

Chapter 13

Workings of A Public Money System

Being intensified by the recent financial crisis in 2008, debt crises seem to be looming ahead among many OECD countries due to the runaway accumulation of government debts. This chapter¹ first explores them as a systemic failure of the current *debt money system*. Secondly, with an introduction of open macroeconomies, it examines how the current system can cope with the liquidation of government debt, and obtains that the liquidation of debts triggers recessions, unemployment and foreign economic recessions contagiously. Thirdly, it explores the workings of a *public money system* proposed by the American Monetary Act and finds that the liquidation under this alternative system can be put into effect without causing recessions, unemployment and inflation as well as foreign recessions, and simultaneously attain a higher economic growth. Finally, public money policies that incorporate balancing feedback loops such as anti-recession and anti-inflation are introduced for curbing GDP gap and inflation. They are posed to be simpler and more effective than the complicated Keynesian policies.

13.1 Modeling A Debt Money System

We have explored in the previous chapter how accumulating government debts could be liquidated under two different macroeconomic systems; that is, a current macroeconomic system of debt money, and a macroeconomic system of public money advocated by the American Monetary Act. What we have found is that the liquidation of government debt under the current macroeconomic system of debt money is very costly; that is, it triggers economic recessions,

¹This chapter is based on the paper: Workings of A Public Money System of Open Macroeconomies – Modeling the American Monetary Act Completed – submitted to the 29th International Conference of the System Dynamics Society, Washington D.C., USA, July 25 - 29, 2011.

while the liquidation process under a public money system can be accomplished without causing recessions and inflations. The results are, however, obtained in a simplified closed macroeconomic system in which no labor market exists.

Accordingly, the purpose of this chapter is to expand the previous simple macroeconomic system to complete open macroeconomies in which labor market and foreign exchange market exist, and analyze if similar results could be obtained in the open macroeconomies for a debt money and a public money system.

For the comparative analysis of the two open macroeconomic systems, the open macroeconomic model as a closed economic system developed in chapter 11 is revisited in this chapter [Companion Model: Design OpenMacro2-6.vpm]. The model of a debt money system is the same as the model in chapter 11. Yet for the convenience of the reader, transactions of the open macroeconomies by government, banks and the central bank are replicated here as a comparative reference to the revised transactions of government, banks and the central bank under a public money system of open macroeconomies to be presented below.

Government

Transactions of the government are illustrated in Figure 13.12 in the appendix, some of which are summarized as follows.

- Government receives, as tax revenues, income taxes from consumers and corporate taxes from producers.
- Government spending consists of government expenditures and payments to the consumers for its partial debt redemption and interests against its securities.
- Government expenditures are assumed to be endogenously determined by either the growth-dependent expenditures or tax revenue-dependent expenditures.
- If spending exceeds tax revenues, government has to borrow cash from consumers and banks by newly issuing government securities.
- Foreign government is assumed to behave in a similar fashion as a mirror image of domestic government.

Banks

Main transactions of banks, which are illustrated in Figure ?? in the appendix, are summarized as follows.

- Banks receive deposits from consumers and consumers abroad as foreign investors, against which they pay interests.
- They are obliged to deposit a portion of the deposits as the required reserves with the central bank.

- Out of the remaining deposits, loans are made to producers and banks receive interests to which a prime rate is applied.
- If loanable fund is not enough, banks can borrow from the central bank to which discount rate is applied.
- Their retained earnings thus become interest receipts from producers less interest payment to consumers and to the central bank. Positive earnings will be distributed among bank workers as consumers.
- Banks buy and sell foreign exchange at the request of producers, consumers and the central bank.
- Their foreign exchange are held as bank reserves and evaluated in terms of book value. In other words, foreign exchange reserves are not deposited with foreign banks. Thus net gains realized by the changes in foreign exchange rate become part of their retained earnings (or losses).
- Foreign currency (dollars in our model) is assumed to play a role of *key* currency or *vehicle* currency. Accordingly foreign banks need not set up foreign exchange account. This is a point where a mirror image of open macroeconomic symmetry breaks down.

Central Bank

Main transactions of the central bank, which are illustrated in Figure 13.14 in the appendix, are summarized as follows.

- The central bank issues currencies against the gold deposited by the public.
- It can also issue currency by accepting government securities through open market operation, specifically by purchasing government securities from the public (consumers) and banks. Moreover, it can issue currency by making credit loans to commercial banks. (These activities are sometimes called *money out of nothing*.)
- It can similarly withdraw currencies by selling government securities to the public (consumers) and banks, and through debt redemption by banks.
- Banks are required by law to reserve a certain amount of deposits with the central bank. By controlling this required reserve ratio, the central bank can control the monetary base directly.
- The central bank can additionally control the amount of money supply through monetary policies such as open market operations and discount rate.
- Another powerful but hidden control method is through its direct influence over the amount of credit loans to banks (known as *window guidance* in Japan.)

- The central bank is allowed to intervene foreign exchange market; that is, it can buy and sell foreign exchange to keep a foreign exchange ratio stable (though this intervention is actually exerted by the Ministry of Finance in Japan, it is regarded as a part of policy by the central bank in our model).
- Foreign exchange reserves held by the central bank is usually reinvested with foreign deposits and foreign government securities, which are, however, not assumed here as inessential.

13.2 Behaviors of A Debt Money System

Mostly Equilibria in the Real Sector

Our open macroeconomic model is now completely presented. It is a generic model, out of which diverse macroeconomic behaviors are generated, depending on the purpose of simulations. In this paper let us focus on an equilibrium growth path as a benchmark for our analysis to follow. An equilibrium state is called a *full capacity aggregate demand equilibrium* if the following three output and demand levels are met:

$$\text{Full Capacity GDP} = \text{Desired Output} = \text{Aggregate Demand} \quad (13.1)$$

If the economy is not in the equilibrium state, then actual GDP is determined by

$$\text{GDP} = \text{MIN} (\text{Full Capacity GDP}, \text{Desired Output}) \quad (13.2)$$

In other words, if desired output is greater than full capacity GDP, then actual GDP is constrained by the production capacity, meanwhile in the opposite case, GDP is determined by the amount of desired output which producers wish to produce, leaving the capacity idle, and workers being laid off.

Even though full capacity GDP is attained, full employment may not be realized unless the following equation is not met;

$$\text{Potential GDP} = \text{Full Capacity GDP}. \quad (13.3)$$

Does the equilibrium state, then, exist in the sense of full capacity GDP and full employment? To answer these questions, let us define GDP gap as a difference between potential GDP and actual GDP, and its ratio to the potential GDP as

$$\text{GDP Gap Ratio} = \frac{\text{Potential GDP} - \text{GDP}}{\text{Potential GDP}} \quad (13.4)$$

By trial and error, mostly equilibrium states are attained when price elasticity e is 3, together with all other adjusted parameters, as illustrated in Figure 13.1.

