The Macroeconomic Impact of Default:

A Study of the Japanese Case

Japanese Macroeconomics Case Study

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Abstract

This paper presents the analysis of post-default in Japan. Since Japanese fiscal condition is in a crisis situation, we set assumption that sovereign default is unavoidable problem for Japan unless current political and economic situations change. Thus, this paper examines the impact of sovereign default on Japanese economy. According to the definition of default, three scenarios are presented: de jure, de facto and near default. The trend analysis shows that the starting point of default will be the year 2036 when the national debt burden exceeds the domestic absorption capacity. As for de jure default, the output loss is estimated by the panel data regression. GDP per capita growth rate will be -3.95% in the year when the default will happen, 2036. Correspondingly, the GDP growth rate will be -4.28% in that year, which is almost the same as the GDP growth of -4.1% after the Lehman Shock in 2008. Consequently, the total output loss per capita will be US$ -162,367 based on the assumption that the default will last 10 years, which is the historical average duration of defaults. On the other hand, it is unlikely for the Japanese government to let the default happen without taking any policy to avoid it. Therefore, de facto and near default are more possible scenarios. The former is a default avoided through debt monetization and inflation. In this case the government has to bear the consequent higher borrowing cost, social welfare loss, investment contraction, capital flight and the risk of high-inflation trap. The latter is near default scenario where IMF intervenes and rescue Japan from default with conditional loans. By accepting the stringent and pro-cyclical macroeconomic conditionality attached to the bail-out package, the government may put the long-term economic growth and economic sovereignty of Japan at risk.

1. Introduction

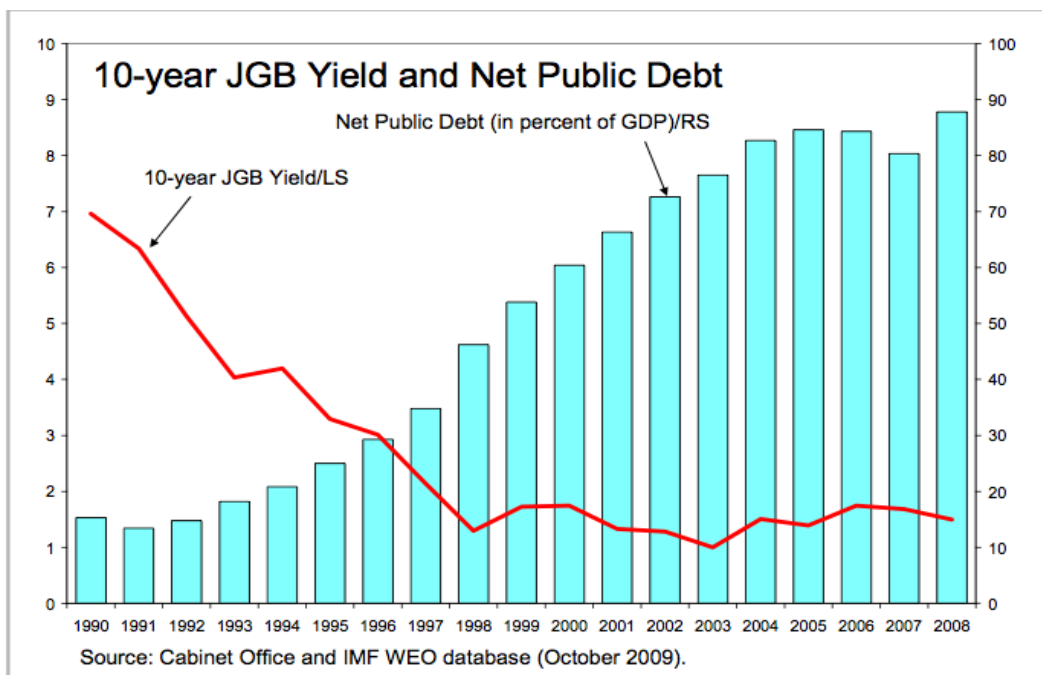   1-1. Japanese Fiscal problem

   Japan is facing a critical problem, i.e. the danger of sovereign default. The current fiscal debt of Japan is in an outstandingly bad state as shown in Graph 1-1-1 below.

