Notes: Pop. over 40 represent the population of 40 over to total population ratio in municipality. Similarly, Pop. over 65.

Table 4. Summary Statistics: Multitask Extended Associations, 2003

Variables	Obs.	Mean.	Std. Dev.	Min.	Max.
Total expenditure (thousands of yen)	30	6,940,464	12,700,000	563,331	71,300,000
Office expenditure (thousands of yen)	30	197,341	260,358	25,313	1,397,466
LTCI payments (thousands of yen)	30	6,600,357	12,200,000	525,090	68,500,000
Population	30	130,414	203,084	7,822	1,081,236
Pop.over 40	30	70,834	111,081	4,657	605,006
Pop.over 65	30	4,772	8,742	343	49,252
Number of care insurance payments	30	103,659	183,565	7,732	1,032,709
Group	30	8	12	3	71
Total revenue (thousands of yen)	30	7,008,914	12,700,000	576,549	71,500,000
Transfer (thousand of yen)	30	157,598	174,977	17,193	754,835
Total wage (thousands of yen)	30	10,900,000	15,700,000	1,958,806	85,000,000
Public officer	30	1,173	1,595	249	8,769
Per capita expenditure	30	60.04	20.84	27.14	113.73
Per capita office expenditure	30	2.09	1.38	0.61	6.51
Per capita LTC payments	30	56.63	19.40	25.75	107.86
Per capita wage of public officer	30	8,963.22	840.32	7,187.99	11,628.78

Notes: Pop. over 40 represent the population of 40 over to total population ratio in municipality. Similarly, Pop. over 65.

Table 5. Summary Statistics: Single Task Extended Associations, 2003

Variables	Obs.	Mean.	Std. Dev.	Min.	Max.
Total expenditure (thousands of yen)	23	5,423,309	3,748,063	598,566	13,100,000
Office expenditure (thousands of yen)	23	170,889	117,043	37,094	482,001
LTCI payments (thousands of yen)	23	5,097,782	3,476,562	549,724	11,800,000
Population	23	99,123	86,930	6,485	387,776
Pop.over 40	23	55,491	45,283	4,502	199,170
Pop.over 65	23	3,514	2,457	422	8,701
Number of care insurance payments	23	73,264	50,742	8,142	181,222
Group	23	6.52	3.68	3.00	17.00
Total revenue (thousands of yen)	23	5,502,372	3,779,194	607,514	13,100,000
Transfer (thousand of yen)	23	116,459	86,913	6,000	351,829
Total wage (thousands of yen)	23	8,237,594	5,566,734	1,444,193	24,200,000
Public officer	23	903	590	154	2,531
Per capita expenditure	23	67.44	24.49	33.69	122.02
Per capita office expenditure	23	2.49	1.43	0.65	5.72
Per capita LTC payments	23	63.45	23.07	29.19	117.16
Per capita wage of public officer	23	9,066.64	661.94	7,915.92	10,074.96

Notes: Pop. over 40 represent the population of 40 over to total population ratio in municipality. Similarly, Pop. over 65.

