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Does Local Spending Have Repercussion from Tax Structure? －Evidence from Japan－

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[Abstract]

The original intention of this article is to explore what are the driving forces for the local tax structures. Is tax policy determining the local expenditure portfolio, or is the relationship the other way around? We expect some research venturing to explore the interplay between the local expenditure responsibilities and tax policy. This article examines these fresh issues in the light of Japan's recent experiences, and tries to bring not only analytical framework but also qualify information on local tax structures. The motivation is that we can test causality through regression models using the notion of Granger causality.

So far it is often said that expenditure has not been decided by making tax revenue given, instead expenditure may be decided for a certain reason and for financing it corresponding revenue is 'guaranteed' in Japan. As local public sector has evolved from 'agency' model to 'autonomy' model, this stereotypical way of thinking will come into question. This article shows that it is possible to have some repercussions from the tax structure to expenditures.

[Key words] tax policy, local spending, granger causality, incrementalism, cyclical ratcheting, sub-national government

Does local spending have repercussion from tax structure? -Evidence from Japan-

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1. Introduction

The original intention of the 2013 CPH workshop is to explore what are the driving forces for the local tax structures[1]. Is tax policy determining the local expenditure portfolio, or is the relationship the other way around? Organizers expect some research venturing to explore the interplay between the local expenditure responsibilities and tax policy. This article examines these fresh issues in the light of Japan's recent experiences, and tries to bring not only analytical framework but also qualify information on local tax structures. The motivation is that we can test causality through regression models using the notion of Granger causality.

So far it is often said that expenditure has not been decided by making tax revenue given, instead expenditure may be decided for a certain reason and for financing it corresponding revenue is 'guaranteed' in Japan. As local public sector has evolved from 'agency' model to 'autonomy' model, this stereotypical way of thinking will come into question. This article will show that it is possible to have some repercussions from the tax structure to expenditures.

In Section 2, we describe local government finance in Japan. The Japanese system seems to attempt combine Northern European expenditure decentralization with Continental style centralized

[1] See, Kim, Junghun, Niels Jorgen Mau and Jorgen Lotz(2013)

methods of financing. In Section 3, using Granger causality test, we will provide an empirical evidence for reciprocal relationship between tax and expenditure in Japan. In Section 4, we will turn our attention to expenditure side. First, we test the *incrementalism* hypothesis - last year's is taken and a little more added- by using ARIMA model. We also analyze how local spending adjusts for the business cycle. The hypothesis tested in this article is that asymmetric government spending over the business cycle leads to upward *cyclical ratcheting* in government spending. Final section briefly looks at policy implication for future tax structure.

2. Local Government Finance

Sub-national jurisdictions can be seen simply as agents of national government, which can more conveniently from an administrative point of view provide local services. On the other hand, sub-national jurisdictions may be seen as independent bodies elected by the local taxpayers to provide certain service in accordance with their preferences. The first and most general issue is the conflict between what has been called the 'agency' versus the 'local autonomy' approach[2].

Agency delegated functions

Japan has together with the Nordic countries the highest degree of decentralization among the OECD countries. In Japan local governments are responsible for a major share of public spending, including on national land conservation and development expenditure, education expenditure, police and fire brigades, social welfare, sanitation and general administration. Lots (2005) demonstrated that measures of the degree of decentralization, based on official statistics on local expenditure, show that also Japan ranks high together with the NCs.

Nevertheless, high sub-national spending shares give a misleading picture of the actual degree of local decision making power. The problem is that there are many ways for central authorities to

[2] See, Messere, Kam and Heady (2003)p.52

influence functions delegated to the local governments sector, as Japan so clearly demonstrates. In Japan local provision was done by “agency delegated function” meaning that the national government remains heavily involved in almost every aspect of local public spending.

Unlike the current theories of today on “local public goods”, but very much in line with contemporary thinking in the Nordic countries, there is in Japan no clear separation between central and local functions. As a result, major programs (education, health, and welfare) are formulated by national ministries and financed by many specific grants. Therefore the issue for Japan is not so much to change/enlarge the expenditure assignments themselves, but to redefine responsibilities for designing, implementing, and financing these assignments. This also is expressed by virtual elimination of agency-delegated functions in 1999 and the reduction in the number and volume of specific purpose grants in “Trinity reform” during 2004-2006.

Tax sharing system

The outstanding points of interest about local tax is first of all the ratio of national tax to local tax is 60:40, which led vertical fiscal imbalance in the public sector and call for grants to fill the gap. Local own tax represents only 30% in the total revenue of local governments. Secondly tax revenues are derived from various tax bases. It is the firmly established, productive local income tax in the Scandinavian countries. The opposite model is the English speaking countries where property tax dominates the local revenue.In Japan, own revenue sources are mainly derived from revenues shares of central taxes on income, property and consumption, local authorities have the authority to vary tax rate. These arrangements have many similarities with the Central European tax sharing systems.