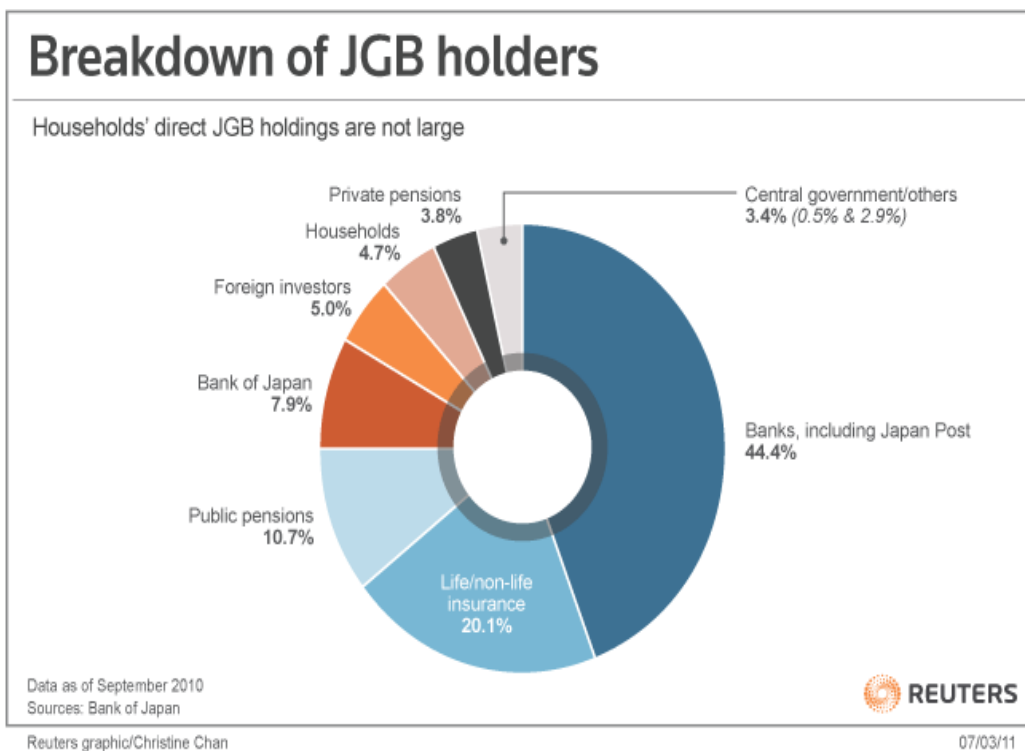Graph 1-1-1 Government debt of selected G20 countries (fiscal debt of GDP)
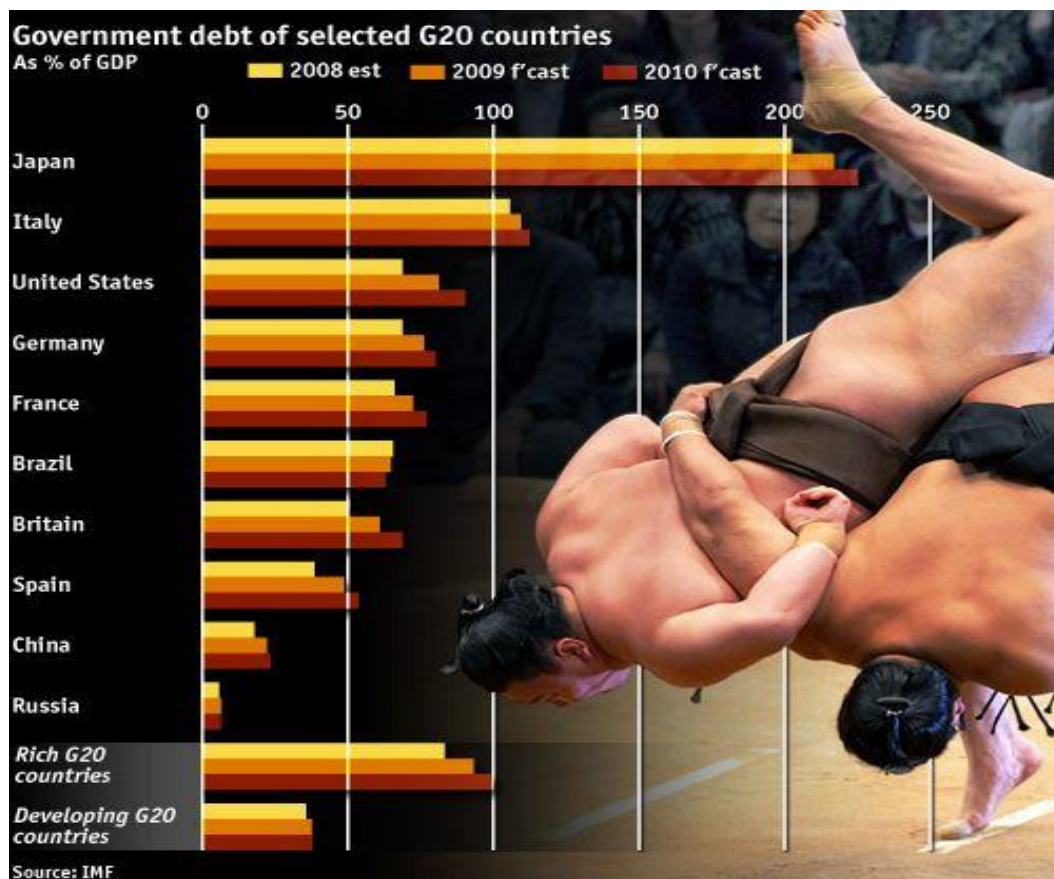
Japan has a huge amount of debt that tops the G20 countries. It's fiscal condition is worse than the currently near- defaulted Greece, Italy or USA in terms of debt-to-GDP ratio However, the observed low interest rate, has been hiding the real severity of Japan's fiscal problem. . There is one very unique feature of the Japanese fiscal condition, which is called the JGB bubble. The bubble can be exhibited by the detachment of JGB yields with JGB issuance: the JGB yield declines while public debt increases simultaneously. The main cause of this paradoxical phenomenon is the "Home bias" of government bond (JGB) holders in japan. In other words, almost all of the JGBs are absorbed domestically (about 95%). This is obvious from the two graphs below: Graph 1-1-2 and 1-1-3.

Graph 1-1-2 10-year JGB yield and net public debt

Graph 1-1-3 Breakdown of JGB holders

Breakdown of JGB holders

Households' direct JGB holdings are not large

Private pensions 3.8%
Households 4.7%
Foreign investors 5.0%
Bank of Japan 7.9%
Public pensions 10.7%
Life/non-life insurance 20.1%
Banks, including Japan Post 44.4%
Central government/others 3.4% (0.5% & 2.9%)

Data as of September 2010
Sources: Bank of Japan

REUTERS

Reuters graphic/Christine Chan   07/03/11

Is the unique fiscal condition of Japan sustainable? Of course, the answer is no. Domestic absorbing capacity will drain out sooner or later as a result of the aging population and shrinking corporate surplus. If that capacity is fully utilized, then it'll be just a matter of time before sovereign debt crisis breaks out in Japan.

Graph 1-1-4 shows the transition of debt to GDP ratio. Japan records much higher ratio than any other OECD countries such as Greece and Italy.

Graph 1-1-4 Debt to GDP ratio (%)
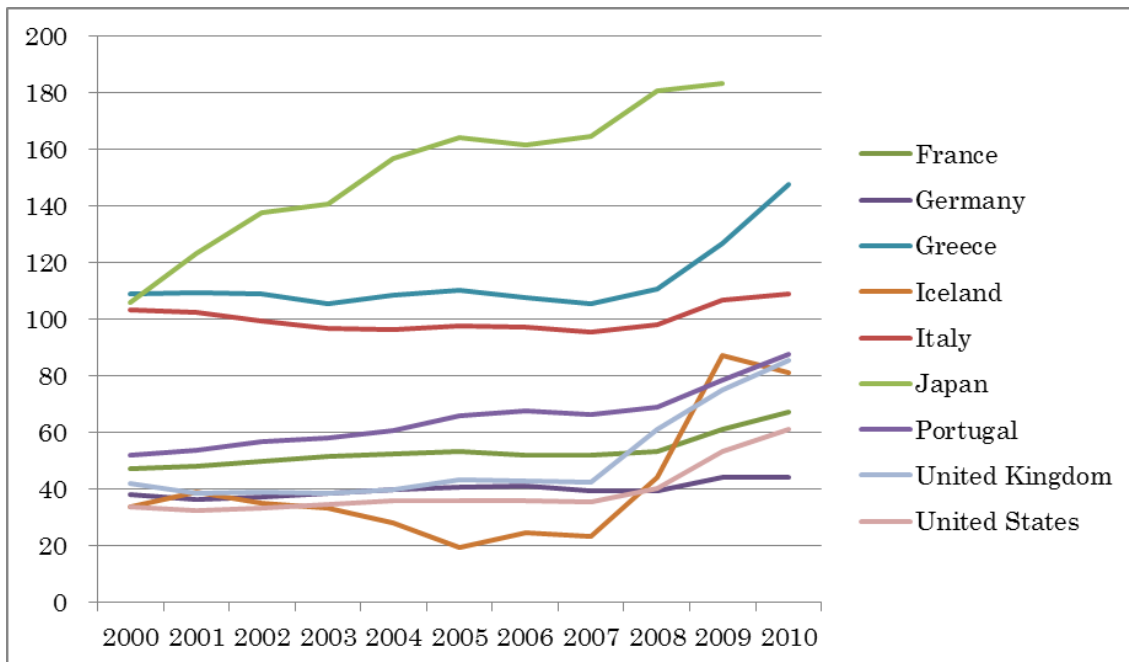
Source:OECD

1-2. Definition of the default

First of all, we define the exact meaning of the sovereign default. In our suggestive preceding study, "This time is different" written by Rinehart and Rogoff, it is defined as follows. "The failure to meet a principle or interest payment on the due date or within the specified grace period. The episodes also include instances where rescheduled debt is ultimately extinguished in term less favorable than the original obligation".

