Viewpoint

BNY MELLON

The Curious Case of the Missing Credit Spread

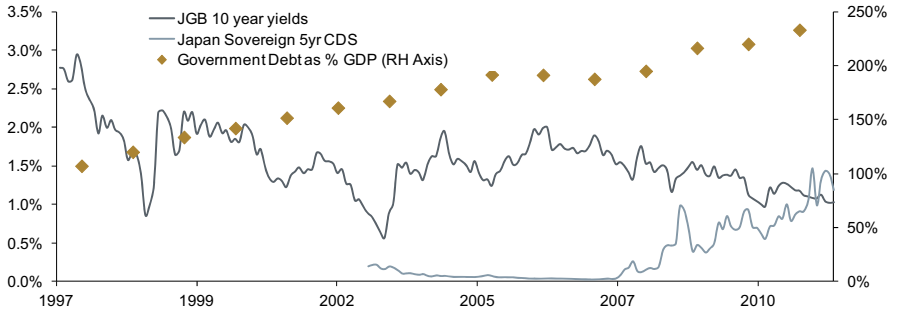
Making Sense of the Japanese Government Bond Market

This research will examine one of the oddest assets in the current investment universe – the Japanese Government Bond (JGB). JGBs combine features which are rarely seen together in capital markets. On the one hand, JGBs are issued by a government which is (proportionally) the most indebted in the world, and maintains a large and seemingly structural budget deficit, which it is politically ill-equipped to address. On the other hand, this same government is able to issue debt at the lowest yield level in the world, and longer-dated bonds are priced such that the market believes that interest rates will not rise above 2% for the next 30 years.

The risk/return conundrum implied by JGB yields has caused numerous academic, market and official commentators to express the view that interest rates are likely to rise, either gradually or explosively, over some foreseeable time frame. This forecast has been heard on a regular basis since long-term rates reached their current low levels at around the end of 1997, but has yet to be realized, despite an impressive build-up of government debt, a household savings rate which has steadily been heading towards zero, and sporadic downgrades from credit rating agencies.

The yawning chasm between credit quality and borrowing cost can be seen below:

CHART 1: JGB YIELDS ARE INSENSITIVE TO THE RISK OF THE ISSUER



Source: Bloomberg from 01/01/1997 to 28/03/2010.

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Note that as a point of contrast, the Japanese sovereign CDS spread can be seen as the red line. This is an additional mystery. Japan is unusual among its developed country peers in that the cost of buying protection via CDS is fairly high; and it is unique in that its CDS actually offers a higher return than the bond itself. The US, UK and Australia all have CDS that are cheaper than their fair value price, in the case of the US by around 20bps. This is reasonable, since counterparty failure could easily accompany sovereign failure, and recent experience has shown that sovereign CDS tend not to pay out in a default event anyway. Japan's CDS, on the other hand, is more than 60bps more expensive than its fair value. This means that the market is simultaneously expressing the view that the Japanese government has non-negligible credit risk (via the CDS), and yet failing to ask for compensation for this credit risk when owning its bonds.

We will therefore address this schism and illustrate not just how it is possible, but why it will continue. In order to cover the issue of JGB yields comprehensively, it is necessary not just to provide an understanding of why they remain so low, but also to address what we deem to be various incorrect but frequently heard statements regarding what factors drive them, and what their future path will be.

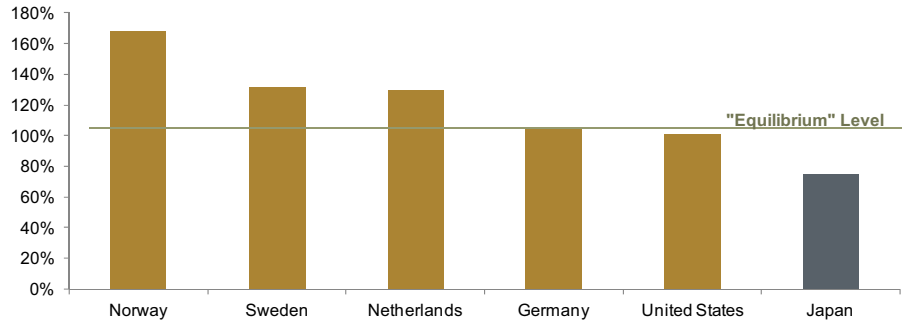
The heavenly economy…

Much observation of the Japanese economy unwittingly commences with a mental picture of an idealized, 'platonic', economy. In this economy, households save money, and banks help that money reach profitable investment channels in the form of corporate investment. Corporate investment increases the economy's productive capacity, and the money flows back to households in the form of return on their investments. The government benevolently observes this circulation, assisting with some economically or socially useful redistribution of funds of its own, though remaining neither a net borrower nor a net lender over the business cycle. As companies hunger for capital to grow their productive capacity, the central bank adjusts the availability of money to ensure that companies are limited to investing only in truly productive projects. While many may disagree with describing most of the developed world economy as having been in its ideal state for the past 30 years, the 'platonic' economy has in fact borne a fair resemblance to the economic reality of the United States and Europe, at least until 2008.

