Fiscal Reconstruction and Local Interest Groups in Japan

by

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Abstract

This paper investigates politico-economic properties of fiscal reconstruction process in Japan by analyzing the dynamic game among local interest groups with concessions of region-specific privileges. Free-riding behavior of local interest groups with feedback strategies brings a lot of deficits. Maintaining political commitment toward fiscal reconstruction would be desirable for a successful outcome. We also consider the empirical implications of raising taxes to attain fiscal reconstruction and its effect on government debt in Japan.

Key words: fiscal reconstruction, free riding, local interest group
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1. Introduction

Japan has been suffering from huge government deficits. This is partly due to a slowdown of economic growth in recent years. When national income does not grow much, tax revenue will not increase either. On the contrary, public transfer payments (and public investment) have been gradually raised due to political pressures of interest groups in the rural and agricultural region, resulting in huge budget deficits and large size of government.

In 1990s the government deficits in Japan increased rapidly because local interest groups living in the rural and agricultural area got a lot of transfers mainly in the form of public works. In Japan the central government provides heavy financial support to local governments, amounting to about 5% of GDP every fiscal year. Allocation of region-specific privileges in the form of subsidies or public works from the central government has been mainly determined by the political factor. Namely, many local interest groups (or politicians) seek to obtain more money from the central and local governments through a variety of lobbying activities. They may be regarded as one of the most powerful interest groups in Japan. From the data on Japan's public works, in comparison with other countries' figures, we may say that local residents in Japan have larger privileges than in other countries, reflecting an influential role of their interest groups.

The Japanese government has been attempting to raise taxes and/or reduce public spending so as to attain the target level of government debt-to-GDP ratio. This is called the fiscal structural reform or reconstruction movement. Reforming interregional transfers and public works is one of the crucial points to achieve successful fiscal reconstruction in Japan.

The main purpose of the present paper is to investigate theoretically the free-riding behavior of those local interest groups during a fiscal

reconstruction process in a politico-economic setting and then to investigate empirically the implications of fiscal reconstruction attempts in Japan.[1] As in Ihori and Itaya (2001), the fiscal authorities of government are assumed to be strong enough to impose a ceiling rule for a certain area of public spending including public consumption and interest payments. This is usually the first step towards fiscal reconstruction. As shown in Figure 3, the Japanese government did impose such a ceiling. However, the government in Japan is politically so weak that it cannot effectively restrain region-specific privileges or public works, which may be regarded as 'rents' from the viewpoint of local interest groups.

Once fiscal reconstruction is successfully completed, the central and local governments can spend more on the provision of public goods, whose benefits spill over the whole nation. On the contrary, if local interest groups were to stick to retaining their own privileges, they might abide by serious criticisms from the public and be ultimately forced to give up their whole privileges due to drastic reforms. Because of the positive externalities accruing from successful fiscal reconstruction and to avoid the worst scenario, each local interest group may be willing to 'voluntarily' give up its region-specific privileges gradually. It seems to us that voluntary concession of the local interest group motivated by these reasons plays a key role in fiscal reconstruction in Japan where local residents (or politicians) behave as influential interest groups and the government (or fiscal authorities) does not have enough power to control those interest groups.

Section 2 briefly summarizes the recent development in Japanese fiscal situation. Section 3 presents the basic theoretical model, which may

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[1] There are several papers including Alesina and Drazen (1991) which, presented a simple dynamic model of delayed stabilization defined as a change of policy that stabilizes the debt-to-GDP ratio, based on a war of attrition among several interest groups, and derived the expected time of stabilization as a function of characteristics of those groups. Chari and Coles (1993) and Velasco (1997) analyzed the free rider problem of fiscal policy in a dynamic game setting.

reflect important characteristics of the Japanese fiscal reconstruction attempts. Section 4 characterizes the open-loop (or precommit) solution. Section 5 investigates feedback-loop strategies. Section 6 conducts some empirical analyses on Japanese fiscal reconstruction. Finally, section 7 concludes the paper.

2. Fiscal reconstruction in Japan

2.1 Fiscal deficits and reconstruction

Japan's fiscal situation in 1990s was the worst of any G7 country, having deteriorated rapidly with the collapse of the 'bubble economy' in 1991 and the deep and prolonged period of economic recession which ensued, and from which recovery has been slow and modest despite the implementation of counter-cyclical policy. In this section let us first summarize briefly the recent movement of fiscal deficits and fiscal structural reform in Japan.

After a "bubble economy" was broken in 1991, natural tax decreased considerably. At the same time the politico-economic pressures for larger expenditure budgets and counter-cyclical packages of fiscal measures intensified. Responding to them, MOF (the Ministry of Finance) employed some measures for stimulating the aggregate demand. However, these counter-cyclical measures were not so effective, resulting in an increase in the fiscal deficit. The implementation of counter-cyclical fiscal policy through supplementary-budgets in-year led to further borrowing still, and the actual bond-dependency rate was more than 22% in FY 1994.

The state of the national finances deteriorated rapidly throughout FY 1995 and FY 1996. MOF was forced to borrow 22.0 trillion to finance a deficit swollen by the large fiscal stimulus in September 1995, resulting in a bond-dependency ratio of 28.2%, its highest level since 1980. In FY 1996

the planned issue of 10.1 trillion of special deficit bonds exceeded all previous experience. Despite the gravity of the fiscal situation the initial budgets for FY 1996 and 1997 nevertheless provided for further increases of expenditure, of 5.8% and 3.0%. Not only were fixed costs for prior commitments rising: those for discretionary expenditures continued to rise as well. The servicing of that debt absorbed more than a fifth of the total general account budget.

Limiting the latter to 1.5% ceiling in FY 1997 was claimed by the Government and MOF as a sign of new fiscal austerity. The initial budget for FY 1998 marked the beginning of a new realism in the control of public spending promised in PM Hashimoto's 'Vision' of fiscal structural reform. Let us briefly summarize Hashimoto's fiscal reconstruction attempts. This efforts were to deal with the current economic and financial situation within the framework of the Fiscal Structural Reform Act, which was implemented in November 1997, had three targets to be achieved by FY 2003.

(i) the elimination of special balanced bonds

(ii) the reduction of general government debt-GDP ratio to 60%

(iii) the reduction of general government deficit-GDP ratio to 3%

General expenditures were down 1.3% over FY 1997 initial budget, the largest decline in history. However, in the light of severe economic and financial situation, the Fiscal Structural Reform Act was revised in May 1998, so that income tax reduction would be easily implemented. Furthermore, since the LDP lost the upper house election in July 1998, Hashimoto's efforts failed.