Default can take various forms and be categorized into three basic types: de jure default, near-default, and de facto default. "De jure default" is the default as defined above by

Rinehart and Rogoff. Additionally, we also include "de facto default", where complete or partial liquidation of domestic debts is realized through inflation, and "near-default" where a default is avoided with major international assistance

For each type of default scenario, we apply different analytical methodology as summarized in Table 1-2-1 below:

Table 1-2-1

Scenario	Explanation	Methodology
De jure	Lack of liquidity	Quantitative analysis
De facto	high inflation	Qualitative analysis
Near default	IMF bail out	Qualitative analysis

As a starting point for the analysis of each default scenariowe need to firstly estimate when the default will occur in Japan.

2.Estimating the consequence of default

2-1. Defining the starting point of default

We assume that the time when the amount of Japanese government bonds (JGBs) exceeds the net financial assets of the private sector is the starting point of default. It is because JGBs go beyond the domestic absorption capacity when default happens. If JGBs cannot be absorbed domestically, they have to be sold in foreign market. It means that JGB yield will have go up because no foreign investors would buy JGBs as long as the JGB yield is low. Why could we say no one would buy JGBs with such a low yield? It is related to Japan's recent bad financial situation as we discussed in the introduction section. Once JGB yield goes up, Japanese government will not be able to afford to pay the interest of JGBs and this will lead to default. Also, we assume that there are no other external factors such as political shocks which might cause the default in Japan. Therefore, we regard the time when JGB issuance exceeds the net financial assets of the private sector as the beginning of the default in Japan and expand our discussion based on this.

Methodology

There are several ways to estimate trends. For simplicity, we use a moving average (MA) to get trends of net financial assets of private sector and JGBs. Once we know the trends, we are able to estimate how much the net financial assets of private sector and JGBs will be in the future. The MA is commonly used with time series data

to smooth out short-term fluctuations and highlight long-term trends or cycles. We apply the moving average to our analysis and take 5-year period to avoid the influence of outdated data. The moving average is defined as

$$MA_n = \frac{X_n + X_{n-1} \cdots + X_{n-4}}{5}$$

Here, let n denote "n"th period of time. MA_n is the average of 5 previous data from X_n to X_{n-4}. In other words, MA_{n+1} is the average of the other 5 previous data from X_{n+1} to X_{n-3}.

Estimation

We have data from 1960 to 2009 obtained from World Development Indicator (WDI). Using the actual data we have, we estimate how the trends are going to be. The result is shown in Graph 2-1-1.

Graph 2-1-1
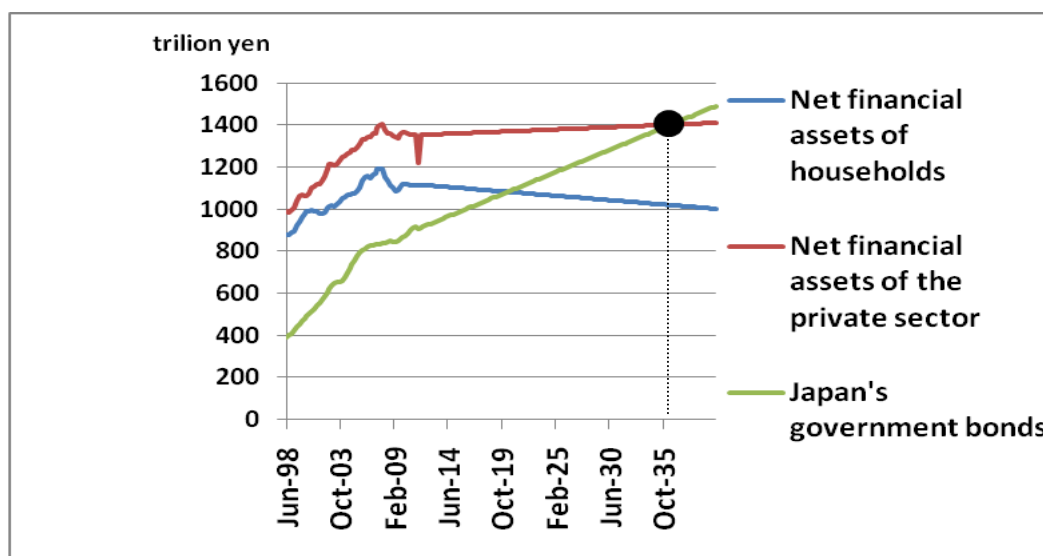
As for the chart, the left side of 2009 is the actual data and the right side of 2009 is the trends we estimated based on the actual data. According to Graph 2-1-1, the net financial assets of households will decrease gradually in the future. The reason is that Japan is now facing the progress of aging population combined with low birthrates. On the other hand, that of the whole private sector will not change very much, keeping the amount of money, 1400 trillion yen. Finally, the trend of JGBs has the steepest upward slope of the three. This surely reflects the Japan's recent bad fiscal situation of mounting debts and shrinking domestic absorption capacity as already mentioned many times. If JGBs get large enough, the Japanese Government is likely to do something to put a brake. However, we do not take this possibility into account for now in order to simplify our discussion. The emphasis of this paper is on what will happen after the default in Japan rather than on when the default will happen in Japan. This is why we do not consider it as the important enough factor to discuss more in details.

Our estimation shows that in 2020, JGBs will surpass the net financial assets of households. Also, JGBs will be more than 1400 trillion yen in 2036. In other words, the JGBs exceed the net financial assets of the private sector in 2036. Therefore, we set the year, 2036, as the starting point of default in Japan. We will discuss what will happen after the default, based on this year, 2036.