…and its fallen earthly counterpart

An early warning-sign to those seeking the platonic economy in Japan might be the loan to deposit ratio of Japanese banks. Although loan to deposit ratios have reduced dramatically since the financial crisis, the developed world average loan-to-deposit ratio is around 110%; banks actually own more assets than they have deposits to support, and are dependent upon central banks and other lenders to make up the difference. In Japan, the loan-to-deposit ratio is a distinctively different figure of 70%. This means that banks have, effectively, spare cash. This is not usually a voluntary situation for a financial institution, since it means a profit opportunity missed; nor is it a structural feature of the economy, as the ratio was close to 100% even as recently as 2000. In our platonic economy, banks would be lending this cash to companies, who would be relentlessly seeking capital to enhance their productivity.

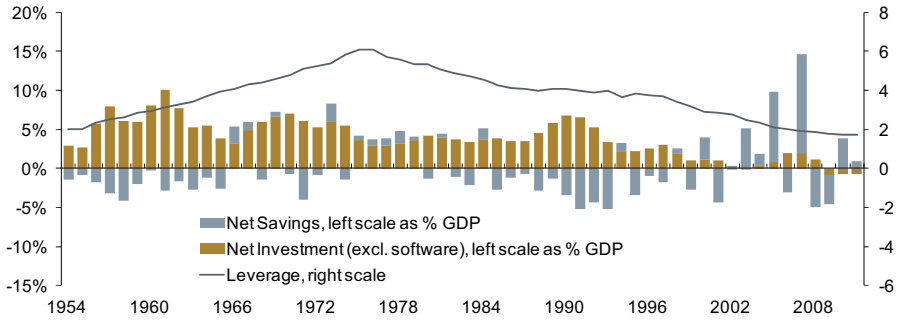
CHART 2: JAPAN'S LOAN-TO-DEPOSIT RATIO IS STARTLINGLY LOW BY DEVELOPED WORLD STANDARDS



Source: OECD. Bank loans to deposit ratios stat, 2008 data (most recent available)

Further analysis of the aggregate financial sector balance sheet reveals yet more intriguing novelties. Banks, which are conventionally considered to be credit intermediaries between households and businesses, hold a surprisingly large amount of government securities, with around 30% of their total assets invested into JGBs and other government-related securities. Insurance companies and pension schemes are even worse, at 45% of total assets. Non-financial companies also have some exotic customs. As can be seen below, up until around 1990, companies were following the platonic template of borrowing and investing. However, since the end of the bubble period in 1991, their tendency to borrow has been steadily decreasing; reflected in an aggregate de-leveraging from 6x levered to a little under 2x levered. Investment has reduced even further; of the corporate borrowing which does currently occur, two-thirds it is opportunistic borrowing, created by the easy financial conditions. The proceeds of this opportunistic borrowing are used for working capital purposes, and therefore considerably less than half of corporate borrowing leads to actual corporate investment.

CHART 3: NON-FINANCIAL CORPORATES ARE REDUCING DEBT RATHER THAN INVESTING

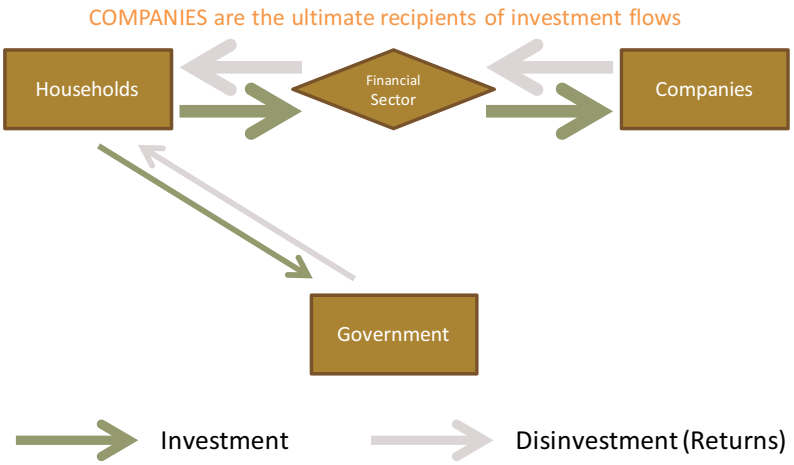


Source: Japan Ministry of Finance, Financial Statement Statistics

The facts seen so far (corporate saving rather than borrowing, very high government debt levels issued at low yields, banks holding unusually large amounts of cash and government bonds) point to an economy with an unconventional direction of funds flow. Unlike in the platonic economy, both households and corporations are attempting to save, rather than spend, money. If left unimpeded this would result in an extreme form of debt-deflation, where cash increases in value relative to goods, and national income, aggregate demand and GDP all plummet. However, an additional player in the form of the government has (by accident or design) taken on the normal role of the