On the surface Japanese local tax system seems to be different from continental tax-sharing because the major source of local own revenue is a kind of piggy-backing which are similar to surtax on national income tax base. However, almost all localities use uniform rate for the same tax base, as described in next part. McLure has argued that Piggy-backing with uniform rate would be tantamount to

an institutionally clumsy form of tax-sharing[3]. It can be said that even an elegant form of tax sharing is in terms of accountability inferior when compared to own local taxation.

Tax sharing is a well known in Continental Europe and also in Norway, but strong theoretical arguments can be made against tax sharing, namely: their lack of local accountability, that they tend to be distributed to the richest authorities, and that the development of the tax bases and revenue over time will depend on conjunctive developments which has nothing to do with the needs coming from for example demographic change. The latter problem has forced Japan to seek to expand on the number of taxes to be shared[4].

But there are more practical reasons why tax sharing is used in many countries. First of all, seen from Japan's experience, is its presumed revenue adequacy. The revenue of the local allocation tax changes over the years like national major taxes, because this is what is multiplied by the fixed tax-sharing ratio. Because this tax-sharing ratio has been quite stable, an automatic increase in major national taxes has provided continuous increase in the financial pool of local allocation tax during rapid growth era. On the other, total fund of transfer is sensitive to business condition because major component of the fund consists of income-elastic national taxes. The question to be asked, however, is whether a better revenue path could have been realized without tax sharing.

One alternative would be a simple, general grant with clauses of negotiated annual increases. Another is the system of powerful own local taxes, so that local authorities themselves could have secured the missing revenue. In neither case there would today have been the need to discuss projects like expanding the number of taxes to be shared, or to increase Consumption Tax in the financial pool of equalization. In conclusion, the Japanese system seems to attempt combine Northern European expenditure decentralization with Continental style centralized methods of financing[5]. This is a problematic match.

[3] See, McLure (1983)p.103
[4] See, Mochida and Lotz (1999)p.61
[5] Mochida and Lotz (1999)p.62

3. Reciprocal relationship between tax and spending

Unit root test and cointegration

The theme of this article is how to understand the interplay between expenditure responsibility and tax policy. With time series data, we can investigate causality through regression models using the notion of Granger causality. Y does not 'Granger cause' x, if past value of y can not help explain x. Assume VAR (vector autoregression) model with two variables.

$$X_t = \alpha_1 + \beta_{11}X_{t-1} + .. + \beta_{1p}X_{t-p} + \gamma_{11}Y_{t-1} + .. + \gamma_{1p}Y_{t-p} + u_{1t}$$

$$Y_t = \alpha_2 + \beta_{21}X_{t-1} + .. + \beta_{2p}X_{t-p} + \gamma_{21}Y_{t-1} + .. + \gamma_{2p}Y_{t-p} + u_{2t}$$

Y does not Granger cause X, if,

$$\gamma_{11} = \cdots = \gamma_{1p} = 0$$

Similarly, X does not Granger cause Y if,

$$\beta_{21} = \cdots = \beta_{2p} = 0$$

In order to test the Granger causality from y to x, we use statistical hypothesis testing as follows.

$$H_0 : \gamma_{11} = \cdots = \gamma_{1p} = 0 \qquad H_1 : \gamma_{1p} \neq 0$$

If a null hypothesis that all of the slopes are zero is rejected, it can be said that Granger causality from y to x does exist.

As a first step for estimating VAR and testing Granger causality, unit root and cointegration test can be used. Using 1956-1987 time series data, Horiba (1999) reports that local expenditure 'Granger' causes tax revenue in Japan. Unfortunately, this article does not test whether two variables are stationary or non-stationary. Non-stationary data, as a rule, are unpredictable and cannot be modeled or forecasted. The result obtained by using non-stationary time series may be 'spurious' in that they may indicate a relationship between two variables where one does not exist.

Table1 Unit root test（ADF）						
	Prefecture（1975-2011）			Municipality（1975-2011）		
	F statistics	lag	Prob.	F statistics	lag	Prob.
A. level						
LEX	-1.1694	3	0.9005	-1.0828	7	0.9147
LTX	-2.2299	2	0.4588	-2.8744	1	0.1825
LAT	-2.0598	1	0.5493	-1.722	3	0.7186
B. 1st difference						
⊿LEX	-2.7369	4	0.4988	-4.1077**	4	0.0151
⊿LTX	-5.1951***	1	0.0009	-3.4568*	0	0.0602
⊿LAT	-3.6832**	0	0.0370	-3.4321*	0	0.0633
Critical value	1%	5%	10%			
	-4.25	-3.54	-3.20			
LEX=log(expenditure), LTX=log(local tax), LAT=log(local allocation tax)						

We use Augmented Dickey=Fuller Test to test null hypothesis that there is unit root and time series is non-stationary. Let LEX denotes log of local expenditure, LTX log of local tax and LAT log of local allocation tax (a block grants). The estimation results are shown in table1. Order of lagged dependent variable is determined by Akaike information criterion[6]. It is hard to reject a unit root in all variable and first differences are stationary. In what follows, we assume that first differences of all variables are stationary. While we can not reject the null hypothesis that ΔLEX has unit root, Phillips and Perron test indicates that Δ LEX is also stationary.