2-2.Estimating Output loss of de jure default

In this part, de jure default, the first scenario, is analyzed quantitatively. De jure default is the one that is exactly same as the definition, "the failure to meet a principle or interest payment on the due date or within the specified grace period and instances where rescheduled debt is ultimately extinguished in term less favorable than the original obligation." Before that crisis happens, governments have option to inflate away the debt. In fact, the domestic debt can be eliminates through high inflation. Since 95% of JGB is domestic debt, hyperinflation seems favorable option for Japanese government. This is analyzed in the next chapter. The possible reason why Japanese government accepts de jure default in domestic debt instead of inflating the problem away is that the inflation cases distortions, especially to the banking system and the cost of inflation itself. De Paoli, Hoggarth and Saporta(2006) analyzes the framework of the channel how sovereign crises are transmitted to the output loss. They argue that the loss of market access and the increase in external borrowing costs are factors. However, some empirical studies prove that the sovereign default seldom happens solely. Historically, it is accompanied by the banking and currency crises. Banking crisis is categorized in two types. First type is the bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions. Second type is if there are no runs, the closure, merging, takeover, or large-scale government assistance of an important financial institution, that marks the start of a string of similar outcomes for other financial institutions. Currency crisis is defined as "an annual depreciation versus the US dollar (or the relevant anchor currency) of 15 percent or more. One mechanism that may reduce the output is the collapse of the domestic financial system. In Japan, banks are the largest holders of JGB and FB. They keep more than 40 percent

of the market share. Therefore, if Japanese government defaults, banks may stop their intermediation role of providing liquidity and credit to the economy. In addition, it let governments bear the fiscal costs of recapitalization. The currency crisis firstly raises the question whether the governments have sufficient foreign currency to defend the exchange rate. For net foreign borrowers, a sharp currency depreciation would increases the net foreign currency debts and debt service costs of governments. Even though Japan has the second largest foreign currency exchange reserves next to China, it is not sure if that is sufficient enough for defense. On the one hand, a tightening in monetary policy to limit the exchange rate depreciation would reduce domestic demand the liquidity in financial system. However, depreciation tends to increase the trade competitiveness. For trade nation like Japan that rather increases the output. Therefore, currency crisis offset impacts on the output loss by increase in net exports and decline in domestic demand. Thus, a triple crisis-sovereign, banking and currency- may occur with several factors being intertwined, and bring about the output loss. This paper treats those crises in estimating the output loss as a whole because it is found to difficult to segmentalize each crisis and analyze each impact on the economy. Hence, we assume triple crisis happens simultaneously.

Here, we try to estimate the output loss due to Japanese default. It means to simulate quantitatively to what extent GDP would be lost in case default occurs in Japan. There are few preceding studies, which deal with the output loss of default. De Paoli, Hoggarth, Saporta(2009) estimates countries, which have experienced sovereign default simulating the output in case where default would not have happened. The loss is calculated by comparing the actual output and the simulated output. DHS(2009) provides two methods. First, they apply HP filter to estimate the counterfactual output

growth rate. It is given by the average of two years growth rate before sovereign default implied by the HP trend. However, DHS says this method overstate what output growth would have been in the absence of a sovereign crises. It happens when if sovereign crises are caused by recessions or if slower GDP growth and sovereign crises are both caused by some other factors. Second method is to explain the factors that determine GDP growth for the defaulted-countries. They estimate the GDP growth rate by panel data regression, including the sovereign default dummy variable and project the GDP growth when the sovereign default would not have happened. Finally, they compare the actual and potential GDP growth to calculate the output loss. Furcerl and Zdzienicka(2010) also assess the impact of sovereign default. They also estimate the loss by panel data regression with the different model from DHS and conclude that debt crises reduce contemporaneous output by 3-5 percent in the short term. Also, they estimate the effect of the output loss in the long term. In terms of simplicity in model specification, the analysis in this chapter is based on DHS, but some part of Furcerl and Zdzienicka is incorporated into it.

In this chapter, two types of Japanese GDP growth are estimated: growth rate without default and with default. The former is projected by the same method in the last chapter. The latter is by the same method as preceding studies above. This takes the following three steps. First, panel regression is run to estimate the output growth of countries, which faced sovereign default in the past and calibrate parameters. Second. We project the variables of Japanese data by the method of taking trend and then plug them in the regression equation. Third, we calculate the output loss of default by comparing output without default and with default.

Data

Our samples are panel data sets, which are 34 countries from 1960 to 2009. Sample countries have all experienced sovereign default in the past. Data sets are available from World Development Indicators. It is the primary World Bank collection of development indicators, compiled from officially-recognized international sources. It presents the most current and accurate global development data.

Model

We build the model based on DHS(2009). Equation (1) is our panel data regression model. Here, y, dependent variable indicates GDP per capita growth rate(%). We have six independent variables. Govcon/GDP is the ratio of government consumption to GDP. It includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. Inflation is measured by the annual growth rate of the GDP implicit deflator which shows the rate of price change in the economy as a whole. Invest/GDP shows the share of investment to GDP. It consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Tradeopen is the degree to which countries have trade with other economies. It is measured as the ratio of export plus import to GDP. Default is the sovereign default dummy variable which takes one while the default is happening and zero otherwise.

$$y_{it} = b_0 + b_1 Govcon/GDP_{it} + b_2 Inflation_{it}$$
$$+ b_3 Invest/GDP_{it} + b_4 Tradeopen_{it} + b_5 Default_{it} \tag{1}$$

Result

Table 2-2-1shows the result of regression. All variables except for trade openness are statistically significant. Basically, expected sign and level of coefficient are obtained. It is similar to the estimation results of preceding studies. Regarding the dummy variable, Debt crises are found to reduce GDP per capita growth rate more than -1.9percent. This is the first step of simulation. Secondly, we project the Japanese indicators in 2036. Table 2-2-2 shows that result. Same method as the last chapter is used. (taking MA) We then insert calibrated parameters and Japanese indicators into the equation (2). Thus, GDP per capita growth rate in case of Japanese default is calculated. The GDP per capita growth rate in 2036 with default is -3.95%. When it is adjusted to GDP growth rate by adding the negative population growth rate, that is -4.28%. At the same time, the GDP per capita growth rate without default case is also predicted. From the data in 2009, its trend is taken by MA. The output loss due to the default is estimated by comparing output with and without default. In this paper, the duration of default is set as ten years because this is the average length from historical data according to DHS(2009). Graph 2-2-1 and Graph2-2-2 are the result of output loss. Graph 2-2-1 shows the estimation of GDP per capita growth rate (%). The blue line is the case without default, the trend of growth rate and the red line is with default. Our projection is that the GDP per capita growth rate would drop from 0.3% to -3.95%. The default dummy variable takes one the equation (2) only from 2036 to 2045, during sovereign default. That is why the red line is downward sloping for a decade and

