

To default or not to default? Differences in government bonds of major countries with monetary sovereignty and of EU member states -- Explanation with 4 sectors balance sheets --

Park, Seung-Joon (machine translation from Japanese version)

2023/4/17

Correction 2023/9/14.

Abstract

The Ministry of Finance Japan (MOFJ) said that default on government bonds denominated in the local currency of advanced economies such as Japan and the US was inconceivable. We try to explain why is that, somewhat in different way from MOFJ's explanation. This paper has examined the creation and extinction of money and the redemption and refinancing of government bonds in the framework of the four-sector balance sheet. The government spending generates reserves in the financial sector, which can in effect only be used to purchase the next Japanese government bonds. Since there is no other use for them, this means that new government bonds can always be sold and maturing bonds can always be refinanced with moderate interest rate. This is the key advantage of monetary sovereignty. On the other hand, like an Euro member state, if a country adopts a common or foreign currency and abandons its monetary sovereignty, it may be unable to refinance its government bonds and be forced to default, as euro reserves acquired by the financial institutions of the euro area as a whole through the spending of a member state are not necessarily used to purchase the state's bonds.

1. Introduction.

On the website of Ministry of Finance Japan (MOFJ) website, it says: "Default on national currency-denominated government bonds of developed countries such as Japan and the US is inconceivable".¹ If default on government is inconceivable in Japan and the US, why is that? It is because they are "government bonds denominated in the national currency". In other words, they are bonds that can be paid back in yen, which means that the Government and the Bank of Japan (BOJ), Japan's central bank, can always pay them back by making money. It does not matter whether Japan has a current account surplus or a large amount of external assets. Nor does it matter how much the outstanding government debt is compared to GDP.² Of course, this does not mean that unlimited fiscal deficits can be run up or that a tax-free state can be achieved. The constraint on the budget deficit is to keep inflation around the target (+2%).³ So it is necessary to take some taxes to regulate the amount of money available in the world

¹ Ministry of Finance, 'Summary of Opinion Letter to Foreign Rating Agencies', 30 April 2002 [in Japanese], https://www.mof.go.jp/about_mof/other/other/rating/p140430.htm

² Reference: Park, Sung-Joon & Shave Tail (2020), *For beginners with balance sheets: the fallacy of fiscal collapse theory*, Seitosha [Japanese].

³ 2% is the figure adopted by governments and central banks of major countries, but it does not have to be this figure. Olivier Blanchard, former IMF chief economist, former president of the American Economic Association, honorary president of MIT and, so to speak, one of the most authoritative figures in the world's mainstream economics community, has proposed a inflation target of 3% (Blanchard, Olivier (2023), *Fiscal Policy in the 21st Century*, translated by Takeshi Tashiro, Nihon Keizai Shimbun Publishing, p.5 [in Japanese], Original: Blanchard (2023) *Fiscal Policy under Low Interest Rates*, The MIT Press). He has also proposed a 4% rate in the past (ibid., p.252). It should be noted that Blanchard's book differs from the author's position in that he believes that a higher

and to keep the inflation at an appropriate rate. But that is a different issue.

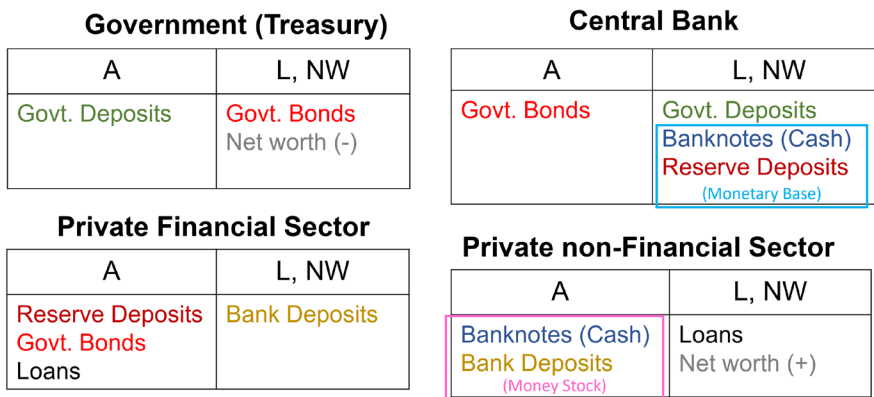
On the other hand, unlike Japan, the USA or the UK, for example, Euro member states that have adopted a common currency may be forced to default on their bonds. In fact, Greece has gone into financial collapse. Even Germany cannot rule out the possibility of financial collapse. Why can a Euro member state go into financial collapse? This is also one of the questions of this paper, the answer to which will be revealed at the end of this paper (→ section 12).