Our open macrodynamic model has more than 900 variables that are interrelated one another, among which, as benchmark variables for comparative analyses in this paper, we mainly focus on two variables: GDP gap ratio and

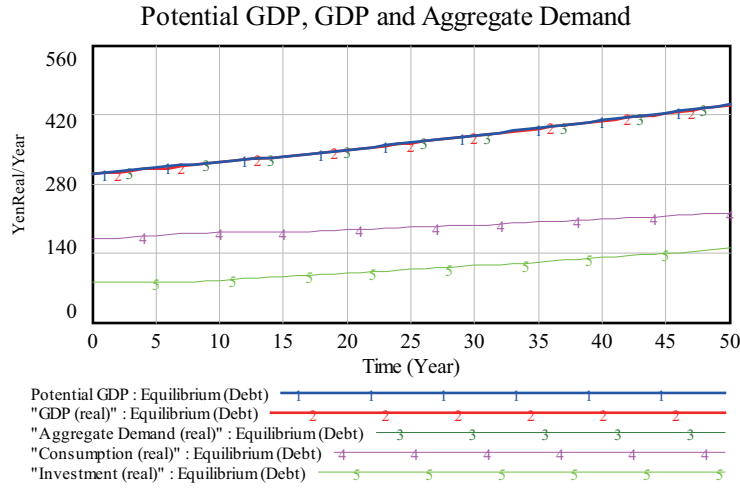


Figure 13.1: Mostly Equilibrium States

unemployment rate. Figure 13.2 illustrates these two figures at the mostly equilibrium states. GDP gap ratios are maintained below 1% after the year 6, and unemployment ratios are less than 0.65% at their highest around the year 6, approaching to zero; that is, full employment. The reader may wonder why these are a state of mostly equilibria, because some fluctuations are being observed. Economic activities are alive like human bodies, whose heart pulse rates, even of healthy persons, fluctuate between 60 and 70 per minute in average. Yet, they are a normal state. In a similar fashion, it is reasonable to consider these fluctuations as normal equilibrium states.

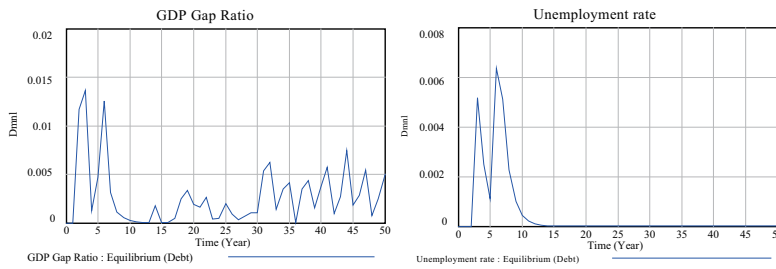


Figure 13.2: GDP Gap and Unemployment Rate of Mostly Equilibrium States

Money out of Nothing

For the attainment of mostly equilibria, enough amount of money has to be put into circulation to avoid recessions caused by credit crunch as analyzed in

[87]. Demand for money mainly comes from banks and producers. Banks are assumed to make loans to producers as much as desired so long as their vault cash is available. Thus, they are persistently in a state of shortage of cash as well as producers. In the case of producers, they could borrow enough fund from banks. From whom, then, should the banks borrow in case of cash shortage?

In a closed economic system, money has to be issued or created within the system. Under the current financial system of debt money, only the central bank is endowed with a power to issue money within the system, and make loans to the commercial banks directly and to the government indirectly through the open market operations. Commercial banks then create credits under a fractional reserve banking system by making loans to producers and consumers. These credits constitute a great portion of money supply. In this way, money and credits are only crated when commercial banks and government as well as producers and consumers come to borrow at interest. Under such circumstances, if all debts are repaid, money ceases to exit. This is an essence of a debt money system. The process of creating money is known as *money out of nothing*.

Figure 13.3 indicates unconditional amount of annual discount loans and its growth rate by the central bank at the request of desired borrowing by banks. In other words, money has to be incessantly created and put into circulation in order to sustain an economic growth under mostly equilibrium states. Roughly speaking, a growth rate of credit creation by the central bank has to be in average equal to or slightly greater than the economic growth rate as suggested by the right hand diagram of Figure 13.3, in which line 1 is a growth rate of

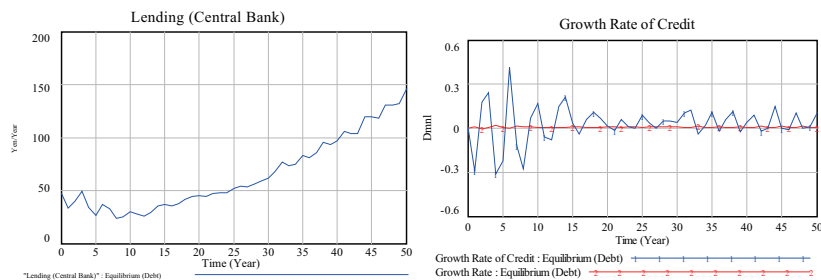


Figure 13.3: Lending by the Central Bank and its Growth Rate

credit and line 2 is an economic growth rate. In this way, the central bank begins to exert an enormous power over the economy through its credit control.

Accumulation of Government Debt

So long as the mostly equilibria are realized in the economy, through monetary and fiscal policies in the days of recession, no macroeconomic problem seems to exist. This is a positive side of the Keynesian macroeconomic theory. Yet behind the full capacity aggregate demand growth path in Figure 13.1 government debt continues to accumulate as the line 1 in the left diagram of Figure 13.4

illustrates. This is a negative side of the Keynesian theory. Yet most macroeconomic textbooks neglect or less emphasize this negative side, partly because their macroeconomic frameworks cannot handle this negative side of the debt money system.

In the model here primary balance ratio is initially set to be one and balanced budget is assumed to the effect that government expenditure is set to be equal to tax revenues, and no deficit arises. Why, then, does the government continue to accumulate debt? Government deficit is precisely defined as

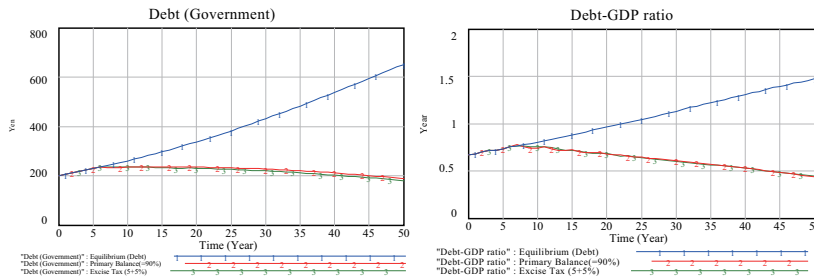


Figure 13.4: Accumulation of Government Debt and Debt-GDP Ratio

$$\text{Deficit} = \text{Tax Revenues} - \text{Expenditure} - \text{Debt Redemption} - \text{Interest} \quad (13.5)$$

Therefore, even if balanced budget is maintained, government still has to keep paying its debt redemption and interest. This is why it has to keep borrowing and accumulating its debt; that is to say, it is not balanced in an expanded sense of budget. Initial GDP in the model is attained to be 300, while government debt is initially set to be 200. Hence, the initial debt-GDP ratio is around 0.667 year. Yet, the ratio continues to increase to 1.473 year at the year 50 in the model as illustrated by the line 1 in the right diagram of Figure 13.4. This implies the government debt becomes 1.473 years as high as the annual level of GDP.