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bounces up after that. However, the growth rate even after the default is lower than the trend. It implies the shock of default inflicts permanent damages on Japanese economy. The gap between the blue and red line indicates the output loss. Total output loss per capita for 10 years is US$ 162,367. Graph 2-2-2 shows the estimation of GDP per capita level in current US$. Also, the blue and the red line are case without and with default respectively. GDP per capita in 2036 is US$40346 but it would drop to US$27040 in 2044 after a decade of the default. This is almost same level as that of current Greece. If there would not be default, GDP per capita is predicted to be US$41474.The difference of GDP per capita between with and without default in 2046 is US$14434. When the GDP per capita in 2035 is set as 100, that of 2045 can be expressed as 64. It means the living standard of each Japanese would be 64% of before default. To conclude this chapter, the de jure default is found to have a huge impact on Japanese economy to extent where the living standard would drastically change. Annual scale of shock on the Japanese macro economy is almost same as Lehman shock in 2008. The GDP growth rate was -4.1% in 2008. Lehman shock was rather external for Japanese economy, but the sovereign default is endogenously generated problem. It is considered to last more than a year. Besides, even after the default ends, Japanese GDP per capita growth rate would be on a more declining trend than the case without default. This result should remind of the importance of fiscal reconstruction.

Table 2-1-1

Dependent Variable	Coef.	Std Error	t-value
Government consumption/GDP	-0.266	0.0381	-6.97
Inflation (GDP deflator)	-0.000775	0.00133	-5.83
Investment/GDP	0.1672	0.0229	7.3
Trade openness (Export+Import/GDP)	0.0094	0.0078	1.22
Sovereign default dummy	-1.942	0.3205	-6.06

$$y_t = b_0 + b_1 Govcon/GDP_t + b_2 Inflation_t \\ + b_3 Invest/GDP_t + b_4 Tradeopen_t + b_5 Default_t \quad (2)$$
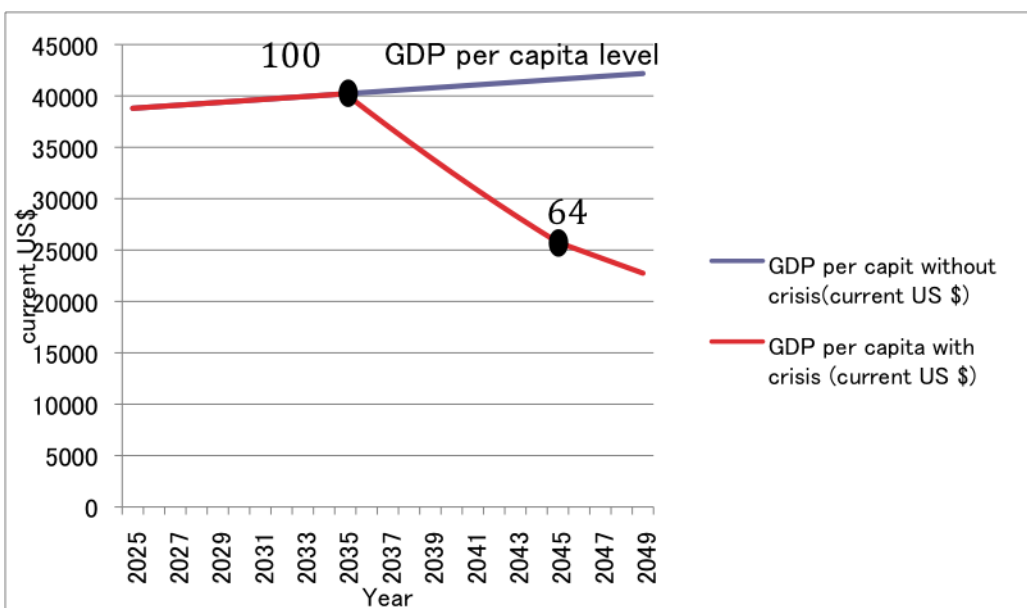
Table 2-2-2

| Year	Government consumption /GDP(%)	Inflation rate (%)	Investment /GDP(%)	Trade openness (Export+Import/GDP)
2036	22.85	-1.04	13.82	47.99

Graph 2-2-1
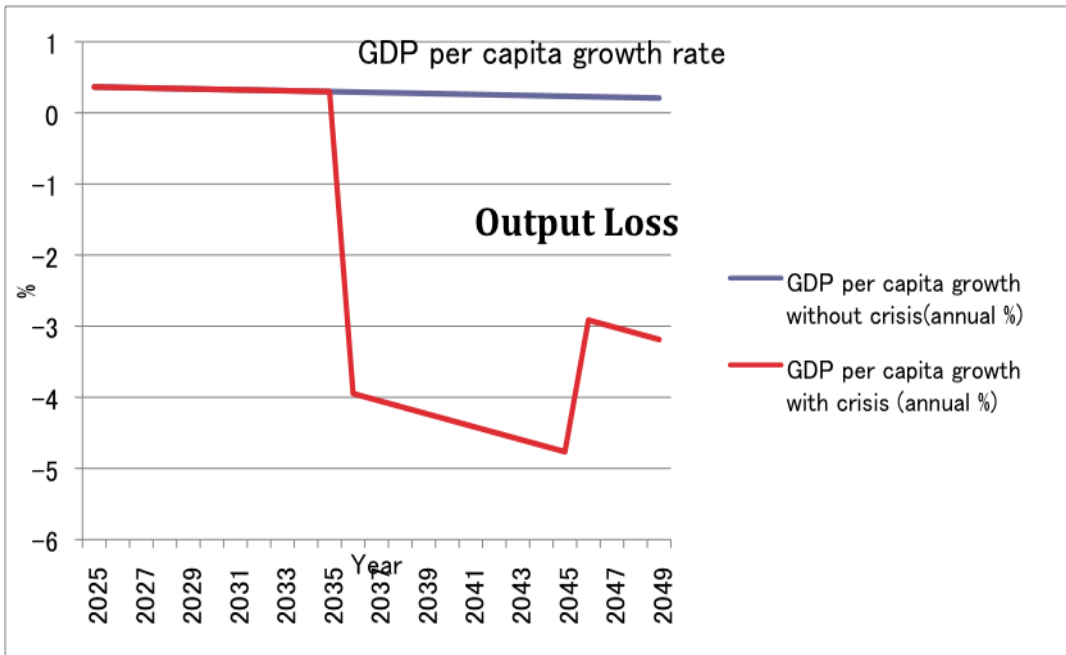
Graph 2-2-2

2-3. Cost of De Facto Default for Japan

De facto default, aka default through inflation, refers to the scenario where complete or near complete liquidation of sovereign debt is realized through monetization, i.e. open market purchase of government bonds by the central bank. Inflation often ensues as a result of the increase in monetary base from the debt monetization. Empirical evidence suggests that it could be tempting for policymakers to monetize at least some of their nations' debt rather than applying austerity through expenditure cut or tax rise.