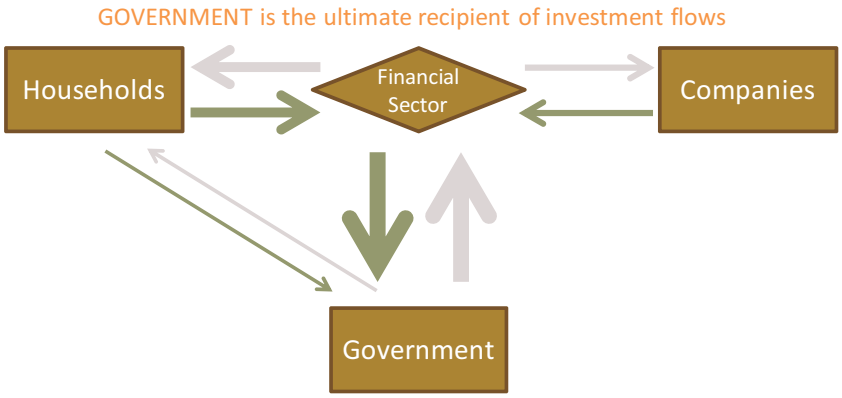
corporate sector. The government, and not the corporate sector, is now borrowing the cash that the private sector wishes to save. By borrowing and spending the private sector's excess savings, the government has stabilized national income and GDP. This anomaly is illustrated below.

CHART 4A: PLATONIC FLOW OF INVESTMENT FUNDS:



Source: BNY Mellon Asset Management International Ltd

CHART 4B: ACTUAL FLOW OF INVESTMENT FUNDS:

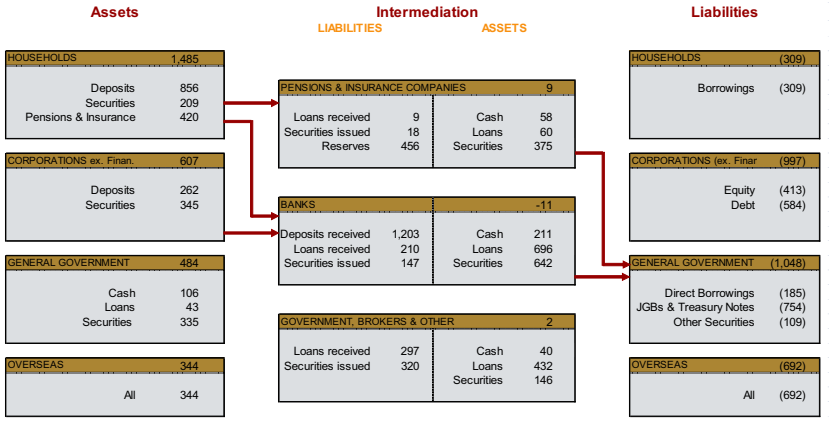


Source: BNY Mellon Asset Management International Ltd

Further probing the investment pipework

Though it has manifestly taken on the normal role of the corporate sector, the government has not quite issued enough government debt to meet the savings demand of the private sector. In order to understand this phenomenon, it is helpful to examine the economy-wide balance sheet, shown below in trillions of yen.

CHART 5: ECONOMY-WIDE BALANCE SHEET



Source: Bank of Japan, Fund-of-Fund statistics

Comparing total private sector assets to private sector liabilities, we can see that the Japanese private sector has a tremendous disparity between money it wishes to invest, and money it wishes to borrow - currently, it wishes to invest ¥785 trillion, or 170% of GDP, more than it wishes to borrow. JGBs have been the sponge by which this excess liquidity has been mopped up. However, despite the government budget deficit, the sponge is already soaked; banks are still unable to find a home for 30% of their assets, and are hence obliged to keep them in cash. This cash excess alone represents ¥211 trillion, or around 45% of GDP. This is a true 'wall of money' – it is pure cash (or, specifically, reserves earning 0% at the central bank), and will seek out any investment which offers a positive return, including any new JGBs which come to auction.