This paper uses a four-sector balance sheet illustration to show how money is created and destroyed, and how the Government raises money, spends it and repays (redeems) its bonds. This will help us understand that a default on Government Bonds (G.bonds) is not possible (unless there is a very deliberate or negligent act by the Ministry of Finance).

2. Financial assets and liabilities of the four economic sectors

Here, the economy is divided into four economic sectors -- the government, the central bank (CB)⁴, private financial sector, and private non-financial sector -- for a simplified picture (Figure 1). If foreign transactions are ignored, these are all four. The 'government' and the 'central bank' are each single institution, while the private financial sector includes a large number of financial institutions and the private non-financial sector includes a large number of businesses, self-employed people and households.⁵

Figure 1: Balance sheets of the four sectors (financial assets only)



By Park Seung-Joon

The money used in the country is so-called credit money. In other words, someone's financial debt (such as an IOU) becomes someone's financial asset (deed of credit), which is then used as money (note that financial liabilities are not always a 'borrowing' or a 'debt', some things do not need to be repaid, such as banknotes; see also footnote 7). Most of these are now electronic. Assets are items written on the left-hand side of the balance sheet (BS), while liabilities are written on the right-hand side. Someone's liabilities are always someone's assets and the amounts are perfectly matched. This perfect correspondence ensures that everything explained in this paper is logically true (let's

debt-to-GDP ratio raises concerns about fiscal sustainability in Japan and the US, as well as in the euro member states.

⁴ The author has the Bank of Japan (BOJ) in mind here. Central bank functions in other countries may differ slightly.

⁵ In fact, local authorities should be included in the 'private non-financial sector' category in these four sectors.

ignore real assets such as land and real estate).

The 'government' in the top left-hand corner of Figure 1 refers to the central government (the so-called national government), and in particular to the Treasury (Ministry of Finance), which is responsible for the government's money. The government has the power to collect taxes. In addition, the government cannot create money (e. g. banknotes) out of nothing, but it can create government bonds out of nothing, with which it can raise money (government deposits). Government deposits are deposited with the central bank. For the government, government deposits are assets (left side of BS) and government bonds are liabilities (right side of BS). The government usually has more liabilities than assets and the difference (net worth) is negative (shown on the right-hand side of the BS).

The central bank, in the top right-hand corner of Figure 1, is the 'bank of the government' and the 'bank of the bank'. It also keeps government deposits and reserve deposits (reserves) from private financial institutions in its current account⁶ (these two types of current deposits are liabilities of the central bank and are written on the right side of the BS). In addition, the central bank also issues banknotes as an 'issuing bank' and records the issuance of these notes as a liability on the right-hand side of the BS (however, banknotes are fiat money that does not have to be exchanged for precious metals, so a liability does not necessarily mean “saimu”⁷). Private financial institutions can withdraw their reserves at any time and convert them into banknotes. The combination of reserves and banknotes (cash) is the so-called 'monetary base' (coins are somewhat complicated and small amounts, so we will not deal with them in this paper).

The 'private financial' sector in Figure 1 actually includes banks, securities firms and insurance companies, but for the purposes of this paper, all are considered to be banks. Banks can deal in bank deposits, which can be used for transfers and cheque settlements, and are therefore accepted as money. Deposits are not 'money held by the bank' but a liability of the bank, so they are written on the right-hand side of the BS. Deposits are 'liabilities' that must be paid in cash (banknotes) if a withdrawal is requested. The financial assets held by the private financial sector are mainly reserves (reserve deposits), government bonds and loans to the private non-financial sector.

The 'private non-financial' sector in the bottom right-hand corner of Figure 1 includes non-financial firms and households. Various financial assets (bonds, bills, etc.) are exchanged within this sector, but the financial assets to the outside world are mainly banknotes and bank deposits. The combination of banknotes and bank deposits is the so-called 'money stock (or money supply)'. On the liabilities side is borrowed money. The private non-financial sector, taken as a whole, is considered to have assets greater than liabilities, so it has a positive net worth.

It is important to note that money, known as the monetary base (or high-powered money), is a liability of the central bank, consisting of banknotes and reserve deposits, while money, known as the money stock, is the assets of private non-financial sector consisting of banknotes and bank deposits. Government deposits are not included in either of these categories. This should be well understood.