Next, we will test cointegration between LEX, LTX and LAT. If liner combination of Ⅰ(1) variables is stationary, then the variables in question are said to be cointegration. There exists a long run toward which they always come back. Here, we use Johansen test to check the presence of cointegration. Lag interval is determined by Akaike information criteria and the estimation results are reported in table2.

Max-Eigen statistics indicate no cointegration at the 0.05 level. Time series of LEX, LTX and LAT are not cointegrated with each other. If two variables are cointegrated, we may usually estimate vector error correction model (VECM) to test Granger causality. Because two variables are not cointegrated as explained above, we

[6] All variable are converted to logarithm.

estimate VAR in first differences in order to test Granger causality.

Table2 Johansen cointegration test			sample : 1977-2011	
A. Municipality				
Hypothesized No. of CE(s)	Statistics		Critical Value (5%)	
	Max-Eigen statistics	Trace statistics	Max-Eigen statistics	Trace statistics
r＝0	18.276	33.8956	21.1316	29.797
r≦1	10.1553	15.6195	14.2646	15.4947
r≦2	5.4642	5.4642	3.8414	3.8414
B. Prefecture				
Hypothesized No. of CE(s)	Statistics		Critical Value (5%)	
	Max-Eigen statistics	Trace statistics	Max-Eigen statistics	Trace statistics
r＝0	17.4894	34.3634	21.1316	29.797
r≦1	10.0816	16.8739	14.2646	15.4947
r≦2	6.7922	6.7922	3.8414	3.8414

Granger causality

The vector auto regression (VAR) model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. The VAR model has proven to be especially useful for describing the dynamic behavior of economic and financial time series and for forecasting. This article simulates VAR model in the first differences of three variables; LEX, LTX and LAT. Lag interval of endogenous is determined by Akaike information criterion.

One of the main uses of VAR models is forecasting. The structure of the VAR model provides information about a variable's or a group of variables' forecasting ability for other variables. The following intuitive notion of a variable's forecasting ability is due to Granger (1969). If a variable, or group of variables, Y is found to be helpful for predicting another variable, or group of variables, X then Y is said to Granger-cause X; otherwise it is said to fail to Granger-cause X. Y fails to Granger-cause X if all of the coefficients on lagged values of Y are zero in the equation for X. The linear coefficient restrictions implied by Granger non-causality may be tested using the Wald statistic. The estimation of Granger causality test results are

summarized in table3.

According to the results, local tax revenue is said to Granger-cause local expenditure and vice versa. So far it is often said that expenditure has not been decided by making tax revenue given, instead expenditure may be decided for a certain reason and for financing it corresponding revenue is 'guaranteed' in Japan. Granger causality test in this article, however, indicates that there is reciprocal relationship between tax and expenditure in Japan. Because there is also reciprocal relation between local allocation tax and spending in prefecture, we have to interpret above results cautiously. But we can tentatively conclude that it is possible to have some repercussions from the tax structure to expenditures.

Table3 Granger causality test

1975-2011 Municipality

Null Hypothesis	no of lag	Chi-sq	prob.	decision	direction of causality	causality
LTX does not Granger cause LEX	8	13.8722	0.0852	Reject	LTX→LEX	Exist
LEX does not Granger cause LTX	8	43.8912	0.0000	Reject	LEX→LTX	Exist
LEX does not Granger cause LAT	8	7.6686	0.4665	Not reject	LEX→LAT	Does not exist
LAT does not Granger cause LEX	8	6.3873	0.6069	Not reject	LAT→LEX	Does not exist
LTX does not Granger cause LAT	8	7.1409	0.5215	Not reject	LTX→LAT	Does not exist

1975-2011 Prefecture

Null Hypothesis	no of lag	Chi-sq	prob.	decision	direction of causality	causality
LTX does not Granger cause LEX	8	96.6888	0.0000	Reject	LTX→LEX	Exist
LEX does not Granger cause LTX	8	15.3377	0.0529	Reject	LEX→LTX	Exist
LEX does not Granger cause LAT	8	14.6615	0.0661	Reject	LEX→LAT	Exist
LAT does not Granger cause LEX	8	156.8843	0.0000	Reject	LAT→LEX	Exist
LTX does not Granger cause LAT	8	3.9699	0.8598	Not Reject	LTX→LAT	Does not exist

