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Local government finance in Japan : Can irresponsible borrowing be avoided?

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No. 72 / 2004

**Local government finance in Japan:
Can irresponsible borrowing be avoided?**

**Frank Robaschik
Naoyuki Yoshino**

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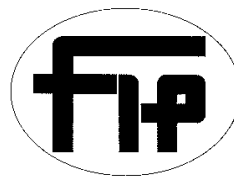
Carsten Herrmann-Pillath / Werner Pascha / Markus Taube

für / on behalf of

Universität Duisburg-Essen

Campus Duisburg

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Foreword

One of the research interests of our Duisburg East Asian economic studies unit is to look at innovative ways of reforming economic policy in Japan. After more than ten years of severe economic problems in Japan, it seems clear that one has to go beyond a plain fine tuning of available policy mechanisms. Rather, one has to look for new institutional frameworks to re-design the economic policy arena, discussing, for instance, elements of rule orientation, independent decision-making, and competition among actors. In a number of contributions, we have dealt with the role of decentralizing government functions. Under what circumstances can local government in Japan fulfil its potentials to improve economic policy through innovation and (regional) competition?

We are happy to publish an interesting proposal by Frank Robaschik (bfai, Duisburg-Essen) and Naoyuki Yoshino (Keio) in our working paper series. It deals with the problem of the rapidly rising debt of local authorities, which makes it very hard for them to play an active, forceful role in Japan's policy reforms. Robaschik and Yoshino propose to introduce user based revenue bonds, where incentives are strengthened to carefully monitor regional projects, thus improving the outside governance of regional authorities.

Werner Pascha

May 2004

Abstract

Rapidly rising local government debt in Japan presents a nontrivial addition to the central government debt. The planned replacement of the approval system for local government borrowing by a 'consultation system' in FY 2006 does not remove the implicit central government guarantee for local debt and thus the moral hazard involved in the system. Given all the risks associated with high debt levels (crowding out, inflation, potential insustainability) and the bad selection of projects financed under the current system, we suggest to restrict local government borrowing to user based revenue bonds, where investors receive the future revenue of the project and have an incentive to carefully select and monitor the projects they finance. In a generation model we show that this not only improves the sustainability of local government debt, but that it is highly likely that the debt will be sustainable.

Keywords

Government debt, sustainability, local government borrowing, local finance, Japan, generation model, government bonds, user based revenue bonds, fiscal federalism

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Local government finance in Japan: Can irresponsible borrowing be avoided? *

1 Introduction

The continued deficits of Japan's central government have drawn much attention from observers within and outside Japan. In addition, Japanese local governments have also been running considerable deficits in the 1990s. It is planned to remove the approval system of local government bonds and to replace it by a 'consultation system' by the year 2006. What implications will these changes have? Given international experiences, there is a high likelihood to see irresponsible borrowing if freedom of borrowing is combined with extensive support by the central government to local governments through fiscal equalization, as we find it in Japan as in the beginning of the 21st century. This could mean a nontrivial addition to the central government debt, especially since there is a moral hazard for local politicians to issue local debt as de facto currently there is an implicit government guarantee for local debt. So the questions to be dealt here are: What are the reasons for the increase in local government debt? How can one prevent the local debt from exploding?

The structure of our paper is as follows: after discussing the major arguments used to justify government borrowing, we discuss the major problems resulting from it. Then, we analyze the Japanese system of local government borrowing and discuss the planned changes and come to the result that if the changes are carried out as planned there is a serious danger of further encouragement of irresponsible local borrowing in Japan. Therefore, we propose a measure to effectively keep additional local government borrowing within productive limits. We suggest that borrowing at the local level should be limited to so-called user based revenue bonds, where the investors in such bonds bear the risk of the bond-financed project and receive the revenue stemming from the investment instead of being paid a fixed interest rate. We show that the gain in efficiency in the selection of projects will not only improve the sus-

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tainability of local government debt, but under normal conditions also effectively prevent the local debt from becoming unsustainable.

2 Justifications for government borrowing

There have been discussions whether or not public debt is a burden on future generations. David Ricardo's and in a later version Robert Barro's (1974) neutrality theorem states that, provided the level of government expenditure remains unchanged, there is no difference whether it is financed by taxes or by debt since individuals will anticipate future tax increases caused by the increased debt. According to this model, individuals know that taxation has simply been postponed and will increase their savings accordingly. However, some assumptions are made for which there is little empirical evidence. Thus there is no fiscal illusion and individuals have to be altruistic and to take into account the interests of future generations at the same discount rate as that of their own. Of course, there are effects as indicated in the Barro model, but in the real world, most importantly, given the fact that future generations have no voice, it is unlikely that present generations will take full care of their interest, at least some burden is transferred on future generations when government expenditures are financed by debt.

2.1 Borrowing for public investment ('pay as you use' concept)

Once it is accepted that debt burdens are passed onto future generations who have to repay it, the question becomes when borrowing should be accepted. According to the classical view, not all expenditure is unproductive and borrowing for public investment is justified since a part of the benefits falls on future generations. Under this concept, the financing of public investment should be adapted to the time structure of its benefits ('pay as you use' concept).

Even though the concept is clear, in practice there are some problems in implementation. First, it is difficult to estimate which generation received what amount of benefits and to clearly define the boundaries of investment (e.g. should it include education as an investment in the future, etc.), and on the other hand not every investment needs to be productive and to generate benefits in the future. Even if cost benefit analysis (including external effects and effects on growth, etc.) is introduced, such estimates could often be wrong. In addition to that, the decisions are influenced by the political pressures and interests of those involved.

Yoshino and Sakakibara (2002) showed that in Japan the regional allocation of public works (this is the major item for which is being borrowed) is strongly being influenced by political power as opposed to e.g. economic efficiency (see Table 1). A similar point was made by

Pascha and Robaschik (2001: 21-22). An additional argument for Japan is that there is already much accumulated debt (147.3% of GDP in 2002 according to the OECD), probably well beyond the levels justifiable by the 'pay as you use' concept. So further borrowing does not seem sensible on these grounds.

Table 1 Allocation of Public Infrastructure in Japan (Pooled data, 47 prefectures)

Explanatory Variables	Agriculture	Land Conservation	Industrial Infrastructure	In-Improvement of living standards
Constant	-35.44 (-10.46**)	-34.26 (-11.32**)	-61.58 (-11.84**)	52.32 (8.00**)
Yp (Income)	0.01 (7.21**)	0.01 (13.18**)	0.02 (17.99**)	0.036 (25.86**)
Sp(AreaSize)	4970 (28.47**)	2090 (13.40**)	3855 (14.39**)	2730 (8.10**)
Rp(Political Power)	8280 (16.88**)	7274 (16.60**)	10956 (14.55**)	-7434 (-7.85**)
Dummy1	-23.21 (-6.69**)	-34.27 (-11.06**)	-59.81 (-11.23**)	-36.85 (-5.50**)
Dummy2	27.43 (9.26**)	-1.65 (-0.62)	65.87 (14.48**)	66.89 (11.70**)
Adj. R^2	0.675	0.486	0.458	0.527

(1) () denotes t-value

(2) ** is significant with 99.0% level,

Source: Yoshino and Sakakibara 2002: 120

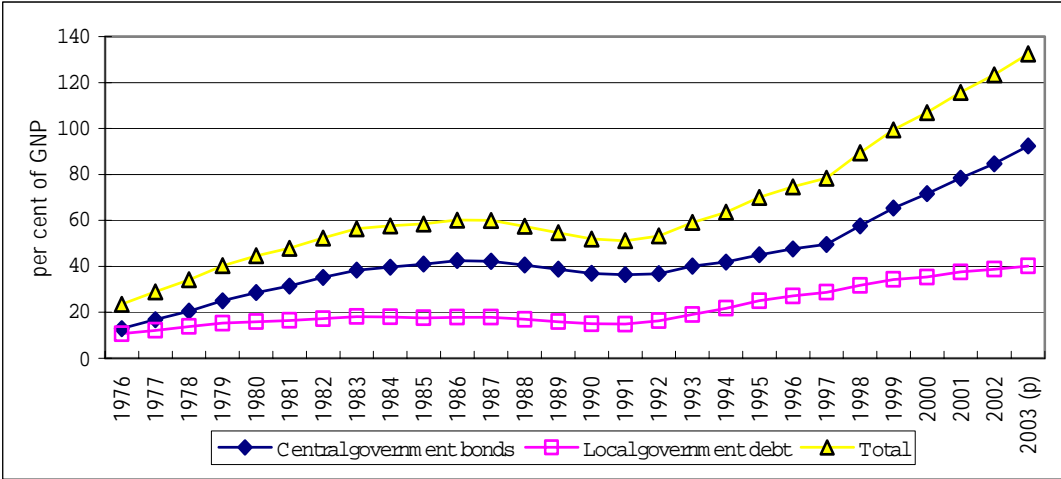
2.2 Keynesian fiscal policy

In a Keynesian argumentation debt financed expansive fiscal policy shall stimulate demand in a recession. The argument is that in a time when tax revenues fall due to a recession, the government shall not further contribute to the recession by increasing taxes or reducing expenditures. Instead it shall issue government bonds in recession and repay the debt during good business conditions (automatic stabilization or passive fiscal policy). In addition, Keynesianism goes further and suggests to increase public spending (especially for public investment) during recessions, and to decrease it again during good business conditions (active fiscal policy). The idea behind this kind of policy is the notion of too low aggregate demand as the reason for the bad business conditions.