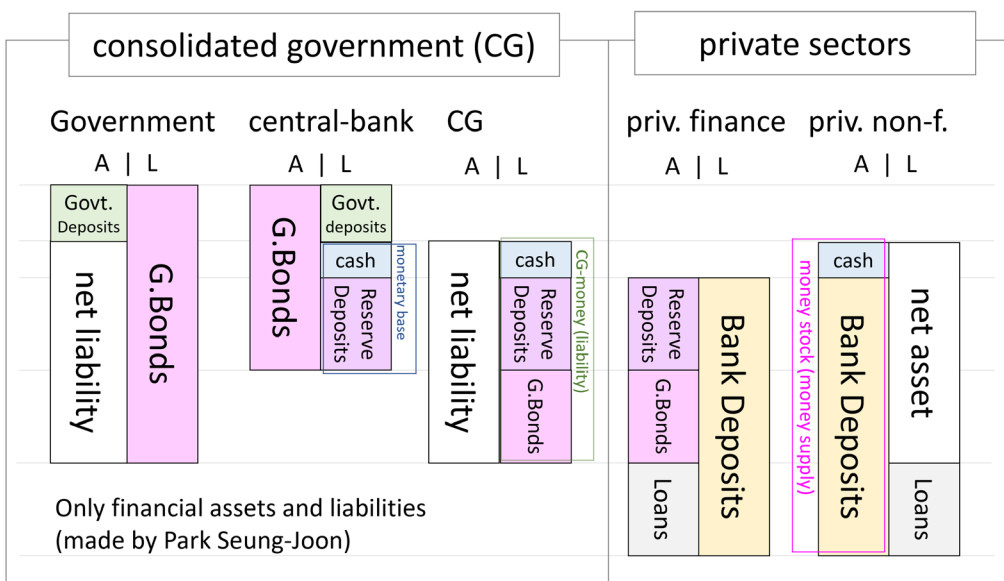
⁶ A current account is a deposit that can be used for cheques. If the reader is not familiar with checking accounts, in the context of this paper, imagine a savings account that allows transfers.

⁷ In Japanese it is possible to make a distinction between “fusai” (which is similar to “liability”) as an accounting term (right-hand side of a balance sheet) and “saimu” (which is similar to “debt”) as a legal term (obligation to provide a specific act or benefit to a specific person), although many Japanese scholars also confuse the two. The author does not understand clearly the difference between liability and debt in English.

Figure 1 is, of course, a simplified version of the various financial assets and liabilities, taking only the most important ones. In reality, an even greater variety of financial instruments are exchanged, such as corporate bonds, insurance policies and derivatives, but these have been omitted. In any case, all financial assets and liabilities are perfectly matched in their respective amounts. These can be ascertained by means of the 'Flow of Funds Statistics', which you can study if you are interested.⁸

Figure 2 is a diagrammatic representation of Figure 1 so that the quantitative relationships and correspondences can be clearly seen. The contents are exactly the same as in Figure 1, so please check each item against each other. Here, the domestic economy is divided into consolidated government (CG) and the private sector. The consolidated government is the consolidated financial statement in which the assets and liabilities of the government and the Bank of Japan are offset. If we consider the transaction between the "consolidated government" and the "private sectors", we can see as if the central-bank's holdings of government bonds (G.bonds) disappeared. Also, note that the central-bank's reserve deposits (reserves) and G.bonds are next to each other as liabilities of the consolidated government. In fact, G.bonds are, at least in Japan, now all electronic and are processed in the BOJ-NET (BOJ's computer network). The BOJ-NET consists of two parts: BOJ-NET Funds Transfer System and BOJ-NET JGB Services (JGB: Japanese government bond).

Figure 2: Four-sector balance sheet illustration



3. What are source of revenue? -- Government deposit funding --.

In this and subsequent sections, we will clarify how money is generated and dissipated in line with fiscal procedures based on the current fiscal system in Japan. In other words, we will assume legal and institutional constraints, such as the Bank of Japan not being allowed to directly underwrite government bonds or government deposits not being

⁸ Bank of Japan (2023), 'Guide to Japan's Flow of Funds Accounts', <https://www.boj.or.jp/en/statistics/outline/exp/exsj01.htm>

allowed to go negative.

Recently, at least in Japan, we often see people saying things like 'tax is not a source of revenue (Zei-wa Zaigen dewa-nai)'. So, what is a financial resource? In this paper, we simply define a source of revenue (Zaigen) as a means of financing government deposits. This would mean that taxation belongs to it, and that government bond issues also belongs to it. Let us see it in following sections.

From this point onwards, transactions between sectors are viewed as increases or decreases in each of the four sectoral balance sheet items. Look at Table 1 as if the scores on a baseball scoreboard light up and disappear. In the illustration from here on, only the increase or decrease in financial assets and liabilities associated with a single transaction is grasped. For example, the outstanding amount of government bonds is in the order of 1,000 trillion yen and exists as stock, but only the increase or decrease in the flow of financial assets and liabilities associated with a single transaction, such as the government taking one tax payment or buying one official vehicle (for example, one million yen worth), is captured.