New PM Obuchi changed the target of fiscal policy. Namely, further tax reductions and increases in public works have been implemented to stimulate the aggregate demand, following the traditional Keynesian counter-cyclical policy. At that time the Fiscal Structural Reform

Act was not regarded as a legally effective constraint any more. In FY 1998 the issue of special deficit bonds was 21.7 trillion yen due to several additional fiscal policy measures. By the end of FY 1999 the accumulated debt was total 327 trillion, equal to 65% of GDP. The deficit on the general government financial balance in FY 1999 was 10.0% of GDP, with a gross debt of over 108%.

In order to evaluate the recent movement of fiscal deficits and fiscal reform in Japan, it would be useful to consider the following points. How would the government deficit matter to the Japanese economy? Is it really necessary to reduce fiscal deficits? What would be the crucial point of attaining fiscal reconstruction successfully? This paper will address the last issue by analyzing a dynamic game among local interest groups with concessions of region-specific privileges in forms of public works and transfers[2].

2.2 Public works and region-specific privileges

Economic implications of public works may be evaluated in two ways; the long-run supply side effect and the short-run demand side effect. In Japan the demand side effect has been regarded as the top priority since fiscal policy has mainly been employed so as to stimulate aggregate demand during recession.

Public works may stimulate private consumption by generating the multiplier effect, and the supply side benefit of the public works seems irrelevant in the short run. However, if people are concerned with the costs and the supply side benefits of public spending, wasteful public works may reduce aggregate demand even in the short run. Only if public works really produce net benefits in the future, the private sector can stimulate

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[2]. We have elsewhere investigated the first two issues to some extent. See Ihori, Doi, and Kondo (2000).

private consumption and investment.

There are some empirical studies on the productivity effect of public capital in Japan; Iwamoto (1990), Asako et.al. (1994), Mitsui and Ohta (1995), Yoshino and Nakano (1996), Doi (1998), Ihori and Kondo (2001) and so on. They commonly conclude that public capital was productive but its productivity has declined recently. These evidences tend to suggest that the total level of public capital is too much in recent years. Hence, a further increase in public works could not stimulate private demand. Especially, agriculture-related public capitals and fishing ports and measures for flood control and conservation of forests are being accumulated too much. On the other hand, there may be a shortage of public capital in some areas such as public works in urban areas.

In Japan, the multiplier effect of public works has become very low in recent years, and hence the efficacy of stimulating aggregate demand by using public works is controversial. Unless the allocation of public works is appropriately revised, it could never stimulate private consumption and investment. The resulting cost is a huge increase in government deficit in 1990s. Since PM Koizumi emphasized the importance of fiscal structural reform in 2001, an effort is being made to put an additional priority on infrastructure investment to improve the people's lives and the environment in urban area. At the same time, seeking to enhance efficiency and transparency, the efforts to reduce costs and to utilize cost-benefit analysis are being complemented by a new re-assessment system. These changes are desirable but the speed of structural reform is not so high.

2.3 political bias and local interest groups

Under the Japanese fiscal system, the central government distributes Local Transfer Taxes, Local Allocation Tax, and National Government Disbursements to local governments. The central government

spends the half of national tax revenues for these grants to local governments. The financial resources needed by local governments are transferred from the central government to local governments. Therefore, representatives of the Diet appeal to the cabinet or the central bureaucrats to distribute more in their own regions. Getting more grants is important for them to be reelected.

Distribution of these grants, however, has a political bias. Especially, a region paid fewer national taxes has received more grants from the national government. Figure 1 shows distributed grants (per capita) from the central government by region.[3] Kanto, Tokai, and Kinki regions live about 60% of the population of Japan, and people and firms in these regions pay about 75% of national taxes in each year. However, they have received fewer grants than people in the rural regions: Hokkaido and Tohoku, Hokuriku and Koshin'etsu, Chugoku and Shikoku, and Kyushu.

A reason why the central government distributes the grants in this way is as follows. More representatives in the ruling party, the Liberal Democratic Party (LDP) for postwar period, have been seated for the rural regions. Figure 2 presents representatives in the ruling party per 1,000,000 people by region. It suggests that people in the rural regions have more representatives in the ruling party than in the urban regions. The ruling party exerts an influence to decide the national budget. So the representatives for the rural regions, who affected by local interest groups and voters, put political pressure to distribute more grants to the rural regions.

Doi and Ashiya (1997) give an econometric analysis on distribution

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[3] We divided prefectures into the following 7 regions: Hokkaido and Tohoku (Hokkaido, Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima), Kanto (Ibaraki, Tochigi, Gumma, Saitama, Chiba, Tokyo, Kanagawa), Hokuriku and Koshin'etsu (Niigata, Toyama, Ishikawa, Fukui, Yamanashi, Nagano), Tokai (Gifu, Shizuoka, Aichi, Mie), Kinki (Shiga, Kyoto, Osaka, Hyogo, Nara, Wakayama), Chugoku and Shikoku (Tottori, Shimane, Okayama, Hiroshima, Yamaguchi, Tokushima, Kagawa, Ehime, Kochi), and Kyushu (Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima, Okinawa).

of grants and national elections in Japan, by examining a regression between distribution of subsidies to a region and representatives in the ruling party for a region for FY 1956-1993. A result of the paper suggests that a region where more representatives in the ruling party are elected for is distributed more subsidies from the central government throughout the period.

Thus the Japanese government takes such an interregional redistribution policy with a political bias. It is important to treat political influence of local interest groups explicitly when we investigate the Japanese fiscal policy.

3. The model

There are many ($n \geq 2$) symmetric local interest groups living in their own regions in a small open economy. Each of them enjoys a region-specific privilege of higher subsidies or private works, L_i, where subscript i means local residence i. The instantaneous utility of local interest group i (or a median voter of region i) is assumed to be strictly increasing in private consumption c_i, expenditures on region-specific public works L_i, and nation-wide public goods G, which is common to all jurisdictions and may be viewed as a pure public good. It is further assumed to be a twice-continuously differentiable and strictly quasi-concave function, which is expressed by

$$U = U(c_i, L_i, G)$$

Moreover, we assume that all goods are normal ones. The relative price of each good is set to be unity for simplicity. Given the instantaneous utility function, the intertemporal utility of local interest group i over an infinite-horizon starting at time 0 is given by

$$\int_0^\infty U(c_i(t), L_i(t), G(t))e^{-rt}dt$$

where r (>0) is a constant discount rate, which is common to all local interest groups.