However, there are technical difficulties in timing and finding the right amount of expansionary stimulus. Equally or even more important, however, in practice is that deficit finance is often used in recessions, the debt however not being repaid during good business conditions. Japan (though there was some debt repayment during the bubble period in the second half of the 1980s, see figure 1) is a good example of this. Especially in the 1970s as well as in the 1990's huge deficits were accumulated (the outstanding debt over GDP levels have more

than doubled both at the central and local government levels during the 10 years between 1991 and 2001) due to proactive fiscal policy. At the same time analysis of its effectiveness shows that the Keynesian multiplier has decreased substantially (see below).

Figure 1 Outstanding central and local government debt (FY 1976-2003)



Remark: Local government debt includes the part of local enterprise borrowing that in other regions is included in the ordinary account.

Source: MPHPT (2004)

2.3 Individual profitability of a project

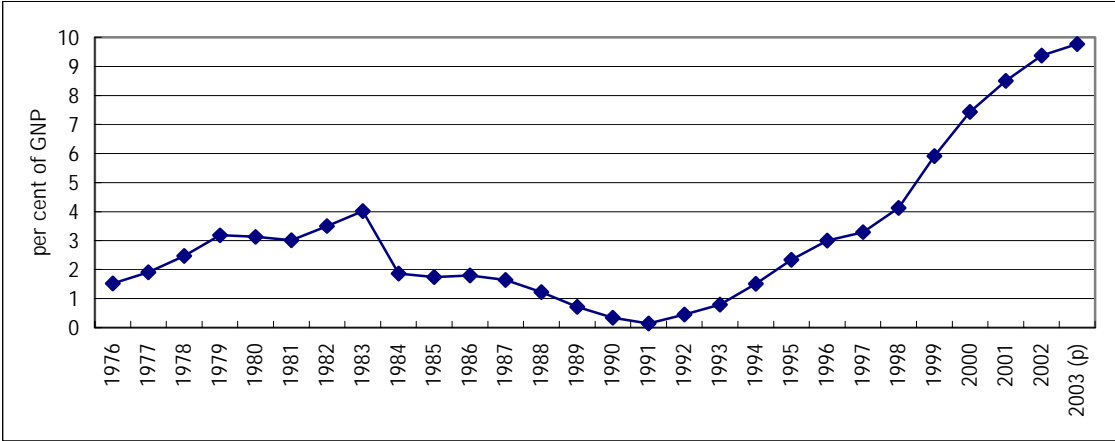
A concept close to borrowing for public investment, but related to individual projects, is borrowing based on the profitability of an individual project as suggested e.g. by Zimmermann (1999: 162). If a project generates sufficient future revenues (e.g. in the form of user fees) to be financially self-sustainable, it is meaningful not to increase the tax rate to implement the project, but to borrow for it and to repay the debt out of the revenues it generates. This idea is different from the general idea of borrowing for public investment as repayment has to come only out of revenues from the investment. The revenues from the project have to cover both the debt and the interest costs.

2.4 Tax Smoothing

A further justification used for government borrowing is tax smoothing. The argument here is that short-term borrowing is meaningful if by doing so tax rates can be kept constant over time. Deficits of one period are to be repaid by surpluses of other periods. However, a problem here is that the generation repaying the debt is not completely identical with the generation which is borrowing (Brümmerhoff 2001: 602). Furthermore, the certainty of whether the current debt can be repaid by future tax revenue is questionable. An example in Japan is the

development of the outstanding debt from the Special Account for Local Allocation Tax (LAT), the Japanese system of fiscal equalization.

Figure 2 Outstanding borrowing from the Account for LAT (FY 1976-2003)



Source: MPHPT (2004)

3 Problems of government borrowing

There are two major streams of objections against allowing unlimited government borrowing. One stems from a public choice argumentation, while the other is more directly concerned with issues of an efficient allocation of resources.

3.1 Systematic incentive problems of government borrowing

As already stated above, through government borrowing “burdens of paying for current public spending can be transferred forward through time and placed on the shoulders of those ‘future generations’ who will be subject to the taxes required to service and amortize public debt”. This leads to serious systematic political deficiencies. The major problem is the "political agents' authority to *spend without taxing*" and their ability “to escape the discipline of opportunity cost”. Most importantly, future-period taxpayers have no effective voice in current-period political choice settings (Buchanan 1997: 120-121).

Increased current expenditure without raising the tax burden enhances the likelihood of politicians to be reelected. Therefore, there is an incentive to generate fiscal deficits much higher than if choices were made taking into account the present-period interests of future-period taxpayers. Moreover, if a politician does reduce borrowing (e.g. Clinton in the United States),

there is no guarantee that a future politician (e.g. Bush) will not go for deficit again (Buchanan 1997: 122).

On the local level, the problem is even more severe, as there is a possibility of fiscal bailout by the central government or other local governments. This is currently the case in Japan (as well as in other countries such as Germany).

3.2 Crowding out

3.2.1 Crowding out through the price effect of rising interest rates

If there are more government bonds on the market, *ceteris paribus* their price falls and the interest rate on them rises. At the same time, the interest rate of enterprise bonds and loans would rise too given limited resources from investors, (i.e. except for a completely elastic supply of savings). Thus financing gets more expensive, and this has a negative effect on private investment.

For example, if large scale issues of government bonds take place, the credibility of the country falls and a premium has to be paid, as in the case of Japan, the so-called "Japan premium". Thus, issues of government bonds on 28 November 2001 led to an increase in the interest rate on government bonds and as a consequence also of the interest rate for private borrowing.

In a small open economy a rising interest rate can lead to an inflow of foreign capital. If exchange rates are flexible, an appreciation of the national currency will occur and the competitiveness of domestic enterprises will fall, leading to a reduction of net exports. However, the interest rate need not necessarily rise because of the public deficit. The more open capital and credit markets in a small open economy are against foreign countries, the smaller is the slope of the supply curve. Even here the public deficit will lead to a deficit of the current account or reduce its surplus. In any of the cases of crowding out, the outcome is a reduced income of future generations. Either the deficits reduce private investment, and thus growth, or higher debt abroad leads to higher debt payments and thus to reduced domestic income (Brümmerhoff 2001: 597).

Interestingly, in Japan a substantial rise in interest rates so far did not occur, among others because of low interest rate monetary policy. Moreover, the debt is mostly being held domestically. The more important issues are the rising of the debt itself and the low productivity of the use of the funds raised by public borrowing.

3.2.2 Crowding out through wealth effect

Another mechanism leading to crowding out stems from a kind of fiscal illusion. If private investors (including households) buy government bonds, they may think that it is wealth. Therefore, the demand for money rises, leading to a rise in the interest rate and thus, as discussed above, lower investment or crowding out of net exports.