3.1. tax collection

Tax collection is a procedure whereby the government collects funds from the private sector without paying a quid pro quo. This section uses the example of a private non-financial (household) sector paying income tax (Table 1). It is the following procedure.

Table 1: Tax collection

All amounts are in one million yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Establishment of tax liabilities	+ tax claims	+ net assets						+ T.liabilities - net assets
(2) Tax transfers	- Tax claims + G.deposits			- reserves + G.deposits	- reserves	- deposit	- deposit	- T.liabilities
total results	+ G.deposits	+ net assets		- reserves + G.deposits	- reserves	- deposit	- deposit	- net assets.

(1) The government decides on a taxable amount of 1 million, requires tax payments to be made and sets up a tax liability. At this stage, the government's net assets increase and households' net debt decreases.

(2) Households transfer taxes to the government in bank deposits. Step (2) of Table 1 can be seen in row (2) from the far right to the left. When private banks and the central bank make the transfer, deposits and reserves decrease and government deposits (G.deposits) increase. This extinguishes the tax liability.

Finally, these two steps are added together. Each column is added together vertically and any identical items with different positive and negative signs are eliminated. The result is shown in Table 1, 'Total results'. The decrease in deposits as private non-financial assets means that the money stock has decreased. This means that the money in the private sector has decreased due to the levy of a million-dollar tax.

In such an illustration, the values of the assets and liabilities of each sector match at each stage, and the liability

items of one sector match the asset items of another sector.

3.2. Government Bonds issuance (if private finance has sufficient reserves funds)

Government Bonds (G.bonds or JGB) issuance is a procedure whereby the government raises money from the private sector by giving it government bonds as consideration. Today, in Japan, all G.bonds are electronic and G.bonds can only be bought with the reserves (BOJ's current account), and new JGBs are bought exclusively by financial institutions (participants of BOJ-NET).⁹ As mentioned earlier, both reserves and G.bonds are data in the BOJ-NET. Each JGB has a maturity date and must be redeemed at some point using government deposits (e. g. 10-year G.bonds must be redeemed after 10 years from issue). Although it is technically possible to have the BOJ directly underwrite new G.bonds, this is prohibited by the Fiscal Law. G.bonds issuance involves the following transactions (Table 2).

- (1) To raise JPY 1 trillion, the government issues JPY 1 trillion worth of bonds and asks the private financial sector to buy them. The BOJ transfers reserves and government deposits.

As a result, the private financial sector gets JPY 1 trillion worth of G.bonds and loses JPY 1 trillion worth of reserves. The government gets JPY 1 trillion worth of government deposits by taking on JPY 1 trillion worth of JGB debt. The net assets of all sectors remain unchanged. The private non-financial sector is not affected in any way and there is no change in the money stock. In other words, the government bond issue does not itself borrow money in the sense of money stock.

Table 2: Government bond issuance (when private finance has sufficient reserves funds)

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Issuance of G.bonds	+ G.deposits	+ G.bonds		+ G.deposits - reserves	+ G.bonds - reserves			

3.3. Government bonds issuance (if private finance has no reserves at all)

The private financial sector can borrow reserves from the central bank and buy G.bonds once they are available, even if they do not have sufficient reserves (Table 3).

- (1) Private finance borrows 1 trillion yen worth of reserves from the Bank of Japan (BOJ). The BOJ has a claim titled "BOJ loans" in the table and private finance has a liability titled "BOJ loans".
- (2) To raise JPY 1 trillion, the government issues JPY 1 trillion worth of bonds and asks the private financial sector

⁹ There are also such bonds for individuals, in which case households who buy government bonds will hold them indirectly through an account equivalent to their government bond holdings at a private financial institution. See Ministry of Finance website 'How to purchase JGBs for individuals' [in Japanese]. https://www.mof.go.jp/jgbs/individual/kojinmuke/how_to_buy_financial_institution/

to buy them.

The BOJ transfers BOJ current deposits and government deposits.