Remarks: Even if a debt crisis due to the runaway accumulation of debt fails to be observed in the near future, still there exit some ethical reasons to stop accumulating debts. First, it continues to create unfair income distribution in favor of creditors, that is, bankers and financial elite, causing inefficient allocation of resources and economic performances, and eventually social turmoils among the poor. Secondly, obligatory payment of interest forces the indebted producers to drive incessant economic growth to the limit of environmental carrying capacity, which eventually leads to the collapse of environment. In short, a debt money system is unsustainable as a macroeconomic system.

Liquidation of Government Debt

Let us now consider how we could avoid such a debt crisis under the current debt money system. At the face of the debt crisis as discussed above, suppose

that government is forced to reduce its debt-GDP ratio to less than 0.6 by the year 50, as currently required to all EU members by the Maastricht treaty.

To attain this goal, though, only two policies are available to the government; that is, to spend less or to tax more. Let us consider them, respectively.

Policy A: Spend Less

This policy assumes that the government spend 10% less than its equilibrium tax revenues, so that a primary balance ratio is reduced to 0.9 in our economy. In other words, the government has to make a strong commitment to repay its debt annually by the amount of 10 % of its tax revenues. Let us assume that this reduction is put into action at the year 6. Line 2 of the left diagram of Figure 13.5 illustrates this reduction of spending.

Under such a radical financial reform, debt-GDP ratio will begin to get reduced to around 0.65 at the year 25, and to around 0.44 at the year 50 as illustrated by line 2 in the right diagram of Figure 13.4. Accordingly, the accumulation of debt will be eventually curved as shown by line 2 in the left diagram of Figure 13.4.

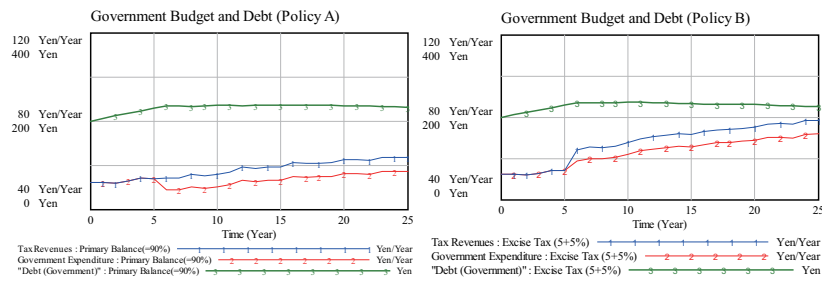


Figure 13.5: Liquidation Policies: Spend Less and Tax More

Policy B: Tax More (and Spend More)

Among various sources of taxes to be levied by the government such as income tax, excise tax, and corporate tax, let us assume here that excise tax is increased, partly because an increase in consumption (or excise) tax has become a hot political issue recently in Japan. Specifically the excise tax is assumed to be increased to 10% from the initial value of 5% in our model; that is, 5% increase. Line 1 of the right diagram of Figure 13.5 illustrates the increased tax revenues.

Out of these increased tax revenues, spending is now reduced by 8.5% to repay the accumulated debt. Though spending is reduced in the sense of primary balance, it has indeed increased in the absolute amount, compared with the original equilibrium spending level, as illustrated by line 2 of the same right diagram of Figure 13.5. Accordingly the government needs not be forced to reduce the equilibrium level of budget.

As a result this policy can also successfully reduces debt as illustrated by line 3 of the same diagram up to the year 25, and further up to the year 50 as illustrated by line 3 in the left diagram of Figure 13.4.

Triggered Recession and Unemployment

These liquidation policies seem to be working well as debt begins to get reduced. However, the implementation of these policies turns out to be very costly to the government and its people as well.

Let us examine the policy A in detail. At the next year of the implementation of 10 % reduction of a primary balance ratio, growth rate is forced to drop to minus 2 %, and the economy fails to sustain its full capacity aggregate demand equilibrium of line 1 as illustrated by line 2 in Figure 13.6. Compared with the mostly equilibrium path of line 1, debt-reducing path of line 2 brings about business cycles. Similarly, line 3 indicates another business cycle triggered by Policy B.

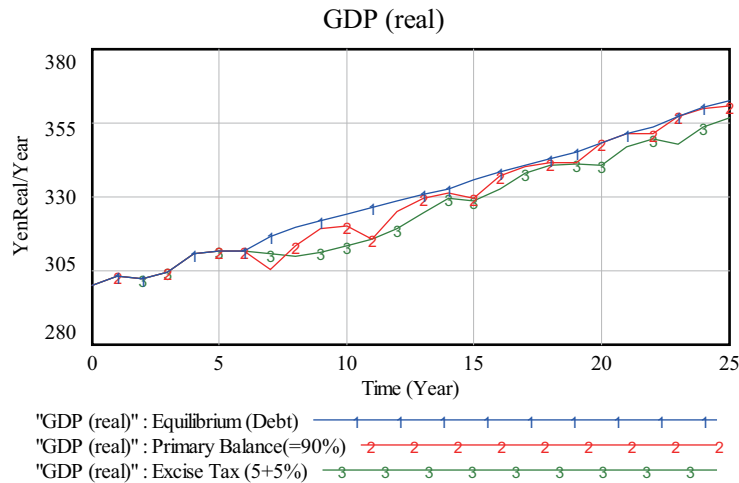


Figure 13.6: Recessions triggered by Debt Liquidation

Figure 13.7 (lines 2) shows how this policy of debt liquidation triggers GDP gap and unemployment. GDP gap jumps from 0.3% to 3.9% at the year 7, an increase of 13 times. Unemployment jumps from 0.5% to 4.8% at the year 7, more than 9 times. In similar fashion, lines 3 indicate another gaps triggered by Policy B.

In the previous paper [91], unemployment was left unanalyzed. In this sense, the result here is a new finding on the effect of debt liquidation under the current debt money system. The reader should understand that the absolute number is not essential here, because our analysis is based on arbitrary numerical values. Instead, comparative changes in factors need be paid more attention.