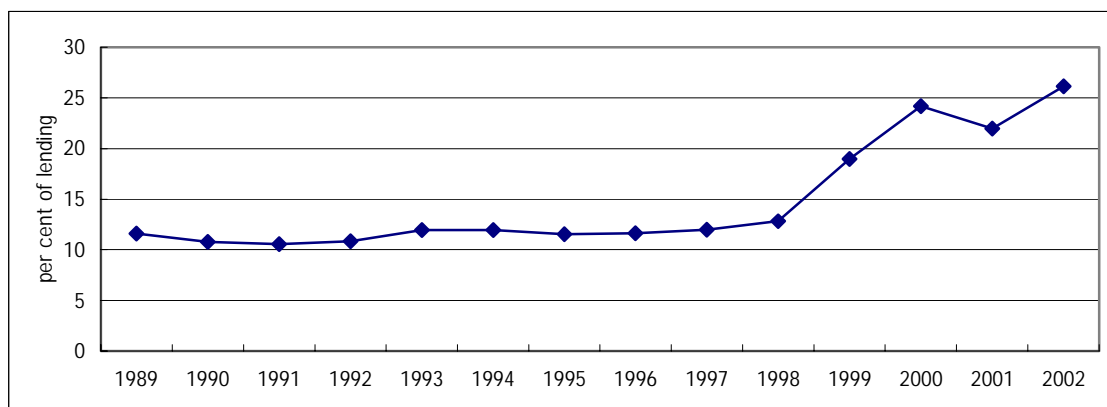
On the other hand there is an effect in the opposite direction. If households save less and spend more on consumption, this in turn could lead to an increase in output. However, this effect is likely to be smaller than the loss through the above crowding out through the wealth effect.

Both effects, however, seem not to have been important in Japan. First, private households hold only a tiny portion of government debt. Moreover, private expectations about the future may have worsened in recent years, thus preventing households from regarding their savings, which through the banks are invested in government bonds, as much wealth.

3.2.3 Japan: Possible crowding out through financial institutions

If the demand for loans were large enough in Japan, crowding could have occurred through the banking sector. According to the current BIS regulations, government bonds and local government bonds are considered zero risk, lending 100% risk and housing loans 50% risk. Therefore the amount of equity capital which the banks have to use for investment activities is largest for lending to enterprises etc. and lowest for buying government bonds. In addition to that, low demand for loans from enterprises combined with the current weakness of Japanese financial institutions and the rising government debt lead to a situation where banks reduce lending and increase their holdings of government bonds, thus providing less money for private investment. Given, however, the easy access to money for the banks under the current Japanese monetary policy, the major reasons for reduced lending are the lack of demand for loans from enterprises and the weakness of financial institutions. Therefore, it does not necessarily mean that crowding out is occurring.

Figure 3 Holdings of government debt by private Japanese banks FY 1989-2002



Remark: Government bonds stands for the total of central government bonds, short-term central government bonds, bonds of government affiliated agencies and local government borrowing.

Source: Bank of Japan

3.3 Potentially low productivity of additional government spending

If the additional public expenditure refinanced through government borrowing is used for public investment, this may lead to increased growth. The overall effect of crowding out and the increase in growth through higher government investment is a priori open. However, the money raised through government borrowing in Japan has been used for relatively inefficient public works with a large rural and agricultural bias and the Keynesian multiplier has fallen to only about 1 after the burst of the bubble (Yoshino/Kaji/Kameda 1998: 9). This means that it has increased the outstanding debt without bringing the economy on a significantly higher path of growth. Moreover, several studies have shown that the productivity of public capital, which was high in the 1950s and 1960s, has substantially fallen since (e.g. Yoshino/Nakajima/Nakahigashi 1999: 26, 32).

Table 2 Changes in the productivity of social capital stock

Time span	1955-59	1960-64	1965-69	1970-74
Private capital	0.8346	0.8685	0.8204	0.4740
Public capital	0.2468	0.3216	0.3610	0.1802
Time span	1975-79	1980-84	1985-89	1990-93
Private capital	0.3144	0.2813	0.2416	0.0241
Public capital	0.0944	0.0722	0.0621	0.0592

Source: Yoshino/Nakajima/Nakahigashi 1999: 26

3.4 Risk of inflation

If government bonds are bought by the central bank, the money supply will rise. This normally leads to an increase in prices. In Japan a price increase so far did not happen. In fact, the opposite occurs. In recent years we saw the progress of deflation. This can be attributed to the problems of financial institutions and thus the missing transmission mechanism through them as well as to a general lack of demand both on the side of private consumption and on the side of investment.

Nevertheless, if the situation changes, i.e. demand recovers and financial institutions improve their situation, the pressure on prices can return. Given the high money supply, an increase in prices may be difficult to control and result in inflation. Japan already has a record of bad experience with inflation, when in the immediate years after World War II the monetization of the borrowings of the government owned Reconstruction Finance Bank led to an uncontrolled increase in prices.

In an inflation environment the development of prices and interest rates is more uncertain than in an environment of stable prices. If investors are risk-averse, which usually is the case, investment is likely to decrease. Another side-effect is the possible devaluation of savings (among them of those who invested in government bonds) with all the distribution effects involved.

3.5 Sustainability

The question of sustainability is a whether outstanding government liabilities can be repaid in the long-run. The question is whether a current budget policy can be continued or whether sooner or later tax increases or expenditure cuts would have to be implemented. According to Blanchard (1990), a budget policy is sustainable if the debt over GDP ratio can be kept constant over time. We will look into this issue in more detail below.

4 The Japanese system of local government borrowing

4.1 General characteristics of local finance in Japan

There are some general characteristics of the Japanese local finance system (for a more detailed discussion see Pascha/Robaschik 2001):

- 1) Even though in recent years a movement in favour of local governments has occurred, the central government receives significantly more tax revenues than local governments.
- 2) Most of the spending (about two thirds), however, occurs on the local level.
- 3) The resulting gap between revenues and expenditures is being closed through a number of transfer mechanisms, most importantly:
 - a) The Local Allocation Tax (LAT), which is a kind of fiscal redistribution mechanism distributing funds from the central government to local governments. Most of it (94%) is being transferred according to a formula calculating the difference between standardised financial demand and standardised financial revenue for each local government authority.
 - b) Different types of subsidies (matching and non-matching grants).
- 4) The remaining balance is covered through the issue of local government bonds or borrowing, among it borrowing from the Special Account for the Local Allocation Tax.

On the expenditure side the most important items are education, civil engineering, welfare, and in recent years also debt costs. If we group expenditures into that of consumptive purposes (including administration, police, fire protection, welfare, labour, hygiene, education and expenditure for Agriculture, Forestry and Fisheries) and investive purposes (including expenditures for Civil Engineering, Commerce and Manufacturing), about 60% are used for consumption (including education). If education is counted as investment, the figure becomes 42%. Investive expenditure accounts for 25% (43% when including education). While the shares of local government investment and local government consumption (both excluding education) in total have remained relatively stable, the share of debt costs is dramatically increased at the expense of the share of expenditure for education. In total, the share of local government spending in GNP has increased over time (see Table 3).

Figure 4 Transfers from Central to Local Governments in Japan
(Initial Budgets fiscal year 2003/2004; Trillions of Yen)

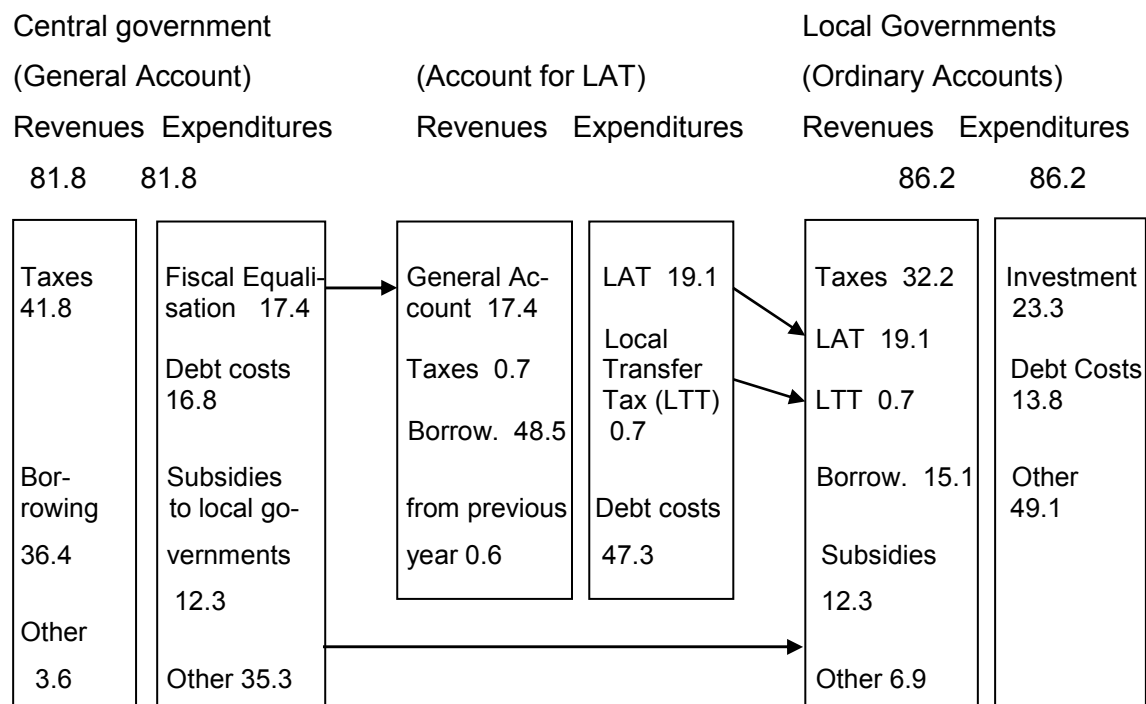


Table 3 Shares of total local expenditure (per cent of total)