Table 3: Government bond issuance (when private finance has no reserves at all)

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Borrowing of reserves			+ BOJ loans	+ reserves	+ reserves	+ BOJ loans		
(2) Issuance of G.bonds	+ G.deposits	+ G.bonds		+ G.deposits - reserves	+ G.bonds - reserves			
total results	+ G.deposits	+ G.bonds	+ BOJ loans	+ G.deposits	+ G.bonds	+ BOJ loans		

As a result of this aggregation, the government first owns government deposits as an asset and owes government bonds as a liability. The private financial sector holds government bonds as an asset and owes the Bank of Japan loans as a liability. The central bank (BOJ) has an asset in the form of BOJ loans and a liability in the form of government deposits. At this stage, the net assets of all sectors have not increased or decreased. The private financial sector must eventually repay its borrowings from the BOJ, but the sector as a whole can always repay its borrowings because the BOJ's current deposit is returned when government expenditure on government bonds is made (see section 4) or when government bonds are redeemed.

3.4. When government bonds or financial bills (FBs) are underwritten by the BOJ

Direct underwriting of government bonds by the BOJ is prohibited by law, but technically possible. In addition, the BOJ is allowed by law to underwrite financial bills (FBs) with short maturities, although it is now customary for the BOJ to issue FBs to private financial institutions. The following illustration shows a case in which the government asks the BOJ to underwrite FBs in order to raise short-term funds (Table 4).

Table 4: BOJ underwriting of Financing Bills

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Issuance of FBs	+ G.deposits	+ FBs	+ FBs	+ G.deposits				

(1) The Government asks the Bank of Japan to underwrite short-term securities in order to raise an immediate JPY 1 trillion.

The aggregate result is simple: the government first holds government deposits as an asset and owes government bills as a liability. The BOJ holds the bills as an asset and government deposits as a liability. The private sector is not affected in any way.

4. Government expenditure

The Government uses the government deposits they obtained to finance government expenditure. Let us consider, for example, the case of cash transfers to people: to transfer 100,000 yen each to 120 million people, 12 trillion yen is needed (Table 5).

- (1) The Government will disburse the government deposits raised and provide cash transfers of JPY 12 trillion in the form of bank deposit transfers.

This shows that government spending generates money stock as deposits of the private non-financial sector. It also shows that the central-bank's current deposits are also positive, so the monetary base is also created. This is what we mean when we say that government spending creates money in the private sector. The government's net assets decrease by JPY 12 trillion in the process of this money creation, but this is not a problem in any way.

The reserves thus created ensures that the private financial sector will always be able to buy G.bonds again. For the private financial sector *as a whole*, the BOJ's current account has no particular use other than to buy G.bonds.¹⁰ This is because the buying and selling of G.bonds, i.e. the exchange of reserves for G.bonds, takes place between financial institutions belonging to the private financial sector. Conversely, from the government's point of view, the reserves created in this way will always result in G.bonds being sold, depending on the price of the bond (namely, depending on the interest rate). This is because financial institutions will always want to convert their interest-free reserves into G.bonds if they can earn some interest. In other words, when existing G.bonds mature, they can always be redeemed by issuing new G.bonds (refinancing, see section 7). This answers the question posed in the first section: What does it mean that Japan cannot default on its government bonds denominated in its own currency?

Table 5: Government expenditure

All amounts in 12 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Government expenditure	- G.deposits	- net assets		- G.deposits + reserves	+ reserves	+ deposits	+ deposits	+ net assets

5. Fiscal deficit

So far, we have seen that tax collection removes money and government expenditure creates money. Therefore, a budget deficit means that money remains in the private sector. Let us confirm this (Table 6).

- (1) The Government collects 1 trillion in taxes.
 (2) The Government spends 2 trillion on government expenditure, paying e. g. civil servants' salaries (the same

¹⁰ Of course, the BOJ current account is also used by financial institutions to obtain banknotes (section 10). But that must be the minimum amount needed to provide for withdrawals by firms and households, because banknotes are inconvenient for settlement between financial institutions and costly to store and transport.

item is shown twice in the table to indicate that it is twice as much). Government employees are private non-financial households. Payroll payments are payments for services, so they do not pay government deposits to obtain alternative financial assets or reduce financial liabilities, which results in a decrease in net worth.

(3) The government issues JPY 1 trillion of government bonds against private finance to restore government deposits.

Table 6: Fiscal deficit

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Establishment of tax liabilities	+ tax claims	+ net assets						+ T.liabilities - net assets
(2) Tax transfers	-Tax claims + G.deposits			- reserves + G.deposits	- reserves	- deposit	- deposit	- T.liabilities
(3) government expenditure	- G.deposits - G.deposits	-net assets -net assets		- G.deposits - G.deposits + reserves + reserves	+ reserves + reserves	+ deposits + deposits	+ deposits + deposits	+ net assets + net assets
(4) Issuance of G.bonds	+ G.deposits	+ G.bonds		+ G.deposits - reserves	+ G.bonds - reserves			
total results	zero	+ G.bonds - net assets	zero	zero	+ G.bonds	+ deposits	+ deposits	+ net assets

The end result of this aggregate result is that the government has increased the money stock (private non-financial deposits) by JPY 1 trillion by issuing JPY 1 trillion worth of G.bonds. In other words, the budget deficit leaves money. We can also say that the government was able to sell G.bonds in step (4) because the monetary base (reserves) has increased by JPY 1 trillion in steps (2) and (3). The total result is just the sum of the steps, so the order can be changed in any way.

