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**Japan's Deleveraging since the 1990s and the Bank of Japan's
Monetary Policy: Some Comparisons with the U.S. Experience
since 2007**

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Japan's Deleveraging since the 1990s and the Bank of Japan's Monetary Policy: Some Comparisons with the U.S. Experience since 2007

By Kazuo Ueda

This paper discusses the backgrounds for the stagnant behavior of the Japanese economy during the last two decades and the failure of the Bank of Japan (BOJ) to turn the economy around. I argue that the policy authorities did not act quickly enough to mitigate the pain of the deleveraging process in the aftermath of the burst of land and stock price bubble in the early 1990s. Thus, the process became overly severe and protracted. The economy increasingly became vulnerable to negative external shocks and the decline in its population. Use of non-conventional monetary policy measures after deflationary expectations became entrenched substantially weakened their power to stimulate the economy. The U.S. economy since 2007 has exhibited many of the features seen for the Japanese economy during the last two decades; hence, the talk of the Japanization of the U.S. economy. There are, however, many dissimilarities as well as similarities between the two episodes. These are also discussed along with the analysis of Japan's two lost decades.

Popular discussions of Japan's stagnation often focus on persistent deflation. Figure 1 shows core CPI inflation and a representative property price index for Japan and the U.S. since the peak of property prices, with the peak ($T=0$) assumed to be 1990 for Japan and 2006 for the U.S. In addition, it also plots investment in structures relative to GDP in Japan.

Inflation in Japan has been in negative territory since 1998.¹ There has been, however, no tendency for the deflation to accelerate. The cumulative decrease in the index since the late 1990s has been only about 5%. Thus, the classic debt-deflation type dynamic has not been a major cause of economic stagnation. In contrast, declines in property prices in Japan since the peak has been large and protracted—cumulating in a 60% decline at the time of writing. They led to significant deleveraging by financial institutions and non-financial corporations, which put downward pressure on aggregate demand for goods and services, especially, investment in structures, the component of aggregate demand most sensitive to property prices. The figure shows that its

¹ Japan's CPI has been adjusted to purge the effects of the consumption tax rate hikes in 1989 and 1997.

movements have been highly correlated with those of property prices.² As may be seen from the figure, this component of aggregate demand alone subtracted about 0.4% per year from GDP growth during the 1990s. Such a negative feedback loop among asset prices, economic activity and, as we discuss below, financial instability has been the key feature of Japan's stagnation. It is also interesting to note that both CPI inflation and property prices in the U.S. since the recent financial crisis have followed closely that of Japan in the 1990s, but inflation has so far avoided plunging into negative territory.

Adjustment in asset prices and real investment were to some extent inevitable given the extent of the excesses created during the bubble period. The deleveraging process, however, became extremely protracted as a result of a forbearance game played by policymakers and financial institutions. Banks kept lending for a while to zombie companies in order to avoid recognition of losses on their balance sheets, and the authority stayed away for years from making the tough decision to recapitalize the banks. This resulted in a huge buildup of bad loans and eventually in a serious credit crunch in the late 1990s, which aggravated the declines in asset prices and deleveraging by banks and nonfinancial corporations. Banks increasingly became risk averse and stopped lending to risky, but promising projects. The economy slowly, but steadily lost momentum and could not grow out of the negative shocks generated by external financial crises in the late 1990s and 2000s, and the declines in its population that started in the 2000s.

Deflation of the general price level did play a part in this process as well. It has hindered the effectiveness of monetary easing. This is ironic because monetary policy normally is a tool for avoiding deflation. Either the deleveraging forces outweighed the capacity of monetary policy to stimulate the economy or the BOJ easing came a bit too late. The BOJ tried to reverse the disinflation trend with fairly aggressive rate cuts—a conventional monetary policy tool-- and brought the policy rate to near zero by late 1995, effectively hitting the zero lower bound (ZLB) constraint on interest rates. Deflation, however, developed in response to economic weakness. The real interest rate has stayed at higher levels than desirable, and undermined the power of a zero interest rate to stimulate the economy, although it did not throw the economy into a deflationary spiral. Since the late 1990s, the BOJ has adopted a variety of non-conventional

² Investment in structures in the figure includes that by the government. There is no good data to separate this component out. Assuming, however, that all investment by the general government is investment in structures, an estimate of investment in structures by private firms is obtained. It shows a similar, but slightly larger decline during the 1990s, while it hits a bottom in the early 2000s and increases marginally toward the late 2000s. This is due to the government's policy to reduce public investment in the 2000s.

monetary policy measures. They have supported the financial system and prevented deflation from becoming worse, but have not turned the economy around. As I argue below, non-conventional measures work by reducing risk premiums and long-short interest rate spreads. The long period of economic stagnation had lowered these spreads to minimum levels and limited the effectiveness of such measures as was the case for conventional measures.

In the following I will describe in more detail the deleveraging experience in Japan and then turn to discussing the experience of the BOJ to turn the economy around. Comparisons with the U.S. experience since 2007 are offered at each stage of the discussion.

1, Deleveraging in Japan during the Last Two Decades

Declines in Economic Growth and Productivity

Figure 2 presents the average growth rate of per capita real GDP and population, thus, also of aggregate real GDP, for Japan and the U.S. during three sub-periods since the early 1970s. Japan's aggregate growth rate declined sharply during the 1990s and 2000s. Regarding this, let us first note the sharp decline in the growth rate of labor productivity, that is, the growth rate of per capita real GDP during the 1990s and 2000s. Productivity in the 1990s and 2000s grew at a speed of less than one third of that in the 1974-1990 period. Secondly, population growth also declined sharply in the 1990s and came to a halt in the 2000s, also contributing to the decrease in the growth of aggregate real GDP. Hayashi and Prescott (2002) are among those who point out that declines in total factor productivity growth was the major cause of Japan's economic stagnation in the 1990s. In their work, however, the reason for the decline in productivity growth is not analyzed.

It is interesting to note that the difference in aggregate GDP growth rates between Japan and the U.S. in the 2000s came almost entirely from that in population growth rates. Put differently, the 2000s may have been a lost decade for the U.S. as well. It saw a fairly serious recession in the early 2000s and the so-called great recession in the late 2000s. It is quite possible that the weakness of the U.S. economy was a factor behind that of the Japanese economy during the period.

Asset Price Declines, Deleveraging and Forbearance Policy

As argued above, it is the declines in asset prices rather than consumer prices that have generated serious negative effects on the Japanese economy. Figure 3 presents

estimates of the market value based leverage ratio for financials and non-financials.³ For both sectors, the ratio declined through the 1980s as stock and land prices increased. The movement was reversed in the 1990s in response to the collapse in asset prices and, in the banks' case, to increased bad loan write-offs.⁴ The increases in leverage during this period were, of course, unintentional; players in both sectors were attempting to deleverage, but were overwhelmed by further declines in asset prices. Banks sold stocks in net terms in large amounts in late 1990 toward early 1991 and then again for a prolonged period between 1996 and 2006. Non-financials were net sellers of land in the mid to late 1990s.⁵ Such sales obviously added to the declines in asset prices and made the deleveraging process severe—a process observed again during 2007-09 in the U.S. concerning many financial instruments. The resulting sharp increase in leverage for financials, in particular, meant a corresponding decline in capital ratios and constrained their risk taking behavior severely. Here, we already see a negative loop between financial stability and asset prices. Leverage finally started to decrease in the late 1990s for non-financials and in the early 2000s for financials. It had been an amazingly long deleveraging process.

Despite the immediate effect on their balance sheets of the fall in stock prices and their prospective deterioration through loans to property related sectors, banks' responses were limited in the early 1990s. Figure 4 shows bank loan growth rates before and after the collapse in asset prices and the amount of bad loan disposals by Japan's large banks. The recent behavior of U.S. bank lending is also shown.⁶ Bank loan growth in Japan fell sharply in the early 1990s, but stayed in positive territory until the late 1990s. In fact, banks were still supporting zombie companies by rolling over loans. Banks became earnest in bad loan disposal in year 1995 (=year T+5) onwards. By this time bad loans probably had become much larger than would have been the case had they been addressed in the early 1990s. The U.S. bank loan growth rate has followed Japan's pattern quite closely so far in a similar way to the movement in property prices, which is suggestive of severe deleveraging taking place in the real sector.

Why was the response of Japanese banks so slow? The introduction of the BIS

³ The data are from Japan's National Income Accounts. Unfortunately, financials include broker-dealers, insurance companies and pension funds, in addition to deposit taking banks.