	1965	1970	1975	1980	1985	1990	1995	2000	2001
G _{LC} (incl. educa- tion)	66.4	64.0	68.7	66.3	63.2	63.1	60.2	60.4	60.7
G _{LC} (excl. educa- tion)	40.1	39.0	41.8	41.0	39.6	41.9	41.3	41.8	42.3
G _{LI} (incl. educa- tion)	51.3	54.4	50.7	49.8	48.2	47.9	47.9	44.2	43.0
G _{LI} (excl. educa- tion)	25.4	29.2	23.8	24.2	24.3	26.5	29.0	25.4	24.7
Debt	3.5	3.8	4.3	7.1	10.2	8.3	8.8	12.7	13.2
Non-classified	4.7	3.0	3.2	2.4	2.3	2.1	2.0	1.5	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (% of GNP)	13.0	13.0	16.8	18.6	17.2	17.4	19.8	19.0	19.5

4.2 The traditional system of local government borrowing

In Japan there is a principle that basically local government revenues should come only from taxes, etc. and not from borrowing. Legally, local government borrowing is only allowed as an exception as a means to achieve intergenerational justice. Therefore it is generally allowed only for investive purposes (public works and financing of public enterprises), and not for current expenditures (Local Finance Law Article 5).

Borrowing is only allowed after approval by local or prefectural assembly. Moreover, in Japan it is obligatory for issuing local governments to receive the approval for issuing government bonds: for the prefectures from the Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT; formerly from the Ministry of Home Affairs), for municipalities from the prefectural governor. The permission to issue bonds is enacted on the basis of general guidelines, not on a case by case basis. However, the guidelines themselves have been subject to discretion (see Pascha/Robaschik 2001: 23 ff.).

Furthermore, the current Japanese approval system to some extent takes care of preventing excessive borrowing by local governments. Under the system:

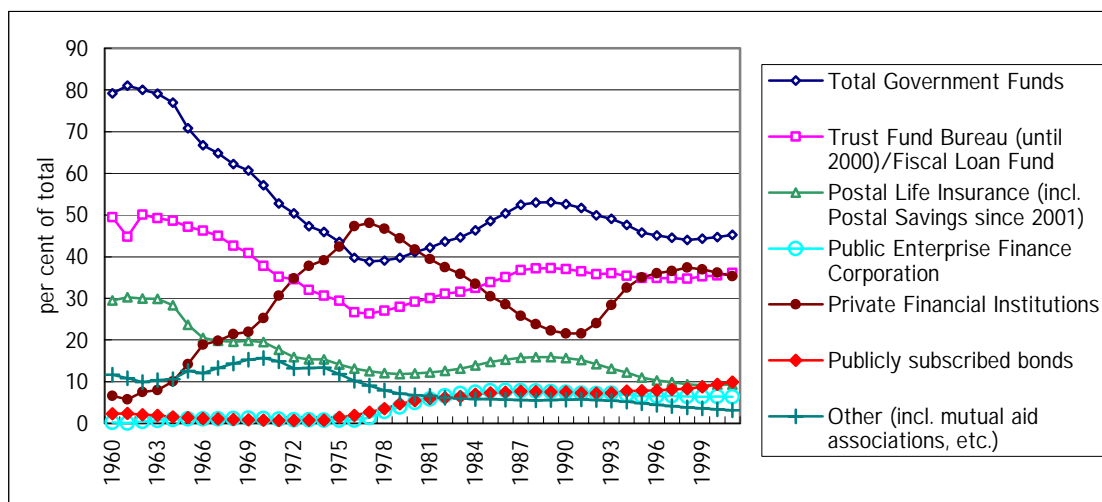
- 1) if a certain percentage of expenditures refinanced by borrowing is reached, no further borrowing is approved, and
- 2) if deficits of a local government authority is larger than a certain defined amount, the authority becomes a fiscal reconstruction entity (*zaisei saiken dantai*) and the control over its financial behaviour gets even stronger.

Thus, the central government through this system acts as an implicit guarantor of local debt.

Through a number of special exemptions (formally through laws adopted by the Diet), there also is massive borrowing to cover deficits that mainly arose because of pursuing active Keynesian fiscal policy (and at the same time bringing benefits to the electorate of the ruling LDP). During these periods, the central government, using its influence on the different local government revenues, even stimulated the issue of local government borrowing to finance public works projects, one of such mechanisms being the inclusion of debt cost in the calculation of the LAT (Pascha/Robaschik 2001: 23-27).

A large share of local government debt has been held by government funds, especially the Trust Fund Bureau and its successor, the Fiscal Loan Fund. In the 1990s, the share held by private financial institutions is substantially increased. Also, the share of publicly subscribed bonds is steadily increased over time.

Figure 5 Holders of local government debt (FY1960-2001)



Source: Somucho Tokeikyoku

4.3 Abolishment of the approval system from FY 2006

From FY 2006, a switch from the approval system to a consultation system is planned. Under this system local governments can borrow even without the consent of the MPHPT or prefecturer if it is reported in advance to the local or prefectural assembly respectively. The approval system remains, however, if the deficit reaches a certain limit, to be established by law or if taxes are set below the standard tax rates set by the central government. The current system of fiscal reconstruction entities (*zaiseisaiken dantai*) will also be kept.

Furthermore, there will be a discrimination between borrowing for which consent was received and for which it was not (Pascha/Robaschik 2001: 31). Most importantly, borrowing from public funds (with generally lower interest rates and longer maturities) will not be available, the borrowing will not be included in the Local Finance Programme and there will be no inclusion in the standard financial demand of the Local Allocation Tax (and thus no subsidisation of it through this system).

Therefore the change is not as big as it looks at a first glance. Especially for financially weaker local governments the dependence on the central government remains. Also, time will show at what conditions borrowing without consent will be accepted by the market.

4.4 Joint issues of local government bonds and the introduction of mini-bonds

As described above, even under the traditional system, a part of the local government borrowing was sold to financial institutions in the form of bonds. Under this system the MHA negotiated with financial institutions (banks and securities companies) every month the financial

conditions of local government bonds, among them most importantly the interest rate. All issuing authorities (28) had to pay the same interest rate (coupon rate) independent of the amount issued and their financial power (so-called 'same conditions system' or '*touitsu jouken kettei houshiki*').

Therefore most importantly Tokyo as the financially strongest local authority demanded to move to a system, where local governments can issue themselves individually. As a result of these discussions and as a preparation to the move to the consultation system, a change was brought about. Since April 2002, Tokyo and the other 27 local governments switched to a system, where they themselves can negotiate the conditions of the issue of local government bonds.

While the local government authorities (all the 28 are relatively large) also partly issue bonds themselves (and further local governments like the city of Saitama and the prefectures of Fukushima, Gunma, Gifu and Kuwamoto followed or will follow), in general a so-called two-table system was introduced. One 'table' is 27 prefectures, which joined to improve their borrowing conditions. These are the prefectures of Osaka, Hyogo, Hokkaido, Kanagawa, Shizuoka, Aichi, Hiroshima, Fukuoka, Miyagi, Saitama, Chiba, Kyoto, Ibaragi, Niigata, and Nagano, and the cities of Yokohama, Nagoya, Kyoto, Osaka, Kobe, Sapporo, Kawasaki, Kitakyushu, Fukuoka, Hiroshima, Sendai, Chiba (Inaba 2003: 53). The other 'table' is Tokyo, which preferred to issue its bonds separately.