Public consumption of the overall government sector (or provision of nation-wide public goods) G at each point in time is determined according to

$$G(t) = G^* - rB(t) \tag{1}$$

where G^* is an exogenously given ceiling level, r is the exogenously given world interest rate, and B is external government debt. Equation (1) means that the central and local governments' spending on nation-wide public goods and interest payments is fixed at the level of G^* through time, so that a higher public good G is possible only by reducing the external public debt outstanding B.

As shown in Figure 3, during the fiscal reconstruction process Japan has actually imposed the ceiling constraint on some of government spending (mainly provision of the nation-wide public goods such as spending on national agencies, national defense, disposition of external affairs, and education and culture) in order to prevent a further deterioration in budget deficits. Equation (1) formulates such a ceiling rule. The strict ceiling rule of (1) (i.e., constancy of G^*) is adopted only for simplicity.[4]

A representative, median voter in region i will face the instantaneous budget constraint.

$$Y = c_i + wY \tag{2}$$

where Y is exogenously given income common to all regions, w is the common income tax rate. To focus on the problem at hand, Y is assumed to be fixed over time. Although this assumption appears to be extremely strong within a dynamic setting, it can be justified by observation of the fact that in Japan facing large budget deficits the balanced budget movement takes place in economies where the growth rate of GDP is close to zero (i.e.,

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4. A more general ceiling rule could be employed with the analytical results intact. All we need below is the negative relation between G and rB.

GDP is nearly fixed over time in recent years). In addition, we also assume that there is neither private saving nor private bequests for analytical simplicity[5]. It follows that private consumption is always equal to disposal income. For simplicity, taxes are incorporated as income taxes.

The overall budget constraint of the central and local governments is given as

$$\dot{B} = G + rB - \sum_{j=1}^{n} g_j \tag{3}$$

with

$$g_i \equiv wY_i - L_i \tag{4}$$

where g_i is net payment of 'taxes' (or contribution to tax revenue) provided by local interest group *i*. More precisely, g_i is defined by the tax payment applied to all local interest groups wY minus region-specific spending L_i. Since in the right hand side of (4) wY_i is exogenously fixed, local interest group *i* can control L_i by choosing g_i.

The ceiling constraint in (1) may be viewed as an agreement to reconstruct the fiscal system towards balanced budget. The government is unable to directly reduce region-specific transfers. Such expenditures could be restrained only with the agreement of the local interest groups. The Japanese fiscal reconstruction process could be thought of as an outcome of voluntary concession on how the increases in net 'taxes' $\sum_{j=1}^{n} g_j$ are to be apportioned between various local interest groups. More formally, each local interest group can voluntarily set cuts in region-specific public works to accomplish fiscal reconstruction at each point in time, given the expectations regarding the time path of others' concessions g_j for $j \neq i$.

We further assume that each local interest group has enough

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[5] We could consider a general case where private agents optimize the consumption-saving behavior intertemporally in a closed economy. The basic results would qualitatively be the same as in the present paper.

information to exactly know the structure of the integrated government budget constraint (3). In other words, there is *no budgetary illusion*. This assumption implies that the number of local interest groups is relatively small so that they can easily recognize the effect of changes in their concessions on the level of national public goods or its accumulation path [see, e.g., Boadway et al. (1989)].

From (1) and (3) we have

$$\dot{G} = r\sum_{j=1}^{n} g_j - rG^* \qquad (3)'$$

Equations (2) and (4) mean that private consumption and the sum of L_i and g_i are exogenously fixed and common to all regions,

$$c_i + g_i + L_i = Y \qquad (5)$$

which is the feasibility condition.

4. The open-loop strategies

Let us first investigate the open-loop strategies. This type of Nash equilibrium concept presumes that the voluntary contribution to net tax revenue made by each local resident (or mean voter) in the fiscal reconstruction process at each point in time is only conditioned on the initial stock of public debt and hence the initial level of national public goods, $G(0)$, and that each local interest group precommits itself to the entire path of region-specific transfers chosen at the outset of fiscal reconstruction.

The optimization problem of local interest group i is formulated as follows: Maximize its intertemporal utility by choosing $g_i(t)$ and $G(t)$, subject to (3)', (2), (4) and the exogenously given $G(0)$ and $g_j(t)$, $j \neq i$, at time 0.

At the steady state we have[6]

$$ng = G^* \tag{6}$$

$$\frac{U_G}{U_L} = \frac{r}{r} \tag{7}$$

where $U_G = \partial U / \partial G$ and $U_L = \partial U / \partial L$.

By substitution of (6) into (5) the steady state feasibility condition can be written as

$$nc + G^* + nL = nY$$

Substituting (2) into the above equation, we have as the steady-state feasibility condition

$$L + \frac{G^*}{n} = wY \tag{8}$$

It is pictured as vertical line AB in Figure 4. The steady state open-loop equilibrium is given by point O, which satisfies (7) on line AB.

We can derive several comparative statics results. First of all, an increase in Y will raise both $\overline{L}^O$ and $\overline{G}^O$ due to the assumption of normality thus leading to a reduction in $\overline{B}^O$ via (1), where superscript O represents the open-loop Nash equilibrium level of the corresponding variable. As a result, if Y declines, for example, due to a negative exogenous macroeconomic shock caused by recession, it reduces both local privileges and nation-wide public goods and results in a larger amount of government debt. Although economic slowdown reduces public spending, it also produces a huge amount of public debt, which was observed in Japan during 1990s.

Equation (7) also means that $\overline{G}^O$ is increasing with r/r and n,

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[6] Since c is fixed throughout the problem, considering (4), the Hamiltonian function is defined by

$$H(g_i, G, l, t) \equiv U(wY - g_i, G) + l\left[r\sum_{j=1}^{n} g_j - rG^*\right]$$

The first-order conditions are given by

$$U_L = lr \quad \text{and} \quad \dot{l} - rl = -U_G$$

while the steady state level of local privileges, $\bar{L}^O = wY - G^*/n$, remains constant with r/r by virtue of (8). Since a higher rate of interest raises the cost of per-capita public debt thus reducing its steady state level, the resulting decrease in *B* causes the steady state level of *G* to rise via (1). An increase in *r* implies a higher rate of discounting the future utilities from *G* and thus an increase in the marginal cost of *G*. In particular, an increase in *r* would lead each local interest group to cooperate more willingly with fiscal reconstruction since the marginal return on doing so (i.e., saving interest payments) rises[7].

