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Abstract

Does internal debt matter? Japan's yen-denominated public debt now totals 140% of GDP, and this number continues to rise rapidly. What constraints will this growing debt finally encounter? I argue that finance can postpone but not eliminate payments owed by the government to the private sector. The combination of continuing Keynsian budget deficits, bleeding banks, over-leveraged municipalities and massive pension liabilities will ultimately bring into question the credibility of the government's many promises. The result could be a massive issuance of new currency.

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Introduction

During the 1980s and 1990s many countries defaulted on their external debt, i.e. amounts owed to lenders outside the country and denominated in dollars or other strong currency accepted in international capital markets. Defaults on internal debt, however, i.e. amounts owed to lenders inside the country and denominated in local currency, were quite rare.

Economists typically minimize concerns about internal debt because it appears to involve simply allocation: taken as a whole, a country owes the internal debt to itself, so that paying it or not paying it does not enrich or impoverish the real economy, but simply reallocates wealth within the country. This is in sharp contrast to external debt, whose payment involves transferring real resources to foreigners.

Furthermore, it seems that local debt should never default because the government can always issue more local currency to meet debt service requirements. Of course, this generally leads to inflation. Economically, inflation is a *partial default* in the sense that lenders do not receive the same real value that was lent, but it is not a legal default – the debt is paid, even if in degraded currency. Rating agencies, for example, do not consider even hyperinflation an act of default.

Japan presents a vivid test of whether internal debt matters. Japan is a wealthy, industrialized country with a massive current account surplus and net financial claims on the rest of the world. Its capacity to pay claims of outsiders is not in doubt. It is externally wealthy. But Japan does have a massive internal sovereign debt.

Japan has traditionally kept a balanced budget. Some fiscal deficits arose in the 1970s due to oil price increases and the economic slowdown, but they were aggressively reduced as prosperity returned in the 1980s. In the 1990s, however, internal debt and deficits have ballooned dramatically, both as a result of and in response to a seemingly interminable Japanese recession. As recently as 1997 the government made a commitment to hold debt to 60% of GDP. But in 2001 it reached 140% of GDP and is projected to hit 148% by the end of 2002.[1] So should we, or the Japanese, be worried?

The bond rating agencies are clearly worried, and have recently lowered their ratings on Japan's yen-denominated government bonds to A- (Standard & Poors) and A2 (Moodys), a level comparable to the internal debt ratings of Greece, Israel, Cyprus and Latvia. The Japanese have complained bitterly that this is irrational and unjust.

Suppose Japan does not alter its present course and continues to display low growth, high budget deficits, and growing internal debt relative to GDP. Can this continue to go on indefinitely, or would it finally encounter limits, problems and constraints? Answering that question is the purpose of this paper.

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[1] The Economist Intelligence Unit, website.

Why internal debt might matter

High public debt must finally encounter at least one of two ultimate constraints: market capacity and absorption of tax revenues by interest. Let us consider each in turn.

Market capacity

When a government runs budgetary deficits, it must sell bonds to someone. The candidates are (a) local institutional lenders such as banks and insurance companies; (b) the central bank; or (c) foreign lenders. I will consider each in turn.

(a) Local institutions have a finite capacity to buy bonds, based ultimately on the national savings rate. If the government forces banks and insurance companies to hold too many government bonds, this will eventually crowd out private sector borrowers. The price the government eventually pays for this action is reduced private sector lending and economic activity.

(b) The central bank can finance bond purchases by selling foreign reserves, though not for long. Alternatively, it can pay for them almost indefinitely by creating currency and deposit claims in the government's deposit account, expanding its balance sheet. As the government spends this money on its deficits, the currency and deposit claims on the central bank are diffused through the private banks, where they count as reserves (high-powered money). Holding additional reserves enables the banks to expand their own balance sheets, so that the money supply usually increases and prices usually rise.