The 27 prefectures have jointly been issuing local government bonds since April 2003. The decision to join was made in order to raise the liquidity and that the bonds can more easily be resold on the secondary market. This is being supported also by regular issues of bonds. A second factor that decreases risk for investors is that the issuing local authorities agreed to pay money in a fund, which serves to ensure the repayment of the debt also in the case there would be a natural disaster or a crisis of a local financial institution. This reduces the default risk.

When the first local government bonds after the break-up of the old system of negotiation through the ministry were issued in April 2002, there was a difference of 1.8 basis points (or 0.018%) in the interest rates between Tokyo and the other local government authorities. However, through joint negotiations of the other 27 with the investors, the difference in interest rates could be brought down and in September 2002 the difference disappeared (Inaba 2003: 69).

Under the system the 27 local authorities all borrow at the same interest rate (1.3% as of February 2004) and if it goes well, they might even be better rated than Tokyo. It is question-

able, whether the 27 will want to admit new members, as for them there is some trade-off between the:

- advantage of raising liquidity and
- the credit-worthiness of new members and thus the whole group of local governments.

Therefore, once the system works well, it can be expected that they would wish to accept as new members only financially stronger prefectures (e.g. Tokyo), not, however financially weaker members. Excluding some of the existing members may be difficult as they all already paid into the joint “insurance fund”. At the same time local authorities with a good financial situation may wish to stay outside such a system because they may hope to be better rated.

An advantage of the system is that even the smaller prefectures can borrow at a low interest rate. On the other hand, relatively easy access to the capital market is provided even to the weaker ones, which can borrow at the same interest rate and know that they will be bailed out. So there is a moral hazard in the system, leading to weaker local authorities borrowing more than without the pooling system. Thus it is not a mechanism to stop borrowing for wasteful expenditure.

If so, and if the aim is only to bring down the interest rate, then the best solution would be to issue central government bonds instead of local government bonds or to give a central government guarantee on the borrowing. Similarly, in the United States Municipal Bond banks have been established by the several states using their superior rating and pooling to provide cheaper borrowing possibilities to local governments (Shah 1997: 12). The question remains, however, on how to prevent irresponsible borrowing then.

Moreover, since FY 2001 mini-bonds aiming at individual investors (mainly private households) have been introduced. This has further increased the ability of local governments to raise money through borrowing.

5 International experiences with local government borrowing

International studies of fiscal federalism come to the result that long-term balanced budgets among subnational governments are found when either the center imposes borrowing restrictions or subnational governments have both wide-ranging taxing and borrowing autonomy. At

the same time, large and persistent deficits occur when subnational governments are simultaneously dependent on intergovernmental transfers and free to borrow (Shah 1997: 11, Rodden 2001: 1).

This is not surprising as expectations to be bailed out by intergovernmental transfers present a big moral hazard for local governments to borrow more than they would have otherwise. At the same time the market would fail to capitalise such risks in view of its anticipation of a central government bailout (Shah 1997: 11).

In Japan, the very presence of huge intergovernmental transfers, and the tradition of support for borrowing costs of local governments through the LAT present such a moral hazard. Therefore, it is unlikely that Japanese local governments will stick to fiscal discipline unless constrained by some mechanism of control. Actually local government debt levels in Japan rose even with borrowing restrictions, though it was the central government that by setting the incentives initiated local governments to go for debt finance (Pascha and Robaschik 2001).

On the other hand, the mechanism preventing local governments from going bankrupt in Japan such as the system of fiscal reconstruction and the approval (consultation) system also prevent the market from sharing the risks of local government borrowing and thus from exercising at least some control.

6 A proposal: The introduction of user based revenue bonds

When relying on regular local government borrowing in the Japanese setting of strong bailout expectations through the central government, it is likely that the borrowing by local governments, if not restrained by some mechanism, will be unsustainable in the sense that there will be no stability of the debt over GDP ratio. Therefore, we suggest to restrict local government borrowing to financing of individual projects through user based revenue bonds as used in US local finance. User based revenue bonds are bonds where the purchaser of the bond, in exchange for the money provided by him, earns the future revenues, i.e. there is no fixed rate of interest. For Japan their introduction was suggested by Yoshino (2001, 2003).

This system leaves the risk with investors and will provide them with an incentive to closely monitor and analyze the project before they will finance it. It can help to prevent the local debt from financing unproductive projects and also to prevent it from exploding. For projects

with sufficient revenues in the future (such as airports or other infrastructure projects in the case of the US), revenue bonds can be used.

Relying on user based revenue bonds has several advantages. Local governments, even financially weaker ones, can correct potential omissions of important projects by the central government by implementing them on a revenue bond basis. Moreover, local people and other investors can buy revenue bonds if they think that the project will bring other benefits to them in addition to the interest payment. At the same time revenue bonds put an effective limit on local government borrowing.

7 Is local government borrowing stable? A generation model

In the following model we will show that the replacement of local government borrowing by borrowing through revenue bonds will help to achieve sustainability of local government borrowing.

7.1 Production function

$$(1) Y_t = A_t \times F(N_t, K_t^P, K_t^G, K_t^L)$$

where Y , N , K^P , K^G and K^L denote aggregate supply, labour, private, central government and local government capital stocks and A_t is a technological parameter.

$$(2) K_{t+1}^P = K_t^P + Y_t - C_t - G_t^C - G_t^L - NX_t$$

$$(3) K_t^G = K_{t-1}^G + \theta_C \times G_t^C$$

$$(4) K_t^L = K_{t-1}^L + \theta_L \times G_t^L$$

where C , G^C , G^L , NX , θ_C , θ_L denote consumption, central and local government spending, net exports, and the shares of investment in total central and local government spending. For simplicity the depreciation of K^P , K^G and K^L is skipped.

7.2 The Dynamics of local government debt of a local authority

The dynamics of local government debt of a local authority follow

$$(5) \Delta B_t^L + \Delta B_t^{RB} = r_t^L \times B_{t-1}^L + r_t^{RB} \times B_{t-1}^{RB} + G_t^L + G_t^{RB} - \tau_L \times Y_t - FE_t - RV_t^L - RV_t^{RB}$$

where r_t^L , B_t^L , r_t^{RB} , B_t^{RB} , G_t^{RB} denote the interest rate paid on local government borrowing, outstanding local government borrowing, the amount paid to investors in revenue bonds divided by outstanding revenue bonds, outstanding revenue bonds, and spending (investment) for projects financed by revenue bonds. FE stands for fiscal equalization transfers of the central government to local and RV denominates the revenues of local governments through the provision of infrastructure financed by debt (RV^L by regular debt and RV^{RB} by revenue bonds).

Dividing equation (5) by the local output Y_t

$$(6) \frac{B_t^L}{Y_t} - \frac{B_{t-1}^L}{Y_{t-1}} \times \frac{Y_{t-1}}{Y_t} + \frac{B_t^{RB}}{Y_t} - \frac{B_{t-1}^{RB}}{Y_{t-1}} \times \frac{Y_{t-1}}{Y_t} =$$

$$= r_t^L \times \frac{B_{t-1}^L}{Y_{t-1}} \times \frac{Y_{t-1}}{Y_t} + r_t^{RB} \times \frac{B_{t-1}^{RB}}{Y_{t-1}} \times \frac{Y_{t-1}}{Y_t} + \frac{G_t^L}{Y_t} + \frac{G_t^{RB}}{Y_t} - \tau_L - \frac{FE_t}{Y_t} - \frac{RV_t^L}{Y_t} - \frac{RV_t^{RB}}{Y_t}$$

and rewriting equation (6) leads to

$$(7) b_t^L - b_{t-1}^L \times \frac{1}{1+\eta} + b_t^{RB} - b_{t-1}^{RB} \times \frac{1}{1+\eta} =$$

$$= r_t^L \times b_{t-1}^L \times \frac{1}{1+\eta} + r_t^{RB} \times b_{t-1}^{RB} \times \frac{1}{1+\eta} + g_t^L + g_t^{RB} - \tau_L - fe_t - rv_t^L - rv_t^{RB}$$

where $b_t^L = \frac{B_t^L}{Y_t}$, $b_t^{RB} = \frac{B_t^{RB}}{Y_t}$, $g_t^L = \frac{G_t^L}{Y_t}$, $g_t^{RB} = \frac{G_t^{RB}}{Y_t}$, $fe_t = \frac{FE_t}{Y_t}$, $rv_t^L = \frac{RV_t^L}{Y_t}$, $rv_t^{RB} = \frac{RV_t^{RB}}{Y_t}$, and $\eta = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$ denotes the growth rate of the economy.