The credit crunch spectre

At this point it is worth attacking one of the largely debunked though lingering conceptions which still haunt the financial industry: the spectre of the Japanese credit crunch, and its colourful side-kick, the zombie borrower. According to this version of events, Japanese banks took enormous capital losses when the bubble burst, and were (at best) capital-constrained or (at worst) technically insolvent. The zombie borrower of infamy was a company with strong ties to a bank which, while dead in any meaningful sense, was able to desperately cling on to life via a constant inflow of borrowed funds from the financial system, and thus wasted what little credit could be squeezed from the banks at the time.

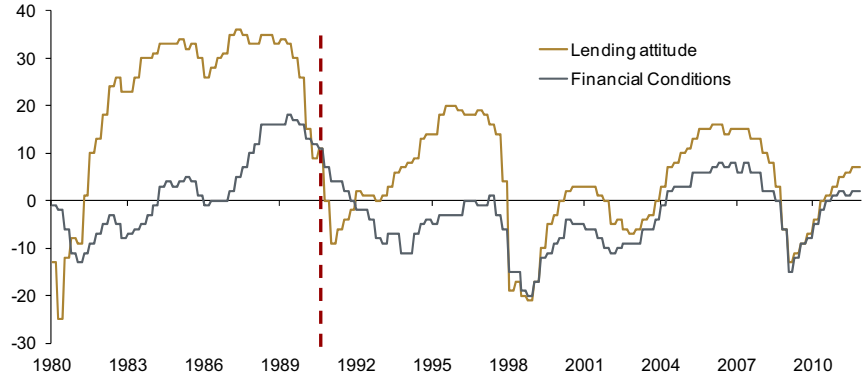
The credit crunch myth gained currency initially because there was (for some short time) a credit crunch, because credit crunches would be a genuine concern for a platonic economy, and because it fitted well with a cursory examination of what happened. However, in the face of its increasing inconsistency with reality, the credit crunch myth has fallen out of favour with all but the most zombie-obsessed commentators. Over the past 20 years, no increase in corporate borrowing has occurred even as banks re-built their balance sheets, imploding the credit crunch story and sending the zombie borrower shuffling back to the mausoleum.

Examining the money pipework in more detail

The credit crunch myth has its root in a presumption imported from the platonic economy – that corporations will always have capital projects available with a real

return above zero, and that therefore there is always some real level of interest which will clear the market for funds, even if that rate is close to zero. In the post-bubble Japanese economy, this is not the case. Companies will not borrow to invest, no matter how cheap it is for them to do so. In order to affirm this proposition, it is necessary to show that companies are able to borrow should they want to do so. So first let us examine two indicators of financial easiness for companies, taken from the Bank of Japan 'Tankan' survey:

CHART 6: COMPANIES ARE NOT HAVING DIFFICULTY BORROWING OR KEEPING AFLOAT…

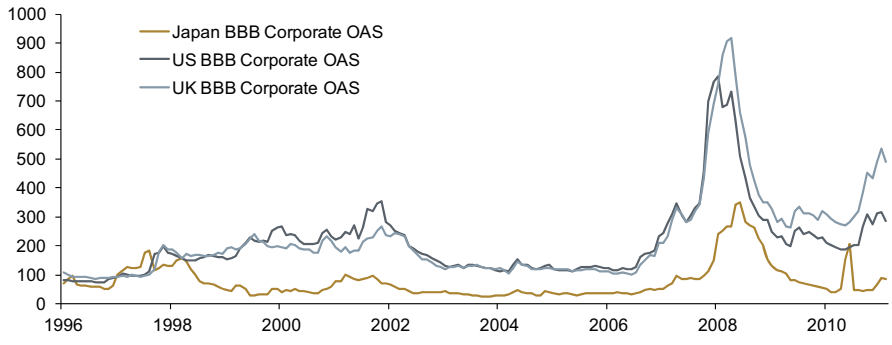


Source: Bank of Japan, Tankan Survey

Here the 'lending attitude' indicator shows how easy the surveyed companies feel that it is to borrow from banks, while the 'financial conditions' indicator shows how comfortable the company feels about its capital position. Although there are ups and downs, the general picture is that it is easy for companies to borrow, and that they are comfortable with their financial situations. Asides from the bubble period (the end of which is marked), the data does not greatly change over the whole time series. This is entirely inconsistent with the aforementioned notion of a credit crunch.

Another chart we can use to make this point is of Japanese corporate bond spreads. If we believed that companies were desperate to borrow but that banks were capital-constrained, we would expect to see companies circumventing the banking system and paying high interest rates to borrow via the capital markets. In fact, to the contrary, below we see that Japanese corporate bond spreads are actually very much lower than the rest of the developed world.

CHART 7: …AND IT IS EXCEPTIONALLY CHEAP FOR JAPANESE COMPANIES TO BORROW VIA CAPITAL MARKETS



Source: Merrill Lynch Credit indices from 31/12/1996 to 31/01/2012.