⁴ Both banks and non-financial firms have held large amounts of equities. Non-financial firms also have held real estate, while banks' exposure to real estate has been mainly through real estate related lendings.

⁵ See Figure A1 in the online Appendix.

⁶ In this chart the peak of asset prices in the U.S. is assumed to be 2007, the year the stock prices peaked.

capital ratio regulation and the erosion of capital as a result of the sharp fall in stock prices had certainly made it difficult for banks to recognize and dispose of bad loans in large amounts.⁷ It is, however, more appropriate to regard this as a forbearance game played by banks and the government. An early attempt at the resolution of the bad loan problem reportedly came in the summer of 1992, when the then prime minister Kiichi Miyazawa discussed the possibility of bank recapitalization with bank CEOs, but was rejected by the latter.⁸ Thus, the government was not able to force banks to address the bad loan problem quickly. It used public money for the resolution of nonbanks called Jusen in 1995. It was, however, not until the late 1990s that the government finally decided to inject capital into banks. Persuading the public of the need for recapitalization required the financial crisis of 1997-98.

Financial Crisis of 1997-98 and the Negative Feedback Loop among Asset Prices, Financial Stability and Growth

The forbearance approach cost the economy dearly. The East Asian economic crisis and the consumption tax rate hike in 1997 became a trigger for a serious financial crisis in 1997-98. A medium sized securities company, Sanyo Securities, went under in November 1977 and defaulted on call market loans for the first time in the post war period. A panic ensued in the financial system and led to a series of bank/ securities company bankruptcies. This was Japan's "Lehman" moment. Figure 5 presents the behavior of the money market risk premium in Japan (3 month Bank Negotiable Certificate of Deposit rate minus 3 month Treasury bill rate) and in the U.S. (3 month LIBOR over 3 month Treasury bill rate) after the bubble burst.⁹ The risk premium increased sharply right after property and stock prices started to fall in the U.S. In contrast, it was not until late 1997/early 1998 that the premium rose sharply in Japan. Despite the buildup of bad loans, banks had still been lending to each other and to non-financial firms, as shown in Figure 4, until sometime in 1997. The government finally decided to inject capital into banks in the spring of 1998 and again in early 1999. The capital injection speeded up the pace of bad loan disposal, as shown in Figure 4.

⁷ Another reason for slow bad loan disposal was opposition to speedy disposal by the tax authority. Until 1997, when own assessment of bad loans by banks was introduced, banks had to go through tough negotiations with the tax authority regarding their treatment of bad loans. This was because bad loan disposal immediately or eventually generated consequences for tax revenues. See, for example, Nishikawa (2011) pp. 148-49.

⁸ Nishikawa (2011), pp. 137-38.

⁹ In the figure T+0 is set to equal June 2007 for the U.S. and January 1990 for Japan.

After the crisis banks intensified their effort at deleveraging. Bank loan growth became negative and did not come back to positive territory until the mid-2000s (Figure 4). Many researchers have found significant negative effects of the deterioration of bank balance sheets on business fixed investment.¹⁰ It may be seen in Figure 1 that investment in structures stopped declining briefly around 1997-98, but resumed a downtrend after that. Non-financial corporations increased savings to repay existing debt, which is the mirror image of the negative bank lending growth shown in Figure 3. Such efforts also intensified after 1998.¹¹

The picture that emerges from all this is one of negative feedbacks among asset prices, financial stability and economic growth. The negative feedback became more serious after the credit crunch of 1997-98. The long-term interest rate declined significantly during 1996-98 in the absence of any significant movements in the policy rate, as shown in Figure 6 below. Most likely, events during these years led to declines in growth and inflation expectations. In fact, various economic surveys point to declines in growth expectations in the late 1990s.¹² The decline in long-term interest rates during this period was larger than that of expected growth as indicated in such surveys, implying that inflation expectations fell as well.¹³ Moreover, when property prices are deflated by GDP, the variable had gone back to pre-bubble levels by the mid- to late 1990s, but continued to decline thereafter, confirming the possibility of negative interaction between growth and asset prices.¹⁴ All this had prolonged the deleveraging process, as was seen in Figure 3.

In passing, we may note that a reason for the forbearance approach can be found in Figure 5, that is, the absence of a serious financial panic until late 1997. In contrast, in the recent U.S. case the financial system exhibited serious instability almost immediately after the collapse of the property and credit market bubble. The difference

¹⁰ See Sekine (1999) and Kasahara, Sawada and Suzuki (2011).

¹¹ See Figure A1 in the on-line Appendix. The literature has not reached consensus as to whether the declines in bank loans were a demand side or supply side phenomenon. Koo (2009) emphasizes the importance of the demand side. Here, let me provisionally assume that both sides played roles.

¹² See Figure A3.

¹³ See Figure A2 where expected inflation is calculated by implied forward rates from the SWAP curve and growth expectations compiled by the Cabinet Office appearing in Figure A3. Although Figure A2 suggests that medium to long-term inflation expectations fell in advance of deflation, it does not seem to support the Benhabib et al (2001) story that an exogenous emergence of deflationary expectations was a cause of a zero interest rate and deflation. Inflation expectations in the figure are mostly positive and their declines in 1996-98, as argued in the text, seem to have been a result of developments in the economy.

¹⁴ See Figure A3.

was due to that of the structure of the financial system. Table 1 compares the financial structure of the Euro Area, Japan and the U.S. The U.S. is clearly an outlier with a large weight of the “others” component, which is mostly market oriented financial institutions. In a market oriented financial system, stresses spread across the system swiftly and the financial authorities are obliged to respond. This seems to be the major reason for the differences in the speed of authorities’ response to the financial crisis between the three areas. Of course, other factors played roles as well. The U.S. authorities may have learned from Japan’s mistake and/or had more accurate recognition of the state of the financial system and the economy. For example, the BOJ’s official economic report did not recognize the negative interaction between financial factors and the real economy until the fourth quarter of 1993.¹⁵

Financial Factors and Declines in Productivity

The literature on Japan’s stagnation has pointed out another aspect of negative interaction between financial stability and the economy. Using firm-level data, Fukao and Kwon (2006) present a striking result that the productivity level of exiting firms was higher than that of staying firms in many industries during 1994-2001. Nishimura, Nakajima and Kiyota (2005) show similar results, but also point out that such a tendency was more salient during years of Japan’s banking crisis, that is, the late 1990s. Peek and Rosengren (2005) go further by showing that Japanese banks allocated credit to severely impaired borrowers in an attempt to avoid the realization of losses on their own balance sheets—another manifestation of the forbearance attitude. Such works point to the distinct possibility that impaired bank balance sheets lowered the efficiency of financial intermediation and led to declines in economic growth. They also provide a bridge between the literature emphasizing reduced productivity growth and the works that focus on financial factors.¹⁶

¹⁵ One thing the U.S. authorities may not have learnt from the Japanese experience is systemic risk implications of a bankruptcy of investment banks. In Japan’s case the failure of securities companies led to a systemic crisis. Something similar could have been foreseen of the failure of Lehman Brothers.

¹⁶ Some authors, including Ogawa and Suzuki (1998), analyze the role played by the use of land as a device to alleviate information asymmetry between lenders and borrowers. They show that firms increasingly relied on the use of land as collateral in the 1980s as land prices soared, which was one of the reasons for the sharp rise in business fixed investment during the period. Conversely, the decline in land prices since the early 1990s exerted strong negative effects on investment through this route—providing yet another channel of negative interaction between asset prices and

Thus, the economy has increasingly lost dynamism and expectations of low growth and deflation have become entrenched. As a result, the financial crises originating in foreign economies since the late 1990s have adversely affected the economy perhaps more seriously than other economies. The expectation of declines in population has affected housing and business fixed investment negatively. In this environment the BOJ's attempts to stimulate the economy have not had much of a success at least so far. I now turn to this topic in the next section.

2, Addressing Financial Instability and Deflation: The BOJ's Experience

Use of Conventional Monetary Policy

In the following I first review the BOJ's experience with the use of the conventional policy tool, the overnight rate, and then move on to discuss the more recent experience with non-conventional monetary policy measures. Figure 6 presents the movements in the overnight rate in Japan and the U.S. along with the 10 year JGB yield. The overnight rates in nominal terms as well as the real rates calculated using ex-post core CPI inflation are shown. The horizontal axis is the time elapsed after the start of the collapse of the stock market bubble.