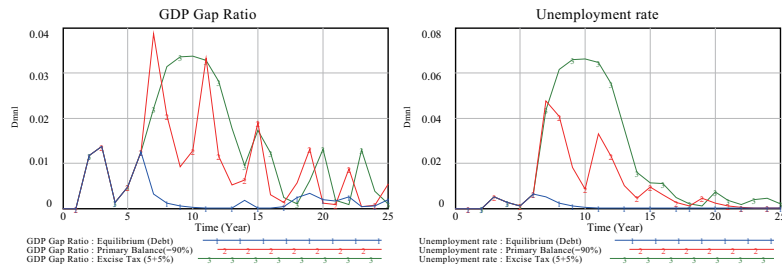


Figure 13.7: GDP Gap and Unemployment

Figure 13.8 illustrates how fast wage rate plummets (line 2 in the left diagram) - another finding in this paper. Concurrently inflation rate plunges to -0.98% from -0.16% , close to 6 times drop, that is, the economy becomes deflationary (line 2 in the right diagram). Lines 3, likewise, indicate another behaviors triggered by Policy B.

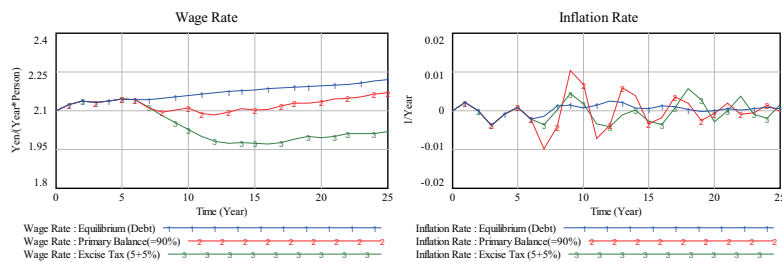


Figure 13.8: Wage Rate and Inflation

These recessionary effects triggered by the liquidation of debt turn out to cross over a national border and become contagious to foreign countries. Figure 13.9 illustrates how GDP gap and unemployment in a foreign country get worsened by the domestic liquidation policy A (lines 2) and policy B (lines 3). These contagious effects under open macroeconomies are observed for the first time in our expanded macroeconomic model - the third finding in this paper. In this sense, in a global world economy, no country can be free from a contagious effect of recessions caused by the debt liquidation policy in other country.

A Liquidation Trap of Government Debt

Under a debt money system, liquidation policy of government debt will be eventually captured into a liquidation trap as follows. The liquidation policy is only implemented with the reduction of budget deficit by spending less or levying tax; that is; policy A or B in our case. Whichever policy is taken, it causes an economic recession as analyzed above.

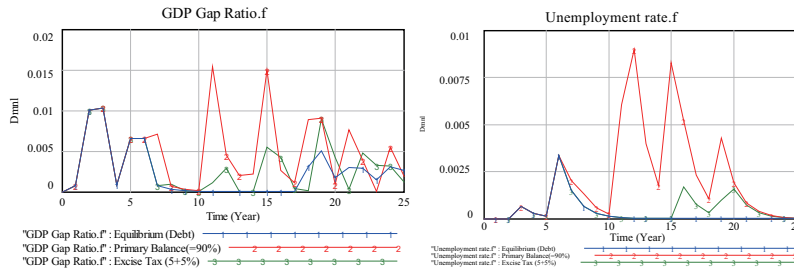


Figure 13.9: Foreign Recessions Contagiously Triggered

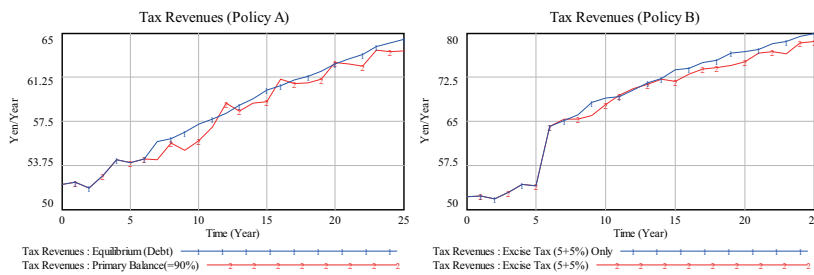


Figure 13.10: Liquidation Traps of Debt

The immediate effects of recession either by policy A or B are the reduction of tax revenues as illustrated by lines 2 in Figure 13.10. Eventually revenue reduction will worsen budget deficit. In other words, policies to reduce deficit result in an increase in deficit. This constitutes a typical balancing feedback loop, which is illustrated as “Revenues Crisis” loop in Figure 13.11.

The other effect of recession will be a forced bailout/stimulus package by the government, which in turn increases government expenditures, worsening budget deficit again. This adds up a second balancing feedback loop, which is illustrated as “Spending Crisis” loop in Figure 13.11.

In this way the liquidation policies of government debt are retarded by two balancing feedback loops of revenues crisis and spending crisis, making up liquidation traps of government debt. This indicates that the debt money system combined with the traditional Keynesian fiscal policy becomes a dead end as a macroeconomic monetary system.

13.3 Modeling A Public Money System

We are now in a position to implement the alternative macroeconomic system discussed in the introduction, as proposed by the American Monetary Act, in which central bank is incorporated into a branch of government and a fractional reserve banking system is abolished. Let us call this new system a public money

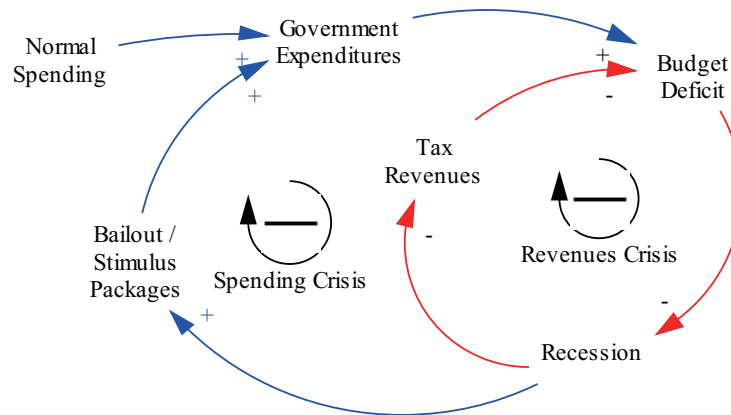


Figure 13.11: Causal Loop Diagram of Liquidation Traps of Debt

system of open macroeconomies. Money issued under this new system plays a role of public utility of medium of exchange. Hence the newly incorporated institution may be appropriately called *the Public Money Administration (PMA)* as in the previous chapter.