Hence we have to conclude that Japanese companies are able, but not willing, to borrow. By conventional economic logic, the only reason that companies would be unwilling to borrow and invest is if they are unable to earn a greater return on investment than the cost of borrowing. In reality, it is highly unlikely that there are no profitable investment opportunities available to Japanese companies. Various theories have been put forward to explain why companies would be unwilling to borrow, even at very low interest rates:

- Companies that have taken losses in the bubble period may be in the odd situation of being profitable, but having a negative total value (liabilities greater than assets), and being desperate to repair their balance sheets before stakeholders realize this[1].
- Alternatively, there may be supply-side problems as companies fail to adjust to the demands of an ageing society[2].
- Owing to deflation, the real rate (which, for most investors, is more relevant than the nominal rate) in Japan is around 1.5%, meaning that there is still a cost to borrowing[3].
- There may be a psychological 'debt aversion' after the losses taken post-bubble.

However, to state that this situation exists is sufficient; except where they may be useful as a predictor of future behaviour, these theories are beyond the scope of this article.

Caveat lender?

Clearly that this situation exists in the present does not necessarily mean that it will continue indefinitely; and there are four commonly cited arguments (stated here in increasing order of logical rigour) as to what could unpick this ongoing logjam of stable disequilibrium. This article will now examine each of these arguments, and the reasons we believe they are incorrect. Having shooed these distractions away, we can then attempt to balance the real drivers of JGB yields, and form a conclusion about their future direction.

ARGUMENT 1: EARTHQUAKE RECONSTRUCTION AND SOVEREIGN PANIC

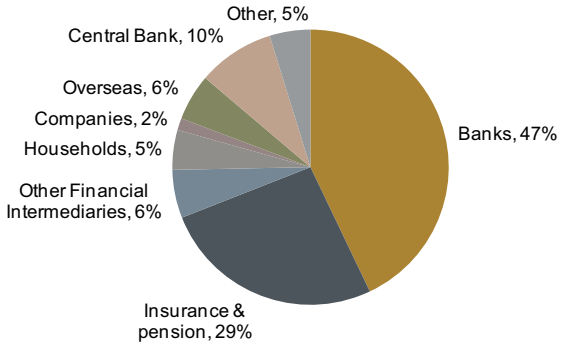
Last year's near-default on US Treasuries and sovereign bond runs in the Eurozone brought a renewed focus on government debt quality, and predictably brought out a handful of commentators raising the possibility of the panic selling of JGBs. Meanwhile, the tsunami reconstruction costs provided a timely hook on which these concerns could be offered to the public. One attractive feature of this theory for those adhering to it is that it requires very little empirical substantiation; the argument being that investors may take flight at any time and for any reason, justified or no.

If the earthquake costs have indeed created heightened levels of concern for sovereign risk, this is not evident from either JGB yields or auction results, which have remained almost exactly as they were before it occurred. An analysis of the holders of JGBs reveals why this may be the case. Collectively, the Bank of Japan, Japanese private banks, insurance companies, pension funds and the national pension fund own more than 75% of outstanding JGBs. Many of these entities are, if not forced buyers, then at least buyers with a good reason to own JGBs without strong concern for their risk-adjusted return. Banks have nothing else to invest in, and JGBs are

1 Richard Koo, The Holy Grail of Macroeconomics
2 BoJ Governor Shirakawa, *The Bank of Japan's efforts towards overcoming deflation*, 2012, among others
3 Paul Krugman, *Japan's Trap*, May 1998

advantageous from a capital perspective; insurance companies likewise need JGBs as low-risk reserve assets; pension schemes find government bonds desirable for liability-matching purposes, and the national pension fund has close ties to government and is consequently more akin to a quasi-sovereign wealth fund. These entities are, to a greater or lesser extent, unable to take flight even if they wanted to.

CHART 8: MOST JGBS ARE HELD BY INSTITUTIONAL INVESTORS, WHO ARE TO SOME EXTENT IMPELLED TO HOLD THEM



Source: Bank of Japan, Fund-of-Fund statistics

When considering this factor, it is noteworthy that the direction and momentum of regulation is very much towards a global increase, rather than decrease, in forced/compelled government bond purchases. Even a dry examination of known facts shows that Basel III banking regulations will tighten almost all forms of lending apart from government bonds. Allowing the use of a little more imagination to forecast the future has led many to the conclusion that governments are likely to use regulation to force investors to hold government bonds with a negative real yield, in order to reduce their debt burdens, as happened many times during the previous century[4].