First, it is noteworthy that the BOJ was still raising rates even after stock prices started to decline sharply; the last rate hike came on August 30, 1990, when Nikkei 225 was already 33% below its peak.¹⁷ Clearly, the BOJ was not concerned much with possible negative consequences of a sharp fall in asset prices for the financial system and the economy at this point.

The BOJ started to lower the policy rate in 1991. By the second half of 1995 the rate had been brought down to less than 0.5%. Even these 800 basis point cuts in the overnight rate did not turn the economy around. The behavior of the real policy rate suggests that the BOJ was cutting the nominal rate faster than the speed with which inflation fell, providing stimulus to the economy.¹⁸ The decline in the real rate, however, came to a halt and started to move upward in the late 1990s as the deflationary trend set in. We see here clearly the severe constraint the ZLB placed on monetary policy. Since then, the nominal policy rate has been in the [0%, 0.5%] range for more than a decade

the real economy.

¹⁷ More precisely, the call market rate became the policy rate in 1995, while before that the official discount rate was the rate that was regarded as representing the stance of monetary policy. August 30, 1990 is the date when the discount rate was raised.

¹⁸ Otherwise, the real interest rate would rise and exert negative effects on the economy.

and a half.

The behavior of the nominal and real federal funds rate in the same figure shows that the Fed has reacted to the current financial crisis much more rapidly than did the BOJ in the 1990s. The policy rate was brought down to near zero within one and a half years of the start of the crisis. Given that inflation is still positive, the real rate has been sharply negative. In contrast, the real policy rate was never below -0.5% in Japan in the 1990s. This is surely one of the reasons why the U.S. has avoided deflation so far.

What if the BOJ had embarked on a much more aggressive rate cut in the early 1990s bringing the real rate down to around -2% by 1992 or 1993? It would have surely stimulated the economy significantly more than the actual policy adopted at that time and possibly weakened the tendency for the yen to appreciate toward the mid 1990s, although the precise magnitude of such effects is difficult to estimate. In reality, however, policymakers' goal at that time seems to have been avoiding the resurgence of asset price bubble. There was no immediate stress felt in the financial system except the declines in land and stock prices—which were a “good” thing. In contrast, the financial crisis of 2007-08 was an important factor behind the Fed's aggressive rate cuts. Such a discussion raises the important question of the role financial stability considerations should play in the determination of the policy rate. I do not have space to get into that, and confine myself to pointing out the literature that gives an important role for financial stability.¹⁹

In concluding the discussion of conventional monetary policy, it would be appropriate to consider the reason for the failure of near zero policy rates to stimulate the economy adequately. First, due to deflation, the real policy rate has been positive, roughly in the zero to one and a half percent range since the mid-1990s, although it has not become sharply positive. Second, deleveraging forces as discussed in the previous section have undermined the stimulus provided by such low rates. Banks have been tightening credit standards in making loans. Non-financial corporations have either been forced by banks or tried hard themselves to repay debt. Given expectations of declines in future property prices, not too many have borrowed money and bought properties. Third, as the period of low interest rates has become protracted, the incentive to move forward future investment to take advantage of low interest rates has diminished. Thus, the interest rate elasticity of spending has declined, lowering the effectiveness of monetary easing.

Use of Non-conventional Monetary Policy Measures

¹⁹ See, for example, Curdia & Woodford (2010).

Given the ZLB and the persistent deflation, the BOJ has adopted many non-conventional monetary policy measures since the late 1990s. The review of the measures is interesting in itself, but is also important in the light of similar measures adopted by other central banks in developed economies since 2007. In the following I first offer a conceptual typology of the measures and then a discussion of the effectiveness of the measures.²⁰

Monetary easing measures that can be adopted near the ZLB may be classified as follows: (A) forward guidance—providing assurance to the market that the policy rate will be lower in the future than currently expected; (B) changing the composition of the central bank's balance sheet so as to increase the central bank's holdings of non-traditional assets (targeted asset purchases); and (C) expanding the size of the central bank's balance sheet beyond the level required for a zero policy rate (Quantitative Easing: QE).

In order to affect market expectations of future short rates under strategy A, the central bank needs to commit to monetary easing even after the economy no longer requires it. Then, the current market rates will be lowered up to a certain maturity, but raised beyond that maturity because unnecessary easing in the future creates an expectation of rising inflation. As such, however, the central bank has an incentive to renege on the commitment *ex post*—one of the weaknesses of the strategy.

Strategy B may be further decomposed into two types: one, purchases of assets in distressed markets, and, the other, those in more normal markets. The first has sometimes been called credit easing and is aimed at containment of liquidity/risk premiums in markets under stress. Allen and Gale (2007) and Curdia and Woodford (2010) show that credit easing can be effective when there is a market failure in credit markets. Even targeted asset purchases in more normal markets seem to require some market imperfections such as investors' segmentation across maturities in government bond markets.

Many central banks, in their recent pursuit of strategy (B) since 2007, have not mopped up the funds supplied, thus giving the appearance that they have been pursuing QE.²¹ Thus, the distinction between the two strategies is a subtle one. In the following let us take QE to be the strategy to pursue expansion of the size of central bank balance sheet no matter what it buys, while with targeted asset purchases the focus is on what the central bank buys.²² Unfortunately, it is not easy to find theoretical justification of

²⁰ For more detail on these see Ueda (2012).

²¹ One exception has been the September 2011 Fed decision to buy long-term, and sell an equal amount of short-term Treasury bonds—an operations twist.

²² An alternative definition of QE is expansion of central bank balance sheet by

QE beyond that for forward guidance or targeted asset purchases. A simple reason for this is the following: if the economy is at the ZLB, it is satiated with liquidity. Hence, attempts to add liquidity further do not seem to produce significant results.

It is worth mentioning that many of the non-conventional measures work by lowering interest rate spreads and/or risk premiums. This is clear with forward guidance, which is an attempt to narrow long-short interest rate spreads up to a certain maturity, although it may widen the spreads beyond that maturity if it succeeds in raising inflation/growth expectations. Credit easing is, by definition, an attempt to reduce risk/liquidity premiums in markets that are temporarily dysfunctional. Asset purchases in more normal markets also is an attempt at lowering the risk premium of the asset bought with hopefully spillover effects on other assets through portfolio rebalancing. Such a consideration suggests that there are limits to how far non-conventional monetary policy measures can be used. Risk premiums cannot go below zero. Even at positive levels, if they fall below certain levels by a central bank move, the central bank is required to carry out large amounts of financial intermediation involving the asset in question. If prolonged, there will be a serious loss of efficiency of intermediation. Admittedly, these lower limits are not as well defined as in the case of the ZLB on the policy interest rate. It still seems appropriate to argue for the existence of loose lower bounds below which risk premiums cannot fall--Lower Bounds on spreads.²³ As we see below, the BOJ, with its extensive use of non-conventional measures, seems close to hitting these lower bounds.

The BOJ: 1999-2011

The BOJ has employed non-conventional measures in three waves. First, the so-called zero interest rate policy (ZIRP) was introduced in April 1999. The ZIRP was not just a zero policy rate, but a commitment to maintain it “until deflationary concerns were dispelled”, and thus was a major example of forward guidance.²⁴ In August 2000, the BOJ lifted the ZIRP and raised the overnight call market rate to 0.25 %.

The second wave came in the aftermath of the collapse of the IT bubble in 2001. The BOJ adopted the quantitative easing policy--let us call it QEJ, Japan's version of QE--in March 2001. QEJ contained all three components of non-conventional monetary policy. There was QE, that is, the shift of the operational target of policy from the call

purchases of traditional asset, say, treasury bills. See Ueda (2012).

²³ In the case of long-short interest rate spreads, these can become negative in general. When the short rate is at the ZLB, however, the spreads cannot become negativ.

²⁴ Some use the ZIRP to mean only a zero policy rate. Here it refers to the combination of a zero rate and the commitment to maintain it until deflation ends.

rate to the current account balances (CAB) at the BOJ, essentially, bank reserves. This framework was promised to be maintained until CPI inflation became stably positive (forward guidance). And, the BOJ increased the amount of purchases of Japanese Government Bonds (JGBs) from time to time to hit the target on the CAB—targeted asset purchases. The target on the CABs was increased from approximately 5 trillion yen at the introduction of QEJ in March 2001, an amount roughly 1 trillion yen greater than the then-required reserves, to a range of approximately 30-35 trillion yen in January 2004. QEJ was finally lifted in March 2006. The extent of the BOJ's balance sheet expansion was unprecedented at that time and is comparable to that of other central banks during the late 2000s.