Multiplying equation (7) with $(1+\eta)$ gives us

$$(8) (1+\eta) \times b_t^L - b_{t-1}^L + (1+\eta) \times b_t^{RB} - b_{t-1}^{RB} =$$

$$= r_t^L \times b_{t-1}^L + r_t^{RB} \times b_{t-1}^{RB} + (1+\eta) \times [g_t^L + g_t^{RB} - \tau_L - fe_t - rv_t^L - rv_t^{RB}]$$

and moving some terms to the right side gives us:

$$(9) (b_t^L - b_{t-1}^L) + (b_t^{RB} - b_{t-1}^{RB}) =$$

$$= (r_t^L - \eta) \times b_{t-1}^L + (r_t^{RB} - \eta) \times b_{t-1}^{RB} + (1+\eta) \times [g_t^L + g_t^{RB} - \tau_L - fe_t - rv_t^L - rv_t^{RB}]$$

Thus the change in the outstanding debt over output is:

$$(10) \Delta b_t^L + \Delta b_t^{RB} =$$

$$= (r_t^L - \eta) \times b_{t-1}^L + (r_t^{RB} - \eta) \times b_{t-1}^{RB} + (1+\eta) \times [g_t^L + g_t^{RB} - \tau_L - fe_t - rv_t^L - rv_t^{RB}]$$

7.3 Stability of the debt

As a next step we look at the stability of the debt, i.e. what secondary effects arise if local government borrowing increases.

7.3.1 Case of increase of regular local government debt

Differentiating equation (10) by b_{t-1}^L leads to

$$(11) \frac{\partial(\Delta b_t^L + \Delta b_t^{RB})}{\partial b_{t-1}^L} = (r_t^L - \eta) + \left(\frac{\partial r_t^L}{\partial b_{t-1}^L} - \frac{\partial \eta}{\partial b_{t-1}^L} \right) \times b_{t-1}^L - \frac{\partial \eta}{\partial b_{t-1}^L} \times b_{t-1}^{RB}$$

$$+ \frac{\partial \eta}{\partial b_{t-1}^L} \times [g_t^L + g_t^{RB} - \tau_L - fe_t - rv_t^L - rv_t^{RB}]$$

$$+ (1+\eta) \times \left(-\frac{\partial fe_t}{\partial b_{t-1}^L} - \frac{\partial rv_t^L}{\partial b_{t-1}^L} \right)$$

where $\frac{\partial fe}{\partial b_{t-1}^L} > 0$, appears since local government debt in Japan is partly being reimbursed by the Local Allocation Tax

$$(12) r_t^L = \frac{\partial Y_t}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L} + \chi_t$$

where $\frac{\partial Y_t}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L}$ is the marginal productivity of the debt financed project of the local government and χ_t is the difference between the marginal productivity of the project and the interest rate paid for local government borrowing. The larger χ_t , the larger is the political inefficiency in the selection of projects.

$$(13) \frac{\partial RV_t^L}{\partial B_{t-1}^L} = \frac{\partial Y_t}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L} + \tau_L \times \frac{\partial Y_t}{\partial K_t^P} \times \frac{\partial K_t^P}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L}$$

$$= r_t^L - \chi_t + \tau_L \times \frac{\partial Y_t}{\partial K_t^P} \times \frac{\partial K_t^P}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L} = r_t^L - \chi_t + \tau_L \times \alpha^L$$

where $\alpha^L = \frac{\partial Y_t}{\partial K_t^P} \times \frac{\partial K_t^P}{\partial K_t^L} \times \frac{\partial K_t^L}{\partial B_{t-1}^L}$ is an external effect of the debt financed local capital stock (e.g. new infrastructure such as a highway or an airport) on the productivity of private capital inviting new private investment in the area and by doing so increasing local output.

Using (12) and (13) gives:

$$(14) \frac{\partial rV_t^L}{\partial b_{t-1}^L} = \frac{\frac{\partial RV_t^L}{Y_t}}{\frac{\partial B_{t-1}^L \times \frac{Y_{t-1}}{Y_t}}{\frac{Y_{t-1}}{Y_t}}} = \frac{\partial RV_t^L}{\partial B_{t-1}^L \times \frac{Y_{t-1}}{Y_t}} = \frac{\partial RV_t^L}{\partial B_{t-1}^L \times (1+\eta)} = \frac{1}{1+\eta} \times \frac{\partial RV_t^L}{\partial B_{t-1}^L}$$

$$= \frac{1}{1+\eta} \times (r_t^L - \chi_t + \tau_L \times \alpha^L)$$

Inserting equation (14) in equation (11) gives us

$$(15) \frac{\partial(\Delta b_t^L + \Delta b_t^{RB})}{\partial b_{t-1}^L} = (r_t^L - \eta) - (1+\eta) \times \frac{1}{1+\eta} \times (r_t^L - \chi_t + \tau_L \times \alpha^L) + \frac{\partial r_t^L}{\partial b_{t-1}^L} \times b_{t-1}^L$$

$$- \frac{\partial \eta}{\partial b_{t-1}^L} \times [b_{t-1}^L + b_{t-1}^{RB} - g_t^L - g_t^{RB} + \tau_L + fe_t + rv_t^L + rv_t^{RB}]$$

$$+ (1+\eta) \times \left(-\frac{\partial fe_t}{\partial b_{t-1}^L}\right)$$

i.e.

$$(16) \frac{\partial(\Delta b_t^L + \Delta b_t^{RB})}{\partial b_{t-1}^L} = -\eta + \chi_t - \tau_L \times \alpha^L + \left[\frac{\partial r_t^L}{\partial b_{t-1}^L} - \frac{\partial \eta}{\partial b_{t-1}^L}\right] \times b_{t-1}^L - \frac{\partial \eta}{\partial b_{t-1}^L} \times b_{t-1}^{RB}$$

$$- \frac{\partial \eta}{\partial b_{t-1}^L} \times [-g_t^L - g_t^{RB} + \tau_L + fe_t + rv_t^L + rv_t^{RB}] - (1+\eta) \times \frac{\partial fe_t}{\partial b_{t-1}^L}$$

has to be smaller or equal to zero to prevent the local debt from exploding.

This shows that a higher growth rate of the economy and higher external benefits of local government projects contribute to a sustainability of local government debt. At the same time a higher political inefficiency of projects and increases of the interest rate of local government bonds caused by an increase in outstanding local government debt over local output larger than the growth of local output caused by the spending refinanced by this additional borrow-

ing contribute to an explosion of local debt levels. The importance of the latter rises if the outstanding debt levels are higher.

The effects of increased local government borrowing on growth have been rather small in Japan in recent years and thus did not contribute much to sustainability. Increased future transfers within the local allocation tax system for debt repayment improve the sustainability of local debt but only transfer the problem to the central government level. Besides low growth, the most important factor leading to increases in outstanding debt levels over output was the political inefficiency of projects.

7.3.2 Case of increase of revenue bonds issues

Differentiating equation (10) by b^{RB}_{t-1} leads to

$$(17) \frac{\partial(\Delta b^L_t + \Delta b^{RB}_t)}{\partial b^{RB}_{t-1}} = (r^{RB}_t - \eta) + \left(\frac{\partial r^{RB}_t}{\partial b^{RB}_{t-1}} - \frac{\partial \eta}{\partial b^{RB}_{t-1}} \right) \times b^{RB}_{t-1} - \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times b^L_{t-1} +$$

$$+ \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [g^L_t + g^{RB}_t - \tau_L - fe_t - rv^L_t - rv^{RB}_t]$$

$$+ (1+\eta) \times \left(\frac{\partial rv^{RB}_t}{\partial b^{RB}_{t-1}} \right)$$

$\frac{\partial fe_t}{\partial b^{RB}_{t-1}} = 0$, since we assume that no reimbursement for revenue bonds will come from the

Local Allocation Tax.