ARGUMENT 2: YIELD TOURISM

A commonly cited argument is that the few investment opportunities available in Japan should be causing Japanese investors, both corporate and household, to look abroad for their returns. For households, this means investing in overseas securities markets, via investment funds. For corporates, this may mean either securities investment, or the acquisition of real assets abroad. Given that corporate pension schemes already have large overseas investments, any increase in yield tourism would likely come from corporations making acquisitions or investments in fixed assets abroad. Since the yen is strong, this is a possible scenario, and indeed corporate foreign investment is on a long-term increasing trend, though it is still low when the fundamentals of the situation are considered.

However, foreign exchange transactions make no difference to the investment situation of the economy, unless the buyer of the currency has different investment habits from the seller of the currency. As we have seen, in the Japanese economy virtually all holders of currency have, by necessity, the same habits. The counterparty to any foreign exchange transaction will end up holding yen cash, and will therefore face the same issues as the original owner of the cash; and by a direct or indirect route, the likelihood is that it will be lent to the government via JGBs. Thus the market effect of an increased desire to invest abroad, and the related currency transactions, will be manifested in the JPY exchange rate, and not in JGB yields.

4 Reinhart & Sbrancia, The Liquidation of Government Debt

ARGUMENT 3: INCREASED FOREIGN INVESTMENT IN JGBS

A similar argument to the above, this states that currently yields are low because JGBs are more than 90% owned by an allegedly supine domestic investor base, who will continue to hold the bonds regardless of their risk and return characteristics. It is easy to see how this assumption is arrived at, since in the platonic economy there are lots of other investment opportunities that investors could move their money into if government returns were unattractive – they have the luxury of choice. The logic then continues that if foreign ownership of JGBs increases (the most likely scenario being if Japan's current account surplus turns to deficit), yield- and risk-sensitive foreign investors may later decide to withdraw their money from JGBs, pushing up yields and creating a panic. This would necessarily be a distant event since the foreign investors will have to amass the holdings in the first place, in order to later sell them. It is also not a scenario that the Japanese Ministry of Finance seems particularly concerned about, since it is actively seeking to diversify its JGB holdings by encouraging foreign investment. Ultimately it falls short for the same reasons as argument 2 above. Yen-denominated currency changing hands between foreign and domestic investors does not affect the fact that the holders will want to invest this cash (whether directly or via a bank), and that JGBs are the only credible outlet for doing so.

ARGUMENT 4: THE SAVINGS POOL AND THE DEMOGRAPHIC PINCH

By far the most common perspective on the Japanese situation (and one held by many official observers) is the savings pool argument. Japan currently looks forward to the famed mid-century "demographic pinch", when the ratio of working people to retirees approaches something close to parity. Conventional wisdom has it that this will incur a drawing-down of the so-called savings pool (by which is meant the household savings pool), leaving less money available for investment in JGBs. Again, in the platonic economy, this could potentially occur. As pension schemes reduced in value and people spent rather than saved, JGBs would be liquidated and household savings would be handed over to companies in the form of trade flows. Companies would then invest this money into productive projects or whatever else took their fancy. However, this imported preconception does not map on to the Japanese economy in its current state. Trade flows will indeed lead to companies owning wealth that was previously held by households. However, companies' investment patterns are currently materially no different from households; they have no investment opportunities that they would like to take up, and therefore they will either retain the cash, or return it to households by share dividends or buybacks. In either event, the cash will end up at a bank, which will then seek to re-invest it in JGBs.

There are reasons to believe that the savings pool myth may not just be wrong, but potentially the inverse of the probable future. Pension schemes, which have a long time horizon, predictable long-term liabilities, and far fewer regulatory impediments to risk-taking than banks, are likely to be more invested in equity markets, corporate bond markets and foreign assets than banks. Therefore, the reduction of the savings pool will (in aggregate) lead to a liquidation of risky assets, by pension schemes, and an investment of the same wealth into non-risky assets, by banks. Hence – all else equal – JGB yields should logically be driven lower, rather than higher, by this transfer.

And a quick point on the non-role of inflation

At this point it is worth briefly considering the role that changes in inflation (here used either positively or negatively to mean inflation and deflation) could have on the Japanese interest rate situation.

The Bank of Japan has been exhorted by external observers many times to increase inflation and thereby decrease real interest rates, with the weapon of choice for this dirty job commonly seen as being quantitative easing. Quantitative easing is itself a concept developed in the heavenly economy, and - as is now also being seen worldwide - in the liquidity-trapped circumstances that Japan has been in, central banks have little or no control over broad money expansion, let alone inflation, regardless of their ability to control base money. However, even if inflation were to somehow materialize (say, via a supply shock), it is difficult to see how it would have an effect on interest rates. Would-be investors in Japan are obliged to take every investment opportunity that provides a positive nominal return, even if it provides a negative real return. This follows from the simple logic that regardless of the level of inflation, if you have no other options, it is better to be earning a 1% nominal return than no nominal return at all. The proof of concept for this is data from the UK over the last 2 years, where inflation has been consistently around 3% higher than 5-year gilt yields, with no significant changes in holdings of sovereign debt. As this has become clearer, quantitative easing advocates have shifted stance, now no longer promoting it as a monetary easing tool, but more as a means of communication - a macroeconomic bugle which can be used to exhort the private sector to create inflation.