As asserted by Rogoff (2003): "Since the invention of money, pressure to finance government debt and deficits, directly or indirectly, has been the single most important driver of inflation." A study by Kwon, Lavern McFarlane and Wayne Robinson (2006) shows that in indebted developing countries, the higher the debt to GDP ratio is, the more tempted the government is to inflate away its debt burden (See Graph 2.3.1). Though they also found that this relationship generally did not hold in developed economies historically, we believe that it is likely to strengthen due to the unprecedented rise in debt-to-GDP ratios that is now pushing some of the developed countries to the verge of default.

As mentioned in the previous chapter, we believe it is likely that the Japanese government will consider default through inflation as an alternative to de jure default because of several reasons. First, inflation is more convenient than default in Japan as it reduces the real value of the public debts without any formal breach of contract. Especially when domestic debts predominate under a fiat monetary system like in the case of Japan, inflation will always be preferred to default.

Graph 2-3-1 Inflatory Public Debt Growth in High Debt Countries; Kwon et al (2006)
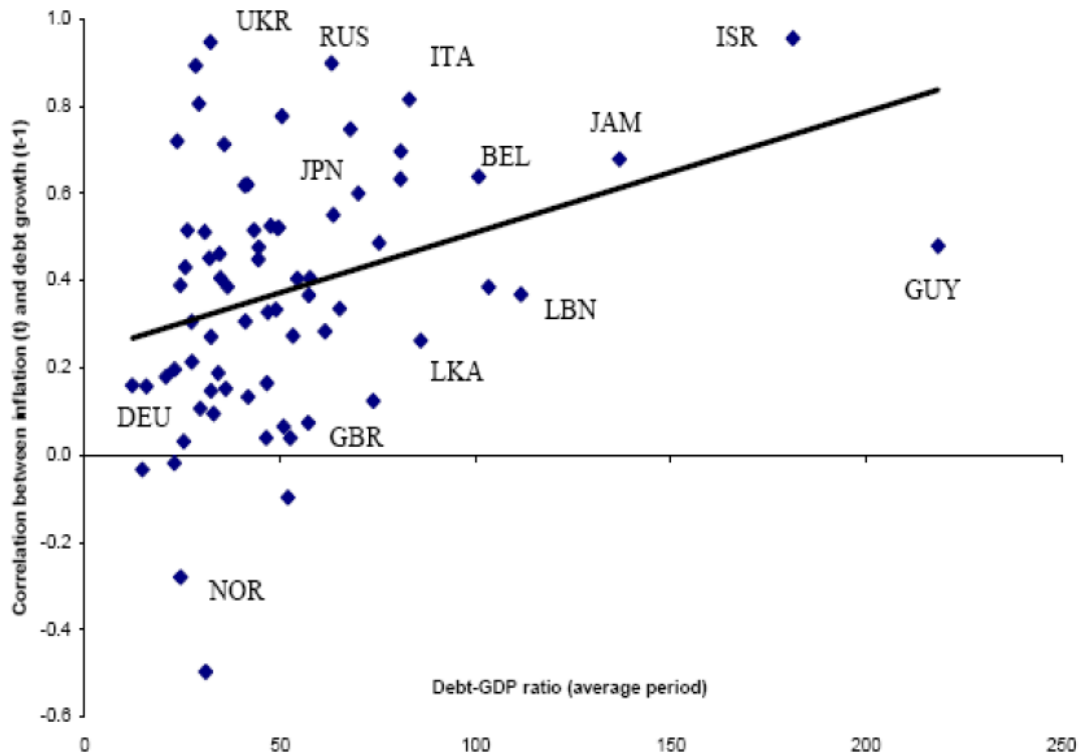
Second, inflation is more attractive from a political perspective, since it redistributes wealth from the unproductive, wealthier rentier class to the productive and poorer borrowers in a relatively painless fashion. As Keynes pointed out, when the debt burden becomes unacceptable, to inflate away debt is "the line of least resistance… it is, so to speak, nature's remedy, which comes into silent operation when the body politic has shrunk from curing itself."

Third, avoiding inflation is a low priority for Japan. Given its long history of being

trapped by deflation, Japan has a relatively big tolerance for inflation.

Furthermore, inflation may be the only option other than a de jure default when public credit has evaporated. For Japan specifically, as the debt absorption capacity of the Japanese household and corporate sector to be exhausted by 2036 according to our simulation, the only way to avoid higher JGB yields is for a buyer to emerge who would be less price-sensitive than the capital markets. That buyer could only be the Bank of Japan (BoJ), and that equates to debt monetization.

Last but not the least, the independence of BoJ will not effectively prevent the inflation from happening. BoJ has always resent the idea of monetization debt, for fear that the monetization (and the intervention of BoJ) may affect the credibility of the nation's sovereign debt, rise risk premiums and in turn push yields higher, add financing costs for the government. However, BoJ is likely to yield to government pressure as the debt crisis escalates, given its close co-operation with the government fiscal authorities in the recent crisis. Moreover, the government can call it an emergency and reclaim control over BoJ by formally changing the BoJ law.

Under this context, the de facto default scenario in Japan is likely to be an unexpected inflation breaking out when the debt crisis escalates to the verge of default. The government can choose to generate either persistent inflation at a moderate rate for a certain period of time, or an abrupt high-inflation all at one time, as long as the aggregate inflation rate achieves the target to erode away a sufficient part of its debt burden. But in either case, the cost of inflation to the Japanese economy would be ineligible.

In general, unexpected inflation leads to redistribution of wealth from creditors to borrowers. Such redistribution will cause significant social welfare loss to Japan because the Japanese people are behind the financial institutions as the de facto creditors for the country's debt. As the first to feel the pain of inflation, Japanese consumers will find themselves immediately poorer and start to consume less. Additionally, the uncertainty in future price level will adversely affect consumer confidence and further slash down consumption. As a result, the domestic demand, a main pillar for Japanese economic growth, will be suppressed both in the short and long run. Moreover, the real value of pension funds, one of the biggest holders of Japanese Government Bonds (JGBs), will depreciate following the inflation. This would bring long-term loss to the welfare of the whole society.

Inflation pulled by the monetization of debt also makes it more costly for Japan to borrow from the capital market. On one hand, high inflation raises nominal cost of borrowing as nominal interest rate surges. On the other hand, high inflation can add to the real cost of borrowing because it raises the inflation uncertainty risk premium, which in turn pushes up the real interest rate.