An increase in *r* has an interesting effect during transition. From the first-order conditions we have during transition

$$\frac{\dot{L}}{L} = s(L)(r - \frac{rU_G}{U_L})$$

where $s(L) \equiv U_L / LU_{LL}$ is the inverse of the intertemporal elasticity in L. We also have

$$\dot{G} = nr(Y - L) - rnwY - rG^*$$

These two equations summarize the dynamic behavior of *L* and *G*. Figure 5 shows a phase diagram of this model. Curve LL means $\dot{L}$=0, while curve GG means $\dot{G} = 0$. It is easy to see that the steady-state equilibrium is saddle- point stable. As shown in Figure 6, an increase in *r* will shift curve LL to the left. *L* jumps upward and then declines towards the original level during transition as in Figure 6. Hence, the interest groups stimulate their lobbying activities to seek for more privileges. Thus, during transition *L* is excessively high and hence the government is in deficit. The

[7] To be more precise, we have to investigate the effect of an increase in *r* on the adjustment speed of fiscal reconstruction (i.e., the adjustment speed of *G* towards its steady state level). Ihori and Itaya (2001) demonstrated that higher *r* accelerates the adjustment speed of *G* at the open-loop solution in the similar context of fiscal reconstruction.

debt outstanding, B, increases over time. If r actually increased in Japan, such a change may well explain the actual fiscal development in 1990s. Under such circumstances fiscal reconstruction would not result in a good success.

If the ceiling level is related to national income in such a way that

$$G^* = hY \tag{9}$$

the size of total government per GDP is given as

$$\frac{G + rB + L}{Y} = h(1 - \frac{1}{n}) + w \tag{10}$$

which is increasing with the ceiling ratio h, and tax rate w. An increase in the ceiling ratio raises the size of government per GDP simply because it raises B. It also reduces L and G in the steady state. Thus, it hurts long-run welfare.

It is easy to see from (2) and (4) that an increase in w has the same effect as an increase in Y on B, G, and L in the sense that it raises total tax revenues of the public sector. The tax rate w can affect the fiscal reconstruction process only through changes in wY. Thus, an increase in the tax rate has qualitatively the same effect of an increase in Y (except the effect on private consumption). Raising tax revenues stimulates local privileges L and nation-wide public spending G, but reduces public debt B as well as private consumption c.

Since B can decrease, raising local and/or national taxes may be desirable for fiscal reconstruction. If private consumption is initially too much ($U_L > U_c$), an increase in the taxes is also desirable in terms of social welfare.

Although the open-loop solution is a precommitment outcome, it does not internalize the free-riding behavior of interest groups. If one local interest group cooperates with fiscal reconstruction by accepting more cuts in subsidies, it would benefit all other local groups in the economy. That is,

the main reason for underprovision of G (and overprovision of B) is that each local interest group disregards a positive externality of cooperation with fiscal reconstruction in choosing its own contribution, which spills over into all other local interest groups.

5. Feedback-loop strategies

When the fiscal authorities are politically 'weak' in that each local interest group can set its own privilege voluntarily, the most likely outcome would be described by feedback strategies rather than open-loop strategies. In Japan the fiscal structural reform movement pursued by PM Hashimoto in 1997 was an attempt to precommit future fiscal policy. In this sense that movement may be regarded as open-loop strategies. On the contrary, fiscal policy after the Hashimoto reform movement may well be regarded as feedback strategies.

The feedback Nash equilibrium allows each local interest group to condition its contribution to net tax revenues on the current stock of public debt or level of central public spending *at each point in time*. Thus, the feedback Nash equilibrium is a subgame perfect equilibrium, but the open-loop equilibrium is not.

In order to obtain explicitly analytical solutions, we shall employ a separable and quadratic utility function, that is,

$$U(L_i, G) = b_0 + b_1 L_i - \frac{g_1}{2} L_i^2 + b_2 G - \frac{g_2}{2} G^2 \qquad (11)$$

$$b_0, b_1, b_2, g_1, g_2 > 0$$

For simplicity, we omit c in (11). Let $V(G)$ be the value function of local government i of the game that starts at G. Using the value function approach the feedback Nash equilibrium strategies must satisfy the following Hamiltonian-Jacobi-Bellman condition:

$$rV(G) = \underset{g_i}{Max}\left[\hat{b} + \tilde{b}_1 g_i - \frac{g_1}{2} g_i^2 + b_2 G - \frac{g_2}{2} G^2 + V'(G)\{\sum_{j=1}^{n} r g_j - rG^*\} \right] \quad (12)$$

where $\hat{b} \equiv b_0 + b_1 wY - (g_1/2)(wY)^2$ and $\tilde{b}_1 \equiv -b_1 + g_1 wY (< 0)$. Since the right-hand side of (12) is concave with respect to g_i, the function g_i that maximizes it is given by

$$g_i = \frac{1}{g_1}\left[\tilde{b}_1 + V'(G)r\right] \tag{13}$$

In what follows, we focus on linear strategies to avoid analytical complexities. Substituting a quadratic form of the value function whose coefficients are unknown and (13) into (12), and then equating the corresponding coefficients appearing on both sides of the resulting expression [for the similar technical procedure in details see Ihori and Itaya (2001)], we finally obtain

$$g^s(G) \equiv k_1^s + k_2^s G \tag{14}$$

where

$$k_1^s \equiv \frac{\tilde{b}_1}{g_1} + q_1 r = Y - \frac{b_1}{g_1} + r\frac{l_1 nr\tilde{b}_1 + b_2 - g_1 l_1 rG^*}{g_1 r - (2n-1)g_1 l_1 r^2} > 0$$

$$k_2^s \equiv r l_1 = \frac{\frac{r}{2} - \sqrt{(\frac{r}{2})^2 + \frac{g_2}{g_1} r^2 (2n-1)}}{r(2n-1)} < 0$$

Moreover, at the steady state we have

$$\overline{G}^S = \frac{nk_1^s - G^*}{-nk_2^s} \tag{15}$$

In addition, we can also show that

$$\frac{U_G}{U_L} > \frac{r}{r} \tag{16}$$

Comparing (16) with (7), it turns out that the resulting steady state level of *G* is smaller than that at the open-loop solution. Since the steady state level of local privileges is constant (i.e., $\overline{L}^S$), the combination of local privileges and nation-wide public spending is depicted as point S in Figure 4. It follows that the free-riding behavior of local interest groups is more sever at the feedback solution than at the open-loop one (i.e., the lower

steady state level of G and the higher steady-state level of B), while the steady state level of local privileges on pubic works and thus the steady state size of government are the same as those at the open-loop solution. Maintaining political commitment toward fiscal reconstruction is important for a successful outcome. Fiscal situations after Hasimoto's efforts may be described as feedback strategies. Comparing the feedback outcome with the open-loop outcome, the above analysis provides one reason why Japan has accumulated a huge amount of fiscal deficits after the Hashimoto reform movement failed.