Third, in response to negative spillover effects on the Japanese economy of the world financial crisis of 2007-09 the BOJ again resorted to many non-conventional measures. Thus, it started term fund supplying operations at 3 months at a fixed rate of 0.1% in December 2009, later extended to 6 months. Since October 2010, it has introduced the Comprehensive Monetary Easing Policy (CMP), the BOJ's version of targeted asset purchases, to buy commercial papers, corporate bonds, ETFs, REITs and long-term JGBs. The BOJ has explicitly stated that “the Bank will encourage the decline in longer-term interest rates and various risk premiums.” Forward guidance has also been used in a slightly weaker form than in the ZIRP or QEJ periods. Since 2007, no attempt has been made to target the size of the BOJ's balance sheet. Throughout the three phases, credit easing measures have been extensively employed to contain stresses in the financial system.

A few remarks on the non-conventional measures adopted by other central banks since 2007 are in order. Reflecting the severity of the credit/liquidity crunch, most central banks adopted credit easing measures that fit the characteristics of the stresses in the country. For example, the Fed lent to brokers and MMFs; the ECB bought covered bonds. No central bank has created a target on a measure of the liability side of its balance sheet, while most central banks have adopted targeted asset purchases whereby a specified set of assets has been bought up to pre-determined amounts. The forward guidance approach has been used by the Fed and the Bank of Canada, but in a much weaker form than the BOJ during 1999-2006. These features seem to reflect the judgment on the effectiveness of the measures adopted by the BOJ in earlier periods, to which I now turn.

Evidence on the Effectiveness of the BOJ's Measures

Given Japan's persistent deflation and sub-par economic growth, one might think

that the measures adopted by the BOJ have had no effects on the economy. This is certainly not the case. Among other things, various credit easing measures have contained risk premiums and prevented the financial system from falling apart. For example, Baba, Nakashima, Shigemi and Ueda (2006) and BOJ (2009) find that the BOJ's fund supplying operations reduced money market risk premiums almost to zero. This can be seen informally in Figure 5 where the money market risk premium has been kept at very low levels with only two exceptions, one, during Japan's credit crunch (1997-98, i.e., T=7,8) and, the other, right after the Lehman shock (T=18, 19).

More formally, Table 2 presents the response of asset prices to some of the major policy measures adopted by the BOJ during the two day window following the announcement of the measures.²⁵ In the table, the measures are classified into three types, A (forward guidance), B (targeted asset purchases) and C (pure QE), according to the typology offered above. Entries in columns 3 to 5 show the number of times the measures moved the asset price in the expected direction. The results indicate that many of the measures lowered the 10 year JGB yield, with some also raising Nikkei 225. One puzzle is that they did not have strong effects on the yen/dollar rate.²⁶ Perhaps, the market realized that the BOJ was closer to the limit of non-conventional monetary policy than were other central banks. Another characteristic of the table is that strategy C, mere expansion of the BOJ's balance sheet, seems less effective than the others, conforming to the theoretical prediction offered above.

Intuitively, the difficulty with finding significant effects of strategy C may be appreciated from the failure of huge expansions in the balance sheet of major central banks to stimulate their economies in any significant ways.²⁷ The BOJ had the largest balance sheet in the late 1990s to mid-2000s, but failed to stimulate the economy adequately. The BOJ's exit from QEJ created a sharp fall in its balance sheet, but the economy kept expanding at a moderate rate. None of the balance sheet expansion by four major central banks since 2007 have generated as large an effect on output and prices as the size of the expansion suggests.

Analyses employing more sophisticated methods also find significant effects of strategies A(forward guidance) and/or B(targeted asset purchases).²⁸ Not too many,

²⁵ Such an analysis is motivated by the prevalence of a similar approach, the news analysis, to evaluate the measures adopted by the Fed. See Ueda (2012).

²⁶ One important exception, not included in the table, is large scale foreign exchange market interventions carried out by Japan's Ministry of Finance during 2003-04. These were effectively an example of targeted asset purchases.

²⁷ Figure A4 shows the size of central bank balance sheet relative to GDP for the Euro Area, Japan, the U.K. and the U.S.

²⁸ See, for example, Okina & Shiratsuka (2004), Bernanke, Reinhart & Sack (2004),

however, have found significant effects of Strategy C (pure expansion of central bank balance sheet).²⁹ To summarize, the effects of the BOJ's non-conventional monetary policy measures have been non-negligible. Liquidity provision stabilized the financial system and forward guidance and/or targeted asset purchases lowered a range of interest rates and supported the economy. This may be the major reason for the absence of acceleration in deflation. Unfortunately, however, the measures have fallen short of bringing inflation back into positive territory clearly.

Figure 8 shows all this in a slightly different manner. Movements in the JGB yield curve since the beginning of 1999 are plotted. It can be seen that the introduction of the ZIRP in April 1999 shifted the curve downward, and QEJ, implemented in 2001, shifted it further downward. Clearly, the two measures exerted more long-lasting effects on interest rates than for just two days as was the case in Table 2. These, however, failed to affect medium-term growth and/or inflation expectations positively; hence, the downward shifts of the entire curve rather than those of a left portion of the curve only.³⁰ As argued above, the forward guidance strategy, if successful, would lower expected future short rates up to a certain point in the future, but raise them beyond that. The second part did not materialize. One exception was a brief period following the introduction of QEJ. As shown in Figure 8, the 10 year JGB rate declined sharply on the day of the introduction of QEJ. Starting on the next day, however, the rate moved upward and this continued for about a month. Stock prices also moved upward for one and a half months, both seem to have been a favorable response to QEJ. Such responses, however, soon gave way to weakness in the economy and asset prices came back to pre-QEJ levels.³¹ The effects on expectations were only temporary. This seems to have been a result of the adoption of the move after expectations of low/negative inflation became entrenched.

The forward guidance strategy is more useful if it is introduced when

Baba et al. (2006) and Oda & Ueda (2007).

²⁹ One exception is Honda, Kuroki & Tachibana (2007) who find, using VAR analysis, that an expansion of the CAB exerted significant effects on stock prices and in turn on output. Given the methodology, however, it is unclear which aspect of QEJ generated such effects. The analysis also does not include a variable representing changes in perceptions about the stability of the financial system and hence runs the risk of picking up spurious correlation between money and output.

³⁰ The picture does not change if implied forward interest rates are used in place of long-term rates. For example, 10 year forward 10 year has been stable at around 3% since 1998. There is a weak negative trend in 10 year forward 20 year in the 2000s.

³¹ It is interesting to note that the response of interest rates and stock prices in the U.S. to the Fed's QE2 during 2010-2011 was very similar to Figure 8, although the period of favorable response was longer.

expectations exist that the economy will be out of the liquidity trap before long. Then, the promise of “unnecessary monetary easing” after the economy is out of the trap affects current inflation expectations more. Unfortunately, strategy A was first used in 1999 when inflation was already negative. QEJ came in 2001, after more than three years of deflation.

Faced with the difficulty of affecting expectations on a sustained basis, the BOJ has had to reduce risk premiums and long-short interest rate spreads in many parts of the financial system, increasingly hitting the “lower bounds on spreads”. Figure 7 shows that as of September 2011 the yield curve has virtually no room downward to the left of the 5 year maturity. Even the 30 year rate is below 2%. While the precise magnitude of the room left for these rates to decline is difficult to determine, one cannot escape the impression that they are close to lower bounds. To repeat, they are as low as these levels because of the protracted stagnation in the economy and repeated application of non-conventional monetary policy measures. As rates and spreads come close to their lower bounds, they have started to affect the incentive of private financial institutions for financial intermediation negatively. Rates having been low for such a long time, borrowers of funds are in no hurry to take advantage of low rates. Thus, the economy has been stuck in a low inflation, low interest rate equilibrium.

The lesson here is that central banks are advised to use even non-conventional monetary policy measures before deflationary expectations become entrenched. Otherwise, expectations of deflation and low growth can significantly undermine the effectiveness of such measures. A case in point is the spillover of developed market monetary easing during 2009-2011, especially the Fed’s non-conventional monetary easing, into emerging market economies and commodity markets where deleveraging forces were very weak.