Under the new system, transactions of only government, commercial banks and the public money administration (formally the central bank) need be revised slightly. Let us start with the description of the revised transactions of the government.

Government

- Balanced budget is assumed to be maintained; that is, a primary balance ratio is unitary. Yet the government may still incur deficit due to the debt redemption and interest payment.
- Government now has the right to newly issue money whenever its deficit needs to be funded. The newly issued money becomes seigniorage inflow of the government into its equity or retained earnings account.
- The newly issued money is simultaneously deposited with the reserve account of the Public Money Administration. It is also booked to its deposits account of the government assets.
- Government could further issue money to fill in GDP gap.

Revised transaction of the government is illustrated in Figure 13.12 where green stock box of deposits is newly added to the assets.

Banks

Revised transactions of commercial banks are summarized as follows.

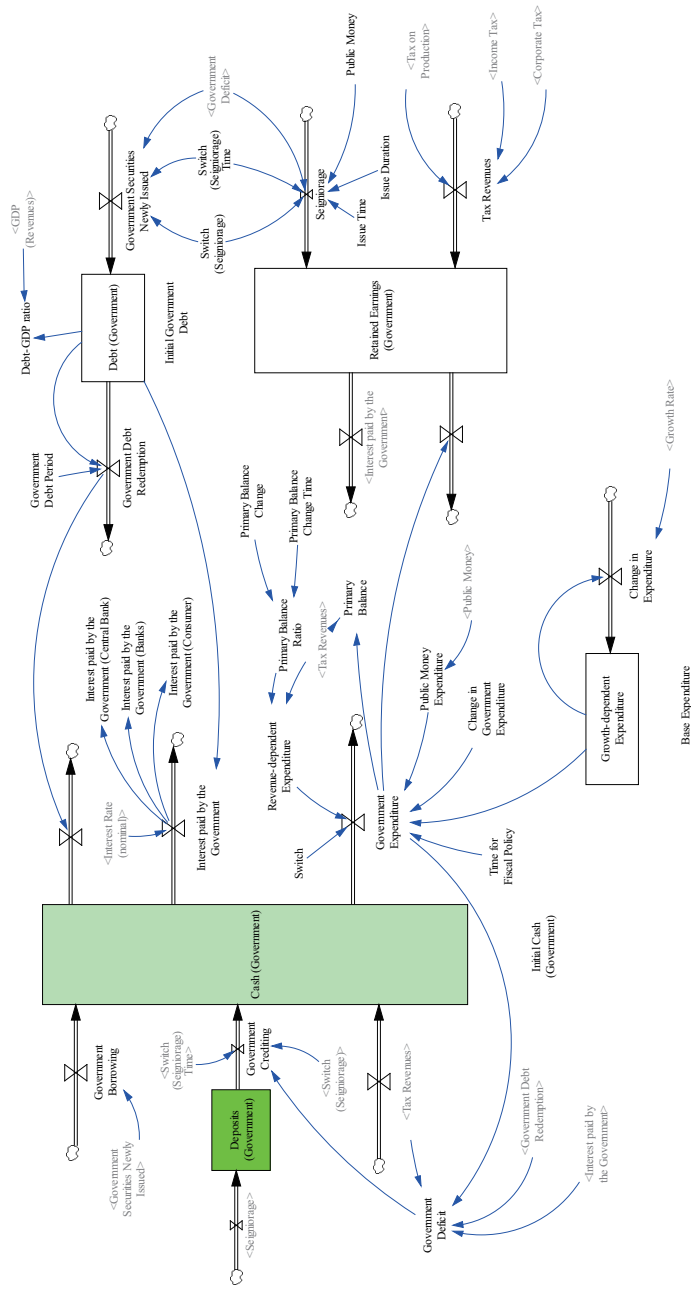


Figure 13.12: Transactions of Government

- Banks are now obliged to deposit a 100% fraction of the deposits as the required reserves with the public money administration. Time deposits are excluded from this obligation.
- When the amount of time deposits is not enough to meet the demand for loans from producers, banks are allowed to borrow from the public money administration free of interest; that is, former discount rate is now zero. Allocation of loans to the banks will be prioritized according to the public policies of the government. (This constitutes a market-oriented issue of new money. Alternatively, the government can also issue new money directly through its public policies to fill in GDP gap as already discussed above.)

Line 1 in Figure 13.13 illustrates the initial required reserve ratio of 5% in our model. As in the previous chapter, we have here assumed three different ways of abolishing a fractional reserve banking system. Line 2 shows that a 100% fraction is immediately attained in the following year of its implementation, while line 3 illustrates it is attained in 5 years. Line 4 indicates it is gradually attained in 10 years, starting from the year 6. In our analysis below, 100% fraction will be assumed to be attained in 5 years as a representative illustration of fractional behaviors.

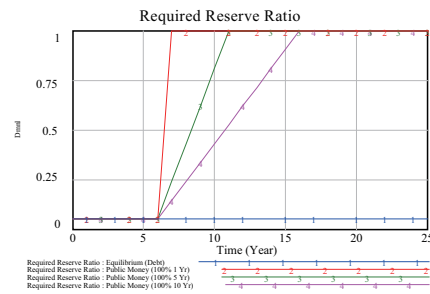


Figure 13.13: 100% Required Reserve Ratios

Public Money Administration (Formerly Central Bank)

The central bank is now incorporated as one of the governmental organizations which is here called the Public Money Administration (PMA). Its revised transactions become as follows.

- The PMA accepts newly issued money of the government as seigniorage assets and enter the same amount into the government reserve account. Under this transaction, the government needs not print hard currency, instead it only sends digital figures of the new money to the PMA.
- When the government want to withdraw money from their reserve accounts at the PMA, the PMA could issue new money according to the requested amount. In this way, for a time being, former central bank note and government money coexist in the market.