Figure 1. Scatter Diagram of Per Capita Office Expenditure and Population, 2003

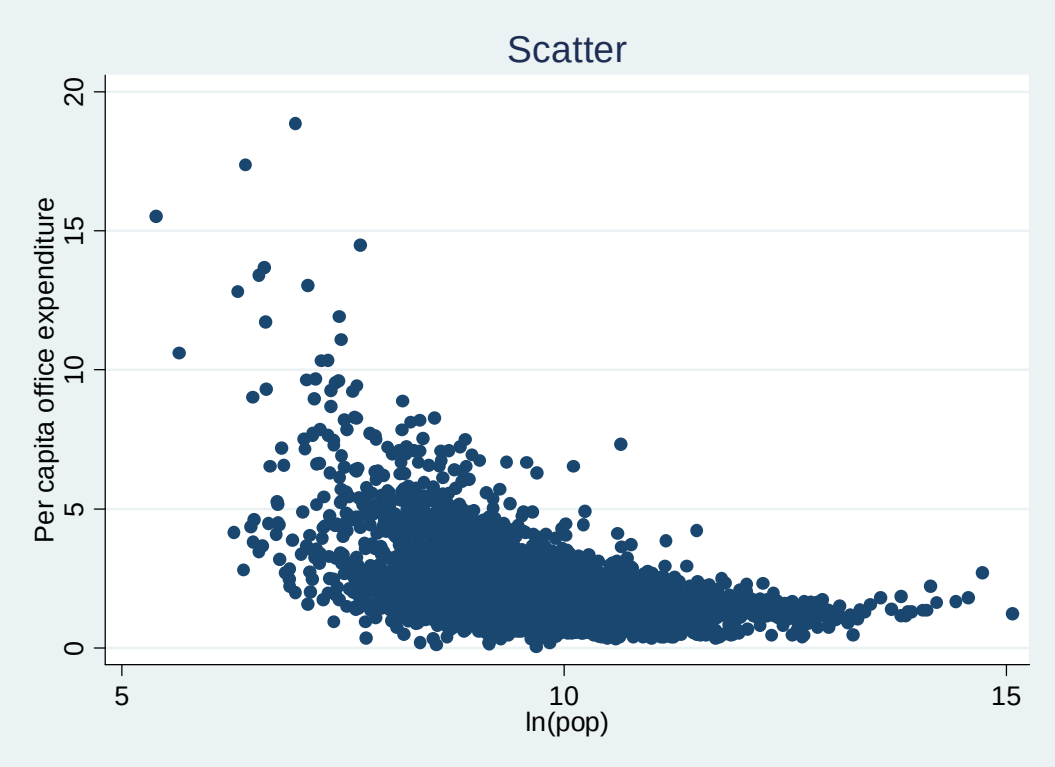


Table 6. Municipal Organizations by Type, Ministry of Internal Affairs and Communications, 2001

Cities

Industrial structure	Secondary and Tertiary	Over 95%		Over 85% to less than 95%		Less than 85%	
	Tertiary	Over 65%	Less than 65%	Over 55%	Less than 55%	Over 50%	Less than 50%
Population	Type	5	4	3	2	1	0
~35,000	0	0-5 (5)	0-4 (9)	0-3 (40)	0-2 (26)	0-1 (32)	0-0 (11)
35,000 ~55,000	I	I-5 (7)	I-4 (37)	I-3 (57)	I-2 (37)	I-1 (10)	I-0 (4)
55,000 ~80,000	II	II-5 (33)	II-4 (35)	II-3 (40)	II-2 (24)	II-1 (1)	II-0 (0)
80,000~130,000	III	III-5 (37)	III-4 (42)	III-3 (25)	III-2 (11)	III-1 (0)	III-0 (0)
130,000~230,000	IV	IV-5 (41)	IV-4 (25)	IV-3 (9)	IV-2 (0)	IV-1 (1)	IV-0 (0)
230,000~430,000	V	V-5 (35)	V-4 (12)	V-3 (7)	V-2 (1)	V-1 (0)	V-0 (0)
430000~	VI	VI-5 (15)	VI-4 (6)	VI-3 (1)	VI-2 (0)	VI-1 (0)	VI-0 (0)

Towns and villages

Industrial structure	Secondary and Tertiary	Over 80%		Over 75% to less than 85%	Over 65% to less than 75%	Less than 80%
	Tertiary	Over 55%	Less than 55%			
Population	Type	4	3	2	1	0
~3,500	0	0-4 (57)	0-3 (58)	0-2 (132)	0-1 (89)	0-0 (59)
3,500 ~5,500	I	I-4 (32)	I-3 (59)	I-2 (148)	I-1 (93)	I-0 (52)
5,500 ~8,000	II	II-4 (58)	II-3 (108)	II-2 (159)	II-1 (88)	II-0 (32)
8,000 ~13,000	III	III-4 (141)	III-3 (162)	III-2 (166)	III-1 (73)	III-0 (13)
13,000~18,000	IV	IV-4 (87)	IV-3 (86)	IV-2 (74)	IV-1 (28)	IV-0 (7)
18,000~23,000	V	V-4 (72)	V-3 (52)	V-2 (23)	V-1 (6)	V-0 (2)
23,000~28,000	VI	VI-4 (49)	VI-3 (30)	VI-2 (12)	VI-1 (0)	VI-0 (0)
28,000~35,000	VII	VII-4 (51)	VII-3 (17)	VII-2 (5)	VII-1 (1)	VII-0 (0)
35,000~	VIII	VIII-4 (43)	VIII-3 (17)	VIII-2 (2)	VIII-1 (0)	VIII-0 (0)