Worse still, the inflation could lead to investment contraction through several mechanisms. First, if the expectation of inflation persists, people will save less as the money is worth more today than tomorrow. A shrinking saving account will inhibit investment in most cases. Second, the hiking interest rate as a result of the inflation chokes off investment in the short run. Moreover, the uncertainty in money market distorts firms' investment decisions. This is especially true when the depreciation expectation of the Japanese yen continues to grow, the firms, both local and foreign,

may be forced to adjust their long–term investment strategy and direct their capital investment out of Japan. The capital flight will further hurt the Japanese economy and make it more difficult for the country to recover from the debt crisis.

Finally, without a properly specified and well-implemented stabilization program, the inflation which serves as a "shock therapy" for the debt crisis may evolve into a chronic high inflation trap through the process of wage-price spiral, which will be detrimental for the Japanese economy in the long run.

2-4. The Near-default Scenario and IMF Conditionality

The near-default scenario refers to the event where de jure default is avoided with financial assistance from international institutions, most likely IMF. As stated by IMF in a Staff Position Paper in 2010, a de jure default in today's advanced economies is "unnecessary, undesirable, and unlikely" because "the challenge stems mainly from the advanced economies' large primary deficits, not from a high average interest rate on debt. Thus, default would not significantly reduce the need for major fiscal adjustment."

Given IMF's stance that fiscal adjustment supported by reforms that enhance economic growth is a more effective response to debt crisis for developed economies, Japan is very likely to receive official support from IMF when it goes "near default".

However, the support will not come with no price: besides the interest attached to the loan, the bail-out package usually comes along with certain "conditionality" designed to urge the recipient country to adjust its economic policies. But historical cases show that despite its good intentions, the IMF conditionality does not necessarily lead to the

expected outcomes.

Conditionality, as defined by IMF, refers to the various policies adopted by the Fund that require, as a condition for the use of the Fund's resources, a member to implement measures that will "assist it to solve balance of payments problems without resorting to measures destructive of national or international prosperity" and "establish adequate safeguards for the temporary use of the Fund's general resources (repayment guarantee)". The design of the conditionality should generally follow 4 principles, including national ownership of the reform program, parsimony and clarity in the application of program-related conditions, tailoring of programs to the member's circumstances and effective coordination between the IMF and other multilateral institutions.

To form a more concrete idea about how the conditionality would look like if Japan were to request the IMF bail-out program, we compare the recent near-default cases of the 2 advanced economies- Ireland and Greece respectively on the cause of their debt crisis, the shape of the bail-out package, and the features of the IMF conditionality, and draw the implications for Japan as follows.

- IMF offers different credit lines to different borrowing countries based on their demanded loan size, robustness of economic institutions and track repayment performance. (see Graph 2.4.1 and 2.4.2).
- The conditionality is time bound with program monitoring tools used to monitor progress toward the goals outlined by the country in cooperation with the IMF, on the basis of prior actions, quantitative and structural performance criteria, indicative targets, and structural benchmarks (see Table 2.4.1).
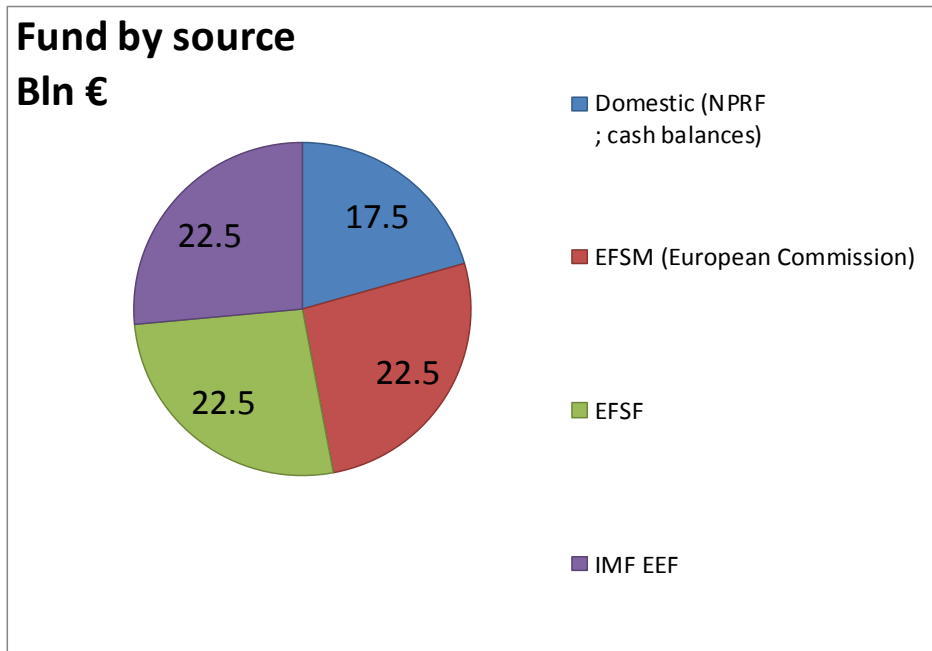
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- The conditionality includes at least a 2-pillar macroeconomic policy package, which usually requires austere fiscal measures and demanding structural adjustment policies even for developed loan recipients

- Great uncertainty is attached to the IMF conditionality since the pro-cyclical nature of the economic policies it imposed may not have the intended positive effects for the recipient countries.

- Additionally, even if the conditionality works effectively in directing the fiscal consolidation and economic growth towards the expected direction, the recipient countries still bear the risk of economic sovereignty loss.