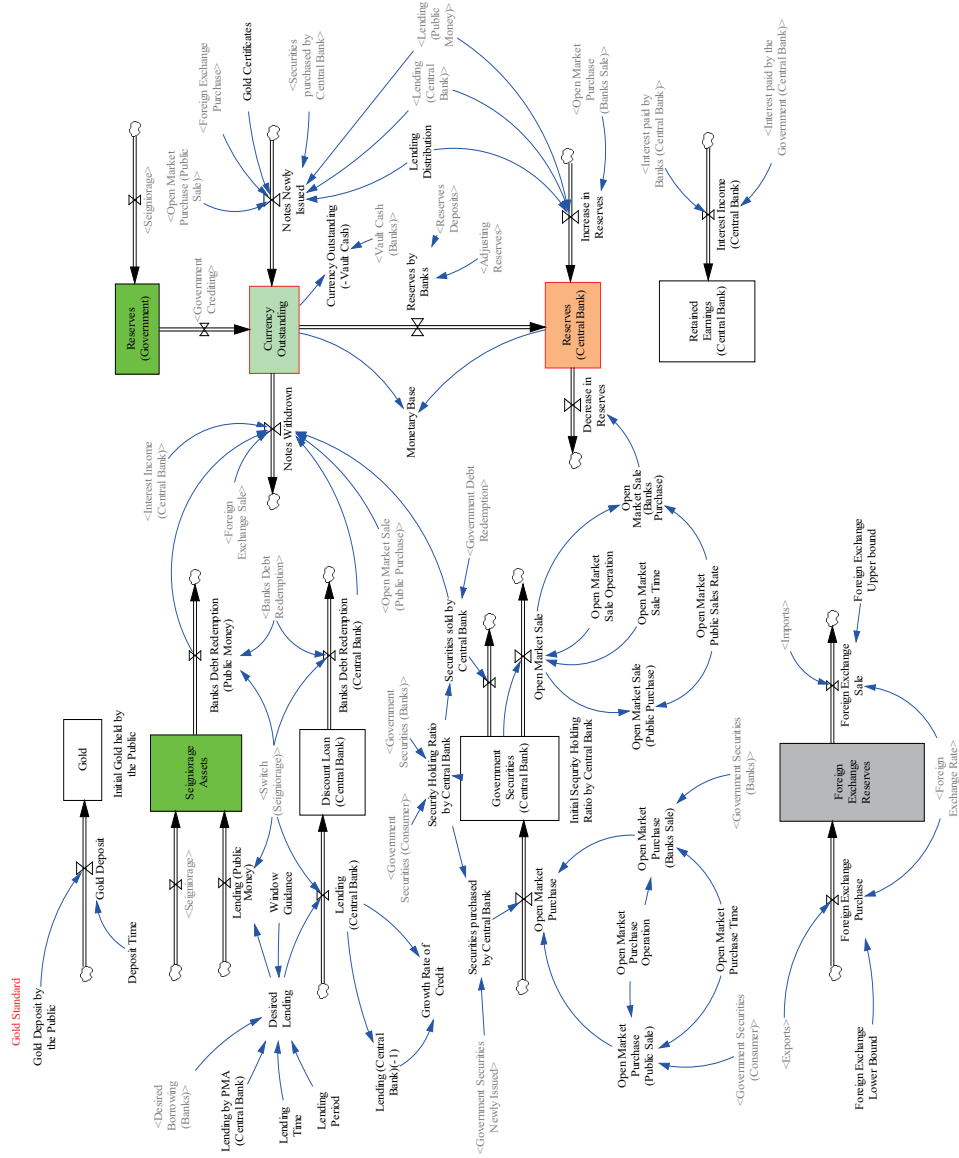


Figure 13.14: Transactions of Public Money Administration (Central Bank)

- With the new issue of money the PMA meets the demand for money by commercial banks, free of interest, according to the guideline set by the government public policies.

Under the revised transactions, open market operations of sales and pur-

chases of government securities become ineffective, simply because government debt gradually diminishes to zero. Furthermore, discount loan is replaced with interest-free loan. This lending procedure becomes a sort of open and public *window guidance*, which once led to the rapid economic growth after world war II in Japan [72]. Accordingly, interest incomes from discount loans and government securities are reduced to be zero eventually. Transactions of the public money administration are illustrated in Figure 13.14 where green stock boxes of seigniorage assets and government reserves are newly added.

13.4 Behaviors of A Public Money System

Liquidation of Government Debt

Under the public money system of open macroeconomies, the accumulated debt of the government gets gradually liquidated as demonstrated by line 4 in the left diagram of Figure 13.15, which is the same as the left diagram of Figure 13.4 except the line 4. Recollect that line 1 is a benchmark debt accumulation of

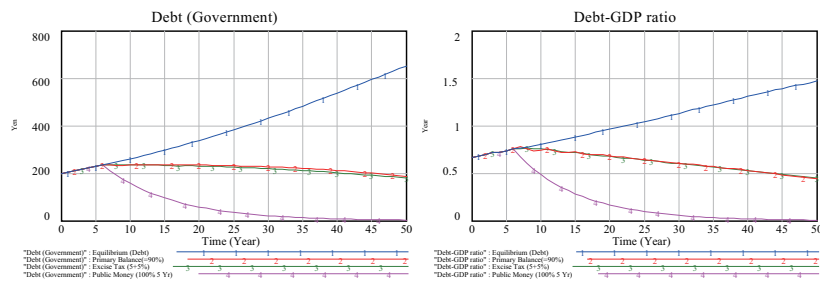


Figure 13.15: Liquidation of Government Debt and Debt-GDP Ratio

the mostly equilibria under the debt money system, while lines 2 and 3 are the decreasing debt lines when debt-ratio are reduced under the same system. Now newly added line 4 indicates that the government debt continues to decline when a 100% fractional ratio is applied in 5 years, starting at the year 6. The other two cases of attaining the 100% fractional reserve discussed above, that is, in a year or 10 years, reduce the debts exactly in a similar fashion. This means that the abolishment period of a fractional level does not affect the liquidation of the government debt, because banks are allowed to fill in the sufficient amount of cash shortage by borrowing from the PMA in the model.

It is shown in Figure 13.16 that the liquidation of government debt (line 4) is performed without triggering economic recession contrary to the case of debt money system (lines 2 and 3). To observe these comparisons in detail, let us illustrate GDP gap ratios and unemployment rates in Figure 13.17, in which the same line numbers apply as in the above figures. The liquidation of government debt under the public money system (line 4) can be said to be far

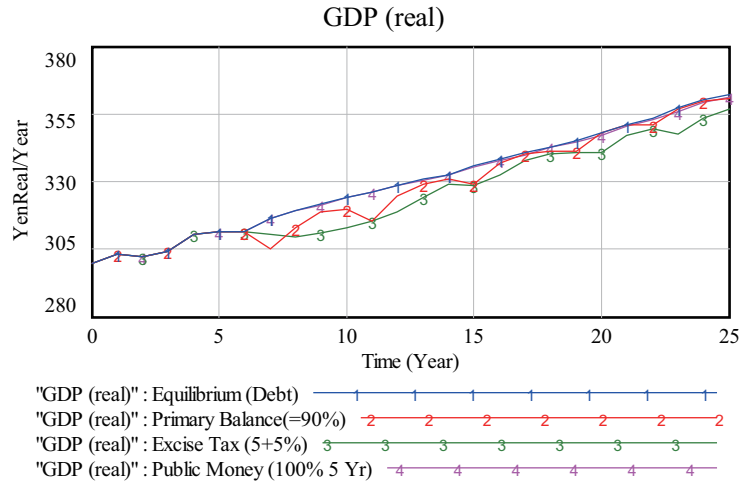


Figure 13.16: No Recessions Triggered by A Public Money System

better performed than the current debt system because of its accomplishment without recession and unemployment.