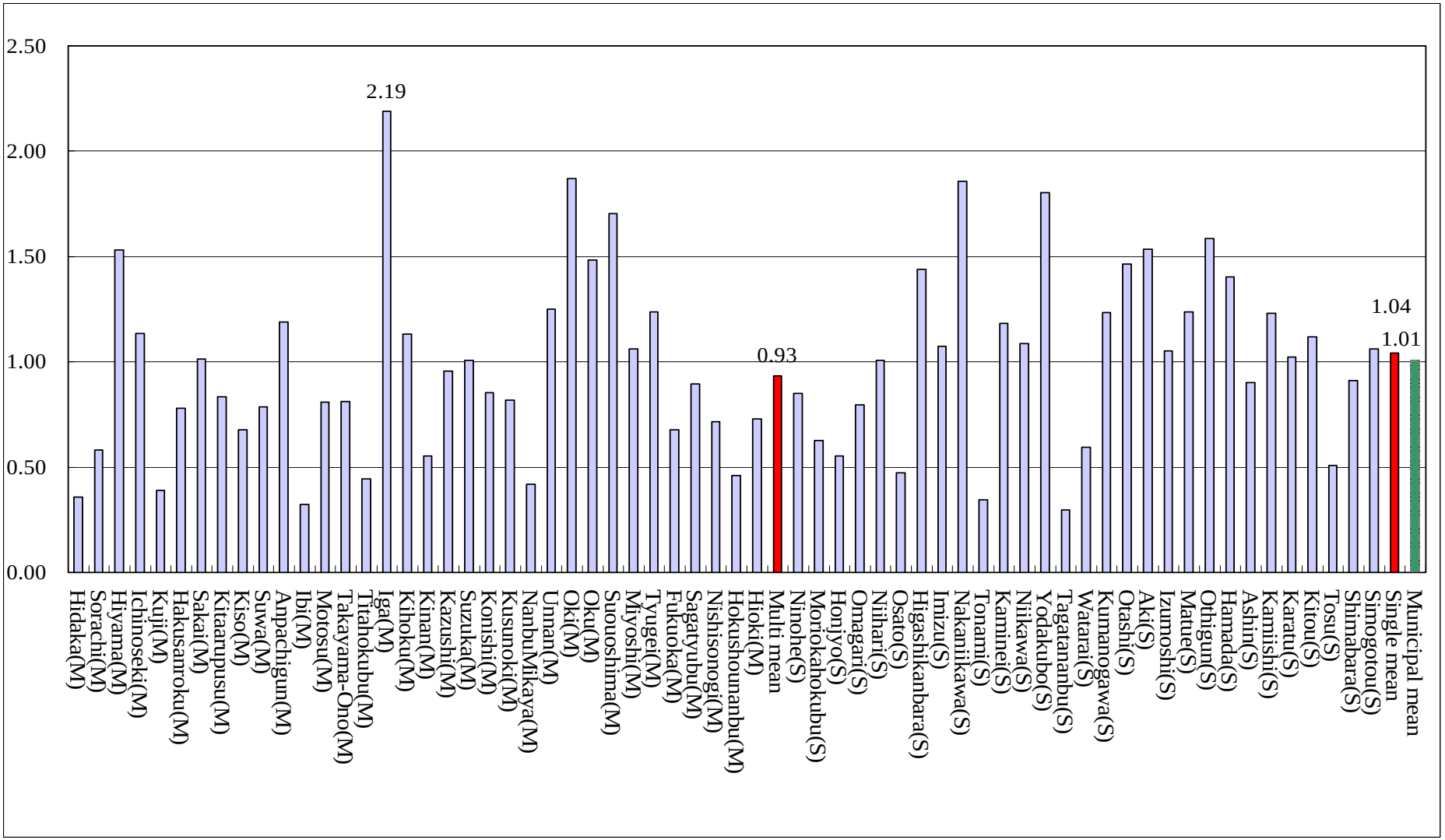
Notes: The number of municipalities is in parentheses. The circled entry in Cities represents Iizuka (III-5). The circled entries in Towns and villages represent the Hidaka multitask extended association. Hidaka is composed of the following three towns: Niikappu (II-0), Shizunai (VI-2), and Mitsuishi (I-0). (See Section 3.3)