Note LTX:log difference in tax, LEX:log difference in expenditure, LAT:log difference in local allocation tax

Above result can be intuitively confirmed by actual data. Figure1 shows rate of increase in local expenditure, local tax and local allocation tax compared with previous years. These variables are approximately equal to log difference of time series data. Until the late 1990s, positive correlation is observed and a close relationship had occurred. Since 2000 these relationship became a little bit obscured. Formal econometric analysis actually supports this observation, given other independent variables are controlled.

Figure1 LEX, LTX and LAT (rate of increase)
A. municnipality

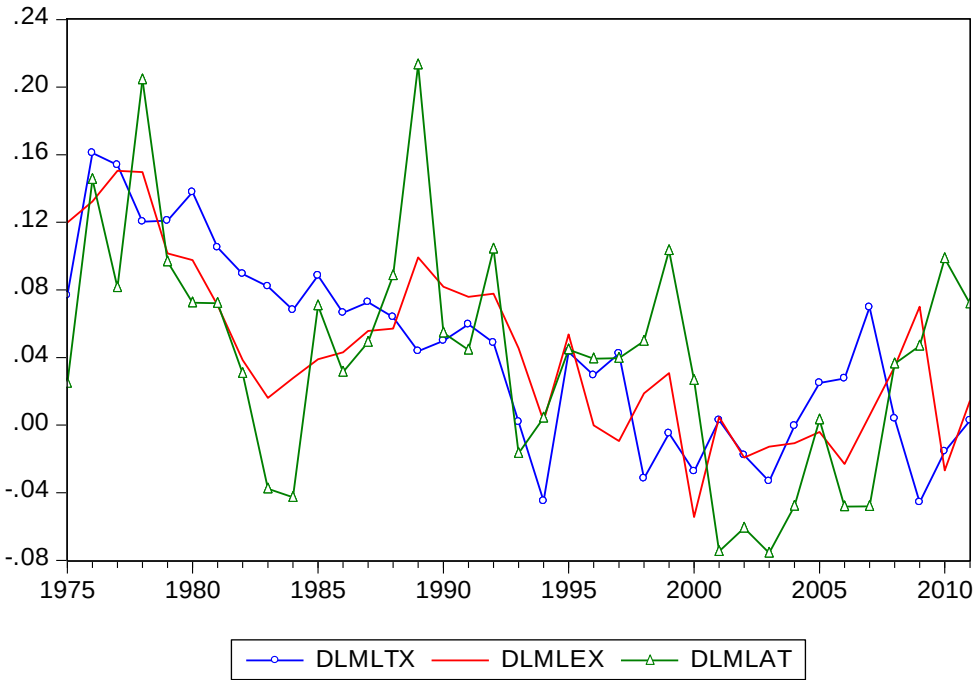
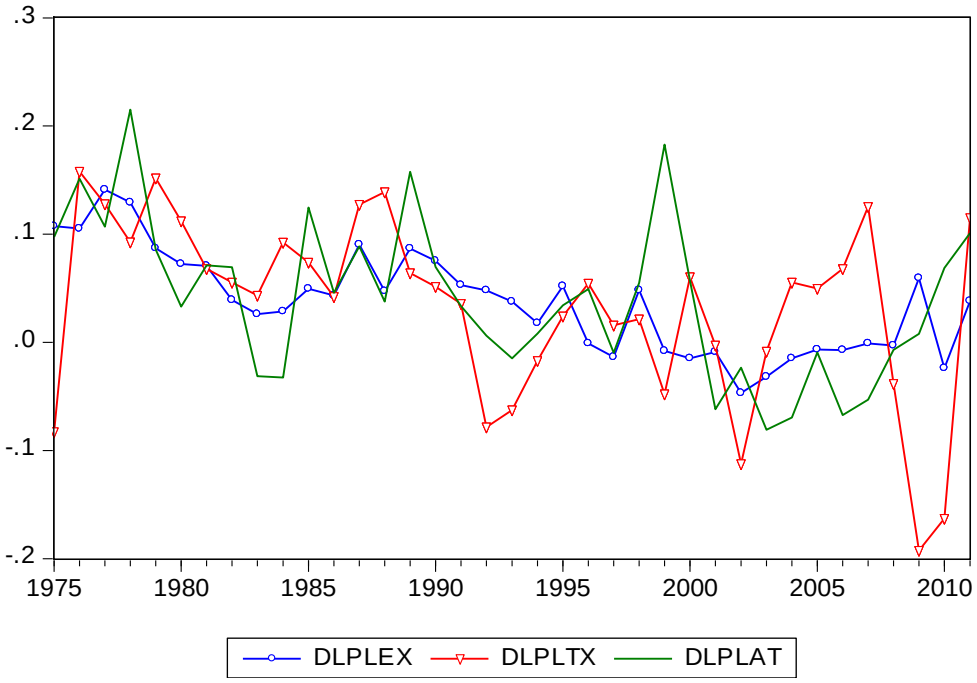