Given that the direct revenue to investors from the implementation of a revenue bond financed project is equal to the marginal productivity of the investment, the following holds:

$$(18) r^{RB}_t = \frac{\partial Y_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}}$$

$$(19) RV^{RB}_t = \frac{\partial Y_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}} + \tau_L \times \frac{\partial Y_t}{\partial K^P_t} \times \frac{\partial K^P_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}}$$

$$= r^{RB}_t + \tau_L \times \frac{\partial Y_t}{\partial K^P_t} \times \frac{\partial K^P_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}} = r^{RB}_t + \tau_L \times \alpha^{RB}$$

$$\text{where } \alpha^{RB} = \frac{\partial Y_t}{\partial K^P_t} \times \frac{\partial K^P_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}}$$

is an external effect of local capital stock (e.g. new infrastructure such as a highway or an airport) financed by revenue bonds on the productivity of private capital inviting new private investment in the area and by doing so increasing local output.

Using (18) and (19) gives us:

$$(22) \frac{\partial r^{RB}_t}{\partial b^{RB}_{t-1}} = \frac{\frac{\partial \frac{RV^{RB}_t}{Y_t}}{\frac{B^{RB}_{t-1}}{Y_t} \times \frac{Y_{t-1}}{Y_t}}}{\frac{\partial B^{RB}_{t-1}}{\frac{Y_{t-1}}{Y_t}}} = \frac{\partial RV^{RB}_t}{\partial B^{RB}_{t-1} \times \frac{Y_{t-1}}{Y_t}} = \frac{\partial RV^{RB}_t}{\partial B^{RB}_{t-1} \times (1+\eta)}$$

$$= \frac{1}{1+\eta} \times \frac{\partial RV^{RB}_t}{\partial B^{RB}_{t-1}} = \frac{1}{1+\eta} \times (r^{RB}_t + \tau_L \times \alpha^{RB})$$

Inserting equation (20) in the above equation (17) gives us

$$(21) \frac{\partial(\Delta b^L_t + \Delta b^{RB}_t)}{\partial b^{RB}_{t-1}} = (r^{RB}_t - \eta) - (1+\eta) \times \frac{1}{1+\eta} \times (r^{RB}_t + \tau_L \times \alpha^{RB})$$

$$- \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t]$$

assuming that $\frac{\partial r^{RB}_t}{\partial b^{RB}_{t-1}} = 0$ i.e. that the rate of return of projects financed by revenue bonds (or their marginal productivity) is not influenced by the issue of new revenue bonds.

i.e.

$$(22) \frac{\partial(\Delta b^L_t + \Delta b^{RB}_t)}{\partial b^{RB}_{t-1}} = -\eta - \tau_L \times \alpha^{RB}$$

$$- \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t]$$

where $[-g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t]$ is the primary deficit.

7.3.3 The introduction of revenue bonds improves sustainability

The improvement of sustainability through switching from regular borrowing to user based revenue bonds can be shown if subtracting (22) from (16):

$$\begin{aligned}
 (23) \quad & \frac{\partial(\Delta b^L_t + \Delta b^{RB}_t)}{\partial b^L_{t-1}} - \frac{\partial(\Delta b^L_t + \Delta b^{RB}_t)}{\partial b^{RB}_{t-1}} = \\
 & = -\eta + \chi_t - \tau_L \times \alpha^L + \frac{\partial r^L_t}{\partial b^L_{t-1}} \times b^L_{t-1} - (1+\eta) \times \frac{\partial fe}{\partial b^L_{t-1}} \\
 & - \frac{\partial \eta}{\partial b^L_{t-1}} \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t] \\
 & - [-\eta - \tau_L \times \alpha^{RB} - \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t]] \\
 & = \chi_t - \tau_L \times \alpha^L + \frac{\partial r^L_t}{\partial b^L_{t-1}} \times b^L_{t-1} - (1+\eta) \times \frac{\partial fe}{\partial b^L_{t-1}} + \tau_L \times \alpha^{RB} \\
 & + [\frac{\partial \eta}{\partial b^{RB}_{t-1}} - \frac{\partial \eta}{\partial b^L_{t-1}}] \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t] \\
 & = \frac{\partial r^L_t}{\partial b^L_{t-1}} \times b^L_{t-1} + \chi_t + \tau_L \times (\alpha^{RB} - \alpha^L) - (1+\eta) \times \frac{\partial fe}{\partial b^L_{t-1}} \\
 & + [\frac{\partial \eta}{\partial b^{RB}_{t-1}} - \frac{\partial \eta}{\partial b^L_{t-1}}] \times [b^L_{t-1} + b^{RB}_{t-1} - g^L_t - g^{RB}_t + \tau_L + fe_t + rv^L_t + rv^{RB}_t]
 \end{aligned}$$

If this is larger than zero, then switching from regular borrowing to user based revenue bonds contributes to sustainability of local government debt.

$\frac{\partial r^L_t}{\partial b^L_{t-1}}$ is positive as an increase in outstanding regular local government debt increases the interest rate paid on regular local government borrowing. b^L_{t-1} is the outstanding regular local government borrowing over local output which is positive and quite large in the Japanese case. χ_t stands for political inefficiency which is larger than zero in the Japanese case. $(\alpha^{RB} - \alpha^L)$ is positive if the external effects of projects financed by revenue bonds are larger than those of projects financed by regular borrowing.

$[\frac{\partial \eta}{\partial b_{t-1}^{RB}} - \frac{\partial \eta}{\partial b_{t-1}^L}]$ is positive if projects financed by revenue bonds increase the local output stronger than projects financed by regular local government debt. This is highly likely to be the case because in the revenue bond case private investors will invest only if they expect future revenue from the project to be sufficiently high, whereas in the case for regular local government borrowing there is no such incentive mechanism as the interest rate is guaranteed.

$[b_{t-1}^L + b_{t-1}^{RB} - g_t^L - g_t^{RB} + \tau_L + fe_t + rv_t^L + rv_t^{RB}]$ is positive if the outstanding debt is already high, as is the case in Japan.

Thus, when switching from regular borrowing to user based revenue bonds, the only factor not improving the sustainability of local debt is $(1+\eta) \times \frac{\partial fe}{\partial b_{t-1}^L}$, stemming from the inclusion of local government borrowing in the calculation of transfers within the Local Allocation Tax. However, this factor serves as an incentive to increase local borrowing beyond productive levels and falls out when aggregating local and central governments.

7.3.4 Financing by revenue bonds case is highly likely to be sustainable

Financing by revenue bonds is sustainable if (22) is smaller than zero

$$(22) \frac{\partial(\Delta b_t^L + \Delta b_t^{RB})}{\partial b_{t-1}^{RB}} =$$

$$= -\eta - \alpha^{RB} - \frac{\partial \eta}{\partial b_{t-1}^{RB}} \times [b_{t-1}^L + b_{t-1}^{RB} - g_t^L - g_t^{RB} + \tau_L + fe_t + rv_t^L + rv_t^{RB}]$$

Rewriting equation (22)

$$(24) \frac{\partial(\Delta b_t^L + \Delta b_t^{RB})}{\partial b_{t-1}^{RB}} =$$

$$? + + + + + + \text{primary deficit}$$

$$= -\eta - \tau_L \times \alpha^{RB} - \frac{\partial \eta}{\partial b_{t-1}^{RB}} \times [b_{t-1}^L + b_{t-1}^{RB}] - \frac{\partial \eta}{\partial b_{t-1}^{RB}} \times [\tau_L + fe_t + rv_t^L + rv_t^{RB} - g_t^L - g_t^{RB}]$$

Thus, when financing projects through revenue bonds, the local government debt is always sustainable if there is no primary deficit and the growth rate of local output is positive.