Table 7. Some Examples of Municipalities by Type

City		Town and Villege					
III-5 (37)		II-0 (32)		VI-2 (12)	I-0 (52)		
Muroran	Izumisano	Minamikabeya	Minamiarima	Shizunai	Shinshinotsu	Kawakami	Goshoura
Ebetsu	Tondabayashi	Yuni	Yokoshima	Makubetsu	Shikabe	Minamimaki	Ogi
Chitose	Kawachinagano	Nakafurano	Tensui	Takahata	Niki	Nishiyoshino	Kujyu
Toride	Minou	Furen	Ogata	Funehiki	Kita	Seranishi	Kitaura
Kounosu	Ashiya	Memanbetsu	Ono	Daigo	Uryu	Touwa	Shiiba
Toda	Sanda	Koshimizu	Azuma	Yachiyo	Watsusamu	Miyakubo	Gokase
Asaka	Kashihara	Kunnetsupu	Higashikushira	Nasu	Kenbuchi	Kamiura	Satsuma
Fujimi	Ikoma	Niikappu	Onejime	Sagara	Tomamae	Misaki	Nagashima
Abiko	Hatsukaichi	Erimo	Isen	Haibara	Rebun	Akehama	Kihoku
Kamagaya	Iizuka	Shihoro	Wadomari	Minamitachi	Tokoro	Shirokawa	Matsuyama
Yotsukaido	Chikushino	Hamanaka	Gusukube	Ishiki	Yubetsu	Yasuda	Sata
Akisima	Kasuga	Rausu	Irabu	Setaka	Atsuma	Geisei	Ie
Koganei	Onojyo	Tatsuko			Mitsuishi	Towa	
Kokubunji	Beppu	Utatsu			Toyokoro	Hoshino	
Higashikurume	Ginowan	Shouwa			Inagaki	Minamikushiyama	
Isehara	Urasoe	Makioka			Souma	Kitaarima	
Ebina	Okinawa	Samizu			Sawauchi	Odika	
Zama		Minabekawa			Jyohouji	Wakamatsu	
Isehara		Nakajima			Oshika	Kaou	
Ikeda		Fukudomi			Hamochi	Soyou	

Note: The number of municipalities is in parentheses.
Iizauka belongs to similar type III-5.
The Hidaka (M) components (Niikappu, Shizunai, and Mitsuishi) are underlined.

Figure 2. Ratio of Office Expenditure and Estimated Expenditure by Type



Notes: (M) and (S) are multi and single task extended associations, respectively.

Table 8. Estimation Results for Per Capita LTC Office Expenditure, 2003

Variables	(1)	(2)	(3)	(4)
ln (pop)	-2.087***	-2.087***	-2.100***	-2.099***
	(0.227)	(0.227)	(0.230)	(0.229)
ln (pop) ·2	0.091***	0.091***	0.092***	0.092***
	(0.010)	(0.010)	(0.011)	(0.010)
Pop.over 40/Pop.	2.027***	2.026***	2.016***	2.016***
	(0.337)	(0.336)	(0.334)	(0.334)
Pop.over 65/Pop.over 40	19.057***	19.055***	18.941***	18.957***
	(5.811)	(5.812)	(5.836)	(5.822)
Rate of LTCI payments	-0.010	-0.010	-0.011	-0.011
	(0.011)	(0.011)	(0.011)	(0.011)
Rate of transfer	53.317***	53.343***	53.754***	53.757***
	(1.920)	(1.913)	(1.888)	(1.886)
Group	-0.013***	-0.011**	-0.031***	-0.026***
	(0.005)	(0.005)	(0.010)	(0.008)
ln wage	0.167	0.163	0.139	0.142
	(0.195)	(0.195)	(0.193)	(0.193)
Municipal Mergers Dummy	0.284***	0.284***	0.280***	0.280***
	(0.099)	(0.099)	(0.100)	(0.100)
Extended Association Dummy	0.571***		21.535**	
	(0.171)		(8.396)	
E.A.(multi) Dummy		0.340		20.375**
		(0.244)		(7.929)
E.A.(single) Dummy		0.835***		20.662***
		(0.169)		(7.988)
E.A.Dummy·ln(pop)			-4.234***	-4.044***
			(1.435)	(1.347)
E.A.Dummy·ln(pop)*2			0.185***	0.176***
			(0.064)	(0.060)
E.A.Dumm·pop.over40/pop			5.101**	4.206**
			(2.126)	(2.059)
E.A.Dummy·pop.over65/pop.over40			2.212	4.851
			(11.999)	(11.135)
E.A.Dummy·rate of LTCI payments			0.060	0.079*
			(0.045)	(0.043)
E.A.Dummy·rate of transfer			-37.244***	-35.643***
			(11.080)	(10.680)
E.A.Dummy·group			0.000	0.000
			(0.000)	(0.000)
Constant	8.303***	8.330***	8.636***	8.619***
	(2.083)	(2.083)	(2.102)	(2.101)
Observations	2,628	2,628	2,628	2,628
R-squared	0.752	0.753	0.756	0.756

Notes: Robust standard errors in parentheses. Asterisks indicate variables whose coefficients are significant at the 10(*), 5(**), and 1%(***) levels.