What are the forces for JGB inertia, and what are the drivers of change?

The present is easy to analyse in light of these above-mentioned factors. JGBs face almost no competition for funds from risk assets, which are in chronically short supply, or the bank reserve rate, which does not provide an actual return. If this situation persists, then JGB yields may be presumed to stay low indefinitely. It is now helpful to summarize the factors which support inertia, and those factors which could drive change.

- On the side of inertia, we have a very large (45% of GDP) surfeit of cash in the financial system, which will without hesitation flow into any investment opportunity which provides a positive risk-adjusted return. Even with an ongoing government budget deficit, this can support JGB yields for some time to come.
- Also on the side of inertia, we see that there are no looming changes which will shake the current situation. However wealth is redistributed within the private sector, lending to the government via JGBs is set to continue.
- However, a potential driver for change comes in the form of increased corporate lending opportunities. If the Japanese corporate sector were to experience a sudden and uncharacteristic desire to invest, then a first-blush analysis would suggest that private sector borrowing may ‘crowd out’ public sector borrowing, as investors switch to this higher-return form of investment. This presents perhaps the central risk to an ongoing ultra-low rate forecast.

Once were borrowers

The proposition, then, is that at some distant future point, corporate borrowing will attract money which would otherwise be invested in JGBs. Though this is not an unreasonable argument, we may put our faith in a few mitigating factors.

CORPORATE BORROWING = GROWTH IN ECONOMY

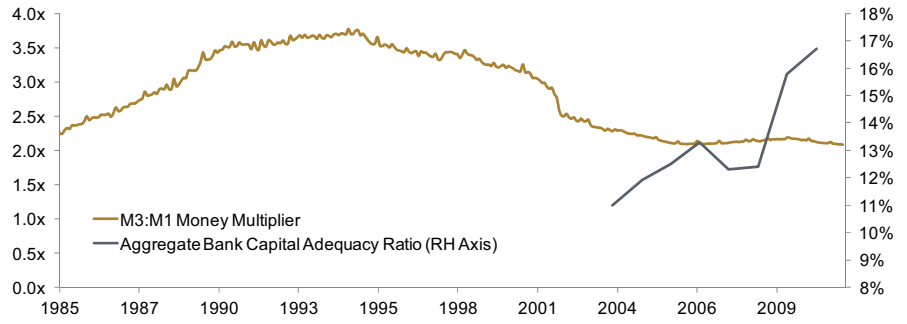
If corporations wish to borrow and invest, it means that they are seeing increased opportunities to grow, and this very likely means that the economy is improving. If the

economy is improving, then corporations and households are paying more tax, meaning that the government budget deficit will be reducing, and hence the supply of new JGBs will be reducing. There is therefore an 'automatic stabilizer' effect whereby investors' desire to lend would naturally be met by corporate investment opportunities rather than government investment opportunities. Alongside this, the perceived risk of JGBs should decrease.

CORPORATE BORROWING = GROWTH IN MONEY SUPPLY

Another factor which means that an increase in corporate borrowing does not have to be bad news for JGB holders is that the money supply may simply increase to accommodate both forms of lending at the same time. This is a difficult subject to accurately prognosticate upon, but it is worth observing that Japanese banks are well-capitalized by developed world standards, and that holdings of JGBs have (by Basel regulations) a zero-risk weighting for banks – taking money from depositors and investing it into JGBs has no direct effect upon banks capital adequacy ratios. Being well-positioned in terms of both reserve requirements and capital adequacy (as illustrated below), banks can in principle engage in corporate lending without having to reduce their lending to the Japanese government; and in practice there is no reason for them not to want to do so. An economic recovery – the scenario under which companies would start to wish to borrow – would also boost banks' capital ratios, enabling them to increase their lending with no other action being taken.

CHART 9: BANKS CAN ACCOMMODATE NEW LENDING WITHOUT HAVING TO SELL JGBS



Source: IMF, OECD

CORPORATE BORROWING = GROWTH IN YOUR OTHER JPY ASSETS (IF YOU HAVE ANY)

Finally - and this is another good reason to stop worrying and learn to love the hike – in the event of increased corporate borrowing and an improvement in Japan's economy, and from the perspective of any investor who holds a proportional amount of Japan-based risk assets alongside their JGBs, any capital losses incurred on JGB holdings by other investors switching into risk assets should be more than offset by an increase in the value of that portfolio's risk assets. The Japanese stock market has nothing if not room for growth.