In this sense, selling bonds to the central bank generally leads to inflation. Inflation is a kind of tax that pays for the deficit by taking real purchasing power away

from those who hold money and fixed claims on money. The inflation tax is politically easier than direct taxation, but it can lead to political unrest. Efforts to protect the populace from inflation through indexing typically only accelerate the inflation, since they are efforts to protect at least some people from the tax while still collecting it, leading to an ever-higher "tax rate". Inflation, and especially hyper-inflation, tend to slow economic growth in part because of the uncertainties they create.

(c) In most developing countries the capacity of local lenders is limited because of low local savings. Furthermore, most developing countries also run current account deficits, and sovereign foreign borrowing conveniently finances both the fiscal and the current account deficits. But foreign borrowing reaches certain natural limits rather quickly, and with severe consequences, as Argentina recently found. When the external market capacity limits are breached the country is forced to lower its imports to resolve the current account and fall back on (a) or (b) to finance the fiscal deficit.

In the 1980s, when Mexico and Brazil lost access to foreign lenders because of their default on previous bank loans, they took opposite paths. Mexico took option (a): it nationalized the banks, pre-empting the national savings and using them to buy government bonds; the price of this was a gutting of the banking system's capacity to support the private sector and resultant economic depression. Brazil took option (b); it left the banks intact and moved toward hyper-inflation, but this also depressed economic performance. These two cases illustrate what happens when internal debt presses against market capacity to absorb it.

In summary, foreign lenders are an attractive source of public funding, but their capacity is usually limited and the consequences of over-using them are severe. Local

financial institutions are more docile but are also limited in capacity by the magnitude of local savings and the competing needs of the private sector. The central bank is the government's lender of last resort, which is why inflation is so endemic in developing countries. Only industrial countries, with good fiscal controls and strong local bond markets, have been able to tame it.

Tax revenues and interest

The other ultimate constraint on the growth of internal debt occurs when interest expense begins to consume too much of tax revenues. When this occurs, the deficit is pushed higher by the rising interest expense and debt begins to grow exponentially. Following is a simple model to show this:

Let S = the structural fiscal deficit per unit time, let B = the total of government bonds outstanding, and let r = the rate of interest on this debt. Then

$$\text{Rate of total deficit} \;=\; \text{Rate of increase in bonds outstanding}$$

$$S + rB \;=\; dB/dt$$

This says that B not only grows, it grows at a growing rate, proportionate to its size. The solution to this equation is:

$$B \;=\; S(e^{rt}-1)/r + B_0 e^{rt} \qquad\qquad \text{[Exponential model]}$$

where B_0 is the initial (t=0) value of B. Since $e^{rt} \approx 1+rt$ for small rt, the first term is approximately equal to St, representing the steady accretion of structural deficits into

debt, and the second term becomes B_0+B_0rt, representing the capitalization of interest. Taking both together, we get a linear approximation:

$$B = B_0 + (S+rB_0)t \qquad\qquad \text{[Linear model]}$$

This approximate version can be applied recursively in a discrete time setting (B_1 as a function of B_0, B_2 as a function of B_1, etc.), and it will capture reasonably accurately the exponential nature of the growth, especially with low values of r.

A perception that debt and deficits are growing exponentially may create strong pressures for tax increases to stop out-of-control deficit growth. Selling bonds is, in effect, a postponement of tax increases, but nothing of importance can be credibly postponed forever. Governments can resolve fiscal deficits by raising current taxes or by selling bonds, but selling bonds is a kind of promise to raise future taxes. Sooner or later the future becomes the present and taxes must be raised just to pay interest on the ballooning debt.

It is not easy to say at what point governments begin to perceive this as a problem. In the United States federal debt and deficits became a political issue in the 1980s. The federal deficit had swollen to the $200-250 billion range, federal debt had grown to more than 40% of GDP and interest expenses had begun to exceed 20% of tax revenues. All of this triggered considerable alarm that debt and deficits were starting to gallop out of control and gave rise to maverick political candidates (e.g. Ross Perot) who used uncontrolled deficits as a campaign issue. Not until the 1990s did the astonishing performance of the U.S. economy boost tax revenues and GDP so strongly that the problem vanished.