Figure1 LTX, LEX and LAT (rate of increase)
B. prefecture



4. Dynamics of local spending

Incrementalism

About the evolution of local spending in Japan, it is usually explained by the notion of *incrementalism*; last year's is taken and a little more added. Here, we test this hypothesis (*incrementalism*) by using simple time series analysis. Local spending has been accompanied by increasing trend continuously, and average ratio of increase in spending compared with previous year is about 8.29 %. The ratio of increase compared with previous year, however, is fluctuated greatly between minimum value of -4.57 % and max value of 30.26%.

From intuitive viewpoints, time series in local spending (*LET*) has an increasing trend and may be non-stationary. When time series is non-stationary, simple model such as autoregressive (AR) or moving average (MA) model cannot be helpful. We will estimates ARIMA (auto regressive integrated moving average) model in log difference of local expenditure. Note that log difference is nearly equal to growth rate of the level variable compared with previous year. Order of lag interval is determined by Akaike information criterion. Then ARIMA (2, 1, 0) for municipality, ARIMA (1, 1, 2) for prefecture are selected as best model. The estimation results are as follows,

$$\Delta PLEX_t = \underset{(0.0181)}{0.0158} + \underset{(0.0868)}{0.7900}\,\Delta PLEX_{t-1} - \underset{(0.1597)}{0.7303}\,u_{t-1} + \underset{(0.1556)}{0.5511}\,u_{t-2}$$

The value under the parenthesis is standard errors. The results indicate the presence of *incrementalism* and it is elaborated as follows. In this equation, we confirm intercept (0.0158) and the slope coefficient (0.79). It means that annual increase in local spending consist both fixed part of increase and proportionate part of increase in previous year. In addition, we estimate ARIMA model for municipalities, and results are as follows,

$$\Delta MLEX_t = \underset{(0.0209)}{0.0190} + \underset{(0.1669)}{0.4420}\Delta MLEX_{t-1} + \underset{(0.1628)}{0.2770}\Delta MLEX_{t-2} + u_t$$

In this equation, we confirm intercept (0.019) and the slope coefficient (0.44) of log difference of t-1 and 0.27 of t-2.

Cyclical Ratcheting Effect

Estimation of ARIMA model in previous section shows that local budget are determined by *incrementalism*－last year's is taken and a little more added. This relationship implicitly suggests the upward trend in local expenditure-GDP ratio. One of the interesting theoretical hypotheses explaining the upward trend in expenditure-GDP ratio can be found in *Economic Surveys: Japan* (OECD (2005)). This report focuses on asymmetric reaction of LAT to business cycle as follows.

The Local Allocation Tax (LAT) - a block grant- is the main equalization scheme. It is based on criteria related to both financial capacity and needs/costs. Several Factors have contributed to the upward pressures on the grant system. The LAT system has been asymmetric in adjusting for the business cycle. The money available for the LAT - a fixed share of central government tax revenue – increases during upswings. Cyclical tax windfalls have made it possible to upgrade minimum standards for local public services. During downturn, however, it has been difficult to cut back these transfers. The decline in funds available for the LAT has largely been compensated by borrowing from the LAT special account or by encouraging local governments to issue bonds whose future repayment costs are partly accounted for in the calculation of entitlements to the LAT, thus creating upward pressures on future LAT transfers (OECD(2005)pp.126-127).

The hypothesis tested in this article is that asymmetric government spending over the business cycle leads to upward cyclical ratcheting in government spending. Hercowitz=Strawczynski (2004) reports evidence that the prolonged increase in government spending/output ratio in OECD countries after 1974 is partially explained by *cyclical ratcheting:* government consumption is moderately pro-cyclical in

expansion, whereas in contractions government consumption and transfers are strongly countercyclical. We test the upward trend in local expenditure-GDP ratio in Japan by empirical formulation of cyclical ratcheting.

For the first step, we provide an indirect evidence for the *cyclical ratcheting* hypothesis. Table4 shows income elasticity of local expenditure, local tax and local allocation tax to GDP growth. This result indicates a kind of irreversibility of expenditure. Before economic stagnation, public goods supplied by local public sector had a high income elasticity of demand and this was accompanied by ample increase in tax revenues.