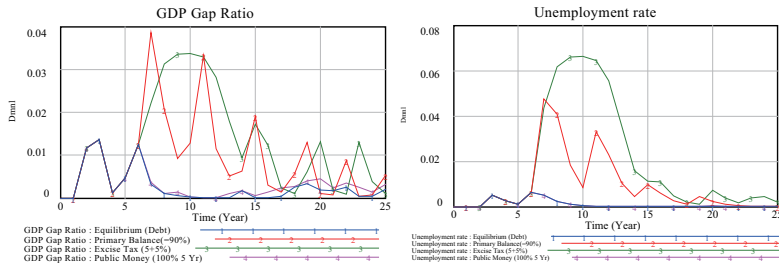


Figure 13.17: GDP Gap and Unemployment

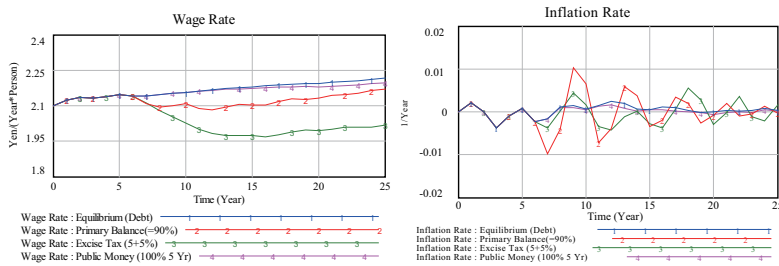


Figure 13.18: Wage Rate and Inflation

Moreover, Figure 13.18 illustrates that wage rate and inflation rates (lines 4) stay closer to the rates of mostly equilibria. Accordingly, the liquidation of debt under the public money system can be said to be attained without reducing wage rate and setting off inflation.

Furthermore, the liquidation of debt under the public money system is not contagious to foreign countries as illustrated by lines 4 in Figure 13.19. That is, GDP gap and unemployment in a foreign country (lines 4) remain closer to their almost equilibria states (lines 1).

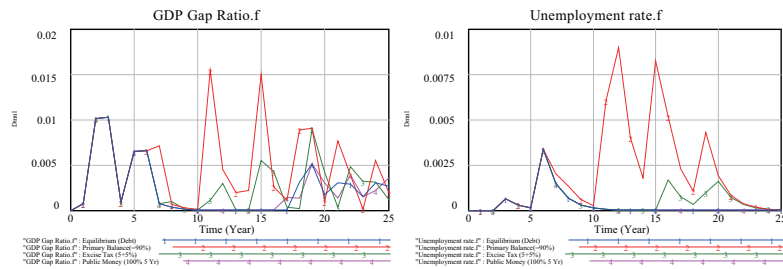


Figure 13.19: Foreign Recessions are Not Triggered

Debt Crises can be Subdued!

In sum, the public money system is, from the results of the above analyses, demonstrated as a superior alternative system for liquidating government debt in a sense that its implementation does not trigger recessions and unemployment both in domestic and foreign economies. In other words, looming debt crises caused by the accumulation of government debt under a current debt money system can be thoroughly subdued without causing recessions, unemployment, inflation, and contagious recessions in a foreign economy.

13.5 Public Money Policies

The role of a newly established public money administration under a public money system is to maintain a monetary value, similar to the role assigned to the central banks under the debt money system. Keynesian monetary policy under the debt money system controls money supply indirectly through the manipulation of required reserve ratio, discount ratio, and open market operations. Accordingly its effect is after all limited, as demonstrated by a failure of stimulating the prolonged recessions in Japan during 1990s through 2000s with the adjustment of the interest rates, specifically with zero interest rate policies.

Compared with these ineffective Keynesian monetary and fiscal policies, public money policies we have introduced here are simpler and more direct; that is, they are made up of the management of the amount of public money in circulation through governmental spending and tax policies. Interest rate is no longer

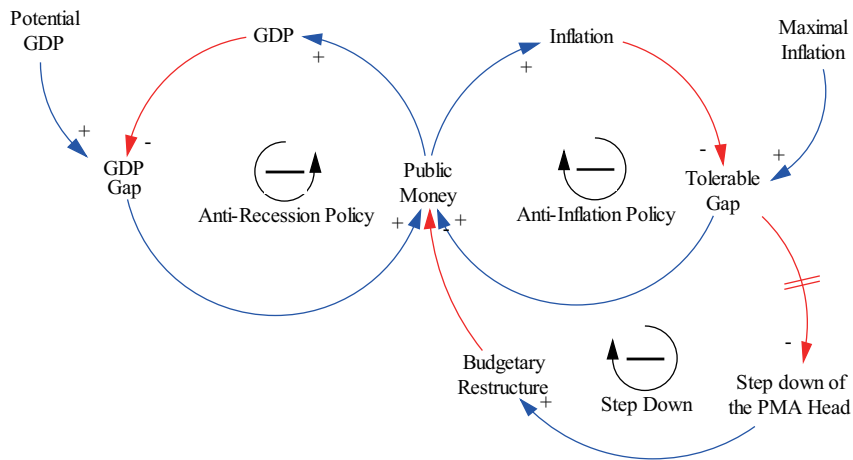


Figure 13.20: Public Money Policies

used by the public money administration as a policy instrument and left to be determined in the market.

More specifically, our public money policies consist of three balancing feedback loops as shown in Figure 13.20. Anti-recession policy is taken in the case of economic recession to fill in a GDP gap; that is, government spends more than tax revenues by newly issuing public money. On the other hand, in the case of inflationary state, anti-inflation policy of managing public money is conducted such that public money in circulation is sucked back by raising taxes or cutting government spending. As a supplement to this policy in the case of an unusually higher inflation rate that is overshooting a maximum tolerable level, a step down policy of budgetary restructure will be carried out so that a head of the public monetary administration is forced to resign for his or her mismanagement of holding a value of public money.

Recession

Let us now examine in detail how anti-recession policy help restore the economy. For this purpose a recession or GDP gap is purposefully produced by changing the value of Normal Inventory Coverage from 0.1 to 0.5 months and Output Ratio Elasticity (Effect on Price) from 3 to 1, as illustrated in the left diagram of Figure 13.21.

To fill a GDP gap under such a recessionary situation, let us continue to newly issue public money by the amount of 5 annually for 20 years, starting at $t=7$. The right diagram of Figure 13.21 confirms that the GDP gap now gets completely filled in. More specifically, Figure 13.22 demonstrates how GDP gap ratio and unemployment rate caused by this recession (lines 1) are recovered by the public money policy as illustrated by lines 2.