Concluding Remarks

This paper has analyzed Japan’s economic stagnation during the last two decades and the BOJ’s failure to turn it around. The stagnation originated in the deleveraging process after the burst of Japan’s asset price bubble. The unprecedented extent of the excesses during the boom led to the severity of deleveraging. The process, however, has become more protracted due to the failure of monetary authorities to act at early stages. The government should have re-capitalized banks in the early to mid-1990s. Some of the BOJ’s rate increases in the early 1990s may have been unnecessary, and rate cuts in the early to mid-1990s could have been more aggressive. As a result, the economy experienced a severe financial crisis in 1997-98 and a negative feedback loop developed

among asset prices, financial stability and growth. Deflation, if mild, ensued in response and constrained the BOJ's ability to stimulate the economy through conventional and non-conventional monetary policy measures.

In contrast, the U.S. monetary authorities reacted promptly to developments since 2007. The Fed lowered the Federal Funds rate to virtually zero within one and a half years of the onset of the financial crisis and has adopted various non-conventional monetary policy measures as well. U.S. banks were re-capitalized in late 2008. Thanks to these, the financial system has resumed stability to a certain extent and inflation has stayed in positive territory.

It has to be noted, however, that the prompt responses of the U.S. authorities owed much to the market based nature of the U.S. financial system and the immediate manifestation of financial stresses after the burst of the property and credit bubble as well as to their learning from the Japanese experience.

The U.S. economy, however, is still far from having recovered fully from the financial and economic crisis of 2007-09. Households are still deleveraging and property prices seem to be at critical levels. Figure 1 shows that U.S. property prices relative to the previous peak are now roughly at levels where Japanese land prices were in the mid- to late 1990s, just when the negative feedback loop became more significant.³²

Judging from Figure 7, traction left of the Fed's non-conventional monetary policy seems roughly equal to that of the BOJ in the late 1990s as far as the government bond market is concerned, while there is probably some more room for action elsewhere, for example, in the RMB market. This may or may not be enough to counteract possible negative forces coming from further deleveraging or other external shocks such as instability in the Euro area.

One lesson from the Japanese experience is that the Fed should not worry too much about inflation when using the remaining traction of non-conventional measures. Take the forward guidance approach as an example. As stated earlier, the approach stimulates the economy by promising to keep interest rates low even after the economy recovers significantly. This necessarily means that either the central bank has raised the inflation target or is ready to allow the inflation rate to overshoot the target temporarily. The central bank is thus accepting some inflation risk in return for lowering deflation risk. Hence, central banks' usual concerns for inflation could become a deterrent to the effective functioning of such a strategy. Acting along these lines is difficult for the Fed, given the still high levels of inflation. Sometimes, however, decision has to be made

³² See also Figure A1.

about what risk one wants to minimize. The BOJ's behavior in this respect was rather halfhearted. It introduced a forward guidance approach in early 1999, promising that a zero rate would be kept until deflationary concerns were dispelled, which should have meant targeting a positive inflation rate. It exited from the framework, however, in August 2000 when core inflation was -0.5%. Deliberations within the BOJ on the "meaning of price stability" later that year were not able to determine whether price stability meant a zero inflation or a positive inflation.³³ Such confusion seems to have cast a dark shadow on its communication policy in subsequent periods³⁴.

³³ See BOJ (2000).

³⁴ The BOJ exited from QEJ in March 2006 with a core CPI inflation rate of -0.5% despite the promise of the continuation of QEJ until "inflation is stably positive." This is partially explained by the possibility that the BOJ had attached more importance to headline inflation than its core. But headline inflation was -0.3% in August 2000 and 0.1% in March 2006. (In Japan headline inflation means ex-energy and core, ex-energy-food.) The BOJ later defined price stability more explicitly to mean 0% to 2% with 1% being the preferred level for many board members.

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**Table 1 Financial Assets/Liabilities of Financial Intermediaries
in 2001: % in total**

	Japan	US	Euro Area
Depository Corporations	59	25	60
Insurance and Pension Funds	18	28	13
Others	23	47	27

Source: Flow of Funds: The Bank of Japan

**Table 2 The effects of the BOJ's non-conventional measures
on asset prices**

Type of measure	# of times adopted	Nikkei 225	10 yr JGB	Yen/Dollar
A	2	2	1	1
A,B,C	1	1	1	1
B,C	4	3	4	1
C	4	2	1	1
B	6	3	5	3

Notes: 1, The entries in the third to fifth columns are the number of times in which the measures moved the asset price in the expected direction during the two days following the policy change.

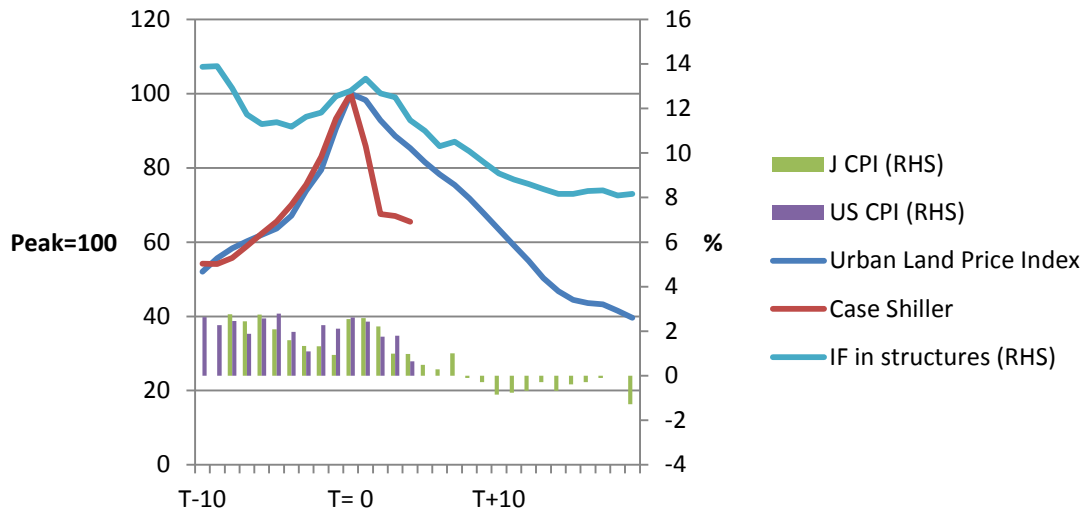
2, In the first column, A: forward guidance, B: targeted asset purchases, C: pure expansion of the BOJ's balance sheet.

3, The specific dates for the measure adopted are: the first row, 13/4/99, 18/12/09, the second row, 19/03/01, the third row, 14/08/01, 19/12/01, 28/02/02, 30/10/02, the fourth row, 30/04/03, 20/05/03, 10/10/03, 20/01/04, the fifth row, 19/12/08, 18/03/09, 05/10/10, 14/03/11, 04/08/11, 27/10/11.

4, The easing on 19/12/08 included a policy rate cut.

Data Source: Bloomberg

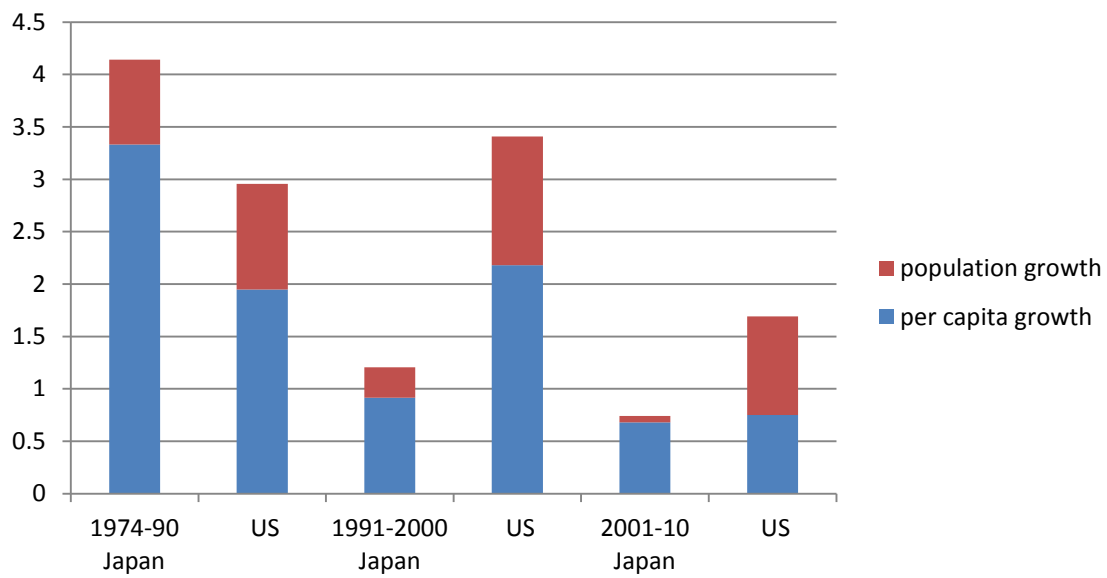
Figure 1 Property Prices and CPI Inflation in Japan & the U.S., and Japan's Investment in Structures/GDP



Note: T=0 corresponds to 1990 for Japan and 2001 for the U.S.