If the growth rate is negative, the following condition has to be fulfilled so that local government debt will be sustainable:

$$(25) \tau_L \alpha^{RB} + \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [b^L_{t-1} + b^{RB}_{t-1}] + \frac{\partial \eta}{\partial b^{RB}_{t-1}} \times [\tau_L + fe_t + rv^L_t + rv^{RB}_t - g^L_t - g^{RB}_t] > -\eta$$

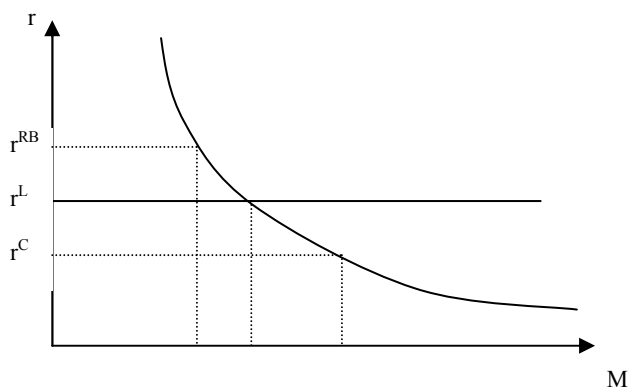
i.e. given that there is no primary deficit, the positive direct and external effects of marginal projects financed by revenue bonds have to be large enough to fulfill this equation.

8 Discussing adequate rewarding of investor's in revenue bonds

Investors will prefer to invest in regular local government borrowing if the interest rate for it is equal or larger than the expected rate of return on revenue bonds as the risk in investing in the latter is higher. Therefore, as long as $r^L \geq r^{RB}$ and no limit is put on regular local government borrowing, unproductive investment will continue

Investors will invest in revenue bonds (ΔB^{RB}) only if $r^{RB} > r^L$, or more exactly if $r^{RB} \geq r^L + p^{RB}$, where p^{RB} denotes a risk premium for revenue bonds. Therefore, investors will invest only if high revenue (high productivity) is expected. This careful selection of projects is also the reason, why the sustainability of local government debt is highly likely to be achieved when switching from regular government borrowing to fund raising through user based revenue bonds. In order that the selection of projects can work efficiently, it has to be clear that there is no implicit government guarantee for the projects financed by revenue bonds. In addition, for a correct perception of risks there may be an important role of rating agencies (on the problems with the latter point in the Japanese context see Pascha 2003: 169-171).

Figure 6 Interest rates of government bonds



$$(26) M = \Delta B_{LG} (r^C, r^L, r^{RB}, \dots) + \Delta B^{RB} (r^C, r^L, r^{RB}, \dots) + \Delta \text{Rest} (r^C, r^L, r^{RB}, \dots)$$

where M , r^C , Rest denote investor's money, the interest rate on central government bonds, and other investment opportunities.

A problem of the introduction of user based revenue bonds is that the direct revenue from the project to investors does not reflect the total benefits of the project. It does not include a rewarding for external benefits of the project since normally payment to investors would be according to marginal productivity:

$$(18) r^{RB}_t = \frac{\partial Y_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}}$$

Total tax revenues to local government from the project, will include the taxation of revenues from an external benefit of the project:

$$(27) \frac{\partial T^L_t}{\partial B^{RB}_{t-1}} = \tau_L \times \frac{\partial Y_t}{\partial B^{RB}_{t-1}} = \tau_L \times \left[\frac{\partial Y_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}} + \frac{\partial Y_t}{\partial K^P_t} \times \frac{\partial K^P_t}{\partial K^{RB}_t} \times \frac{\partial K^{RB}_t}{\partial B^{RB}_{t-1}} \right]$$

where the second term is an external benefit to local government (increase of local tax revenue due to increased private investment induced by the new infrastructure financed by revenue bonds). This external benefit part of increased tax revenues to local governments could be given to investors in order to increase the attractiveness to invest in the revenue bond financed project.

This could be done by a subsidy from the local government to the project or by transferring the additional local tax revenue due to the external benefits to the investors as they occur (for example, according to some in advance agreed formula). The authors of this paper prefer the latter as the closest resemblance to the benefit principle of taxation.

The question then is how to estimate the external effects. This could be done, for example, by estimating the increase of land prices or increases in tax revenue due to the project (i.e. around the place where the new revenue bond financed infrastructure was set up). This could be estimated for some projects existing already or some test projects could be run and estimated. Existing works on the estimation of external effects include, for example, Yoshino/Nakata/Nakahigashi (1999).

A problem here is that there will not always be a lasting increase in local tax revenue (though there is a high probability that there will be one during the construction period), since, for example, the benefits could also go to other local governments. A good example of this is the

experience of a bridge built to connect Shikoku with Honshu. Inhabitants of Tokushima prefecture on Shikoku now go for shopping to Honshu, which was actually further decreasing the income of Tokushima on Shikoku instead of increasing it.

9 Towards a new system of local government revenues

An advantage of revenue bonds is that even financially weak local governments can use them if they have projects that produce sufficient revenue. On the other hand a problem that arises is that while investors move to places with high productivity, other areas may have problems in obtaining money for their projects and in the extreme case will get no projects financed at all.

From the point of view of the distribution of income, this extreme case is undesirable. From a social point of view a national minimum has to be defined, which should be guaranteed for all citizens (this can also be justified by arguments of constitutional and behavioural economics). The mechanism to ensure that the resources for financing of such a national minimum are available all over the country is a system of (horizontal and/or vertical) fiscal equalization, not, however, local government bonds. They are not a financing instrument meant to bring about a redistribution of income. If they are used for redistribution purposes, they lose much of their allocative functions what is highly likely to lead to a reduction in growth.

On this background, we argue, that expenditures for the national minimum should be paid out of:

- 1) Local taxes as the major source of revenue.
- 2) A fiscal support or fiscal equalization scheme if local taxes are insufficient to finance the national minimum at the local level. In order to leave local governments with incentives to put efforts to raise their own taxes, systems of fiscal equalization should not equalize to an extent that at the margin the whole additional (missing) revenues are being withdrawn (added).
- 3) Subsidies from the central government or other local governments in case there are nationwide benefits or external effects to other local governments from the project implemented (this argument refers to both cases within or outside the national minimum).

Expenditures beyond the national minimum should generally be paid by tax revenues left after financing the minimum. As within the national minimum, benefits to other authorities can be rewarded by subsidies. Given the high levels of outstanding debt, and the already high level of public infrastructure in many areas such as roads, bridges, etc. all over Japan, we argue that if taxes and revenues from subsidies are insufficient to finance additional desired projects, only revenue bonds should be allowed to make sure that the debt can be repaid and to avoid the above described problems of government borrowing.

Figure 6 A proposal for major forms of revenues for local government depending on the type of project to be financed

National minimum			Beyond national minimum	
Local taxes	Fiscal equalization	Subsidies from the central government	Local taxes	User based revenue bonds
Basic source of revenue	Additional source of revenue if there are no sufficient tax revenues to finance the national minimum	In case the local government is carrying out functions on behalf of the central government or in case there are other external effects to the central government.	Major source of revenue	To ensure the individual profitability of the additional projects financed

10 Summary

Outstanding debt levels of local governments in Japan have doubled over the last 10 years. The use of these additional revenues raised was rather unproductive, and expenditures were allocated according to political considerations rather than economic productivity. The movement from the existing approval system of local government bonds to a consultation system by the year 2005 does not remove the implicit central government guarantee for local debt and the incentive problems for local government borrowing involved. Given all the risks as-

sociated with high debt levels (crowding out, inflation, potential insustainability) and the bad selection of projects financed, we suggest to limit local government borrowing to user based revenue bonds.

In the case of such bonds, investors receive the future revenues of the projects, they invest their money, and thus have an incentive to carefully select and monitor the projects. Thus, many of the governance problems in the public sector can be solved. However, our proposal is different from pure private sector activity. In the projects financed by user based revenue bonds, the government acts as a coordinator, as it, for example, has the power to reallocate people in case of airport or other infrastructure projects. Once the projects are working, they can be completely privatised.

We showed, that switching from regular government bonds to user based revenue bonds not only improves the sustainability of local government debt. Local government debt is highly likely to be sustainable when raising additional revenue bonds. In a growing economy it is sufficient to demand that there is no primary deficit. For a shrinking economy we also showed the conditions to be fulfilled.

As investors will not take into account external effects in their investment decision, the financing of projects may be below the optimum. Therefore, we suggest to reward investors in revenue bonds with the external effects part occurring to local governments in the form of additional tax revenues due to the implementation of the projects financed by revenue bonds on top of the direct revenues from the projects already going to investors. This additional rewarding of investors in revenue bonds corresponds to the $\tau_L \times \alpha^{RB}$ part in the equations and thus does not fundamentally change the results on the sustainability of local government debt.

User based revenue bonds enable even financially weak local governments to implement projects if those produce sufficient revenue. They do not, however, solve problems distribution of income. Such are the task of systems of fiscal equalization.

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