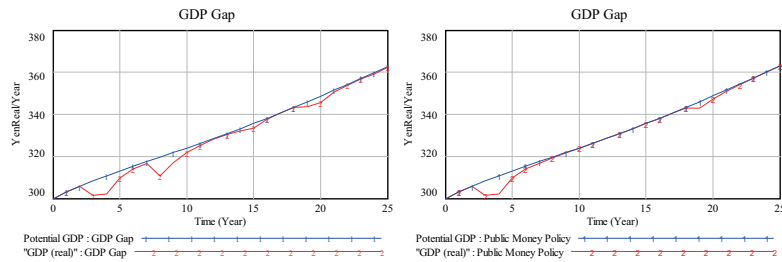


Figure 13.21: GDP Gap and Its Public Money Policy

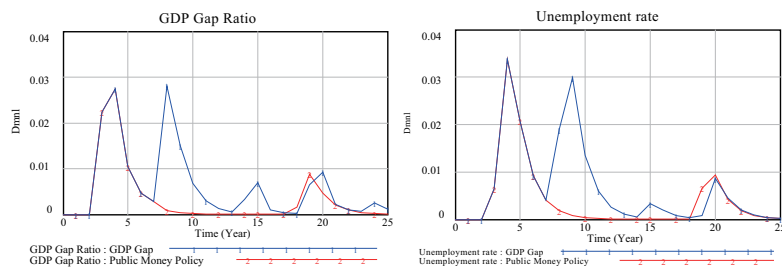


Figure 13.22: GDP Gap and Unemployment Recovered

Inflation

As shown above, so long as a GDP gap exists, an increase in the government expenditure by newly issuing public money can restore the equilibrium by stimulating the economic growth. Yet, this money policy does not trigger a price hike and inflation as illustrated by lines 2 in Figure 13.23 in comparison with lines 1 of GDP gap.

Yet, inflation could occur if government happens to mismanage the amount of public money. To examine the case, let us take a benchmark equilibrium state attained by the public money policy as above (lines 2), then assume that the government overly increases public money to 15 instead of 5 at $t=7$ for 25 years in the above case. This corresponds to a continual inflow of money into circulation. Under such situations, Figure 13.23 shows how price goes up and inflation rate jumps to 1.3% (line 3) from the level of 0.3% attained by the public money policy (line 2), 4 times hike, at the year 9.

The inflation thus caused by the excessive supply of money also triggers a GDP gap of 5% at the year 12 (or -3.1% of economic growth or recession), and an unemployment rate of 7.7% at the year 13 as illustrated by lines 3 in Figure 13.24.

Persistent objection to the public money system has been that government, once a free-hand power of issuing money is being endowed, tends to issue more money than necessary, which tends to bring about inflation eventually, though

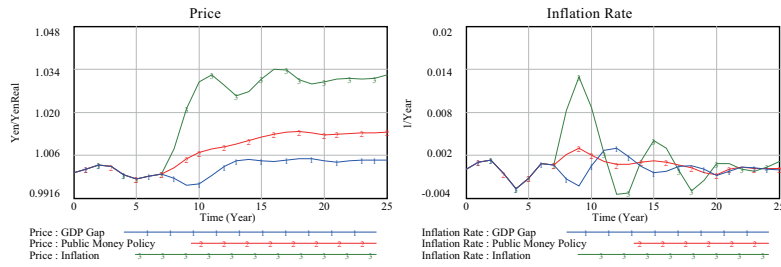


Figure 13.23: Price and Inflation Rate

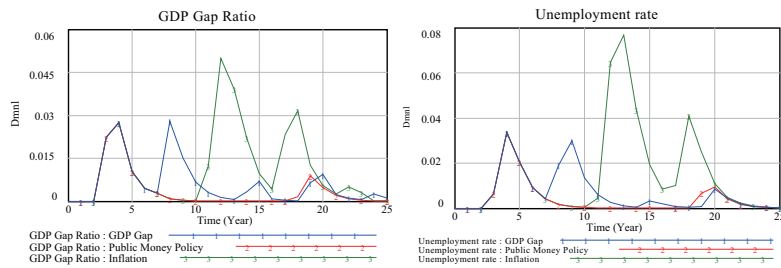


Figure 13.24: GDP Gap and Unemployment

history shows the opposite [96]. The above case could be unfortunately one such example. With the introduction of anti-inflationary policy, however, this type of inflation can be easily curbed by the decrease in public money. Let us define maximal inflation as a maximum tolerable inflation rate set by the government. For instance, it was set to be 8% in [91], as suggested by the American Monetary Act. Then, anti-inflationary policy works such that if an inflation rate approaches to the maximal level and a tolerable gap decreases to zero, the amount of public money will be reduced to curb the inflation through the decrease in government spendings and/or the increase in taxes.

Step Down

What will happen if the tolerable gap becomes negative; that is, current inflation rate becomes higher than the maximal inflation? This could occur, for instance, when the incumbent government tries to cling to the power by unnecessarily stimulating the economy in the years of election as history demonstrates. Business cycle thus spawned is called *political business cycle*. “There is some evidence that such a political business cycle exists in the United States, and the Federal Reserve under the control of Congress or the president might make the cycle even more pronounced [51, p.353].” Indeed Figure 13.25, obtained from the above analysis of inflation, shows how business cycles could be caused by the mismanagement of the increase in public money (line 3) when no GDP gap

been derived. The accumulation of debt will sooner or later lead to impasses of defaults, financial meltdown or hyper-inflation; in other words current debt money system is facing its systemic failure.

Under such circumstances it is shown that it becomes very costly to save the current debt money system by reducing government debt and debt-GDP ratio; that is, a liquidation process of debt inevitably triggers economic recessions and unemployment of both domestic and foreign economies.

An alternative system, then, is presented as a public money system of open macroeconomics as proposed by the American Monetary Act in which only government can issue money with a full reserve banking system. It is shown that under the public money system government debt can be liquidated without triggering recession, unemployment and inflation.

Finally, in place of the current Keynesian monetary and fiscal policies, public money policies are introduced, consisting of three balancing feedback loops of anti-recession policy, anti-inflation policy and restructuring policy of step down of a head of PMA (Public Money Administration). Public money policies thus become simpler and can affect directly to the workings of the economy.

Accordingly, from a viewpoint of system design, a public money system of macroeconomics as proposed by the American Monetary Act seems to be worth being implemented if we wish to avoid impasses such as defaults, financial meltdown and hyper-inflation².

²This implementation might bring about fortunate by-products. A debt money system of the current macroeconomy has been pointed out to constitute a root cause of unfair income distribution between haves and haves-not, wars due to recessions, and environmental destruction due to a forced economic growth to pay interest on debt. Accordingly, a public money system remove the root cause of these problems and could be panacea for solving them. Due to the limited space, further examination will be left to the reader