6. Redemption of government bonds

When government bonds mature, the government redeems (repays) them with government deposits raised. Government deposits can be raised either through tax collection, the issue of government bonds or the issue of financial bills (FBs), as explained in section 3. The illustration starts at the stage after the government deposits have already been raised (Table 7).

(1) On a certain date, the Government redeems JPY 1 trillion worth of government bonds that have reached maturity.

This produces just the opposite result to Table 2. Looking at this stage alone, private non-financial sector will not be affected. The private non-financial sector will be impacted only if the previous stage of financing is done through tax collection (see Table 1).

Table 7: Government bond redemptions

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Redemption of G.bonds	- G.deposits	- G.bonds		- G.deposits + reserves	- G.bonds + reserves			

7. Refinancing of government bonds

Refinancing is the process of redeeming the principal of maturing bonds with government deposits raised through the issuance of new bonds. Let us assume a situation in which neither the government nor the private sector has sufficient money, and combine Table 4, Table 7, and Table 2 (Table 8).

- (1) The Government obtains government deposits of JPY 1 trillion by having the Bank of Japan (BOJ) underwrite financial bills (FBs) (equivalent to Table 4).
- (2) Government deposits redeem 1 trillion worth of maturing government bonds (corresponding to Table 7).
- (3) The private financial sector buys new government bonds with the newly-acquired JPY 1 trillion reserves (corresponding to Table 2).
- (4) Redemption of government securities.

Table 8: Refinancing of government bonds

All amounts in 1 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Issuance of FBs	+ G.deposits	+ FBs	+ FBs	+ G.deposits				
(2) Redemption of G.bonds	- G.deposits	- G.bonds		- G.deposits + reserves	- G.bonds + reserves			
(3) Issuance of G.bonds	+ G.deposits	+ G.bonds		+ G.deposits - reserves	+ G.bonds - reserves			
(4) Redemption of FBs	- G.deposits	- FBs	- FBs	- G.deposits				
total results	zero	zero	zero	zero	zero	zero	zero	zero

The aggregate result, interestingly, is zero for all items. Refinancing government bonds has the same result as if nothing had been done with regard to the amount of money outstanding in the society. The refinancing preserves the amount of money in the society. Therefore, when government bonds are redeemed through tax collection, money decreases, and money increases to the extent that a budget deficit is incurred. For this reason, in major countries other than Japan, it is natural to refinance government bonds, and only interest payments are included in the expenditure budget, not the redemption of the principal amount of government bonds. Japan is an exception to this rule, as it includes the redemption of the principal amount in its government expenditure.¹¹

¹¹ Ministry of Finance document "Debt management policies of other countries" [in Japanese], 17 April 2015.
https://www.mof.go.jp/about_mof/councils/gov_debt_management/proceedings/material/d20150417-4-2.pdf .pdf

8. Payment of interest

Interest payments are separate from the redemption of the principal for budgetary purposes. The principal is usually refinanced, but the interest must be paid from the general account. In the case of interest-bearing bonds, the coupon interest rate is determined separately from the principal amount (face value) as a percentage per annum when the bonds are issued, and the face value multiplied by the coupon interest rate is paid in two instalments each year. Once the coupon rate has been determined for a particular government bond on issuance, it remains unchanged regardless of how much the market value of the bond changes (and by the same token, how much the market interest rate changes as a result).

Interest may be paid from the general fund through tax collection or through the issue of new bonds. Both cases are normal.

8.1. interest payments due via taxation

The following procedure is used for interest payments through tax collection. Consider that the interest payment for the current year is 5 trillion, which is to be paid in one instalment (Table 9). See the description and table in section 3.1. for the impact of tax collection.