Comparative static results are qualitatively the same between the open-loop and feedback-loop solutions.

6. Estimation

It is important to analyze relationship between tax revenues (T) and expense for local privileges (L) when we evaluate the Japanese fiscal policy. As shown in Figure 3, T has a positive correlation with L intuitively. We have two explanations of the correlation. One is that an increase in L causes an increase in T. The other is that an increase in T causes an increase in L. The former reflects the policy stance that the government tries to increase tax revenues when local privileged increases for exogenous reasons, and that has an enhancing effect to fiscal reconstruction. We name this effect the 'fiscal reconstruction-supporting effect.' The latter reflects the policy stance that the government increases local privileges when the tax revenues increase for exogenous reasons, and that has a hindering effect to fiscal reconstruction. We name this effect the 'fiscal reconstruction-offsetting effect.' The above model in this paper explains the latter effect. We conjecture that the Japanese fiscal policy reflects the latter rather than the former. In this section, we confirm which causality is stronger using an econometric method.

Based on the above model, we investigate the consolidated account of central and local governments in FY 1955-1999. We would like to analyze relationship among tax revenue, expenditures for provision of pure public goods, and public investment and privileges to regions. Ihori, Doi, and Kondo (2000) provide an analysis applying literature on the revenue-expenditure nexus: causalities between revenues and expenditures. Ihori, Doi and Kondo (2000) treat only the national budget, excluding grants of local allocation tax and budgets of local governments. Japanese fiscal system, however, is centralized, and the central government spends many grants to local governments in each year. We extend the coverage of the analysis, including grants of local allocation tax and budgets of local governments. We comprehensively study Japanese fiscal policy using the consolidated data by purpose for the first time.

In the Japanese statistics, central and local expenditures by purpose are divided into the following categories; agencies (including imperial household, general administration, the Diet or local assemblies, elections, diplomatic service, tax collection, justice, police, and fire defense), local government finance, national defense, disposition of external affairs, national land conservation and development (i.e. public works), industrial development, education and culture, social security, pensions, government bonds, appropriation brought up to previous fiscal year, and other. Their consolidated data (net total of accounts of the central government and accounts of local governments) are obtained from the Ministry of Home Affairs (the present Ministry of Public Management, Home Affairs, Posts and Telecommunications) "Situation of Local Government Finance."[8] To

[8] The consolidated account includes the General Account, the Special Account (SA) for Grants of Allocation Tax and Transferred Taxes, the SA for Government-Operated Land Improvement Projects, the SA for Measures for Structural Improvement of Coal, Petroleum and Energy Supply and Demand, the SA for National Forest Service (Forest Reservation Accounts only), the SA for Welfare Insurance (Child Allowance Account only), the SA for Road Improvement, the SA for Airport Development, the SA for Harbor Improvement, the SA for Promotion of Electric Power Resource Development

analyze Japanese fiscal policy based on the above model, we can divide these variables into three as follows. The first group is expenditures for provision of pure public goods, including national defense, disposition of external affairs, education and culture of both governments, agencies of the national government, and expense for police and fire defense of local governments, denoted by *G*. The second is interest payment, equal to government bonds minus bond redemption of both governments, denoted by *rB*. The last one is public investment and privileges to regions, including the remaining expenditures, denoted by $\sum_{i=1}^{n} L_t^i$.

On the revenue side, we divide the net total revenue into tax and other revenues of both governments (*T*) and issue of bond of both governments. Then the accumulated issue of bond becomes outstanding of bond (*B*). We use these variables deflated by the GDP deflator.

In previous studies of revenue-expenditure nexus, the Granger causality tests using the conventional VAR analysis and ECMs (error correction models) have been used. One of these defects is the tests cannot be implemented when the orders of integration of revenues and expenditures are different, or when either order of integration is more than two. To avoid it, we employ the method of Toda and Yamamoto (1995)[9]. An advantage of this method is that we can implement the Granger causality tests when the order of integration of revenues is not equal to that of expenditures and when either order of integration is more than two. The method is as follows.

We consider the following VAR of an N-vector time series $\{\mathbf{X}_t\}_{t=-k+1}^{\infty}$ ($k \geq 1$):

$$\mathbf{X}_t = \mathbf{b}_0 + \mathbf{b}_1 \mathbf{t} + \Phi_1 \mathbf{X}_{t-1} + \cdots + \Phi_k \mathbf{X}_{t-k} + \cdots + \Phi_l \mathbf{X}_{t-l} + \mathbf{å}_t, \qquad (17)$$

(Electric Power Plant Location Account only) of the national government, and the ordinary account of local governments.

$$\text{where } \mathbf{X}_t \equiv \begin{bmatrix} X_{1t} \\ X_{2t} \\ \vdots \\ X_{nt} \end{bmatrix}, \quad \Phi_i \equiv \begin{bmatrix} j^{\,i}_{11} & j^{\,i}_{12} & \cdots & j^{\,i}_{1N} \\ j^{\,i}_{21} & j^{\,i}_{22} & & \\ \vdots & & \ddots & \vdots \\ j^{\,i}_{N1} & & \cdots & j^{\,i}_{NN} \end{bmatrix},$$

Φ_i (i = 1,2, …, k, …, l) denotes an N×N matrix of coefficients, **t** denotes a vector of a time trend, and $\mathbf{e}_t$ denotes an N-vector of the innovation. We assume that the order of integration of $\mathbf{X}_t$ is at most $d_{\max}$ around a linear trend. $d_{\max}$ denotes the maximal order of integration of variables in $\mathbf{X}_t$.

First, we select the lag length in (17). According to Toda and Yamamoto (1995), under the following null hypothesis:

$$H'_0: \Phi_{m+1} = \ldots = \Phi_l = \mathbf{0}, \qquad \text{where } k \le m \le l-1$$

the usual Wald statistic obtained from the OLS estimators of coefficients in (17), has an asymptotic χ^2 distribution with $N^2(l-m)$ degrees of freedom if $m \ge d_{\max}$. After this test, we select the lag length as the null hypothesis can be rejected. l denotes the selected lag length.