After the burst of bubble economy, however, income elasticity of expenditure has still remained roughly one, while income elasticity of tax revenues fell almost to one third. This fact indicates that expenditure cannot be adjusted to the fall of tax revenues immediately. The levels of expenditures have a kind of downward rigidity, and temporally shortage of tax revenues are compensated by corresponding increase in block grant (local allocation tax). Put it differently, the LAT system has been asymmetric in adjusting for the business cycle as pointed by OECD (2005).

Table4 Income elasticity of local revenue resources

a. Municipality			
range of sample	LEX	LTX	LAT
1975-1989	1.046***	1.4746***	0.911***
1990-2011	1.021***	0.621**	1.536**
b. Prefecture			
range of sample	LEX	LTX	LAT
1975-1989	1.000***	1.358***	1.022***
1990-2011	0.8845***	0.462	1.643**

the value of each colum indicates the slope of following equations.

$\log LEX = a_1 + b_1 \log GDP + u$

$\log LTX = a_2 + b_2 \log GDP + u$

$\log LAT = a_3 + b_3 \log GDP + u$

In what follows, we test directly the cyclical ratcheting hypothesis. Let x_t denotes GDP, and y_t local expenditure-GDP ratio. Let Δ denotes the growth rate so that $\Delta x_t = (x_t - x_{t-1})/x_{t-1}$ and $\Delta y_t = (y_t - y_{t-1})/y_{t-1}$. And let $\overline{\Delta}x$ and $\overline{\Delta}y$ denotes an average of the variable x_t and y_t .Then an increase in the growth of above the average, Δx_t^p, and a decrease in the growth of below the average, Δx_t^n ,can be defined as below.

$$\Delta x_t^p = (\Delta x_t - \overline{\Delta}x)d_t \qquad d_t = 1 \quad if \Delta x_t \succ \overline{\Delta}x$$
$$\Delta x_t^n = (\Delta x_t - \overline{\Delta}x)(1 - d_t) \qquad d_t = 0 \quad if \Delta x_t \prec \overline{\Delta}x$$

Empirical formulation of the cyclical spending behavior is specified in the following regression equation.

$$\Delta y = \alpha_0 + \alpha_{11}\Delta x_t^p + \alpha_{12}\Delta x_{t-1}^p + \alpha_{21}\Delta x_t^n + \alpha_{22}\Delta x_{t-1}^n + \lambda y_{t-1} + \varepsilon_t$$

The coefficient α_{11} and α_{12} capture the spending pattern in expansion, and α_{21} and α_{22} the spending pattern in contraction, respectively. If local spending-GDP ratio reacts in the same way to Δx_t^p and to Δx_t^n, $\alpha_{11} + \alpha_{12}$ should be equal to $\alpha_{21} + \alpha_{22}$. When $\alpha = 0$, the evolution of local spending-GDP ratio is unrelated to business cycle. If $\alpha \succ 0$, y_t increases in expansions and decrease in contractions (pro-cyclical), and vice versa (counter-cyclical) when $\alpha \prec 0$. In contrast, the asymmetric behavior described above implies that $(\alpha_{11} + \alpha_{12}) \geq (\alpha_{21} + \alpha_{22})$. In this case, fluctuations in output growth are accompanied by an increasing local spending-GDP ratio over time. The quantitative importance of this mechanism can be measured by the ratcheting coefficient $\theta \equiv (\alpha_{11} + \alpha_{12}) - (\alpha_{21} + \alpha_{22})$. Estimation results are shown in table5.

Let us consider following example as a benchmark case. Assume that the elasticity of tax revenue with respect to GDP is 1. In expansions all additional tax revenue is spent, and hence, given unit elasticity of tax revenue, y_t remains constant. This implies that $\alpha_{1t} = 0$. In recessions, spending grows at the normal rate, and correspondingly $\alpha_{2t} = -1$. In this case, the ratcheting coefficient θ

is $\alpha_{1t}-\alpha_{2t}=1$. In terms of the drift of y_t over time, after two years with $\Delta x_t^p=0.01$ in one and $\Delta x_t^n=-0.01$ in the other, the spending-GDP ratio is higher than previously by 1%.

The results indicate the presence of cyclical ratcheting, and they can be elaborated as follows; the estimates of θ are 3.17 in municipality and 2.76 in prefecture, and significantly different from 0. In what follows we refer only to the prefectures. As in the benchmark example above, where $\theta=1$, this estimate implies that following an artificial 2 years cycle of 1% amplitude(1% above $\bar{\Delta}y$ in the first year and 1% below in the second), the municipality spending/output ratio is 2.76 % higher than prior to the cycle.