This example makes the further point that strong economic performance can bail out an internal debt problem, while prolonged weak economic performance will tend to aggravate it.

The facts about Japan

Table I shows selected economic data on Japan, drawn from the Economist Intelligence Unit (EIU), the Bank of Japan's *Financial and Economic Statistics Monthly* (BOJ), and the International Monetary Fund's *International Financial Statistics* (IFS). They show a pattern of government revenues falling over 1998-2000 at 4.4% per year, while expenditures rise at 2.2% per year, resulting in an escalating pattern of debt and deficit. How close is Japan to the constraints described above?

Market Capacity

(a) Up to now the Japanese government has had little problem selling its bonds to domestic banks, insurance companies and off-budget government agencies such as the Trust Fund Bureau which appear to hold about a third of the government's debt. Such institutions seem to buy them regardless of interest rate as a matter of national duty. Furthermore, the institutions seem far from having exhausted their capacity to buy more bonds. For example, at year-end 2001 government bonds represented just 8.9% of total bank assets and 9.1% of life insurance company assets according to BOJ data.

Furthermore, both the banking industry and the life insurance industry are so badly crippled with losses on previous corporate loans that both have been reducing rather than increasing their corporate loans outstanding during the 1990s, a major reason for the economy's poor performance. In these circumstances the managers of financial

institutions have become intensely risk-averse, and may prefer government bonds to more private sector loans.

According to IFS, loans to the private sector by Japan's deposit money banks, after stagnating from 1992 to 1997, declined slowly from ¥583T [T=trillion] in 1998 to ¥539T in 2001. Claims on government, however, rose from ¥44T in 1998 to ¥99T in 2001. So there has been a significant replacement of private sector lending with government bonds in recent years, though it may not be appropriate in current conditions to describe this as "crowding out".

(b) The central bank presents a slightly different story. According to the BOJ's published accounts, its holdings of government securities were ¥86T in March 2002, up only slightly from ¥82T in March 2000. On the other hand, its total assets grew considerably, from ¥106T to ¥138T, and it may be that part or all of this growth was in support of the government in ways other than direct purchase of bonds.

On the liability side of the BOJ's balance sheet, the sum of banknotes outstanding and non-governmental deposits ("high-powered money") grew from ¥75T to ¥97T in the same two years, so under conventional monetary economics the money supply should have expanded, leading to inflation. But the peculiar situation of Japan's financial system does not translate growth of the BOJ balance sheet into immediate inflation. The money supply M1 has indeed been rising at 8-10% per year since 1998, yet M2 has risen much more slowly and there has been no inflation, indeed there has been a slight deflation.

(c) Foreigners hold about 6% of Japan's sovereign bonds, and the great majority of these holdings are probably by central banks interested in currency diversification and

political courtesy. The interest rate on Japanese bonds, currently about 1.4%, is simply too low to attract private sector investors.

If bond rates were to rise materially, however, Japan's sovereign debt could easily become attractive to foreign investors. The potential global market is huge and has scarcely been tapped. Tapping it would require higher real rates, i.e. both higher nominal rates and a conviction that the currency would remain strong, with low inflation. But in terms of sheer capacity it would definitely be available at a price.

In summary, it does not appear that market capacity is a binding constraint for Japan in the foreseeable future. On the other hand, the government has made much of a commitment to limit annual issues of bonds to ¥30T. Framing the voluntary constraint in this way does suggest some concern that the market not burdened with too many new bonds. Note in Table I that this commitment will be difficult to keep in 2002, given the projected decline in revenues.