For implementing the Granger causality tests, we estimate the following VAR:

$$\mathbf{X}_t = \mathbf{b}_0 + \mathbf{b}_1\mathbf{t} + \Phi_1\mathbf{X}_{t-1} + \cdots + \Phi_k\mathbf{X}_{t-k} + \cdots + \Phi_l\mathbf{X}_{t-l} + \mathbf{å}_t, \qquad (18)$$

In this regression, the i-th variable, $\mathbf{X}_{it}$, does not Granger-cause the j-th variable, $\mathbf{X}_{jt}$, if we cannot reject the following null hypothesis[10]:

$$H_0: j^{\,1}_{ji} = \ldots = j^{\,\lambda}_{ji} = 0.$$

We analyze a VAR model with the following five endogenous variables: $\frac{G}{Y}$, $\frac{\sum_{i=1}^{n} L_t^i}{Y}$, $\frac{T}{Y}$, and $\frac{B}{Y}$, where Y denotes GDP. Sample period is FY 1995-1999. We set $d_{\max}$=2 as the larger of the order of integration of

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[9] Ihori, Doi, and Kondo (2000) employ this method.

[10] Toda and Yamamoto (1995) proved that under the above null hypothesis, the usual Wald statistic obtained from the OLS estimators of coefficients in (18), has an asymptotic χ^2 distribution with l degrees of freedom if $l \ge k + d_{\max}$. Note that the conditions, $l \ge k + d_{\max}$ and $k \ge 1$, must be satisfied.

the five variables; $\frac{G}{Y}$, $\frac{\sum_{i=1}^{n} L_t^i}{Y}$, $\frac{T}{Y}$, and $\frac{B}{Y}$, because the number of observation of these variables is too small to obtain robust results from the unit root tests.

In the next step, we select the lag length of VAR. As mentioned above, we decide the lag length, l, using the Wald statistic. We note that the conditions, $l \geq k + d_{\max}$ and $k \geq 1$, must be satisfied. As a result, we set l =4.

We estimate the VAR equation (18), which lag length is equal to 4. The result is reported in Table 1. We then implement the Granger causality tests based on the Wald statistics from the OLS estimators. The Wald statistics are reported in Table 2. Figure 7 summarizes the results of the Granger causality tests in Table 2.[11]

According to the Granger causality tests, we confirm that causality from $\frac{T}{Y}$ to $\frac{\sum_{i=1}^{n} L_t^i}{Y}$ as well as causality from $\frac{T}{Y}$ to $\frac{G}{Y}$ is strong. From results in 5% significant coefficients in Table 1, an increase in the tax revenues leads to an increase in privileges as well as an increase in expenditures for pure public goods. Also an increase in local privileges leads to an increase in outstanding of bond.

The empirical results suggest the fiscal reconstruction-offsetting effect dominates in the Japanese fiscal policy. The government increases local privileges when the tax revenues increase for exogenous reasons. These results are consistent with the analytical result of non-cooperative game in sections 4 and 5. In other words, the Japanese government was not strong enough to persuade interest groups to cooperate with fiscal reconstruction in the above sample period. We could not exclude

[11] We obtain the almost same causalities in a VAR estimation with $\Delta B/Y$ as a substitute

free-riding behavior of local interesting groups in Japanese fiscal reconstruction.

We don't support the fiscal reconstruction-supporting effect, because an increase in tax revenues results from not raising tax rates but exogenous expansion of tax bases (higher rate of GDP growth in the rapid economic growth era and rising asset price in the bubble era) in Japan.

We also observe the causality from $\frac{\sum_{i=1}^{n} L_t^i}{Y}$ to $\frac{B}{Y}$ in Table 2 or Figure 7. It means that an increase in tax revenues causes an increase in debt outstanding (see also Table 1). According to the above theoretical model, it seems that a gradual increase in the ceiling, G^* affects the causality. That is, we estimate the above equations for the long term (about 40 years), and $G + rB$ increases gradually for the long term. We can reduce in our model that an increase in tax revenues leads to an increase in debt outstanding when G^* increases. It is consistent with the result.

7. Concluding Remarks

Although the government can impose the ceiling constraint on some of public spending for fiscal reconstruction, it cannot easily restrain region-specific transfers. In formulating the process of fiscal reconstruction in Japan it is critical to clarify how the existing privileges of local interest groups such as preferential treatments of public works are to be abandoned.

This paper has shown that the free riding problem in the fiscal reconstruction process is aggravated when players' choices are conditional on the observable collective variables. We have explored the free-riding behavior of local interest groups in the fiscal reconstruction process by comparing the open-loop and closed-loop solutions. Without commitment

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for B/Y.

higher existing privileges and higher government debt are made relative to the enforceable commitment case. The important policy's lesson from this analysis is that if the program of fiscal reconstruction is too flexible in the sense that it allows each interest group to reconsider the predetermined policies such as tax increases or subsidy cuts at each point in time when the outcome of fiscal reconstruction is revealed, it is highly likely that fiscal reconstruction ends finally in much failure. Allowing such possibility would straighten an incentive of each group to free ride. This feature actually happened in Japan during 1990s.

In order to realize successful fiscal reconstruction, therefore, we have to stick to the long-term program for fiscal reconstruction that has been agreed at the beginning of planning period. In practice, one of effective means is to enact legislation for fiscal reconstruction that does not permit much room for reconsidering or revising the fiscal reconstruction plan. In Japan the Fiscal Structural Reform Act by PM Hashimoto tried to do so, but it has weakness in that it allowed for much room for reconsidering the fiscal reform.

We have shown that the steady-state level of government debt during fiscal reconstruction is increasing with the rate of time preference and the level of income, but is decreasing with the rate of interest. In particular an increase in the rate of time preference is relevant since it induces an increase in lobbying activities to seek for more privileges during transition and larger deficits, while it reduces national-wide public good. We have also shown that raising taxes has the similar effect as an increase in GDP for the public sector. Namely, an increase in local and/or national taxes may be desirable for fiscal reconstruction to some extent although this policy cannot attain the Pareto-efficient outcome. The empirical investigation with respect to an increase in taxes is consistent with the politico-economic theoretical model developed in this paper.

The present model could be extended in several directions. The

most important extension is to allow heterogeneity across local interest groups. The extension to include heterogeneous regions in terms of incomes, preferences, or discount factors may add further insights to our results despite the analytic complexity.