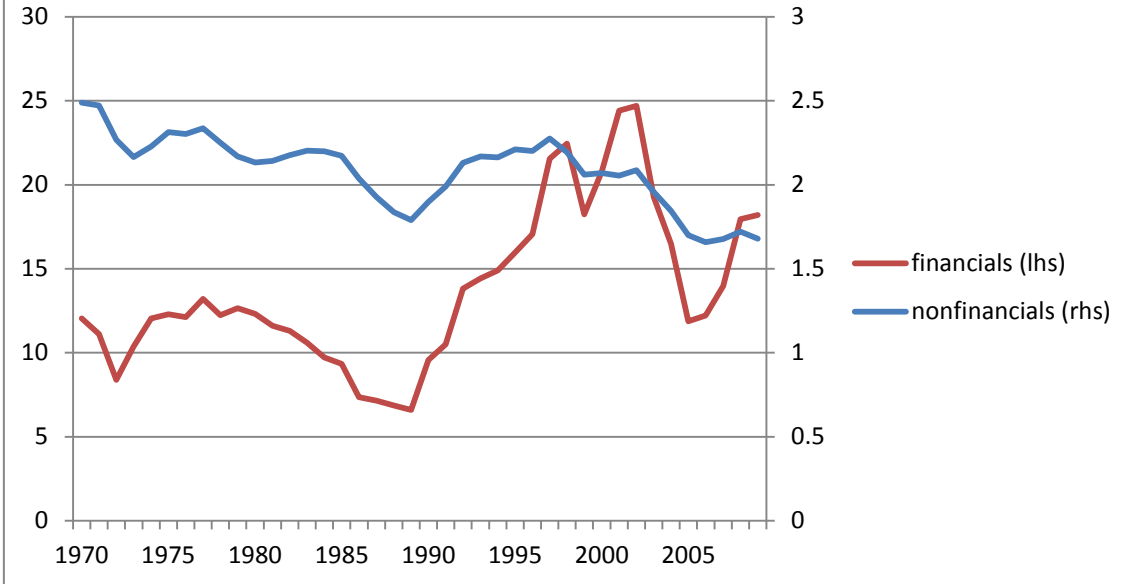
Source: Bloomberg, Nikkei Needs, Japan's National Income Accounts

Figure 2 Per capita RGDP and Population Growth Rates in Japan & the U.S.



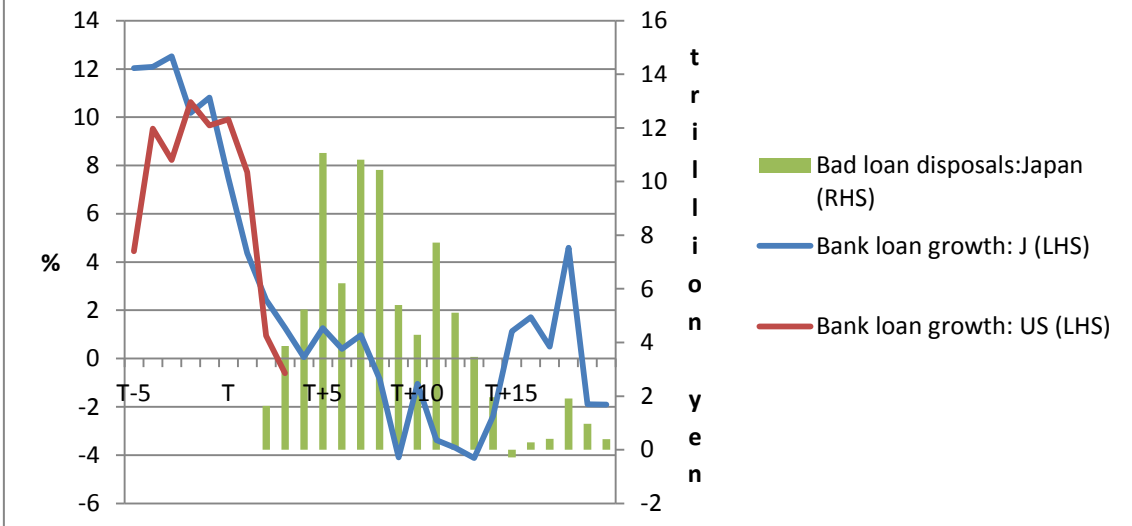
Source: Datastream

Figure 3 Leverage (at Market Value) for Japan's Financials and Non-Financials

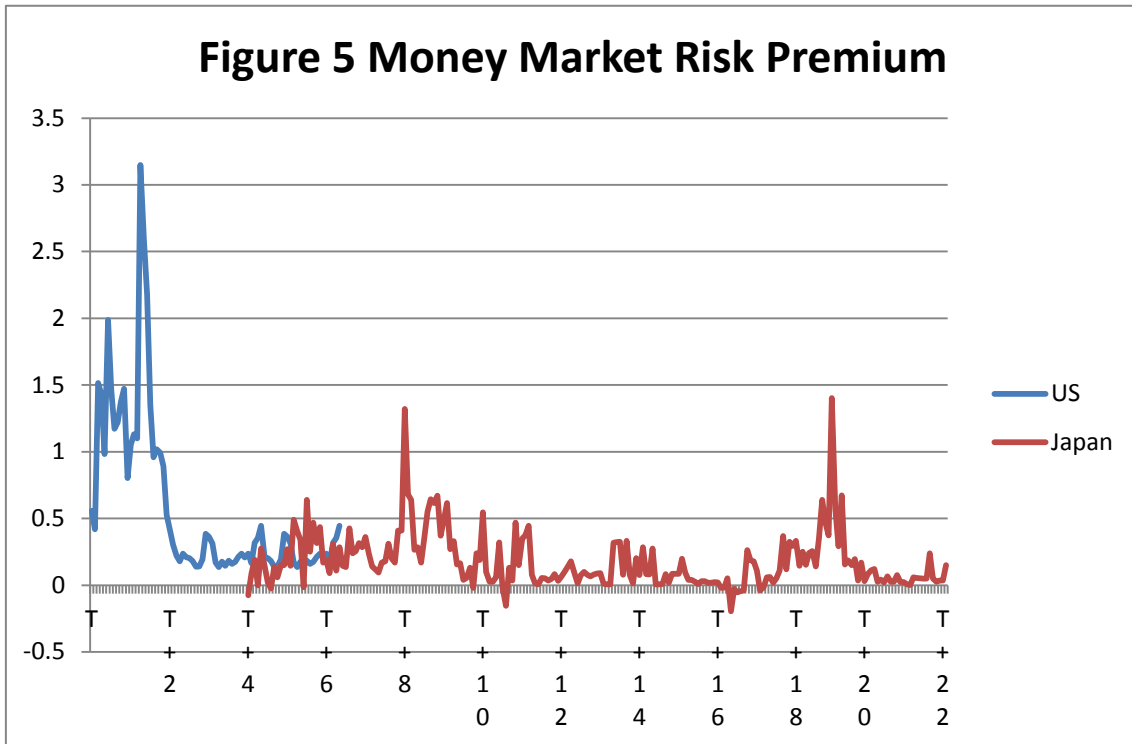


Source: National Income Accounts

Figure 4 Bank Loan Growth Rates in Japan & the U.S., and Bad Loan Disposals in Japan