Tax revenue and interest

As to the other potential constraint, interest expense in 2001 is 32% of government revenues, which seems much closer to the point at which pressure to increase taxes must emerge. Indeed, Hiromitsu Ishi, chairman of Japan's tax commission, recently warned publicly that the tax cuts implemented between 1988 and 2000 were excessive and had to be reversed or Japan could be "bankrupt in 10 years".[2]

The 32% figure is actually down from 42% in 2000. Even though debt has grown, the average effective interest rate paid on total outstanding debt fell from 3.3% in

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[2] Financial Times, June 14, 2002, p.1.

2000 to 2.4% in 2001. This number will continue to fall toward the current rate on new government bonds as old bonds reach maturity, assuming the rate on new debt remains low.

We can calibrate the debt growth model offered above to Japanese data. The results are highly sensitive to the assumed value of S, the structural deficit. Table I shows the officially stated budget deficit, which the government is attempting to cap at ¥30T, and which matches the amount of bond issuance. However, government debt has been growing each year by more than the amount of the deficit.

As shown in Table I, the "true" deficit implied by the growth in debt is higher than the reported deficit. Subtracting interest payments from the implied deficit and averaging over 1999-2001, we can estimate the remaining structural deficit at about ¥26T per year.

Setting S=26 and B_0=705, the growth of debt and interest under various interest rate scenarios is set forth in Table II. If interest rates are about 2% for 10 years, the debt grows to about ¥1,100T. At 5% interest it rises to ¥1,500T, i.e. more than doubles. If GDP fails to grow during that period, the debt would rise from 140% of GDP to nearly 300% of GDP.

The more politically sensitive number, however, is the amount of interest compared to tax revenues. Today, tax revenues are about ¥50T. If the interest rate paid on government debt remained about 2%, the interest bill would grow from about ¥17T currently to ¥23T in 10 years. This is 46% of current revenues.

The greatest risk, in my view, is a continued growth of debt which does not seem problematic because interest rates are low, followed by a rise in interest rates. If, for example, interest rates rose gradually to 5% over the 10 year period, accumulated debt might grow to ¥1,300T, but the annual interest bill on this would become ¥65T which would now exceed all the tax revenues.

About 44% of government debt has a maturity of 10 years or longer,[3] so Japan seems to have a cushion built into the system. It would take some years for a higher bond rate to work itself fully into the fiscal deficit. Understanding this cushion helps us to see why Japanese officials seem so complacent on this issue. But it also shows that this could be a trap.

What will finally happen?

Japan's very complacency about internal debt, its sense that it is cushioned against the obvious problems, probably means that debt will continue to increase for some years to come. However, nothing can keep growing disproportionately forever. Sooner or later, the debt must be dealt with, and the longer it has built up the more painful the adjustment is likely to be. In particular, several large fiscal burdens lie in the road ahead, any of which could someday trigger alarm over its impact on public debt.

The most immediate problem is the banking system. The official quantification of non-performing loans stands at ¥37T, but most academic estimates are in the ¥70-80T range. Much larger figures are reached when the "gray zone" of loans to seriously troubled borrowers is added to the actual non-performing loans. Goldman Sachs puts the

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[3] Ministry of Finance press release, June 24, 2002.

debts of all bankrupt or potentially bankrupt companies at ¥170T, [4] *The Economist* uses

¥150T[5] and the IMF in August 2001 put this figure at ¥111T. [6] Bank losses on NPLs

average about 30% in the U.S., but are likely to be much higher in Japan given the depth

of its problems, in particular the destruction of collateral values. If we assign a 50% loss

rate against the IMF's estimate of loans to bankrupt and potentially bankrupt companies,

we get an estimated loss of ¥55T, i.e. equivalent to two years' of structural deficits.

A less-discussed problem is the shaky financial condition of regional and local

governments. The LDP can be understood as an alliance of regional politicians, many in

rural areas, able to deliver votes so long as Tokyo continues to subsidize and conceal

local problems. This, plus the Japanese voting system which gives rural citizens two to

four times the Diet representation of urban Japanese, helps to explain the LDP's hitherto

unchallenged hold on power.