Conclusions for the investor

The argument presented here is that over any foreseeable time frame, there is little for JGB investors to worry about. Exceptionally easy financial conditions mean that yields should remain low, and, if anything, downward pressure on yields would appear to be significantly stronger than upward pressure, though in reality it is difficult to imagine JGBs getting any more expensive. This article has only addressed the risk to JGB

holders from interest rate risk rises; it goes without saying that as a country with the facility to manage its own currency, we believe it is highly unlikely that Japan would ever default on its sovereign debt. Any government with the facility to do so would instead choose to print money to pay its debt, preferring that the central bank becomes 'reputationally' bankrupt than the government becomes physically bankrupt.

NO IMMEDIATE CAUSE FOR CONCERN, BUT CONSIDER DIVERSIFICATION ANYWAY

However, although JGB holders are unlikely to experience a capital loss, those who hold JGBs purely for their risk and return characteristics (and not for regulatory capital, liability duration matching or any other reason) should consider diversifying away from this asset, as the risk/return profile is unattractive, with stable yields or no. JGB richness may be a chronic rather than an acute inefficiency, but they are still not desirable assets. Even if we take the assumption that there is no capital risk at all to JGBs, investors should not be happy with a yield in the range of 1-2%. To put this in the context of capital market returns, this is equivalent to buying equities with a P/E ratio of 50-100x. JGBs are sitting squarely below the efficient frontier of available investments.

Nor can we claim a particular diversification benefit to JGBs. Although government bonds are normally valued for their ability to diversify a portfolio of risky assets, this improvement in a portfolio's Sharpe ratio can only be achieved when the bonds themselves have room for price appreciation; with JGBs, very low yields mean that they will not rise greatly in value if risky assets sell off. This was seen at the start of the current crisis, when JGB price appreciation was modest at best.

TAKE THE RISKS YOU LIKE, LEAVE THE RISKS YOU DON'T

One way to consider a bond is as a bundle of risks, which should each be providing an appropriate return, as well as other characteristics. An investor who buys a JGB is choosing to own all of the following risks: credit risk (to the Japanese government), duration (or interest rate) risk, re-investment risk, and liquidity risk (which is very low). Other attributes of a JGB are that it has predictable cash-flow, and is low in risk and return. All in all, we have listed six characteristics. An ideal JGB investor would enjoy benefits from all six of these characteristics. Most investors would see some of these characteristics as an advantage, but other characteristics may be neutral or even disadvantageous. However, they have to consider the asset in aggregate, and therefore may have to accept some of the undesirable characteristics in order to obtain the desirable ones.

Pension schemes, for example, are large holders of JGBs, but at a first glance, many of a JGB's characteristics are unsuited to their needs. Pension schemes have a long investment horizon and limited short-term cash-flow needs, so therefore may desire more exposure to liquidity risk, and less exposure to re-investment risk. Since they are often investing for more than 10 years, the low risk and low return of a JGB appears unsuitable (though the JGB holding may compliment the scheme's other assets, producing a desirable overall result). Some pension schemes may be using JGBs for liability-matching purposes; if so then the duration risk is desired, though the shape of the JGB's cash-flows are not a good fit for the shape of the average scheme's liabilities, and the duration is usually too short. Investors who work from an asset-only perspective, however, will definitely not want the duration risk – it exposes them to capital losses if yields do rise.

Rather than buying a pre-defined bag of good and bad risks just to get at the ones that they like, sophisticated investors should select their own risks. The rise of synthetic instruments, and the associated ability to trade single-factor risk exposures, has made

this possible. Investors should take advantage of these advances to make sure that they are getting a product which meets their needs, while maximizing return by gaining exposure to those risks which the investor is happy to take.

If we are to consider this in the context of JGB investors, we need to specify the investors' requirements. Holders of JGBs may have a spectrum of reasons for holding them, but perhaps the two most common ones are that they want a low-risk, low-return asset, or that they are trying to meet a pre-defined set of liabilities. In the case of the former, there are a number of investment vehicles and fund types which can provide a significantly higher return and lose the undesirable duration risk, while only moderately increasing complexity and risk. For this kind of investor, short-duration credit, ABS/MBS, or 'genuine' absolute return strategies with modest return targets may be suitable replacements for JGBs. In the case of the latter, a full LDI strategy – either done by bonds or by derivatives (such as interest rate swaps) – should greatly improve the liability matching while increasing the return and better managing correlation and other risks.

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