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Grants from the central government (per capita)

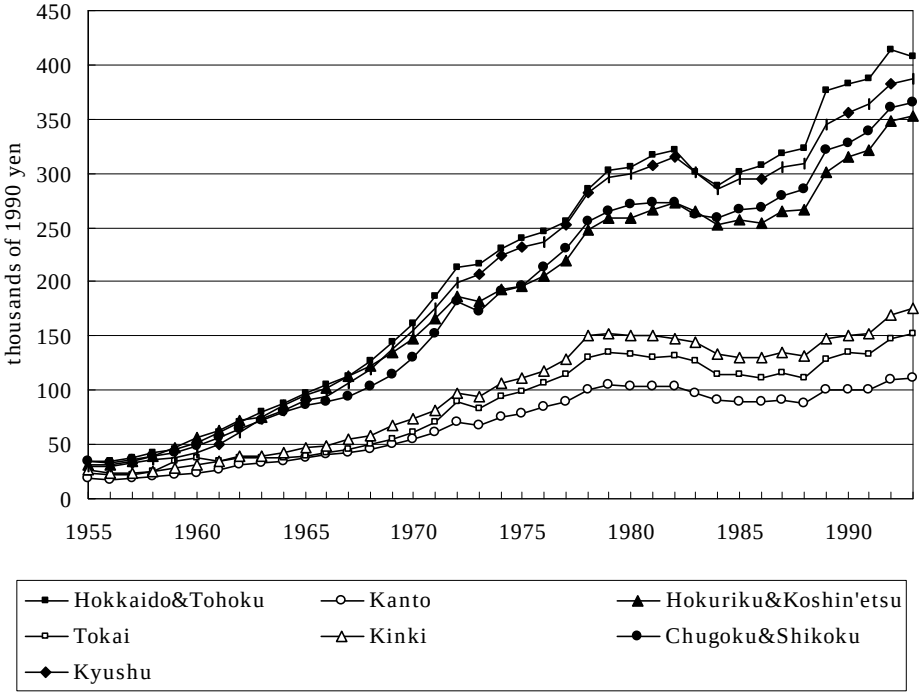


Figure 1

Representatives in the ruling party per 1,000,000 people

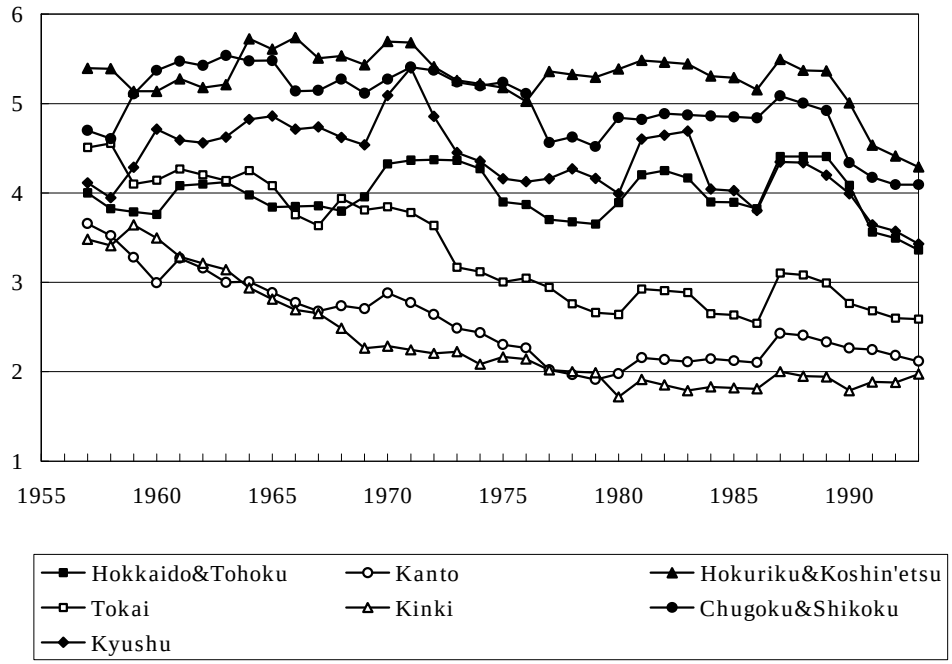


Figure 2

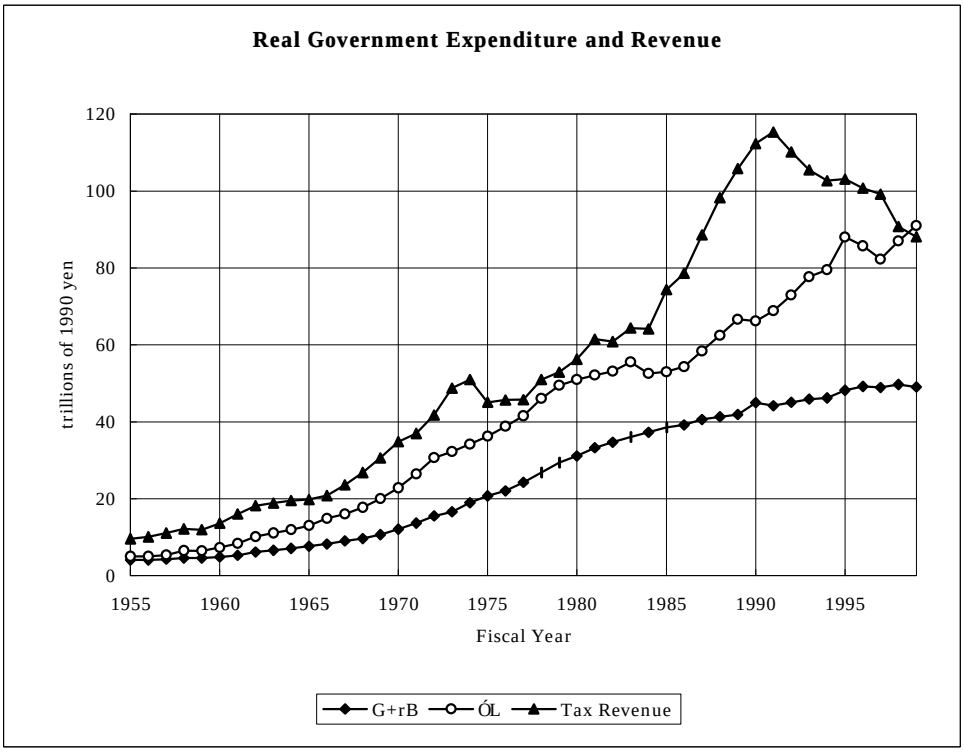


Figure 3

Notes: G is public spending by central and local governments including agencies, national defense, disposition of external affairs, and education and culture. rB is interest payments. ΣL is public investment and privileges to regions, including the remaining expenditures.