Table5 Cyclical Ratcheting

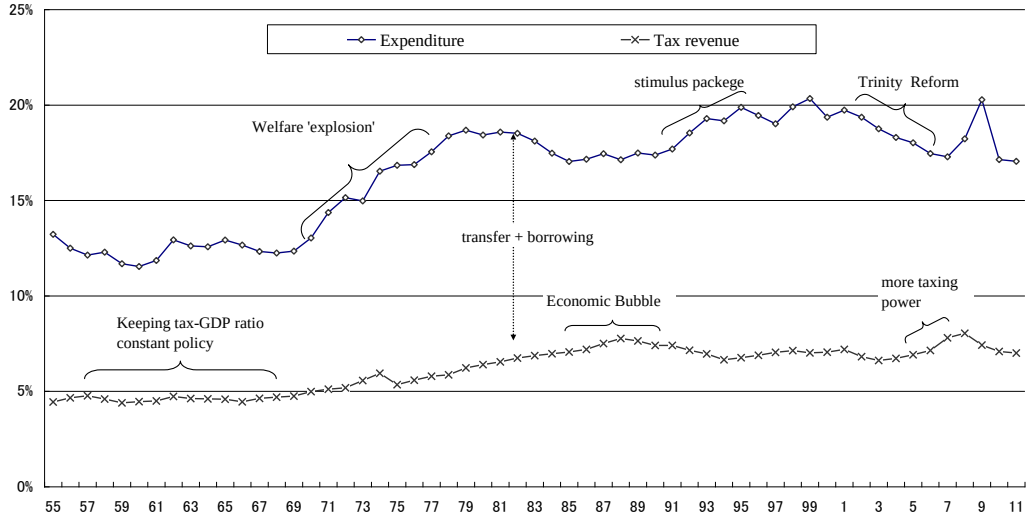
Municipality			Prefecture		
Variable	Coefficient	OLS	Variable	Coefficient	OLS
Δx_t^p	α_{11}	-0.1904	Δx_t^p	α_{11}	-0.4085
		(0.2566)			(0.2738)
		[-0.7421]			[-1.4922]
Δx_{t-1}^p	α_{12}	0.5623**	Δx_{t-1}^p	α_{12}	0.6435**
		(0.2631)			(0.2710)
		[2.1369]			[2.3743]
Δx_t^n	α_{21}	-2.6136***	Δx_t^n	α_{21}	-2.1231***
		(0.4729)			(0.4879)
		[-5.5261]			[-4.3514]
Δx_{t-1}^n	α_{21}	0.0593	Δx_{t-1}^n	α_{21}	0.0726
		(0.6488)			(0.6141)
		[0.0915]			[0.5829]
g_{t-1}	λ	0.2332	g_{t-1}	λ	0.1069
R^2		0.5823	R^2		0.4678
Ratcheting coefficient ϕ		3.1759	Ratcheting coefficient ϕ		2.7666
Dependent variable Δy_t					
Sample:1976-2011(standard errors in parentheses, t-value in [ ])					
Observations:36					

The cyclical pattern is also different from benchmark example. Whereas in the example the coefficient for contraction was -1(meaning that when output growth is lower than average, spending growth remains at the average rate), the corresponding $\alpha_{21}+\alpha_{22}$ is

-2.5543. Hence, spending growth in contractions is actually higher than normal. For expansion, the coefficient in the benchmark example was 0- implying that spending grows at the same, higher than normal rate as output- whereas the corresponding estimates of $\alpha_{11}+\alpha_{12}$is 0.3719. This means that spending is actually expanded by 1.37 % for each percentage point of output growth above normal.

Above result can be intuitively confirmed by actual data. Figure 2 shows evolution of local government finance since 1950s. The lower curve in the figure shows that local tax ratio as percentage of GDP has steadily and incrementally increased during the 1970s and 1980s. Although the local expenditure kept constant with GDP growth during 1950s and 1960s, the upper curve in figure show that welfare expenditure rose sharply during 1970s, of which demand came from local residents. Since 1990s, tax-GDP ratio has steadily declined due to prolonged recession, while local public investment was also extensively used for macroeconomic stabilization. Trinity reform during 2004-2006 had ‘succeeded’ in overcoming downward rigidity of spending for the first time since 1975.

Fig.2 Local expenditure and tax revenue (in percent of GDP)



(source) Ministry of Internal Affairs and Communications, *Statistical data of Local Tax*

5. Policy implication for tax structure

Summary of empirical study

The main fact findings of this article are summarized as follows. First, Granger causality test indicates that there is reciprocal relationship between tax and expenditure in Japan. We can tentatively conclude that it is possible to have some repercussions from the tax structure to expenditures. Second, we tested the *incrementalism* hypothesis - last year's is taken and a little more added- by using ARIMA model. The result indicates that annual increase in local spending consist both fixed part of increase and proportionate part of increase in previous year.