Source: Datastream, Japan's FSA

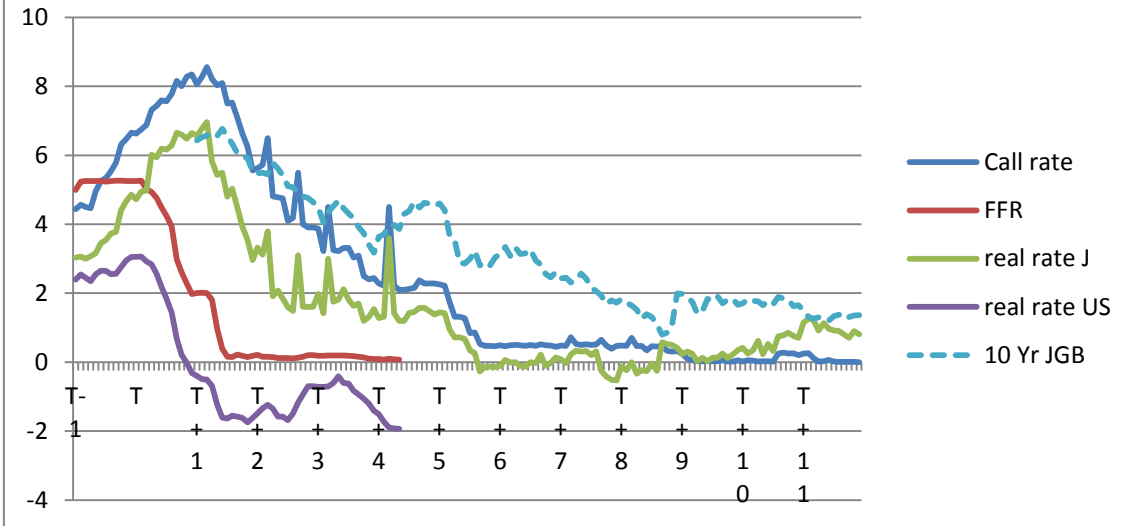


Notes: 1, The risk premium is 3 month LIBOR- 3 month Treasury bill rate for the U.S. and 60-90 day bank certificate of deposits – 3 month treasury bill rate for Japan.

2, T=0 stands for June 2007 for the U.S., and January 1990 for Japan.

Source: Bloomberg

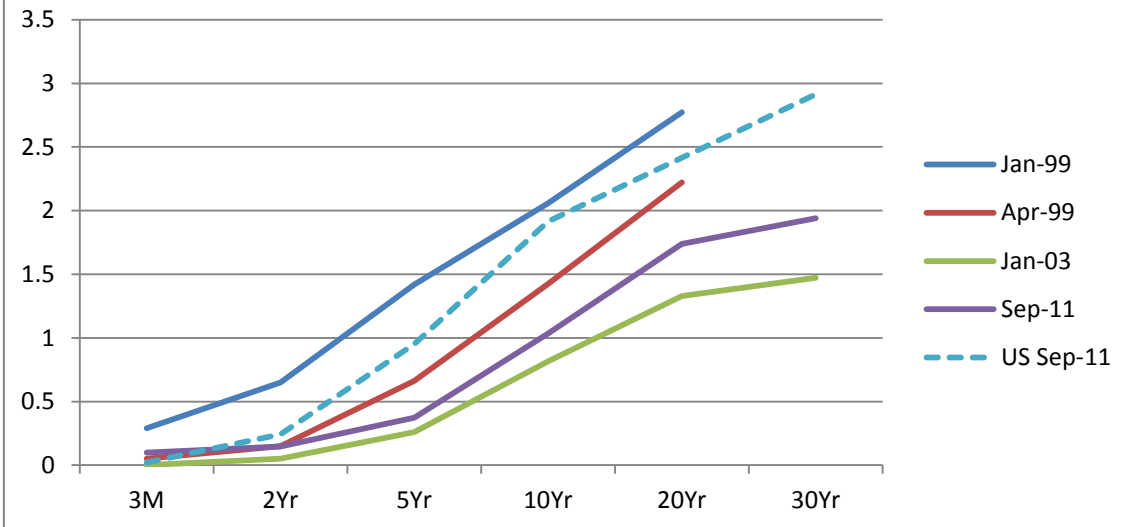
Figure 6 Real & Nominal Overnight Rates in Japan and the U.S. and the 10 Year JGB Yield



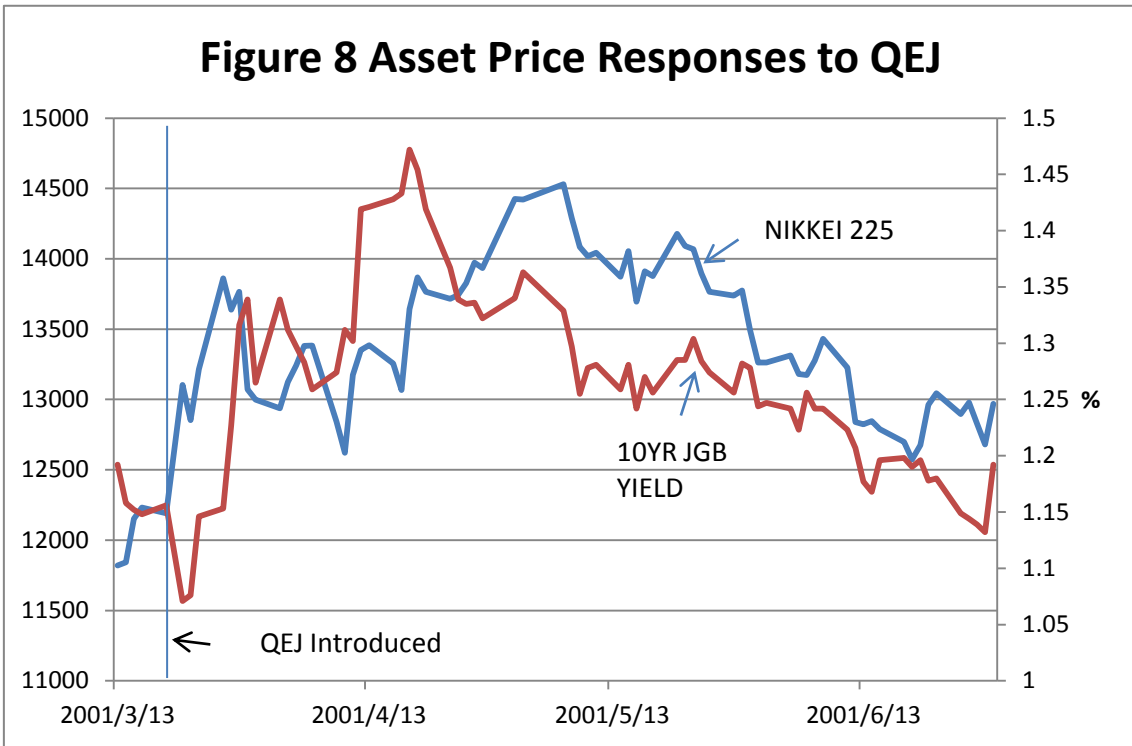
Note: T=0 stands for June 2007 for the U.S., and January 1990 for Japan.

Source: Bloomberg

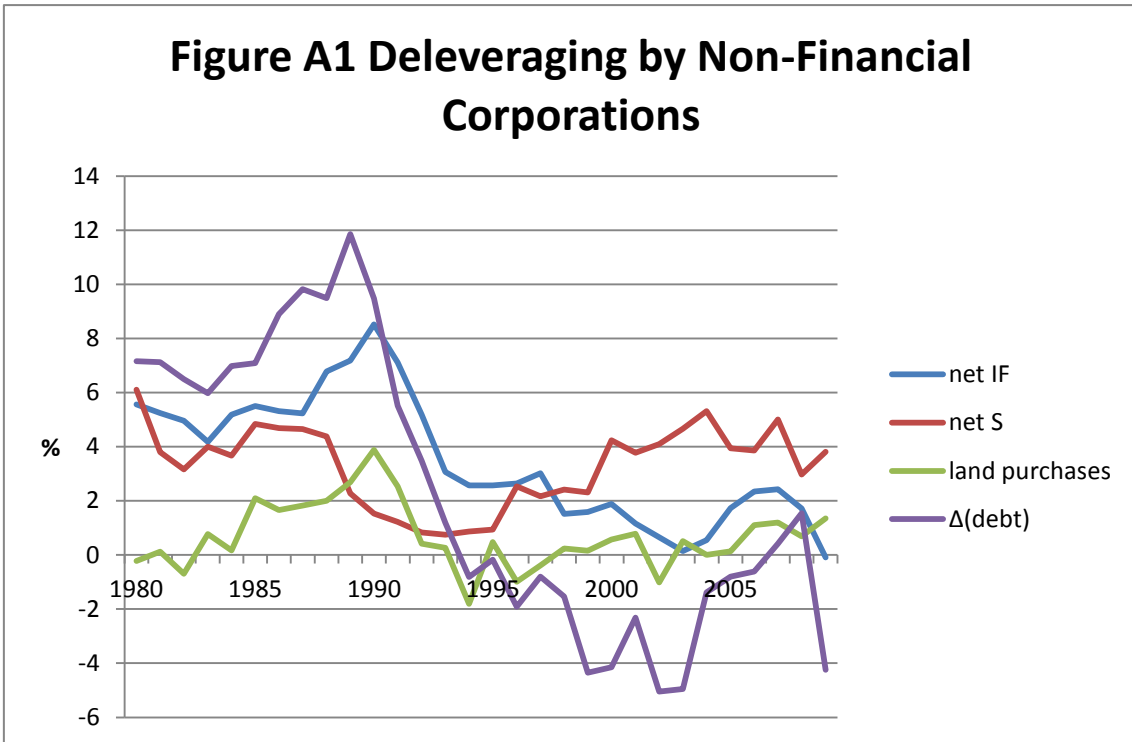
Figure 7 Movements in the JGB Yield Curve & the U.S. Treasury Yield Curve in 2011