Graph 2-4-1 The bail-out package featuring 3-year Stand-By Arrangement (SBA) from IMF for Greece
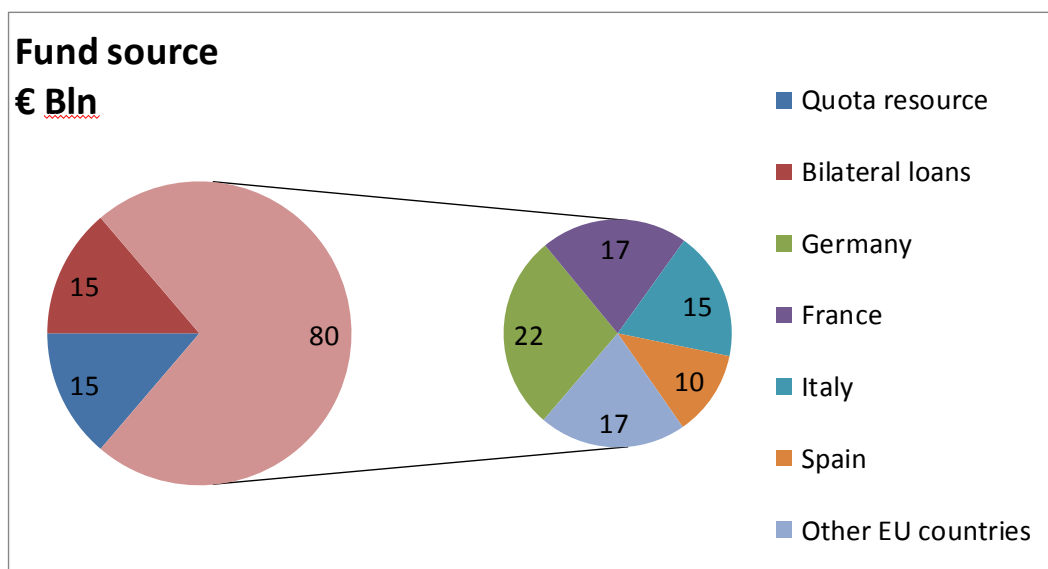
Source: IMF website

Graph 2-4-2 The bail-out package featuring Extended Fund Facility (EFF) from IMF for

Ireland

**Fund by source
Bln €**

■	Domestic (NPRF ; cash balances)
■	EFSM (European Commission)
■	EFSF
■	IMF EEF

Pie chart values: 17.5, 22.5, 22.5, 22.5

Source: IMF website

Table 2.4.1 IMF conditionality on Greece

	Indicative Targets		
Quantitative Criteria	Dec- 11	Dec- 12	Dec- 13
	Progress cumulatively from Jan 1, 2010	Progress cumulatively from Jan 1, 2011	Progress cumulatively from Jan 1, 2012
Floor on the modified general government primary cash balance	-2.1	2.4	7.4
Ceiling on State Budget primary spending	67	68	69
Ceiling on the accumulation of new domestic arrears by the general government	0	0	0
Ceiling on the overall stock of central government debt	365	-	-
Ceiling on the new guarantees granted by the central government	1	0	0
Ceiling on the accumulation of new external payments arrears on external debt contracted or guaranteed by general government	0	0	0

Source: IMF website

According to the analysis above from the case studies, we come to the conclusion that the IMF is likely to attach to the bail-out program a 3-pillar conditionality tailoring to the economic circumstances of Japan if Japan goes near-default and requests support from the Fund. The 3 pillars include fiscal measures, structural reform and monetary policies, with details given as below.

Pillar 1: Fiscal measures designed to boost government revenue and cut expenditure in order to close the deficit gap in the short-term, including

- Revenue measures
    - Comprehensive tax reform: a gradual increase in the consumption tax to 15 % over several years. Plus cut in the corporate income tax rate from 40 % to 35 % and reforms of personal income tax that reduce allowances and base exemptions
- Expenditure reforms
    - Freezing central government contributions to the public pension system in nominal terms, e.g. raising the pension retirement age
    - Freezing nonsocial security spending in nominal terms and introducing an income cap on social transfers
    - A taxpayer identification system to a taxpayer identification system to allow a more effective targeting of social transfers and facilitate the reform

Pillar 2: Structural reforms targeting mid-term external viability while fostering sustainable economic growth. Those include:

- A framework of explicit and long-term fiscal rules that target a primary fiscal balance consistent with a debt limit in a sustainable way.

- Strengthening the resiliency of the financial sector, mainly focus on the reform of banking sector through consolidation and reconstruction. A good starting point might be the privatization of the Japan Post Bank.

- Growth enhancing structural reforms to promote start-ups and SMEs by facilitating the risk-based lending mechanisms such as the less stringent public credit guarantees.

- Reform of the labor regulations, e.g. lowering the level of employment protection in the regular contract, to encourage female participation in the labor force and increase the overall labor income.

- Trade liberalization and regional integration through further deregulation and market opening as a catalyst for productivity improvement, particularly in agriculture, health, childcare, and other service sectors.

Pillar 3: Monetary policy to address the deflation trap, which is a unique problem for Japan. The BoJ might be required to carry out the following initiatives.

- Further monetary easing through the purchase of long term JGBs, i.e. moderate monetization of the debt.

- Additional purchases of private assets such as corporate bonds, commercial paper, and ETFs.

- More effective communication strategy to manage the inflation expectation of the market. A possible, though controversial approach is the introduction of the inflation target.

3. Conclusion

A lesson to learn from the modeling and simulations of the 3 default scenarios for Japan is that default in either form would induce considerable cost to the Japanese economy in the short, medium and long run.

The strong home-bias of the Japanese government bond market has been effectively shielding the country from debt crisis historically. However, an overall examination of the fiscal sustainability of Japan indicates that its domestic debt absorptive capacity will drain out sooner or later and push the economy to the verge of sovereign default. By applying the moving average (MA) method, we simulate the accumulation of national gross debt and the evolution of household and private sector net financial assets overtime, and find that if the government continues with the Business As Usual (BAU) policy strategy, Japan will be facing sovereign default in 2036.

In the case of de jure default where the breach of debt contract actually occurs and the debt is entirely or partially erased through debt reconstruction, we assume that the scenario will be a triple-crisis episode with sovereign default, banking crisis and currency crisis that lasts for 10 years, and estimate the output loss accordingly based on the panel regression model by DHS (2009) .The results show that the default will slash down the per capita output of Japan by 36% from its base level in 2035 when the crisis ends in 2045, almost of the same magnitude as the Lehman shock in 2008.

Alternatively, the Japanese government can opt to inflate away its debt burden through monetization by the BoJ. It is empirically proven to be preferable in highly indebted countries, and even more so in countries such as Japan where domestic

debts predominate and deflation persists. But nevertheless, the monetization-pulled high inflation would induce significant loss to the Japanese economy as it will lead to consumption suppression, social welfare loss, higher borrowing costs from capital market, investment contraction, currency depreciation and capital flight, and inflation trap in the long run if the stabilization program fails.

Another option to weather the debt crisis is to request bail-out loans from IMF and accept the attached conditionality that often demands austere fiscal policies and stringent structural reforms. In a best-case scenario, the bail-out program will not only rescue Japan from sovereign default but also direct the country to the right trajectory of fiscal consolidation and economic growth. However, the pro-cyclical macroeconomic policies featured in the conditionality could be damaging rather than effective for Japan's economic growth in the long run, not to mention the potential risk of economic sovereignty loss.

Therefore we conclude that there's no painless panacea for the upcoming sovereign debt crisis in Japan. To avoid future losses that would be too detrimental to the country's economy, the Japanese government should move proactively and start fiscal consolidation and structural reforms now.

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