Table 9: Payments of interest on government bonds through tax collection

All amounts in 5 trillion yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Establishment of tax liabilities	+ tax claims	+ net assets						+ T.liabilities - net assets
(2) Tax transfers	- Tax claims + G.deposits			- reserves + G.deposits	- reserves	- deposit	- deposit	- T.liabilities
(3) Interest claims and liabilities		+ I.payable - net worth			+ I.payable	+ net worth		
(4) Interest pay- ments	- G.deposits	- I.payable		- G.deposits + reserves	- I.payable + reserves			
total results	zero	zero	zero	zero	zero	- deposit + net worth (total zero)	- deposit	-net worth

- (1) Of the tax revenue, JPY 5 trillions are the portion used to repay interest; the government establishes the tax liabilities of JPY 5 trillions are taxpayers.
- (2) Households transfer taxes to the government in bank deposits. This reduces deposits and reserves and increases government deposits. This extinguishes the tax liability.
- (3) When the time comes for interest to be paid, the financial institutions holding the bonds are considered to have interest claims and the government is considered to have interest liabilities (I.payable on the table; in reality, interest claims and liabilities are incurred when the bonds are issued, but are shown at this stage to aid understanding).
- (4) The government pays interest-equivalent government deposits to the private financial sector, which holds government bonds. Interest claims and liabilities (I.payable) are extinguished.

Let's look at the result of adding these up. For the Government, the difference between the incoming tax revenue and the expenditure on interest is zero, so the change in assets and liabilities is zero. For the Bank of Japan, too, the change in assets and liabilities is zero, since it only made a transfer of accounts. For private banks, deposits on the liability side are reduced once, but interest income (positive net worth) comes in, so the net change is zero. The reserves do not increase just because the financial sector receives interest. In the private non-financial sector, deposits on the asset side decrease. In other words, the money stock decreases. At first sight, this may seem somewhat counter-intuitive, as it appears that only private non-financial sector loses money and the private financial sector does not make much money. However, at all stages the transactions are paired and the changes in assets and liabilities within each sector are balanced. There is therefore no doubt about this result. In fact, private banks have gained net worth on the liability side by the elimination of the liability of deposits, whereas there has been no change in assets.

8.2. Interest payments from new government bond issues

The following procedure is used for interest payments from new government bond issues. Let us assume that the interest payment for the current year is JPY 5 trillion and that this is paid in one instalment (Table 10). For the impact of new government bond issuance, see the description and table in section 3.2 (when private finance has sufficient reserves).

Table 10: Bond interest payments from new bond issues

All amounts in 5 trillion yen.	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Issuance of G.bonds	+ G.deposits	+ G.bonds		+ G.deposits - reserves	+ G.bonds - reserves			
(2) Interest claims and liabilities		+ I.payable - net worth			+ I.payable	+ net worth		
(3) Interest pay- ments	- G.deposits	- I.payable		- G.deposits + reserves	+ I.payable + reserves			
total results	zero	+ G.bonds - net worth	zero	zero	+ G.bonds	+ net worth		

- (1) issue JPY 5 trillion of new government bonds to private finance.
- (2) When the time comes for interest to be paid, the financial institutions holding the bonds are considered to have interest claims and the government is considered to have interest liabilities (in reality, interest claims and liabilities are incurred when the bonds are issued, but are shown at this stage to aid understanding).
- (3) The government pays interest-equivalent G.deposits to the private financial sector, which holds government bonds. Interest credits and debts are extinguished.

The aggregate result shows that the government's net assets decrease because the issuance of new government bonds is a liability (this is not a problem). In the private financial sector, net assets have increased because they received government bonds for interest (within the sector, the financial institutions that bought new government

bonds may differ from those that received interest). So, in simple terms, the Government has paid interest of JPY 5 trillion by JPY 5 trillion of government bonds. If this continues to happen, the outstanding amount of government bonds will rise at the same rate as the interest rate.¹² This is also not a particular problem for the macro-economy, as long as inflation does not exceed the target (there is a distribution problem where financial institutions make money, but this is a different story).

9. Withdrawal of banknotes

In the private financial sector as a whole, the reserves are used only to buy G.bonds. No matter how much G.bonds are bought and sold within the private financial sector, the balance of reserves and G.bonds held by the whole financial sector does not change at all. The balance of the reserves changes only when the private non-financial sector withdraws its deposits.¹³ This is done at the will of the private non-financial sector, and the private banks passively to this. However, to be able to comply with the withdrawal, the financial sector must exchange the reserves with banknotes in advance. That is the procedure shown in Table 11.

- (1) Financial institutions convert reserves into banknotes.
- (2) A company withdraws one million yen from its bank account.

The aggregate result shows that the liabilities of the BOJ have changed from reserves to BOJ notes and the assets of the private non-financial sector have changed from deposits to BOJ notes. In the private financial sector, the net assets remain unchanged, as both the reserves and deposits decrease. However, in terms of individual banks, this decrease in reserves may restrict the amount of money that can be lent, which is a problem in its own right.