Source: Bloomberg

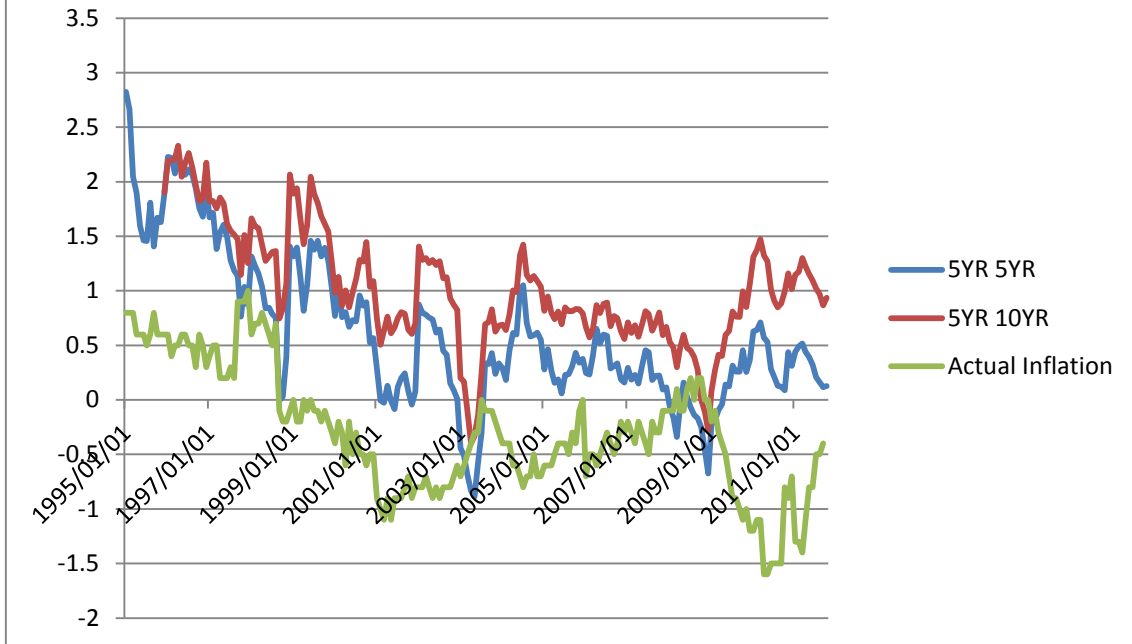


Source: Bloomberg



Source: Japan's National Income Accounts

Figure A2 Inflation Expectations in Japan

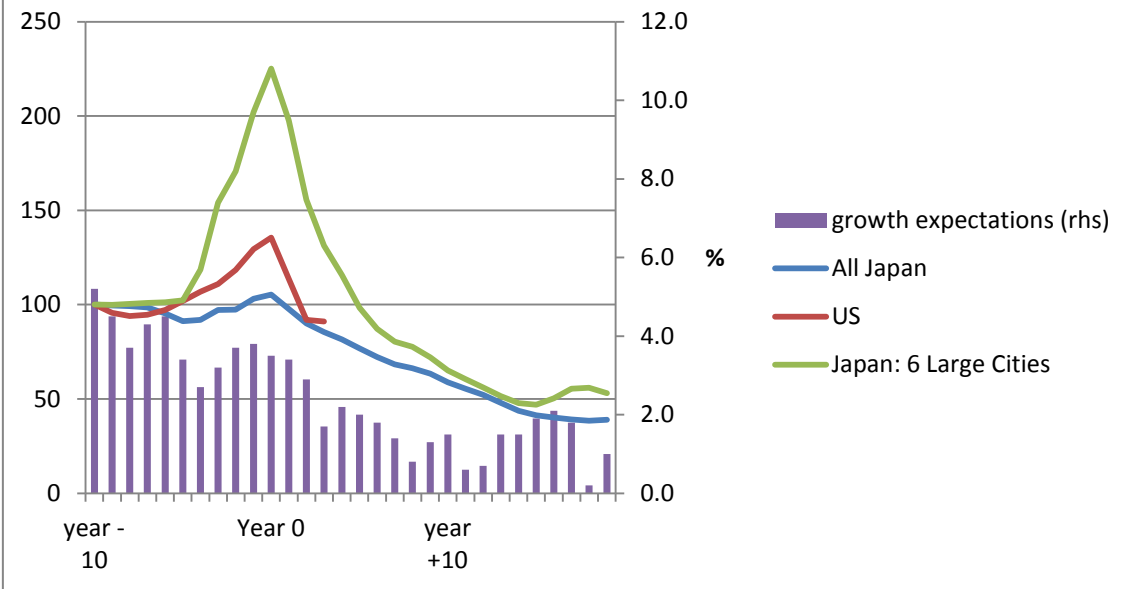


Notes: 1, Inflation expectations are calculated as implied forward interest rates from the SWAP curve – growth expectations in Cabinet Office’s survey.

2, 5YR 5YR uses 5 yr forward rates starting in the fifth year. 5YR 10YR uses 5 yr forward rates starting in the 10th year. Growth expectations are for the next 5 years and are assumed to be constant over the 12 months within each year.

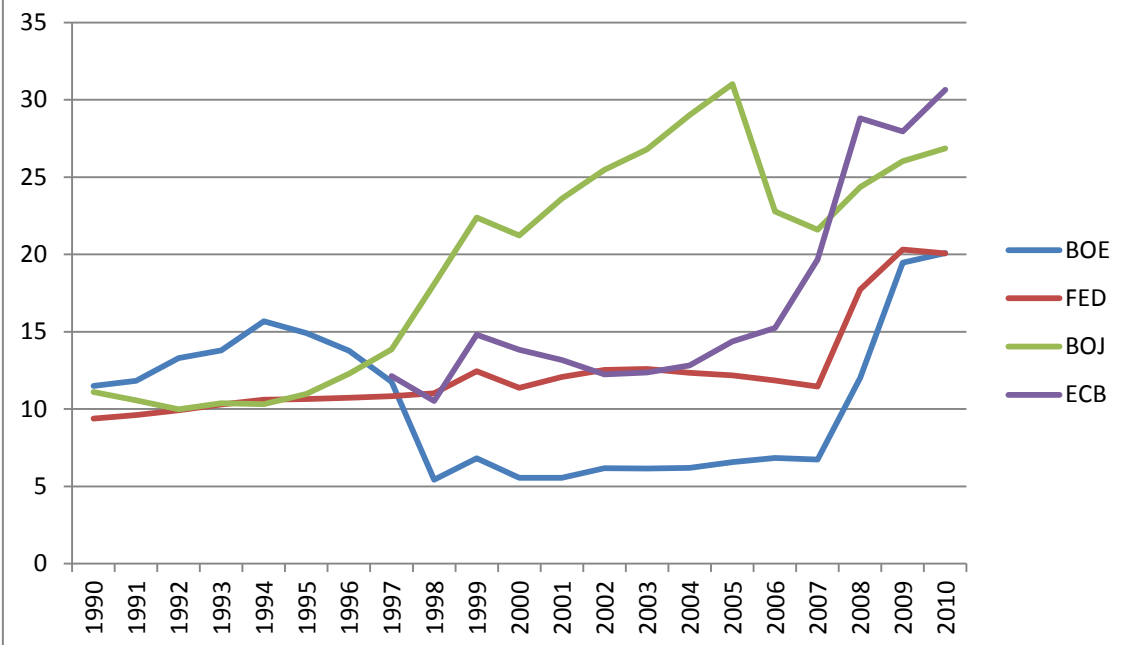
Source: Bloomberg. Cabinet Office.

Figure A3 Property Price-Income Ratios and Growth Expectations



Source: Bloomberg, Japan's Cabinet Office.

Figure A4 Central Bank Balance Sheets/ GDP



Source: Datastream