Figure 3. Per Capita Office Expenditure (Estimated) and ln(pop)

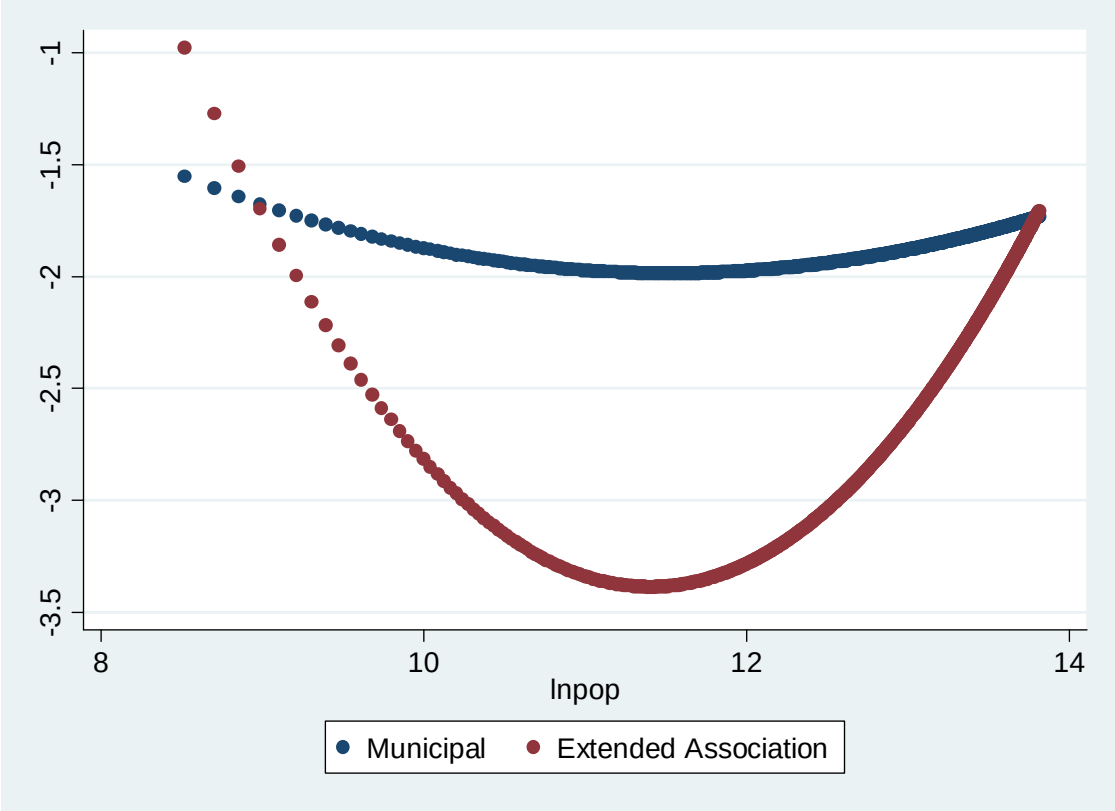


Table 9. Estimation Results for Fiscal Policy Interdependence, 2003

Variables	(1)	(2)
ln (pop)	-1.523***	-1.523***
	(0.227)	(0.227)
ln (pop) ·2	0.067***	0.067***
	(0.010)	(0.010)
Pop.over 40/Pop	1.298***	1.297***
	(0.229)	(0.229)
Pop.over 65/Pop.over 40	12.287***	12.293***
	(3.821)	(3.824)
Rate of LTCI payments	-0.004	-0.004
	(0.007)	(0.007)
Rate of transfer	29.554***	29.584***
	(2.322)	(2.323)
Group	-0.004	-0.003
	(0.003)	(0.003)
ln wage	-0.180	-0.180
	(0.144)	(0.144)
Municipal Mergers Dummy	0.091	0.091
	(0.091)	(0.091)
Extended Association Dummy	0.331***	
	(0.105)	
E.A.(multi) Dummy		0.256*
		(0.145)
E.A.(single) Dummy		0.417***
		(0.108)
Lagged similar expenditure 2001	0.138***	0.138***
	(0.030)	(0.030)
(Below) Lagged similar expenditure 2001	0.529***	0.528***
	(0.031)	(0.031)
Constant	8.921***	8.924***
	(1.777)	(1.777)
Observations	2,626	2,626
R-squared	0.854	0.854

Notes: Robust standard errors in parentheses. Asterisks indicate variables whose coefficients are significant at the 10(*), 5(**), and 1%(***) levels.