Many municipalities are seriously overextended, but the aggregate problem is

difficult to quantify. A independent survey two years ago put Tokyo's debt at ¥20T,

twice the previously-admitted total.[7] This suggests that the aggregate of regional and

local debts must be several hundred trillion yen. One or more municipal bankruptcies

would put immediate pressure on the central government for a bailout and could trigger

major anxiety about debt and deficits.

The largest internal off-budget claim is the pension system. Because Japan has

virtually no immigration, the age balance of its population is the most unfavorable in the

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[4] The Economist, April 18, 2002, p.1 of Japan survey.
[5] The Economist, June 22, 2002, p.72.
[6] IMF, Japan 2001 Article IV Consultation, August 2001.
[7] Adam Posen, "The real trouble with Japanese debt", *The International Economy*, July/August 2000.

industrial world. Like all major countries, Japan has a pay-as-you-go social security system which faces massive claims in the next 30 years, but Japan has a more severe demographic problem than any other industrial country. While I do not have a quantification of the amount needed to honor all pension promises under various scenarios, many analysts seem to believe it is so large that the promises somehow will have to be adjusted. This by itself implies some sort of default.

If little changes within the next 10 years the fraction of tax revenues consumed by interest will enter a critical zone (i.e. 50-75%). The government will then have to choose whether to raise taxes materially, to default on pension promises or debt, or to inflate the currency. Since raising taxes is so contentious and default is so humiliating, the softer option of printing money will inevitably enter the debate.

The possibility of issuing currency to resolve pressure on tax revenues will trigger turbulence and periodic panic in the market for both government bonds and foreign exchange. While the central bank can control short-term interest rates, long-term rates are set by the marginal buyer (or the absence of a marginal buyer) in the secondary market, over which the government has little control.

In January 1999, for example, the Trust Fund Bureau announced that it no longer had funds to buy government bonds, Moody's downgraded government bonds from Aaa to Aa1, and within six weeks secondary market yields doubled from 1.2% to 2.4%.[8] The panic was brief, but the impact on long-term interest rates was slow to reverse. This type of incident is likely to be repeated in the coming years.

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[8] Posen, ibid.

If the government were very strong, clear and decisive, its best course at some point in the future could well be a one-shot massive issuance of yen to repay or buy back perhaps half to three-quarters of the government bonds outstanding, followed by a commitment to issue no more. Yet even this kind of resolution, which is taken for granted as feasible by most economists, needs to be examined more closely.

For example, if the BOJ were to make a tender offer for ¥500T of outstanding bonds and finance the purchase with new central bank liabilities, the new liabilities would dwarf the current ¥97T of reserve money. BOJ's balance sheet would explode and the quantity of high-powered money would increase nearly six-fold. Such a program is too large, in other words, for conventional monetary tools to manage.

The ¥500T would represent about 17% of M1, which stands at about ¥3000T. To be feasible, the repayment should be made a direct increment to M1. This suggests that the government would have to issue a new currency in exchange for all existing yen and most existing government bonds. The consequence of this idealized program would be a one-shot reduction in wealth and real living standards by the amount of the inflation (perhaps 17%, although this is by no means certain), and in this manner the Japanese people would finally pay in real wealth for the excessive government spending of the past.

It is almost inconceivable, however, that the government would be able to take such a massive step quickly and decisively. Given its long history of vacillation and indecision, and the need for consensus in Japanese decision-making, the more likely scenario is increasing anxiety, debate, tentative steps and reversals. This unfortunate course would lead to substantial turbulence in the bond and foreign exchange markets.

The worst effects of inflation are caused by its uncertainty.[9] Persistent uncertainty about policy in the face of severe fiscal pressures and market panic could have very negative consequences, including sharply increased long-term interest rates and a collapse in the value of the yen. This would put substantial stress on the world trading system as well as on the government in power. Perhaps this would be the set of events that finally cause the LDP to break up and new opposition parties to emerge.