Table 11: Bank of Japan note withdrawals

All amounts in one million yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Banks withdraw Banknotes				+ banknotes - reserves	+ banknotes - reserves			
(2) Cash withdrawals by companies					- banknotes	- deposit	- deposit + banknotes	
total results	zero	zero	zero	+ banknotes - reserves	- reserves	- deposit	+ banknotes - deposit	

10. Increase in the monetary base through BOJ lending

So far, we have seen that money is created in the world by government expenditure, money disappears through tax collection and money remains in the world through budget deficits. However, money (an increase in the

¹² The purpose of chapter 4 of Blanchard (above) is related to this.

¹³ In addition to this, when financial institutions borrow from the central bank, the reserves increase, which is dealt with in Section 11.

monetary base) is not only created and destroyed by government fiscal policy. The central-bank's lending (BOJ loans) to private banks generates reserve deposits (Table 12, but some of this can also be seen in Table 3 above). In fact, it can be said that in the past, when government bonds and reserves balances were low in major countries, the monetary base was mainly supplied by loans from the central bank, from which the money stock was generated.

Table 12: Monetary base creation from BOJ loans

All amounts are in millions of yen.	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Bank of Japan loans			+ BOJ loans	+ reserves	+ reserves	+ BOJ loans		

11. When banks lend, the money stock increases

There are other factors besides government spending that increase the money stock. Money stock increases when banks lend to firms and households (Table 13). Banks do not lend the cash they have. They write the amount lent in their deposit books. As well as holding a loan, they also have a liability in the form of deposits. Correspondingly, the private non-financial sector acquires money in the form of deposits by assuming the loan liability.

Table 13: Money stock increases when banks lend

All amounts are in millions of yen	government		central bank (BOJ)		private financial		private non-financial (firms and households)	
	assets	liabilities	assets	liabilities	assets	liabilities	assets	liabilities
(1) Loan					+ loan	+ deposits	+ deposits	+ loan

12. Why euro member states can fail financially

So far, we have seen that the Japanese Government will not be forced to default on its government bonds. Government spending transfers government deposits and invariably increases the reserves of the financial sector, which as a whole has no other use than to buy Japanese government bonds denominated in yen. This paper does not include the foreign sector, so transactions in foreign assets are not considered, but even if the foreign sector were included, the G.bonds and reserves deposits existing in the BOJ-NET would not flow out to foreign countries (if a Japanese bank buys foreign assets from a foreign bank, the foreign bank's branch in Japan, which participates in the BOJ-NET and therefore is a part of Japan's financial sector, would hold the reserves). In other words, Japanese government bonds and reserves are like "Japanese land" and cannot be taken out of the country. Therefore, for the government of Japan it is always possible to refinance G.bonds (although depending on interest rates), so default is inconceivable (unless those in the Ministry of Finance default intentionally or through negligence).

However, the use of the common currency, the euro, by the governments of European euro member states has led to a situation where all of them have issued government bonds denominated in "foreign" currency. This is because when the government of one member state (e. g. the Greek government) spends money, it increases the euro reserves of banks in the euro area, but this will not necessarily be used to buy the government's (i. e. Greek) bonds

again (that amount could be used to buy German or French bonds instead). That is, financial institutions have other options than to buy *the government's* bond. So, there is no expectation that the bonds can always be refinanced, with moderate interest rate, when they come due, and the possibility of default cannot be ruled out. This is why euro member states can go into financial ruin. Even Germany has the potential for financial collapse in this sense. This is where it differs completely from the case of Japan, US, UK etc. which has monetary sovereignty.

13. Conclusion

This paper has examined the creation and extinction of money and the redemption and refinancing of government bonds in the framework of the four-sector balance sheet. The Ministry of Finance Japan (MOFJ) said that default on government bonds denominated in the local currency of advanced economies such as Japan and the US was inconceivable, but what they meant (and I am not sure if this is consistent with the intentions of the MOFJ officials who wrote that document) was that government spending generates reserves in the financial sector, which can in effect only be used to purchase the next Japanese government bonds. Since there is no other use for them, this means that new bonds can always be sold and maturing government bonds can always be refinanced with moderate interest rate.

On the other hand, like an euro member state, if a country adopts a common or foreign currency and abandons its monetary sovereignty, it may be unable to refinance its government bonds and be forced to default, as euro reserves acquired by the financial institutions of the euro area as a whole through the spending of a member state are not necessarily used to purchase the state's bonds. The state may not be able to refinance its bonds, even with high interest rates, and could be forced to default.

In this sense, the situation is different in Japan, where the reserves issued by the Bank of Japan corresponds on a one-to-one basis with Japanese government bonds denominated in yen, and this is the reason why Japan is a sovereign currency country.