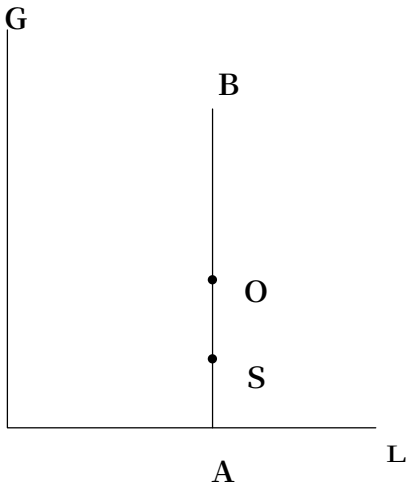


Figure 4

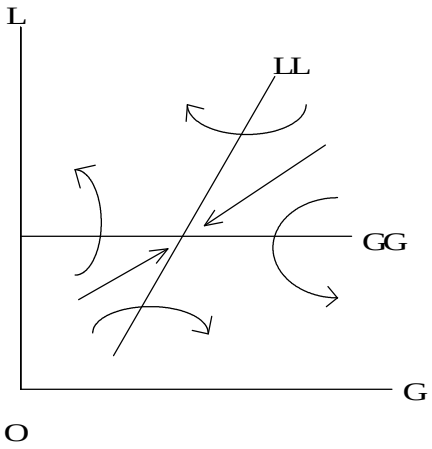


Figure 5

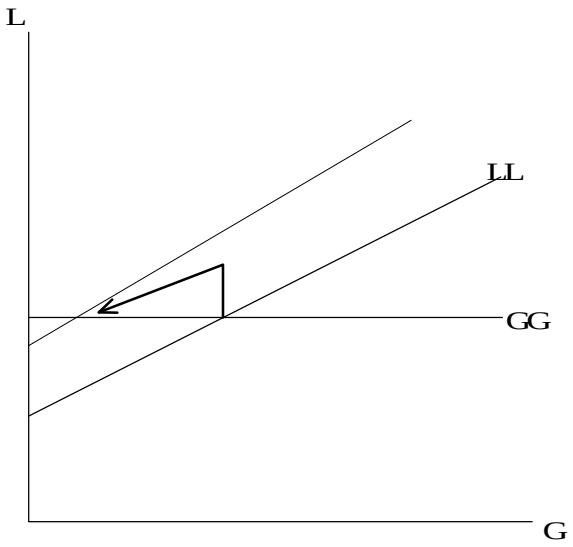
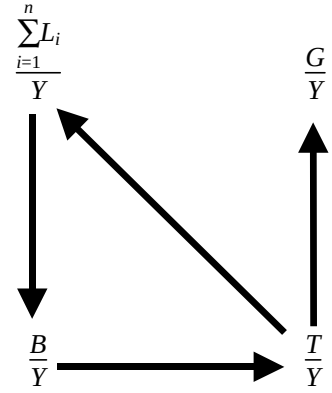


Figure 6

Granger causality tests

1955-1999



: 1% significance

: 5% significance

Figure 7

Table 1
Estimation of the VAR
1955-1999

	Dependent variable:			
	$(\Sigma L/Y)_t$	$(T/Y)_t$	$(G/Y)_t$	$(B/Y)_t$
intercept	0.017	0.113	-0.008	-0.094
	(0.851)	(3.454)	(-1.001)	(-2.211)
time trend	2.893	1.677	-0.106	2.074
$(\times 10^3)$	(3.148)	(1.112)	(-0.279)	(1.066)
$(\acute{O}L/Y)_{t-1}$	-0.034	-0.037	-0.091	1.714
	(-0.151)	(-0.100)	(-0.976)	(3.605)
$(\acute{O}L/Y)_{t-2}$	0.084	0.652	0.127	0.384
	(0.304)	(1.439)	(1.110)	(0.657)
$(\acute{O}L/Y)_{t-3}$	0.003	-0.350	-0.028	0.406
	(0.010)	(-0.745)	(-0.238)	(0.671)
$(\acute{O}L/Y)_{t-4}$	-0.117	-0.479	0.122	0.254
	(-0.513)	(-1.283)	(1.292)	(0.527)
$(G/Y)_{t-1}$	0.583	-0.656	0.438	2.092
	(1.086)	(-0.745)	(1.969)	(1.842)
$(G/Y)_{t-2}$	0.783	1.600	0.165	-0.901
	(1.428)	(1.779)	(0.728)	(-0.777)
$(G/Y)_{t-3}$	0.489	0.806	0.173	-1.393
	(0.886)	(0.889)	(0.758)	(-1.191)
$(G/Y)_{t-4}$	-0.380	-0.389	-0.290	0.354
	(-0.921)	(-0.575)	(-1.696)	(0.406)
$(T/Y)_{t-1}$	0.352	0.806	0.229	0.515
	(2.395)	(3.343)	(3.766)	(1.657)
$(T/Y)_{t-2}$	-0.151	-0.329	-0.065	-0.374
	(-0.830)	(-1.099)	(-0.866)	(-0.968)
$(T/Y)_{t-3}$	0.358	-0.725	-0.023	0.563
	(1.979)	(-2.443)	(-0.313)	(1.471)
$(T/Y)_{t-4}$	0.069	0.162	0.022	0.118
	(0.647)	(0.931)	(0.496)	(0.529)
$(B/Y)_{t-1}$	0.260	-0.200	0.099	2.233
	(2.395)	(-1.122)	(2.213)	(9.724)
$(B/Y)_{t-2}$	-0.388	0.126	-0.148	-1.711
	(-1.796)	(0.354)	(-1.649)	(-3.738)
$(B/Y)_{t-3}$	0.015	-0.406	0.090	1.072
	(0.070)	(-1.128)	(0.995)	(2.310)
$(B/Y)_{t-4}$	0.050	0.517	-0.062	-0.719
	(0.417)	(2.621)	(-1.243)	(-2.828)
	log of likelihood function			679.376
std. err. of regression	0.004	0.007	0.002	0.009
adj. R^2	0.973	0.920	0.927	0.999
D.W.	1.639	1.994	1.864	2.225

The above parentheses indicate the t-values.

Table 2

Granger causality tests
Wald statistics

		Independent variables			
		ΣL/Y	T/Y	G/Y	B/Y
Dependent variable	ΣL/Y	--	14.483	6.709	7.675
			(0.002)	(0.082)	(0.053)
	T/Y	2.191	--	5.733	13.299
		(0.534)		(0.125)	(0.004)
	G/Y	1.828	16.592	--	5.715
		(0.609)	(0.001)		(0.126)
	B/Y	14.936	3.895	5.580	--
		(0.002)	(0.273)	(0.134)	

The above parentheses indicate the p-values of the hypothesis: The independent variable does not Granger-cause the dependent variable.