Conclusion

Internal debt does matter. When it is readily available, as in Japan, it can be used to postpone for many years the consequences of the government spending more than it takes in. But a high and rising ratio of interest expenses to GDP will finally create an unsustainable situation. At some point, market volatility will drive up interest rates and accelerate the problem. The only possible outcomes are tax increases, default or issuance of currency. The latter will prove to be the least painful of these, and should therefore be expected. Finance reallocates burdens in time, but does not make them go away. Sooner or later, the Japanese government will have to deal with the fact that it does not have enough resources to meet all the claims upon it.

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[9] David Beim and Charles Calomiris, *Emerging Financial Markets*, (2001) Irwin McGraw-Hill, pp. 231-232.

Table I: Selected Data on Japan (¥ billion)

	1998	1999	2000	2001	2002	Source	Annual Growth
GDP (Nominal)	516,191	512,435	513,822	504,181		EIU	-0.8%
Govt Revenues	62,111	50,810	52,377	54,334	46,800	EIU / FT	-4.4%
Govt Expenditures	77,669	81,860	84,987	82,652	81,230	EIU	2.1%
Deficit	-15,558	-31,050	-32,610	-28,318	-34,430	EIU	
Govt Debt outstanding (ex Soc. Sec.)	437,555	492,970	538,386	582,456		BOJ	10.0%
held by banks	25,292	26,689	30,710	38,697		BOJ	
held by life insurance cos	24,699	27,599	27,161	31,187		BOJ	
implicit deficit		-55,415	-45,416	-44,070			
Govt Debt outstanding (incl. Soc. Sec.)	568,842	615,434	668,996	705,853			7.5%
as fraction of GDP	**110.2%**	**120.1%**	**130.2%**	**140.0%**	**148.0%**	EIU	
implicit deficit		-46,592	-53,562	-36,857			
Debt service	17,263	19,832	21,965	17,171	16,671	EIU	-0.2%
as fraction of Revenues	28%	39%	42%	32%			
as fraction of Debt	3.0%	3.2%	3.3%	2.4%			

	1998	1999	2000	2001	2002	Source	Annual Growth
BOJ claims on government	37,929	50,063	44,422	71,855		IFS	
Currency held outside banks	54,310	59,404	61,947	66,676		IFS	7.1%
Reserve money	64,336	89,621	73,273	85,957		IFS	10.1%
Growth of BOJ claims on government	17.1%	32.0%	-11.3%	61.8%			
Growth of currency	3.7%	9.4%	4.3%	7.6%			
Growth of reserve money	3.6%	39.3%	-18.2%	17.3%			
Change in Wholesale Price Index	-1.6%	-1.5%	0.1%	-0.8%		IFS	
Change in Consumer Price Index	0.7%	-0.3%	-0.7%	-0.7%		IFS	
Percent change in M1	8.1	10.5	8.2	8.5	24.4	BOJ	
Percent change in M2	4.0	3.6	2.1	2.8	3.8	BOJ	
Percent change in Liquidity	3.0	3.9	2.9	2.1	1.3	BOJ	

Table II: A Model of Japan's Debt and Deficits

Initial value of internal debt	$B_0 =$	705
Annual fiscal deficit	$S =$	26
Interest rate on debt	$r =$	2.0%

	Evolution of Debt (B)		Interest	Debt after 10 Years		
	Recursive			Recursive		
Year (t)	Linear	Exponential	Rate	Linear	Exponential	Interest
0	705	705				
1	745	746	1.0%	1,036	1,053	11
2	785	787	2.0%	1,106	1,149	23
3	825	829	3.0%	1,177	1,255	38
4	865	872	4.0%	1,247	1,371	55
5	906	916	5.0%	1,318	1,500	75
6	946	961	6.0%	1,388	1,641	98
7	986	1,006	7.0%	1,459	1,796	126
8	1,026	1,053	8.0%	1,529	1,967	157
9	1,066	1,100				
10	1,106	1,149				