The third point of argument we analyzed is that how local spending adjusts for the business cycle. The hypothesis tested in this article is that asymmetric government spending over the business cycle leads to upward *cyclical ratcheting* in government spending. Empirical test confirms that the levels of spending have a kind of downward rigidity, and temporally fall of tax revenues are compensated by corresponding increase in block grant.

So far it is often said that expenditure has not been decided by making tax revenue given, instead expenditure may be decided for a certain reason and for financing it corresponding revenue is 'guaranteed' in Japan. As local public sector has evolved from 'agency' model to 'autonomy' model, this stereotypical way of thinking will come into question. Let us finish this article by considering what will be the problems and what issues will arise if we were to develop local tax structure.

Benefit principle

Accountability of local tax to the electorates is key to understanding the interplay between spending and tax structure. Local accountability in Japan is still in progress. According to an OECD survey, 94 per cent of municipal taxes and 83 per cent of prefectural taxes have overlapping national-local tax bases and are classified as taxes for which the local governments has the authority to set tax

rates[7].But real picture is slightly different from such institutional setting. The personal inhabitant tax, local consumption tax, and property tax are essentially very close to tax sharing. The tax rates of these local taxes are nearly uniform throughout the country. Local governments, especially prefectures, heavily depend on corporate tax revenue which might be 'exported' to non-residents and no one knows who pay for what.

There are a few progresses in enhancement of taxing power of subnational governments. First, flexibility of tax rate has been enhanced by the removal of the ceiling (upper limit) on the municipal inhabitant taxes on individuals in 1998 and of the maximum property tax rate in April 2004. Second, tax autonomy of local governments has been further enhanced by the 2000 Amended Local Taxation Act which enable them to invent and create 'supra-legal taxes' (i.e. taxes not stipulated by national laws, but local ordinance) after consultation with Ministry of Internal Affairs and Communications. Many subnational governments introduce new taxes, including some on nuclear and industrial waste, hotel stays, fishing, holiday house etc[8].

Third and most important step for enhancing accountabilities was introduction of a new form of local business tax; 'VAT-like local business tax' in 2005[9]. Since businesses benefit, directly and indirectly, from much public expenditure, VAT-like local business tax serves as a way of recapturing some of these benefits, most of which are more connected to the size of business activities than to their profitability.

Distribution across the regions

Traditionally, Japanese society put emphasizes equal access to public services and equitable sharing of burden of paying for them. This paradigm has sift away toward the society that gives priority to

[7] As to Taxing power of state and local government, see OECD(1999)(2009)

[8] Several tax experts point problem of 'supra-legal taxes'. These taxes often fall on non-residents or can be shifted on non-voting company and revenues are in many cases low, while obtaining the consent of local residents is time-consuming task.

[9] For 'VAT-like local business tax' in general, see Bird (2013).

the individual preferences and local autonomy. Local specific conditions and unique tax capacities have direct influence over the level of public services now. For example, disparity between municipalities in fees for nursery and public assistance for infant care is widened recently. Local governments with high tax capacity, like Nagoya city have serious consideration for inhabitant tax cut.

Uneven distribution of tax base across local jurisdictions will become one of the most important challenges. According to "Reference Data on Local Taxes", the ratio of the largest tax revenue per capita (Tokyo Metropolis) to the smallest (Okinawa Prefecture) is 3.2 about individual inhabitant tax, 6.6 for corporate enterprise tax, and 1.8 for sub-national VAT. These data suggests that sub-national VAT on a per capita basis is strong candidate for even distribution of tax bases across local jurisdictions[10].

Stability over business cycle

In expansion, public goods supplied by local public sector had a high income elasticity of demand and this was accompanied by sufficient increase in tax revenues. In contraction, income elasticity of spending has still kept the status quo, while income elasticity of tax revenues fell greatly. The levels of expenditures have a kind of downward rigidity, and temporally shortage of tax revenues are compensated by corresponding increase in block grant.

Fluctuation in tax revenues over business cycle is another concern of local government finance. According to "Reference Data on Local Taxes", tax with the largest fluctuation is corporate enterprise tax, followed by individual inhabitant tax. Partly for system-related reasons, property tax is relatively stable and also has much growth potential. Sub-national VAT is far more stable than local corporate taxes.

'VAT-like local business tax' is also good candidate for stable revenue sources. Owing to Japan's prolonged recession in recent decades, an increasing number of companies on the taxable income basis reported persistent losses and hence paid no enterprise tax. To offset the loss of local revenue, a new form of local business tax was

[10]For Japan's sub-national VAT, see Mochida, Horiba and Mochizuki(2012).

introduced in 2005 for corporations with capital greater than ¥100 million. The principal reason for this change was to make the local business tax base less sensitive to economic fluctuations.

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